



# The Catalogue



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# Safety

for man and machine  
in **industry.**

Rely on our expertise and know-how in industrial safety.

You identify the requirements. We provide advice and develop convincing solutions. Economically. Reliably. From one source.

Complete safety systems. Perfect safety applications for the most demanding environments.

A spectrum of components with intelligent added-value advantages for your use. In breadth and depth.



**CANsafe** – a jump to the future.

Automation and safety in one Bus





# Systems and component solutions for **selected** industries.

Meet our industry specialists.  
They talk your language and understand your business.

We enjoy considerable success when building partnerships with our customers. We share development, idea-exchanges and knowledge to realise industry specific applications and systems.

We are particularly strong in

- Lift/Escalators
- Automobile production
- Packaging systems



Systems and component solutions  
for lift and escalators



Systems and component solutions  
for automobile production



Systems and components for  
Packaging machines/equipment

# We are only satisfied when you are.

Our service to you begins at the moment of first contact.

Thereafter we ensure all questions and enquiries are dealt with swiftly and accurately.

To do so we rely on our long experience, know-how, development capabilities and world-wide proven systems, application and components.



We ensure our products meet all applicable standards and legislation. Their cost-effectiveness is also a primary objective helping to minimise these concerns for our customers.

Our team is always on hand to provide competent advice and support for order processing, delivery enquiries and after-sales service.

Take us at our word and try our service for yourself. You will not be disappointed.



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Switches



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Sensors



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Enclosures



# Switches

## Plastic-bodied limit switches

## Metal-bodied limit switches

## Footswitches

Model	Page	Model	Page	Model	Page
 <b>C2</b> <b>Compact limit switches</b>	<b>10</b>	 <b>GC I &amp; II</b>	<b>30</b>	<b>Footswitches</b>	<b>54</b>
<ul style="list-style-type: none"> <li>• For confined spaces</li> <li>• Short contact travel</li> <li>• 6 switching versions</li> <li>• IP 30</li> </ul>		<ul style="list-style-type: none"> <li>• Very compact</li> <li>• Multiple contact options</li> <li>• IP 65</li> <li>• EEx certificated versions available acc. ATEX 100 a</li> </ul>		<ul style="list-style-type: none"> <li>• Contact configuration</li> <li>• Ordering instructions</li> </ul>	
 <b>TI2</b> <b>Compact limit switches</b>	<b>13</b>	 <b>SN 2</b>	<b>36</b>	 <b>Single pedal</b> <b>Types F1 &amp; F1 UN</b>	<b>56</b>
<ul style="list-style-type: none"> <li>• Compact design</li> <li>• Locking lid</li> <li>• 6 switching versions</li> <li>• IP 65</li> </ul>		<ul style="list-style-type: none"> <li>• 3 cable entries</li> <li>• Fixed/adjustable mounting</li> <li>• IP 65</li> </ul>		<ul style="list-style-type: none"> <li>• Available with or without guard</li> <li>• Heavy duty version available</li> <li>• IP 65</li> <li>• EEx certificated versions available acc. ATEX 100 a</li> </ul>	
 <b>I 88</b>	<b>17</b>	 <b>ENM 2</b>	<b>40</b>	 <b>Dual pedal</b> <b>Types F2 &amp; F2 UN</b>	<b>61</b>
<ul style="list-style-type: none"> <li>• DIN EN 50 047 compliant</li> <li>• Self-retaining snap lid</li> <li>• IP 65</li> </ul>		<ul style="list-style-type: none"> <li>• DIN EN 50 041 compliant</li> <li>• IP 65</li> <li>• EEx certificated versions available acc. ATEX 100 a</li> </ul>		<ul style="list-style-type: none"> <li>• Available with or without guard</li> <li>• IP 65</li> <li>• EEx certificated versions available acc. ATEX 100 a</li> </ul>	
 <b>Biggy</b>	<b>23</b>	 <b>D I</b>	<b>46</b>	 <b>Triple pedal</b> <b>Types F3 &amp; F3 UN</b>	<b>63</b>
<ul style="list-style-type: none"> <li>• Four mounting options</li> <li>• 2 lateral cable entries</li> <li>• IP 65</li> </ul>		<ul style="list-style-type: none"> <li>• Suitable for heavy duty applications</li> <li>• IP 65 (IP 43)</li> </ul>		<ul style="list-style-type: none"> <li>• Available with or without guard</li> <li>• IP 65</li> </ul>	
 <b>ENK</b>	<b>26</b>	<input type="checkbox"/> <b>Actuator selection table</b>	<b>50</b>		
<ul style="list-style-type: none"> <li>• DIN EN 50 041 compliant</li> <li>• Self-retaining snap lid</li> <li>• IP 65</li> <li>• EEx certificated versions available acc. ATEX 100 a</li> </ul>		<input type="checkbox"/> <b>Assembly instruction for turret head functions</b>	<b>52</b>		
		<input type="checkbox"/> <b>Accessories</b>	<b>53</b>		

## Safety switches

### CATEGORY 2: Safety switches with separate actuator

Model	Page
 <b>Plastic-bodied SKT</b> <ul style="list-style-type: none"> <li>Rotating head, 4 x 90°</li> <li>Small design</li> <li>IP 65</li> </ul>	<b>64</b>
 <b>Plastic-bodied SKI</b> <ul style="list-style-type: none"> <li>Rotating head, 4 x 90°</li> <li>Mounting acc. EN 50 047</li> <li>IP 65</li> </ul>	<b>66</b>
 <b>Plastic-bodied SKC/SK</b> <ul style="list-style-type: none"> <li>Triple coded actuator</li> <li>DIN VDE 0660 T 200 and IEC 947-5-1 compliant</li> <li>Tested to GS-ET-15</li> <li>IP 65</li> </ul>	<b>68</b>
 <b>ENK...VTU safety switch with separate actuator</b> <ul style="list-style-type: none"> <li>Plastic bodied</li> <li>8 actuating directions</li> <li>Mounting to EN 50041</li> </ul>	<b>72</b>
 <b>Metal-bodied ENM-VTW GC-VT</b> <ul style="list-style-type: none"> <li>Standard mounting</li> <li>IP 65</li> </ul>	<b>74</b>
 <b>Plastic-bodied interlock switches SLK</b> <ul style="list-style-type: none"> <li>Power to lock or unlock</li> <li>Rotating head, 4 x 90°</li> <li>IP 67</li> </ul>	<b>75</b>
 <b>Metal-bodied interlock switches SLM</b> <ul style="list-style-type: none"> <li>Power to lock or unlock</li> <li>Industry standard mounting</li> <li>IP 67</li> </ul>	<b>78</b>

## Safety switches

### CATEGORY 1: Safety switches for hinged guards

Model	Page
 <b>I 88 VKS/VKW</b> <ul style="list-style-type: none"> <li>Suitable for hinged lids/doors</li> <li>IP 65</li> </ul>	<b>88</b>
 <b>GC-VKS/VKW</b> <ul style="list-style-type: none"> <li>Suitable for hinged lids/doors</li> <li>IP 65</li> </ul>	<b>88</b>
 <b>I 88-AHDB</b> <ul style="list-style-type: none"> <li>Hinge operated</li> <li>IP 65</li> </ul>	<b>90</b>
 <b>ENM-AHZ</b> <ul style="list-style-type: none"> <li>Safety switch with personnel protection function in forward and reverse movement</li> <li>IP 65</li> </ul>	<b>91</b>
 <b>SHS Safety-Hinge Switch</b> <ul style="list-style-type: none"> <li>Integrates safety switch and load hinge</li> <li>Adjustable from 0–180°</li> <li>IP 67</li> </ul>	<b>92</b>
 <b>S/Si Rope Pull switches</b> <ul style="list-style-type: none"> <li>Plastic-bodied</li> <li>Metal-bodied</li> <li>IP 65</li> </ul>	<b>96</b>
 <b>SR Rope Pull safety switches</b> <ul style="list-style-type: none"> <li>EMERGENCY STOP function according to EN 60947-5-5</li> <li>Quick rope connection clamp</li> <li>Contacts: 2NC+2NO (standard)</li> <li>Visual rope tension and EMERGENCY OFF function</li> <li>Rope tension monitoring</li> <li>IP 67</li> </ul>	<b>102</b>

## Safety switches

Model	Page
 <b>SiRK Rope Pull safety switches</b> <ul style="list-style-type: none"> <li>Insulation encapsulated</li> <li>two-sided spanning (max. 2 x 75 m)</li> <li>IP 65</li> </ul>	<b>104</b>
 <b>Si2 Conveyor belt monitoring switch</b> <ul style="list-style-type: none"> <li>Misalignment detection</li> <li>IP 65</li> </ul>	<b>107</b>
 <b>SNA Emergency-stop button</b> <ul style="list-style-type: none"> <li>Tamper-proof</li> <li>According to EN 418</li> <li>Installation diameter 22.5 mm</li> <li>IP 65</li> </ul>	<b>108</b>
 <b>SCR Safety relay</b> <ul style="list-style-type: none"> <li>Control category 3 and 4 according to EN 954-1</li> <li>With extended output functions</li> <li>Up to 4 enabling paths</li> </ul>	<b>112</b>
<b>See sensor section</b>	<b>Electronic safety modules 202</b>

## Appendix

	Page
<input type="checkbox"/> <b>Rope Pull switch</b> <ul style="list-style-type: none"> <li>accessories</li> </ul>	<b>106</b>

# Plastic-bodied compact limit switches

## Combi C2

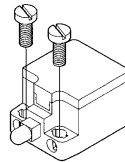
For confined spaces  
With two mounting options  
Protection class IP 30  
Hinged snap lid



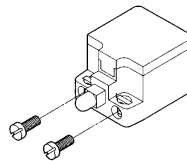
- Compact switches for safety or control applications
- 3 different contact configurations available as slow-action and snap-action
- All normally-closed contacts are positive break
- Two channel safety control possible
- Galvanically isolated terminals, type Zb
- Approvals UL, CSA, BG (pending)
- Rectangular cable entries (8.5 x 3.5 mm) for 4 x 1-mm<sup>2</sup> flexible lead
- 4 screw-type connections (M3,5) with self-lifting clamps
- PBT enclosure, glass-fibre reinforced, self-extinguishing UL 94-V0
- Lid, PC UL 94-V0
- 2 mm contact opening of slow-action system according to EN 81-1 for lift applications



### Mounting



a) 2 holes for M4 screws



b) 2 captive M3 nuts for end mounting (depending on type)

### Contact configuration

Switching element	Switch function	Switch contact	Designation	Voltage	Continuous current
Slow-action	changeover	1NC/1NO	U1Z	250 V	10 A
Snap-action	changeover	1NC/1NO	SU1Z	250 V	10 A
Slow-action	normally-closed	2NC	A2Z	250 V	10 A
Snap-action	normally-closed	2NC	SA2Z	250 V	10 A
Slow-action	normally-open	2NO	E2	250 V	10 A
Snap-action	normally-open	2NO	SE2	250 V	10 A



### Designation

#### Part number

Switching diagram

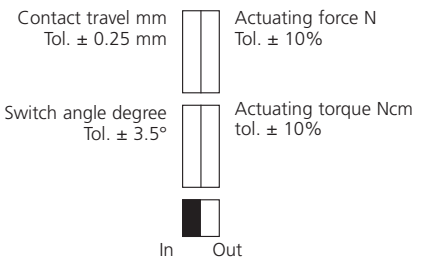
⊕ positive break according to IEC 947-5-1 Chap. 3

Za: changeover contact is not galvanically isolated

Zb: changeover contact is galvanically isolated

Slow-action contact/snap-action contact

Gasket inside (iw)/outside (w)



Voltage max.

Continuous current max.

Making current, acc. to IEC 947-5-1 AC 15/DC 13

Switching frequency max.

Mech. operational life – number of switching cycles

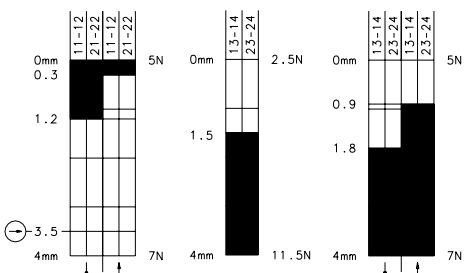
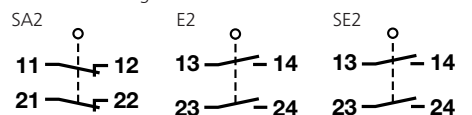
Ambient temperature min./max.

### Approvals

### Weight

Delivery: ex-stock/built to order

### Further switching functions



### Dimensions

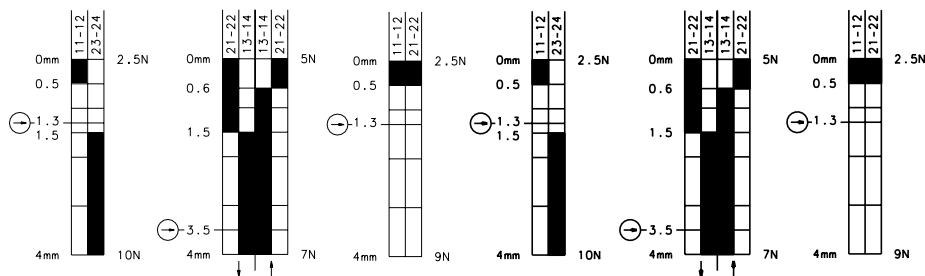
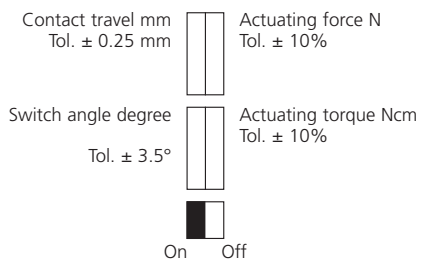
All dimensions in mm







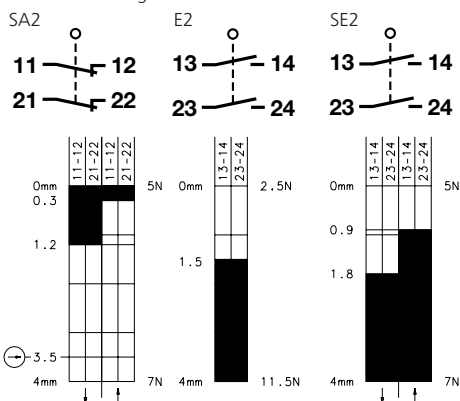
Designation	C2-U1Z R	C2-SU1Z R	C2-A2Z R	C2-U1Z o.M.+H	C2-SU1Z o.M.+H	C2-A2Z o.M.+H
<b>Switch part number</b>	<b>600.8116.013</b>	<b>600.8366.014</b>	<b>600.8816.015</b>	<b>600.8101.007</b>	<b>600.8351.008</b>	<b>600.8801.009</b>
<b>Actuator part number</b>	-	-	-	<b>391.0190.259</b>	<b>391.0190.259</b>	<b>391.0190.259</b>
Switching diagram						
⊕ positive break according to IEC 947-5-1 Chap. 3						
Za: changeover contact is not galvanically isolated						
Zb: changeover contact is galvanically isolated						
Slow-action contact/snap-action contact	●/-	-/●	●/-	●/-	-/●	●/-
Gasket inside (iw)/outside (w)	-/-	-/-	-/-	-/-	-/-	-/-



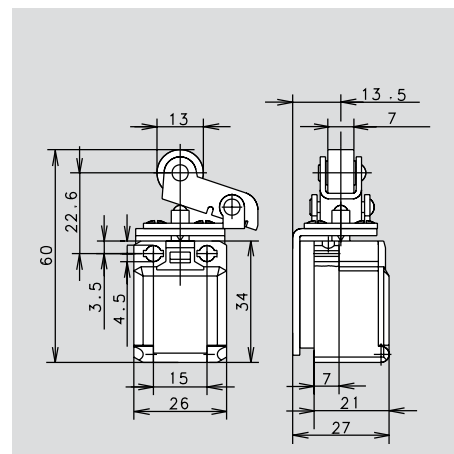
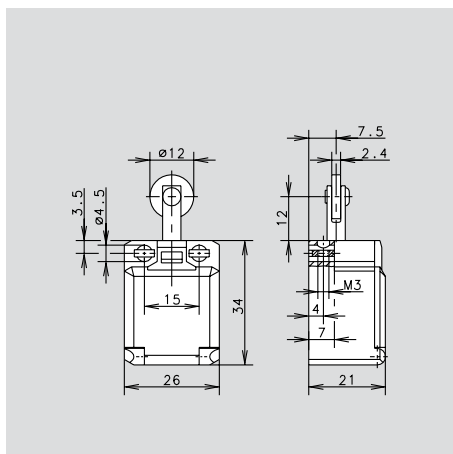
Voltage	max.	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC
Continuous current	max.	10 A	10 A	10 A	10 A	10 A	10 A	10 A	10 A
Making current, acc. to IEC 947-5-1 AC 15/DC 13		●	●	●	●	●	●	●	●
Switching frequency	max.	100/min.	100/min.	100/min.	100/min.	100/min.	100/min.	100/min.	100/min.
Mech. operational life – number of switching cycles		3 x 10 <sup>5</sup>	3 x 10 <sup>5</sup>	3 x 10 <sup>5</sup>	3 x 10 <sup>5</sup>	3 x 10 <sup>5</sup>	3 x 10 <sup>5</sup>	3 x 10 <sup>5</sup>	3 x 10 <sup>5</sup>
Ambient temperature	min./max.	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
		-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F

Approvals	UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA
Weight	0.02 kg	0.02 kg	0.02 kg	0.03 kg	0.03 kg	0.03 kg
Delivery: ex-stock/built to order	●/-	●/-	●/-	●/-	●/-	●/-

Further switching functions



Dimensions  
All dimensions in mm



## Plastic-bodied compact limit switches

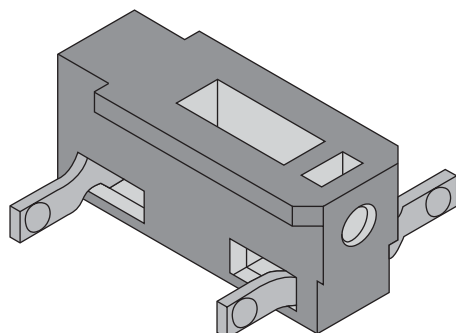
### Tiny Ti2

Compact design  
Protection class IP 65  
Mounting measurements according to  
DIN EN 50047  
Hinged snap lid

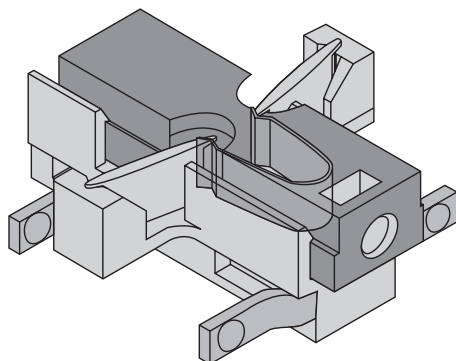


#### The switching system for C2 and Ti2

- Small hysteresis on the snap-action system
- Large variety of contact functions
- Optimized size utilising proven terminal technology
- Snap-action type prevents undefined status even with very slow actuation
- Compact switches for safety or control applications in protection class IP 65
- 3 different contact configurations available as slow-action or snap-action devices
- Positive break  $\ominus$
- Two channel safety monitoring possible
- Galvanically isolated terminals, type Zb
- Approvals UL, CSA, BG
- Cable entries M 16 x 1.5
- 4 screw terminals M3.5 with self-lifting clamps
- PBT enclosure, fiberglass reinforced, self-extinguishing UL 94-V0
- Lid, PA 6.6 UL 94-V0
- 2 mm contact opening of slow-action system according to EN 81-1 for lift construction
- Actuator mounting in 4 x 90°



Slow-action device

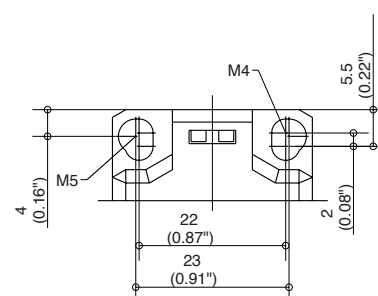


Snap-action device



#### Mounting

- adjustable mounting with two M4 screws (22 mm centres)
- fixed positioning with two M5 screws (23 mm centres) for safety applications



#### Contact configuration

Switching element	Switch function	Switch contact	Designation	Voltage	Continuous current
Slow-action	changeover	1NC/1NO	U1Z	250 V	10 A
Snap-action	changeover	1NC/1NO	SU1Z	250 V	10 A
Slow-action	normally-closed	2NC	A2Z	250 V	10 A
Snap-action	normally-closed	2NC	SA2Z	250 V	10 A
Slow-action	normally-open	2NO	E2	250 V	10 A
Snap-action	normally-open	2NO	SE2	250 V	10 A

# Plastic-bodied compact limit switches

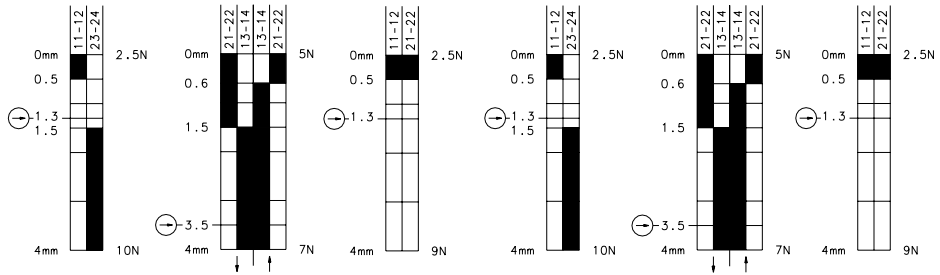
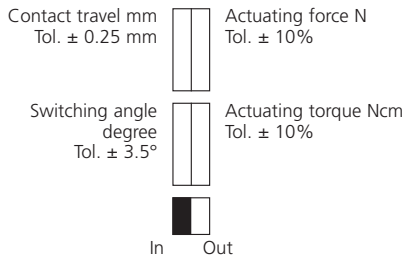
## Tiny Ti2

Compact design  
 Protection class IP 65  
 Mounting measurements according to DIN EN 50047  
 Hinged snap lid



Designation
<b>Part number</b>
Switching diagram
⊕ positive break according to IEC 947-5-1 Chap. 3
Za: changeover contact is not galvanically isolated
Zb: changeover contact is galvanically isolated
Slow-action contact/snap-action contact
Gasket inside (iw)/outside (w)

Ti2-U1Z w	Ti2-SU1Z w	Ti2-A2Z w	Ti2-U1Z RiW	Ti2-SU1Z RiW	Ti2-A2Z RiW
<b>608.8103.001</b>	<b>608.8153.002</b>	<b>608.8803.003</b>	<b>608.8117.007</b>	<b>608.8167.008</b>	<b>608.8817.009</b>
⊕ Zb	⊕ Zb	⊕ Zb	⊕ Zb	⊕ Zb	⊕ Zb
●/-	-/●	●/-	●/-	-/●	●/-
w	w	w	iw	iw	iw

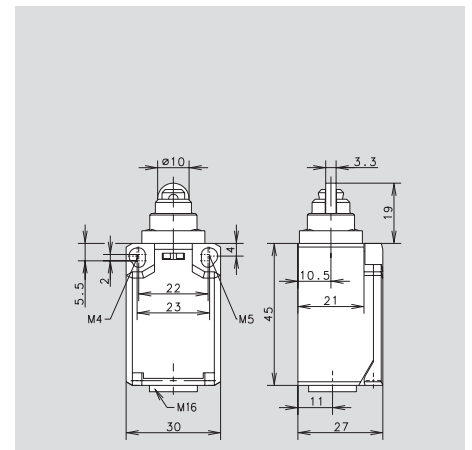
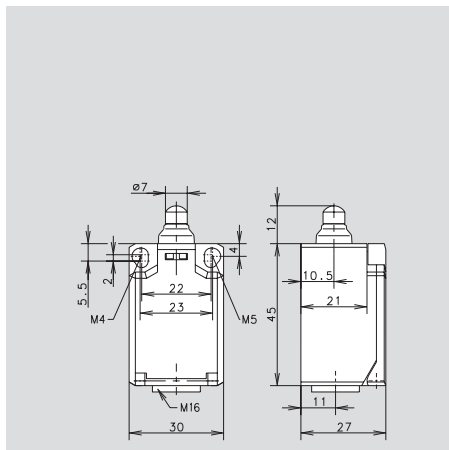
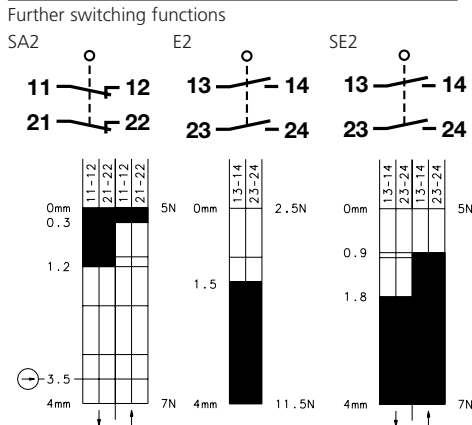


Voltage	max.
Continuous current	max.
Making current, acc. to IEC 947-5-1 AC 15/DC 13	
Switching frequency	max.
Mech. operational life – number of switching cycles	
Ambient temperature	min./max.

250 V AC	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC
10 A	10 A	10 A	10 A	10 A	10 A
●	●	●	●	●	●
100/min.	100/min.	100/min.	100/min.	100/min.	100/min.
3 x 10 <sup>5</sup>	3 x 10 <sup>5</sup>	3 x 10 <sup>5</sup>	3 x 10 <sup>5</sup>	3 x 10 <sup>5</sup>	3 x 10 <sup>5</sup>
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F

Approvals	BG, UL, CSA
Weight	0.04 kg
Delivery: ex-stock/built to order	

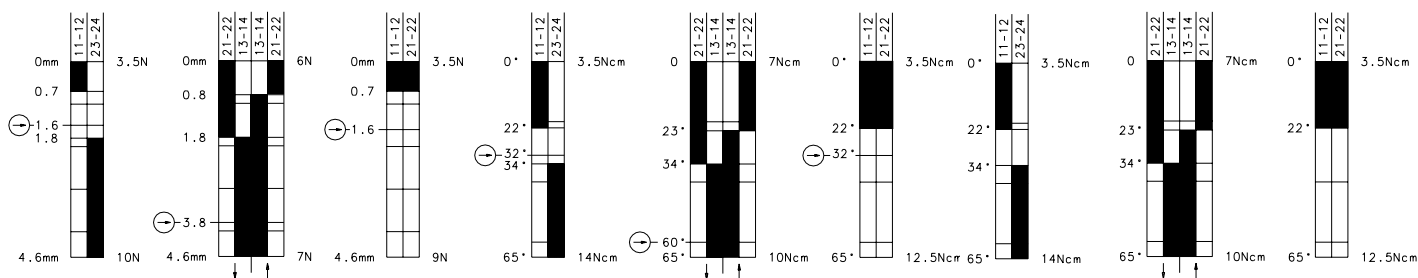
BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA
0.04 kg	0.04 kg	0.04 kg	0.05 kg	0.05 kg	0.05 kg
●/-	●/-	●/-	●/-	●/-	●/-



Dimensions  
 All dimensions in mm

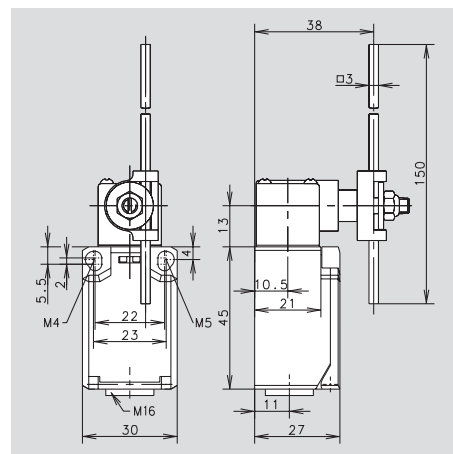
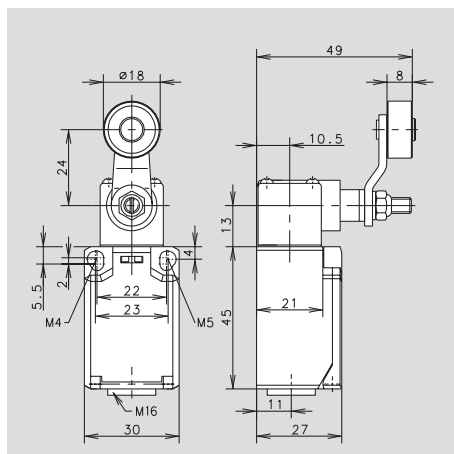
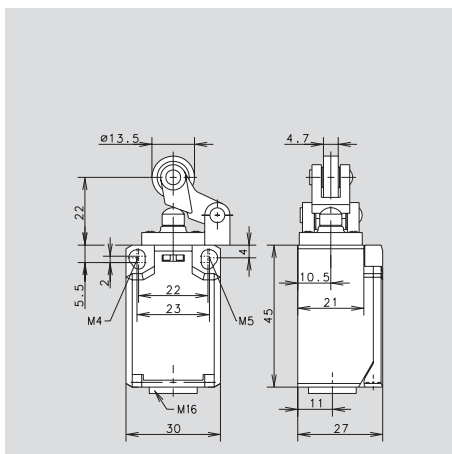


Ti2-U1Z Hw	Ti2-SU1Z Hw	Ti2-A2Z Hw	Ti2-U1Z AH	Ti2-SU1Z AH	Ti2-A2Z AH	Ti2-U1 AD	Ti2-SU1 AD	Ti2-A2 AD
608.8121.015	608.8171.016	608.8821.017	608.8135.021	608.8185.022	608.8835.023	608.8137.027	608.8187.028	608.8837.029
⊕ Zb	⊕ Zb	⊕ Zb	⊕ Zb	⊕ Zb	⊕ Zb	Zb	Zb	Zb
●/-	-/●	●/-	●/-	-/●	●/-	●/-	-/●	●/-
w	w	w	iw	iw	iw	iw	iw	iw



250 V AC	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC
10 A	10 A	10 A	10 A	10 A	10 A	10 A	10 A	10 A
●	●	●	●	●	●	●	●	●
100/min.	100/min.	100/min.	100/min.	100/min.	100/min.	100/min.	100/min.	100/min.
3 x 10 <sup>6</sup>	3 x 10 <sup>6</sup>	3 x 10 <sup>6</sup>	3 x 10 <sup>6</sup>	3 x 10 <sup>6</sup>	3 x 10 <sup>6</sup>	3 x 10 <sup>6</sup>	3 x 10 <sup>6</sup>	3 x 10 <sup>6</sup>
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F

BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA
0.05 kg	0.05 kg	0.05 kg	0.07 kg	0.07 kg	0.07 kg	0.07 kg	0.07 kg	0.07 kg
●/-	●/-	●/-	●/-	●/-	●/-	●/-	●/-	●/-







## Plastic-bodied limit switches

### I88

Euronorm standard switch to  
DIN EN 50047  
Protection class IP 65  
Hinged snap lid



- Standard actuators to DIN EN 50047 type A, B, C, E
- Large range of actuators
- Snap action or slow make & break contacts
- Galvanically separated contacts
- Forced disconnection of NC contacts
- Protection class IP 65
- Body and lid PA 6 which is self extinguishing
- 4 x 90° actuator positions
- Cable entry M 20 x 1.5
- Terminals numbered in accordance with DIN EN 50013
- International approvals

#### Mounting

- Adjustable – Two slots for M 4 screws (22 mm centres)
- Fixed – Two holes for M 5 screws for safety applications without additional fixings (fig. 1)
- Additional positive location with guide discs (fig. 2)
- Front mounting (type dependant) (fig. 3)

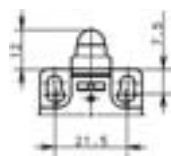


Fig. 1

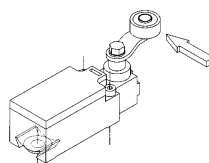


Fig. 2

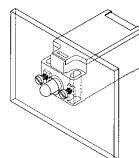


Fig. 3



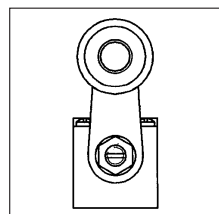
#### Benefits

- Hinged snap lid for quick and easy access (screwdriver release)
- Lid hinges open to 135° (can also be easily detached)
- Internal cover protects the contacts during mounting
- Screw terminals with self-lifting clamps for easy wiring
- Transparent cover for easy adjustment and inspection

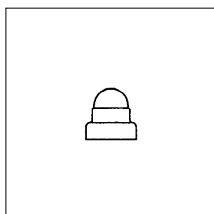
#### Options

- Contact lock (safety pull button reset)
- Contact LED display (LED protected within terminal chamber)
- Cable entry M 16 x 1.5
- Additional lid security with fixing screw

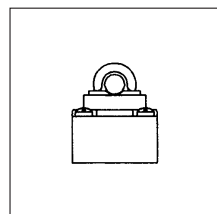
#### Standard actuators DIN EN 50047



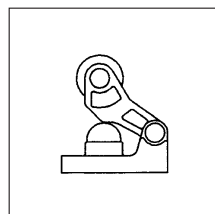
Type A



Type B



Type C



Type E

#### Contact configuration

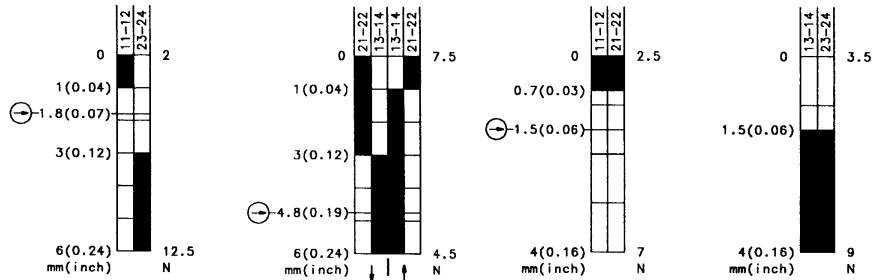
Contact type	Switch function	Switch contacts	Reference	Max. Voltage	Max constant current
Slow make & break	Changeover	1NC/1NO	U1/U1Z	500 V	10 A
Slow make & break	Changeover	1NC/1NO	UV1Z	500 V	10 A
Slow make & break	Changeover	2NC/1NO	UV15Z	400 V	6 A
Slow make & break	Changeover	1NC/2NO	UV16Z	400 V	6 A
Slow make & break	NC	2NC	A2Z	400 V	6 A
Slow make & break	NO	2NO	E2	400 V	6 A
Snap action	Changeover	1NC/1NO	SU1/SU1Z	500 V	10 A



Designation  
**Part number**  
 Circuit diagram  
 ⊕ Forced disconnect to IEC 947-5-1 chapter 3  
 Za: not galvanically separated contacts  
 Zb: galvanically separated contacts  
 Slow make & break/snap-action  
 Internal seal (iw)/external seal (w)

l88-U1Z w	l88-SU1Z w	l88-A2Z w	l88-E2 w
<b>608.6103.008</b>	<b>608.6153.012</b>	<b>608.6803.013</b>	<b>608.6803.014</b>
⊕ Zb	⊕ Zb	⊕ Zb	-
●/-	-/●	●/-	●/-
w	w	w	w

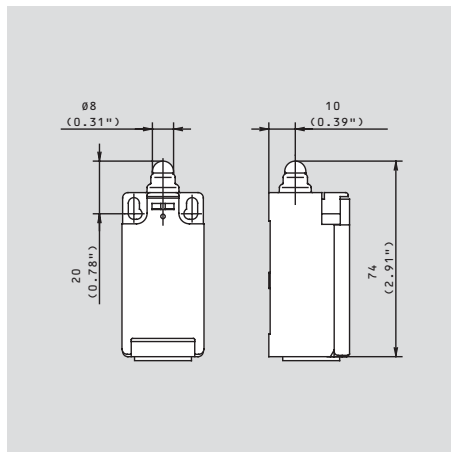
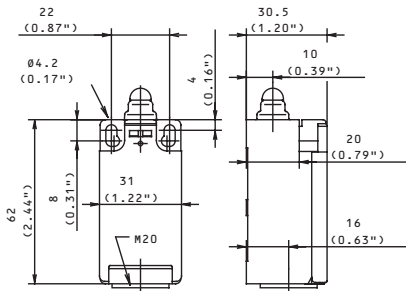
Contact travel mm (inch) Tol. ± 0.25 mm  
 Actuator force N Tol. ± 10%  
 Actuator angle ° Tol. ± 3.5°  
 Actuator torque Ncm Tol. ± 10%  
 On Off <sup>1)</sup> Latch Point



Voltage	max.
Permanent current	max.
In-rush current complies with standards	
IEC 947-5-1 AC 15/DC 13	
Switching frequency	max.
Mechanical life – number of switching actions	
Operating temperature	min./max.
Standard actuator	form
Approvals	
Weight	
Delivery: ex-stock/built to order	

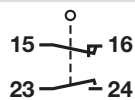
500 V AC	500 V AC	400 V AC	400 V AC
10 A	10 A	6 A	6 A
●	●	●	●
100/min.	100/min.	100/min.	100/min.
10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F
B	B	B	B
UL, CSA	UL, CSA	UL, CSA	UL, CSA
0.06 kg/0.13 lb	0.06 kg/0.13 lb	0.06 kg/0.13 lb	0.06 kg/0.13 lb
●/-	●/-	●/-	●/-

All dimensions in mm (inch)





I88-UV1Z w  
608.6303.011

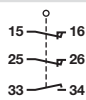


⊖ Zb

●/-

W

I88-UV15Z w  
608.6603.046

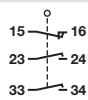


⊖ Zb

●/-

W

I88-UV16Z w  
608.6603.047

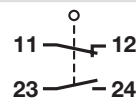


⊖ Zb

●/-

W

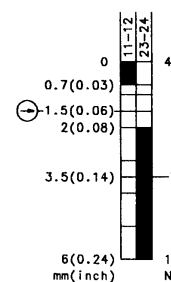
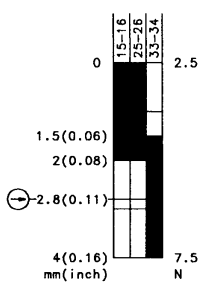
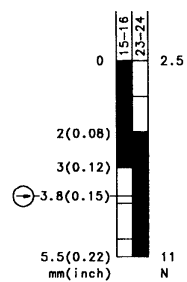
I88-U1Z w Rast  
618.6103.005



⊖ Zb

●/-

W



500 V AC  
10 A

●

400 V AC  
6 A

●

400 V AC  
6 A

●

500 V AC  
10 A

●

100/min.

100/min.

100/min.

60/min.

10 x 10<sup>6</sup>

1 x 10<sup>6</sup>

1 x 10<sup>6</sup>

1 x 10<sup>6</sup>

-30 °C/+80 °C

-30 °C/+80 °C

-30 °C/+80 °C

-30 °C/+80 °C

-22 °F/+176 °F

-22 °F/+176 °F

-22 °F/+176 °F

-22 °F/+176 °F

B  
UL, CSA

B  
UL, CSA

B  
UL, CSA

B  
UL, CSA

0.06 kg/0.13 lb

●/-

0.06 kg/0.13 lb

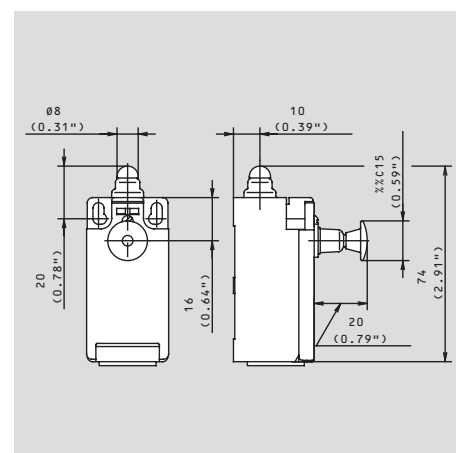
●/-

0.06 kg/0.13 lb

●/-

0.06 kg/0.13 lb

●/-

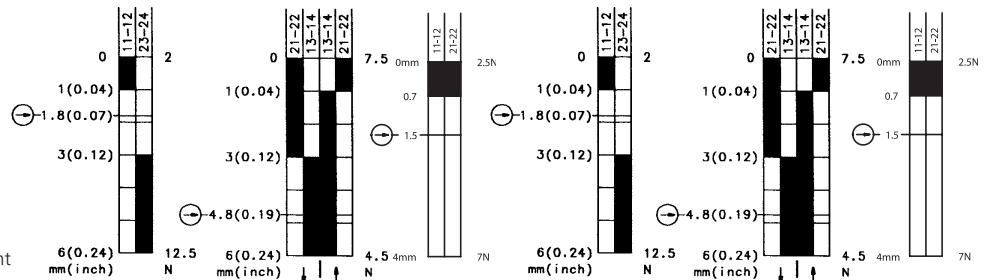






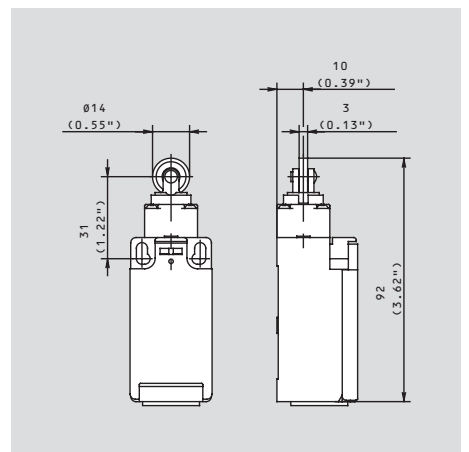
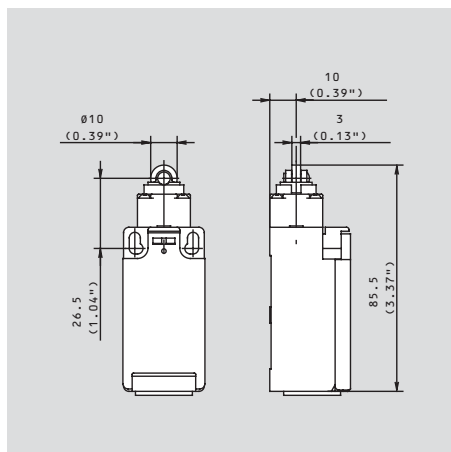
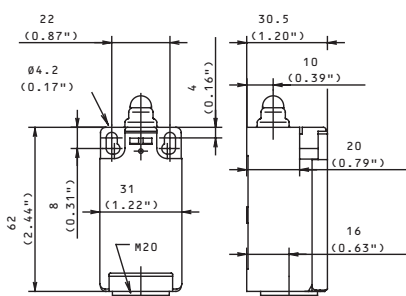
Designation	I88-U1Z Riw K	I88-SU1Z Riw K	I88-A2Z Riw K	I88-U1Z Riw L	I88-SU1Z Riw L	I88-A2Z Riw L
<b>Part number</b>	<b>608.6117.017</b>	<b>608.6167.018</b>	<b>608.6817.087</b>	<b>608.6117.050</b>	<b>608.6167.051</b>	<b>608.6817.072</b>
Circuit diagram						
⊕ Forced disconnect to IEC 947-5-1 chapter 3						
Za: not galvanically separated contacts						
Zb: galvanically separated contacts						
Slow make & break/snap-action						
Internal seal (iw)/external seal (w)						

Contact travel mm (inch)		Actuator force N	
Tol. ± 0.25 mm		Tol. ± 10%	
Actuator angle °		Actuator torque Ncm	
Tol. ± 3.5°		Tol. ± 10%	
On		Off	
		1) Latch Point	



Voltage	max.	500 V AC	500 V AC	400 V AC	500 V AC	500 V AC	400 V AC
Permanent current	max.	10 A	10 A	5 A	10 A	10 A	5 A
In-rush current complies with standards		●	●	●	●	●	●
IEC 947-5-1 AC 15/DC 13							
Switching frequency	max.	100/min.	100/min.	100/min.	100/min.	100/min.	100/min.
Mechanical life – number of switching actions		10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>
Operating temperature	min./max.	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
		-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F
Standard actuator	form	C	C	C	-	-	-
Approvals		UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA
Weight		0.07 kg/0.15 lb	0.07 kg/0.15 lb	0.07 kg/0.15 lb	0.07 kg/0.15 lb	0.07 kg/0.15 lb	0.07 kg/0.15 lb
Delivery: ex-stock/built to order		●/-	●/-	●/-	●/-	●/-	●/-

All dimensions in mm (inch)





188-U1Z Hw  
608.6121.021

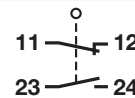
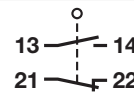
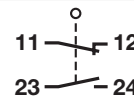
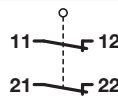
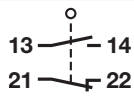
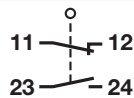
188-SU1Z Hw  
608.6171.022

188-A2Z Hw  
608.6821.099

188-U1Z AH  
608.6135.033

188-SU1Z AH  
608.6185.034

188-U1 AV  
608.6136.037



⊖ Zb

⊖ Zb

⊖ Zb

⊖ Zb

⊖ Zb

Zb

●/-

-/●

-/●

●/-

-/●

●/-

w

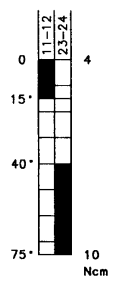
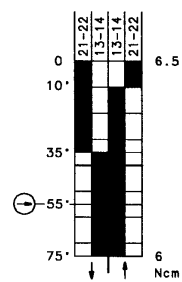
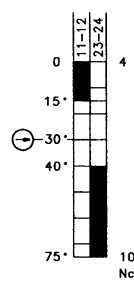
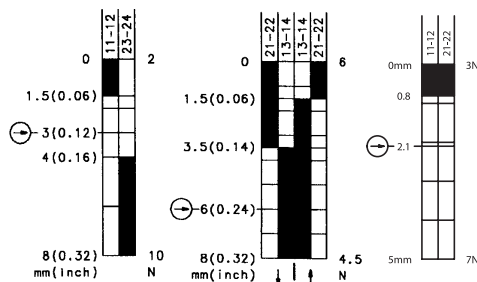
w

w

iw

iw

iw



500 V AC  
10 A

500 V AC  
10 A

400 V AC  
5 A

500 V AC  
10 A

500 V AC  
10 A

500 V AC  
10 A

●

●

●

●

●

●

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

100/min.  
1 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

E  
UL, CSA

E  
UL, CSA

E  
UL, CSA

A  
UL, CSA

A  
UL, CSA

-  
UL, CSA

0.07 kg/0.15 lb

0.07 kg/0.15 lb

0.07 kg/0.15 lb

0.10 kg/0.22 lb

0.10 kg/0.22 lb

0.11 kg/0.24 lb

●/-

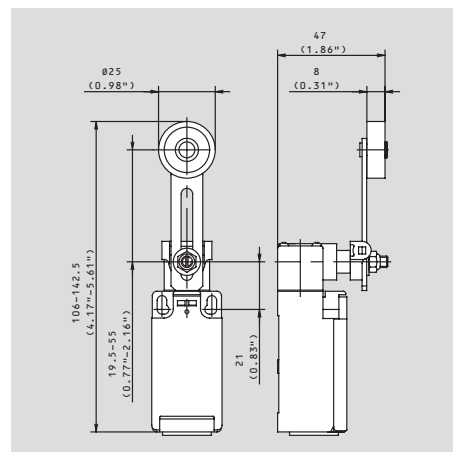
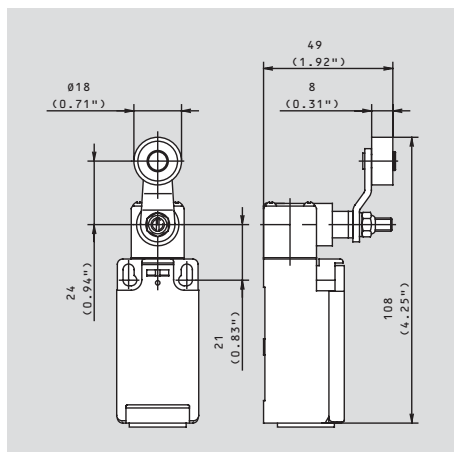
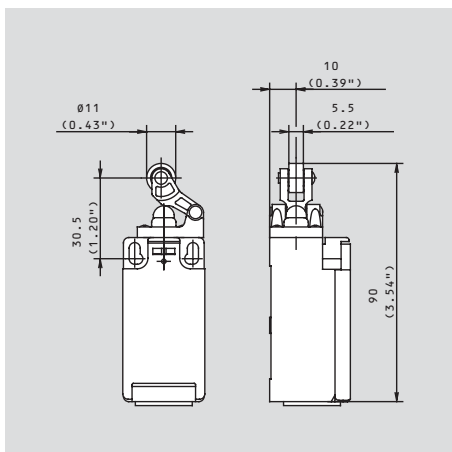
●/-

●/-

●/-

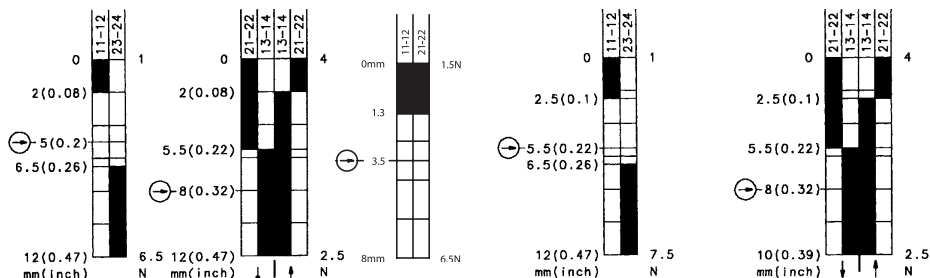
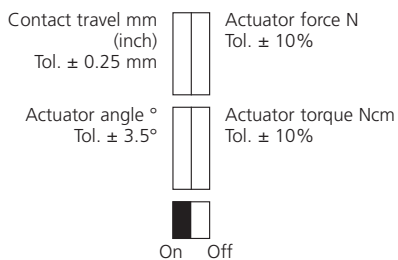
●/-

●/-



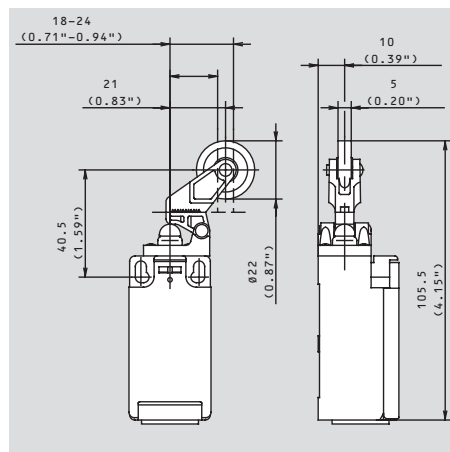
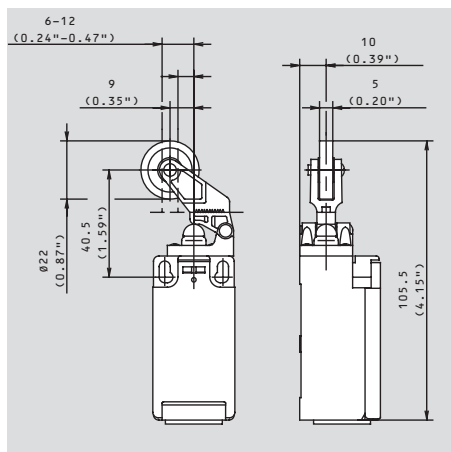
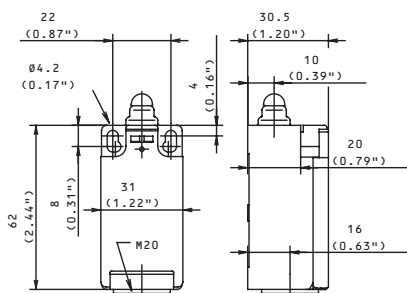


Designation	I88-U1Z DGH w	I88-SU1Z DGH w	I88-A2Z DGH w	I88-U1Z DGK w	I88-SU1Z DGK w
<b>Part number</b>	<b>608.6121.029</b>	<b>608.6171.030</b>	<b>608.6821.120</b>	<b>608.6127.025</b>	<b>608.6177.026</b>
Circuit diagram					
⊕ Forced disconnect to IEC 947-5-1 chapter 3					
Za: not galvanically separated contacts					
Zb: galvanically separated contacts					
Slow make & break/snap-action					
Internal seal (iw)/external seal (w)	●/-	-/●	●/-	●/-	-/●



Voltage	max.	500 V AC	500 V AC	400 V AC	500 V AC	500 V AC
Permanent current	max.	10 A	10 A	5 A	10 A	10 A
In-rush current complies with standards		●	●	●	●	●
IEC 947-5-1 AC 15/DC 13						
Switching frequency	max.	100/min.	100/min.	100/min.	100/min.	100/min.
Mechanical life – number of switching actions		10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>
Operating temperature	min./max.	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F
Standard actuator	form	-	-	-	-	-
Approvals		UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA
Weight		0.07 kg/0.15 lb	0.07 kg/0.15 lb	0.07 kg/0.15 lb	0.07 kg/0.15 lb	0.07 kg/0.15 lb
Delivery: ex-stock/built to order		●/-	●/-	●/-	●/-	-/●

All dimensions in mm (inch)



## Plastic-bodied limit switches

### Biggy

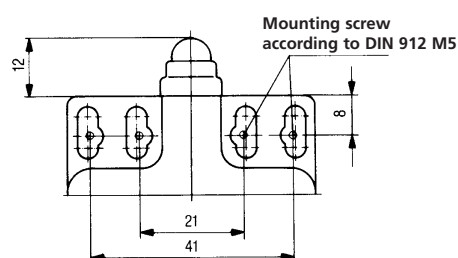
With four different mounting holes,  
Protection class IP 65  
Hinged snap lid  
Two cable entries M 16 x 1.5



- Wide selection of actuators
- Snap action or slow make & break
- Galvanically separated contacts
- Forced disconnection of NC contacts (type dependant)
- Protection class IP 65
- Body and lid PA 6 which is self extinguishing (UL-94 V0) cover PC (UL-94 V0)
- 4 x 90° actuator positions
- Adjustment of the AH lever arm position in 90° increments
- Two cables entries M 16 x 1.5
- Terminals numbered in accordance with DIN EN 50013
- International approvals

#### Mounting

- Adjustable – two slots for M 4 screws (22 mm centres)
- Adjustable – two slots for M 4 screws (42 mm centres)
- Fixed – two holes for M 5 screws for safety applications (21 mm centres)



- Fixed - two holes for M 5 screws for safety applications (41 mm centres)

#### Benefits

- Two cable entries allow "through wiring"
- Hinged snap lid for quick and easy access (screwdriver release)
- Lid hinges open to 135° (can also be simply detached)
- Internal cover protects the contacts during mounting
- Screw terminals with self lifting clamps for easy wiring
- Transparent cover for easy adjustment and inspection



#### Options

- Contact lock (safety pull button reset)
- Contact LED display (LED protected within terminal chamber)
- Additional lid security with fixing screw

#### Contact configuration

Contact type	Switch function	Switch contacts	Reference	Max. Voltage	Max. constant current
Slow make & break	Changeover	1NF/1NO	U1/U1Z	500 V	10 A
Snap action	Changeover	1NF/1NO	SU1Z	500 V	10 A



Designation  
**Part number**  
 Circuit diagram  
 ⊕ Forced disconnect to IEC 947-5-1 chapter 3  
 Za: not galvanically separated contacts  
 Zb: galvanically separated contacts  
**Slow make & break/snap-action**  
 Internal seal (iw)/external seal (w)

BI-U1Z w	BI-SU1Z w	BI-SU1Z Hw
<b>608.5103.001</b>	<b>608.5153.008</b>	<b>608.5171.017</b>
 ⊕ Zb ●/-	 ⊕ Zb -/●	 ⊕ Zb -/●
w	w	w

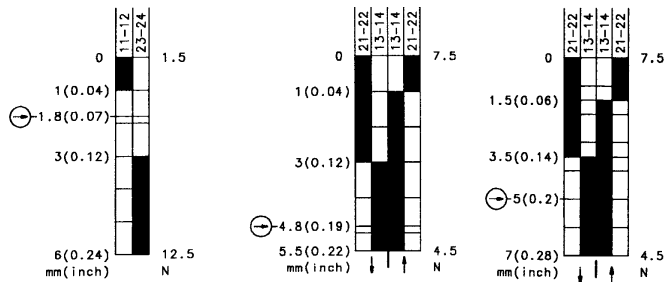
Contact travel mm (inch)  
 Tol. ± 0.25 mm

Actuator force N  
 Tol. ± 10%

Actuator angle °  
 Tol. ± 3.5°

Actuator torque Ncm  
 Tol. ± 10%

On Off

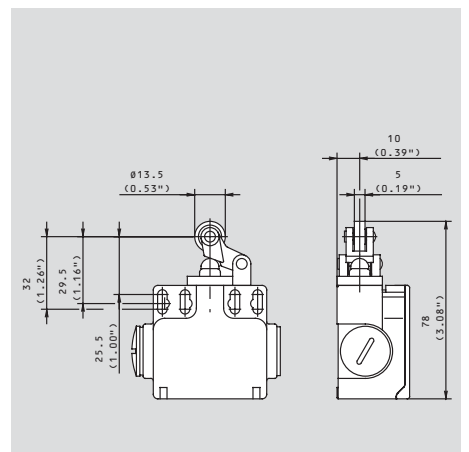
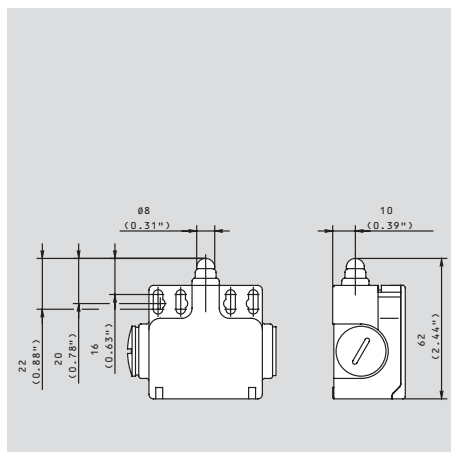
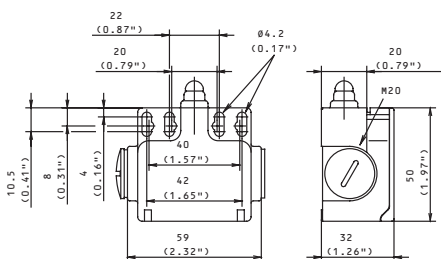


Voltage	max.	500 V AC
Permanent current	max.	10 A
In-rush current complies with standards		
IEC 947-5-1 AC 15/DC 13		
Switching frequency	max.	100/min.
Mechanical life – number of switching actions		10 x 10 <sup>6</sup>
Operating temperature	min./max.	-30 °C/+80 °C -22 °F/+176 °F

500 V AC	500 V AC	500 V AC
10 A	10 A	10 A
●	●	●
100/min.	100/min.	100/min.
10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>
-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F

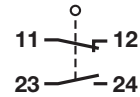
Approvals	UL, CSA	UL, CSA	UL, CSA
Weight	0.08 kg/0.18 lb	0.08 kg/0.18 lb	0.09 kg/0.20 lb
Delivery: ex-stock/built to order	●/-	●/-	●/-

All dimensions in mm (inch)





BI-U1Z Riw  
608.5117.002

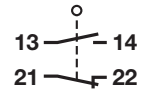


⊖ Zb

●/-

ivv

BI-SU1Z Riw  
608.5167.009

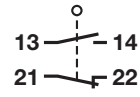


⊖ Zb

-/●

ivv

BI-SU1Z AH  
608.5185.012

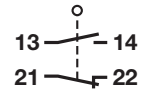


⊖ Zb

-/●

ivv

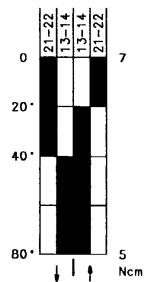
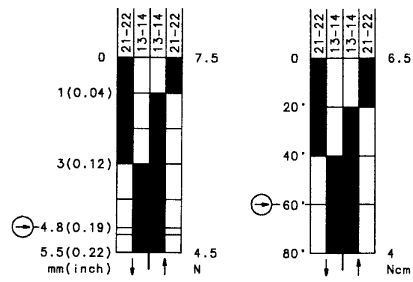
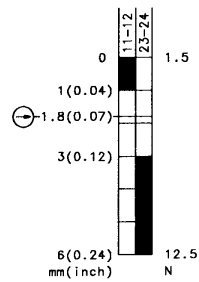
BI-SU1 AV  
608.5186.013



Zb

-/●

ivv



500 V AC

10 A

●

500 V AC

10 A

●

500 V AC

10 A

●

500 V AC

10 A

●

100/min.

10 x 10<sup>6</sup>

-30 °C/+80 °C

-22 °F/+176 °F

100/min.

10 x 10<sup>6</sup>

-30 °C/+80 °C

-22 °F/+176 °F

100/min.

10 x 10<sup>6</sup>

-30 °C/+80 °C

-22 °F/+176 °F

100/min.

10 x 10<sup>6</sup>

-30 °C/+80 °C

-22 °F/+176 °F

UL, CSA

UL, CSA

UL, CSA

UL, CSA

0.08 kg/0.18 lb

●/-

0.08 kg/0.18 lb

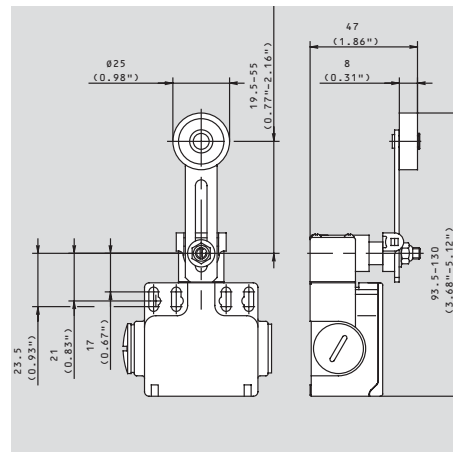
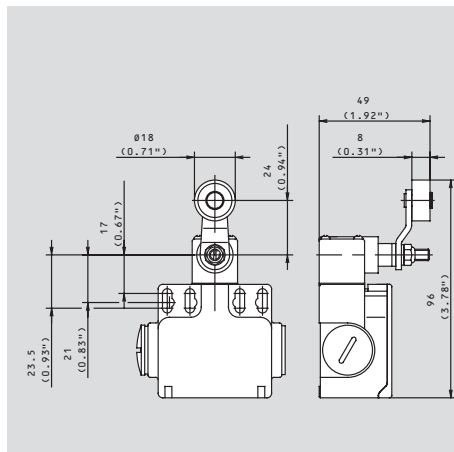
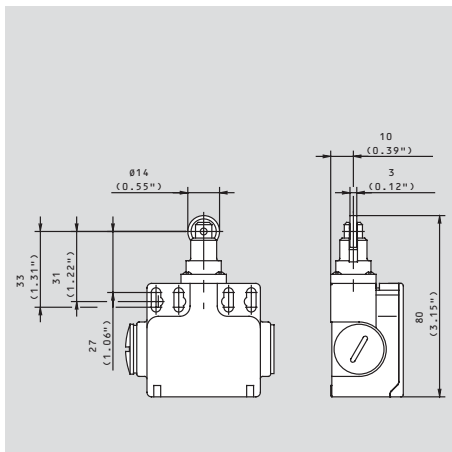
●/-

0.12 kg/0.26 lb

●/-

0.13 kg/0.29 lb

●/-





# Plastic-bodied limit switches

## ENK

Euronorm standard switch according to  
DIN EN 50041  
Protection class IP 65  
Hinged snap lid



- Standard actuators to DIN EN 50041 form A, B, C, D, F, G
- Large range of actuators
- 4 x 90° actuator positions
- Snap action or slow make & break contacts
- Galvanically separated contacts
- Forced disconnection of NC contacts
- Metal actuators for heavy duty applications
- Cable entry M 20 x 1.5
- Protection class IP 65
- Body and lid PA 6 which is self extinguishing (UL-94-V0)

### Benefits

- Hinged snap lid for quick and easy access (screwdriver release)
- Lid hinges open to 150° (can also be simply detached)
- Internal cover protects the contacts during mounting
- Screw terminals with self lifting clamps for easy wiring
- Transparent cover for easy adjustment and inspection



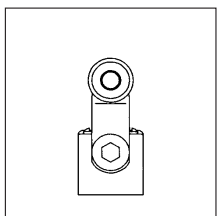
### Mounting

- Adjustable – two slots for M 5 screws
- Fixed - two holes for M 5 screws for safety applications

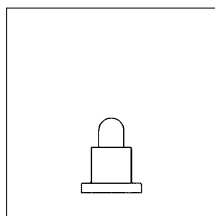
### Options

- Contact lock (safety pull button reset)
- Contact LED display (LED protected within terminal chamber)
- WK actuator (form F) can be supplied to order
- WR actuator (form G) can be supplied to order
- EEx certificated versions available acc. ATEX 100 a

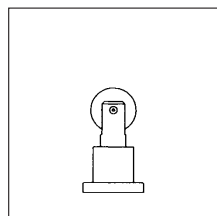
### Standard actuators DIN EN 50041



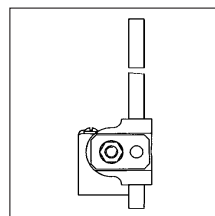
Type A



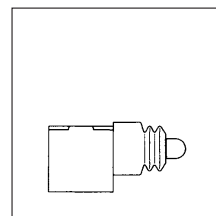
Type B



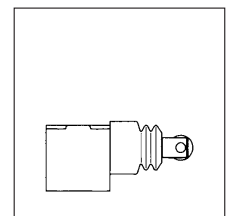
Type C



Type D



Type F  
(Built to order)



Type G  
(Built to order)

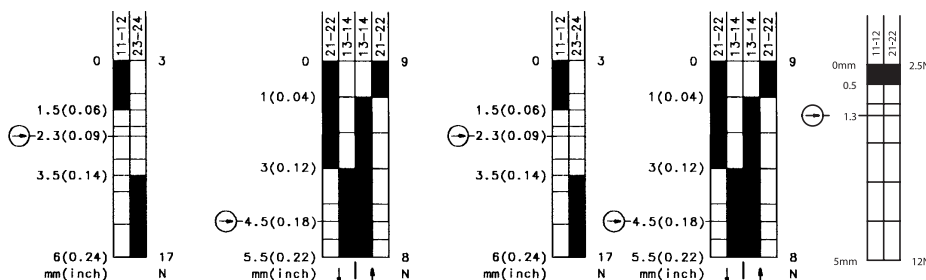
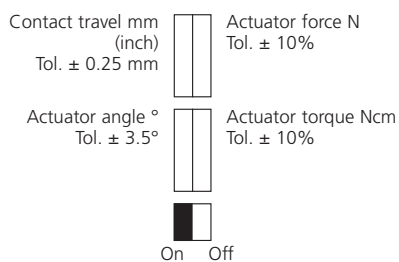
### Contact configuration

Contact type	Switch function	Switch contacts	Reference	Max. Voltage	Max. constant current
Slow make & break	Changeover	1NC/1NO	U1/U1Z	500 V	10 A
Slow make & break	Changeover overlapping	1NC/1NO	UV1Z	500 V	10 A
Slow make & break	NC	2NC	A2Z	400 V	6 A
Slow make & break	NC	3NC	A3Z	400 V	6 A
Snap action	Changeover	1NC/1NO	SU1/SU1Z	500 V	10 A



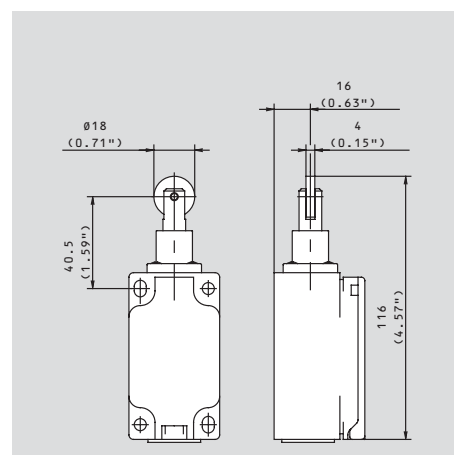
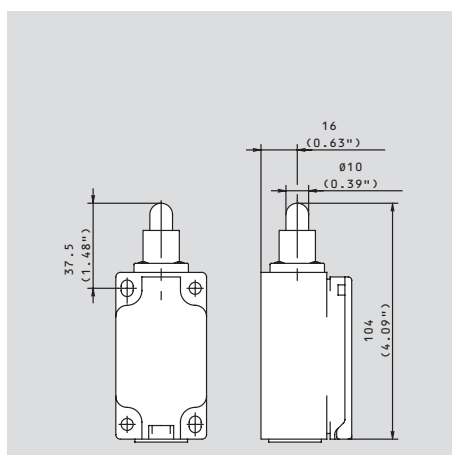
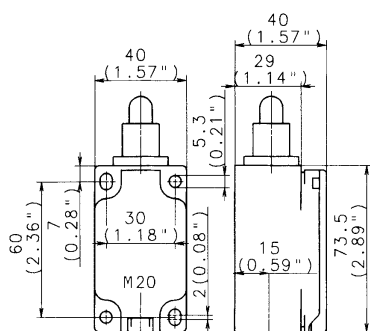
Designation  
**Part number**  
 Circuit diagram  
 ⊕ Forced disconnect to IEC 947-5-1 chapter 3  
 Za: not galvanically separated contacts  
 Zb: galvanically separated contacts  
 Slow make & break/snap-action  
 Internal seal (iw)/external seal (w)

ENK-U1Z iw	ENK-SU1Z iw	ENK-U1Z Riw	ENK-SU1Z Riw	ENK-A2Z Riw
<b>608.1102.001</b>	<b>608.1152.007</b>	<b>608.1117.002</b>	<b>608.1167.008</b>	<b>608.1817.281</b>
⊕ Zb	⊕ Zb	⊕ Zb	⊕ Zb	⊕ Zb
●/-	-/●	●/-	-/●	-/●
iw	iw	iw	iw	iw



Voltage	max.	500 V AC	500 V AC	500 V AC	500 V AC	400 V AC
Permanent current	max.	10 A	10 A	10 A	10 A	5 A
In-rush current complies with standards		●	●	●	●	●
IEC 947-5-1 AC 15/DC 13						
Switching frequency	max.	100/min.	100/min.	100/min.	100/min.	100/min.
Mechanical life – number of switching actions		10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>
Operating temperature	min./max.	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F
Standard actuator	form	B	B	C	C	C
Approvals		UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA
Weight		0.15 kg/0.33 lb	0.15 kg/0.33 lb	0.16 kg/0.33 lb	0.16 kg/0.33 lb	0.16 kg/0.33 lb
Delivery: ex-stock/built to order		●/-	●/-	●/-	●/-	●/-

All dimensions in mm (inch)

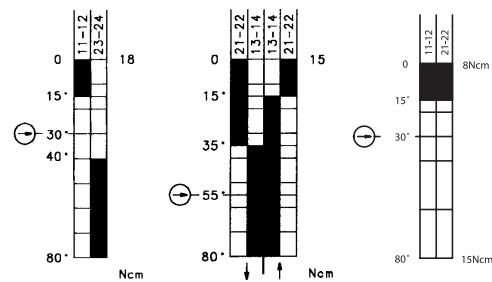




Designation  
**Part number**  
 Circuit diagram  
 ⊕ Forced disconnect to IEC 947-5-1 chapter 3  
 Za: not galvanically separated contacts  
 Zb: galvanically separated contacts  
**Slow make & break/snap-action**  
 Internal seal (iw)/external seal (w)

ENK-SU1 FF	ENK-U1Z AHS-V	ENK-SU1Z AHS-V	ENK-A2Z AHS-V
<b>608.1190.045</b>	<b>608.1135.003</b>	<b>608.1185.009</b>	<b>608.1835.323</b>
Zb	⊕ Zb	⊕ Zb	⊕ Zb
-/●	●/-	-/●	-/●
w	iw	iw	iw

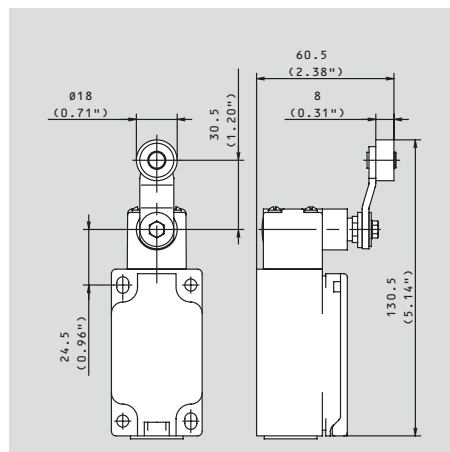
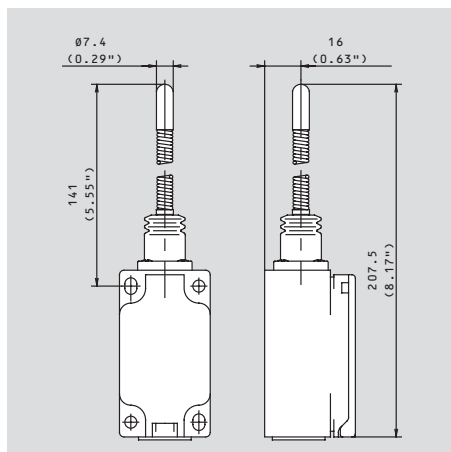
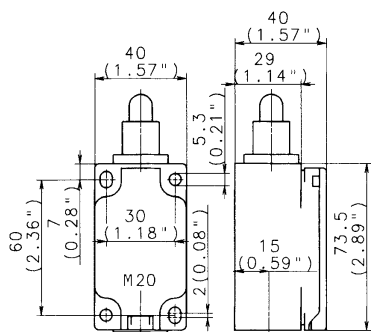
Contact travel mm (inch) Tol. ± 0.25 mm	Actuator force N Tol. ± 10%
Actuator angle ° Tol. ± 3.5°	Actuator torque Ncm Tol. ± 10%
On	Off



Voltage	max.
Permanent current	max.
In-rush current complies with standards	
IEC 947-5-1 AC 15/DC 13	
Switching frequency	max.
Mechanical life – number of switching actions	
Operating temperature	min./max.
Standard actuator	form
Approvals	
Weight	
Delivery: ex-stock/built to order	

500 V AC	500 V AC	500 V AC	400 V AC
10 A	10 A	10 A	5 A
●	●	●	●
100/min.	100/min.	100/min.	100/min.
10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F
–	A	A	A
UL, CSA	UL, CSA	UL, CSA	UL, CSA
0.15 kg/0.35 lb	0.23 kg/0.51 lb	0.23 kg/0.51 lb	0.23 kg/0.51 lb
●/-	●/-	●/-	●/-

All dimensions in mm (inch)





ENK-U1 AV  
608.1136.012

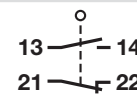
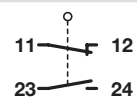
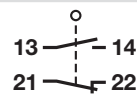
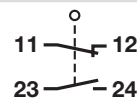
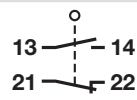
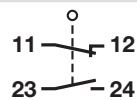
ENK-SU1 AV  
608.1186.018

ENK-U1Z AD  
608.1137.011

ENK-SU1Z AD  
608.1187.017

ENK-U1Z Hw  
608.1121.095

ENK-SU1Z Hw  
608.1171.096



Zb  
●/-  
iw

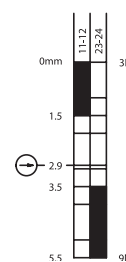
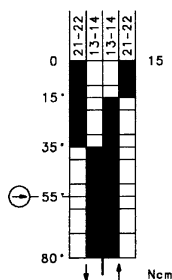
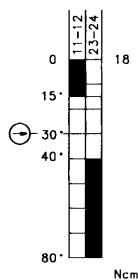
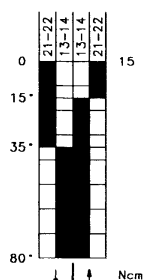
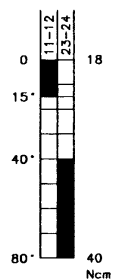
Zb  
-/  
iw

⊕ Zb  
●/-  
iw

⊕ Zb  
-/  
iw

⊕ Zb  
-/  
iw

⊕ Zb  
-/  
w



500 V AC  
10 A

500 V AC  
10 A

500 V AC  
10 A

500 V AC  
10 A

500 V AC  
10 A

500 V AC  
10 A

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

-  
UL, CSA

-  
UL, CSA

D  
UL, CSA

D  
UL, CSA

D  
UL, CSA

-  
UL, CSA

0.24 kg/0.53 lb  
●/-

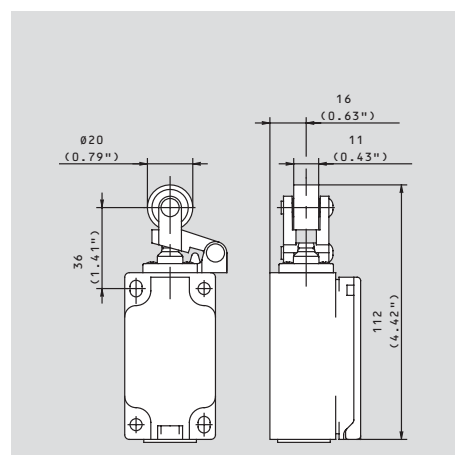
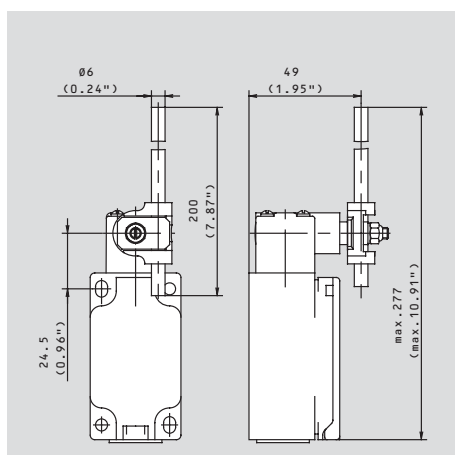
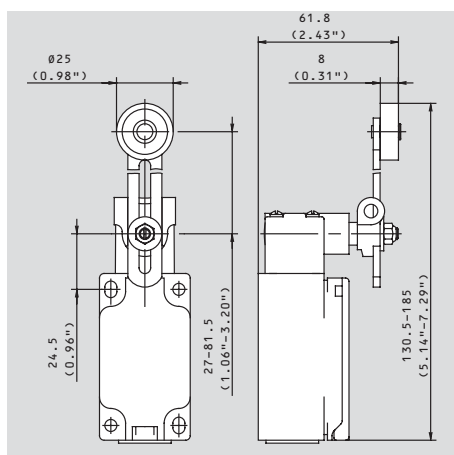
0.24 kg/0.53 lb  
●/-

0.23 kg/0.51 lb  
●/-

0.23 kg/0.51 lb  
●/-

0.16 kg/0.35 lb  
●/-

0.16 kg/0.35 lb  
●/-

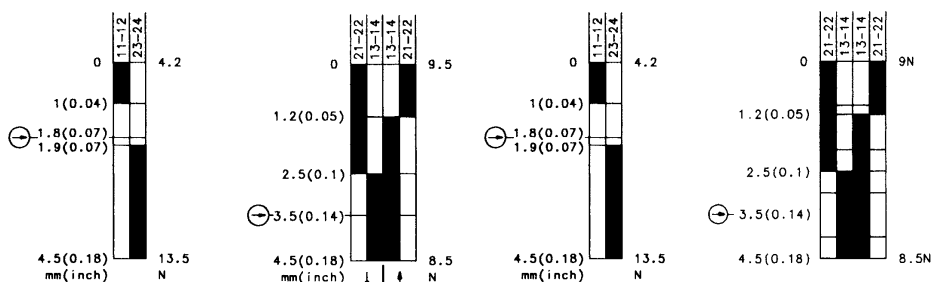
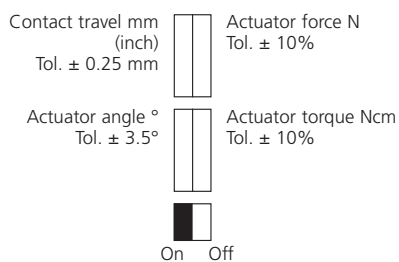






Designation  
**Part number**  
 Circuit diagram  
 ⊕ Forced disconnect to IEC 947-5-1 chapter 3  
 Za: not galvanically separated contacts  
 Zb: galvanically separated contacts  
 Slow make & break/snap-action  
 Internal seal (iw)/external seal (w)

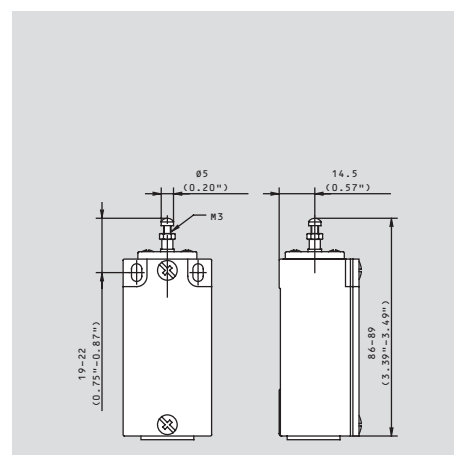
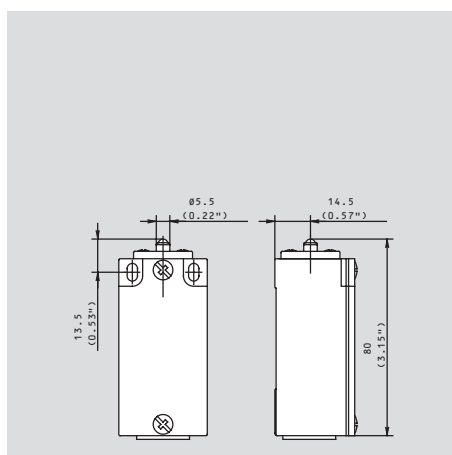
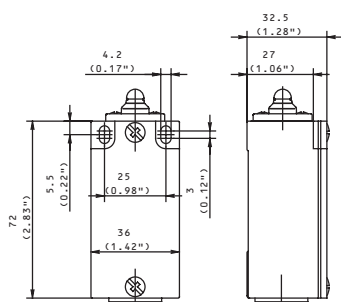
GC-U1Z iw	GC-SU1Z iw	GC-U1Z STiw	GC-SU1Z STiw
<b>602.1102.001</b>	<b>602.1352.620</b>	<b>602.1105.015</b>	<b>602.1155.017</b>
⊕ Zb	⊕ Zb	⊕ Zb	⊕ Zb
●/-	-/●	●/-	-/●
iw	iw	iw	iw



Voltage	max.
Permanent current	max.
In-rush current complies with standards	
IEC 947-5-1 AC 15/DC 13	
Switching frequency	max.
Mechanical life – number of switching actions	
Operating temperature	min./max.
Approvals	
Weight	
Delivery: ex-stock/built to order	

500 V AC	500 V AC	500 V AC	500 V AC
10 A	10 A	10 A	10 A
●	●	●	●
100/min.	100/min.	100/min.	100/min.
10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F
UL, CSA	UL, CSA	UL, CSA	UL, CSA
0.14 kg/0.31 lb	0.14 kg/0.31 lb	0.14 kg/0.31 lb	0.14 kg/0.31 lb
●/-	●/-	●/-	●/-

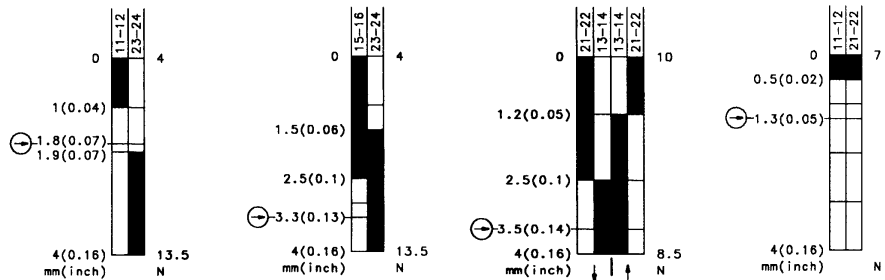
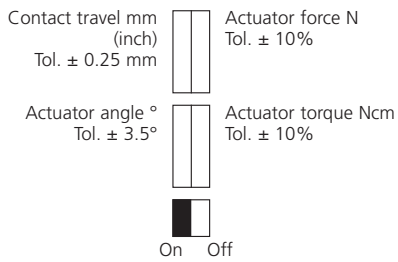
All dimensions in mm (inch)





Designation  
**Part number**  
 Circuit diagram  
 ⊕ Forced disconnect to IEC 947-5-1 chapter 3  
 Za: not galvanically separated contacts  
 Zb: galvanically separated contacts  
 Slow make & break/snap-action  
 Internal seal (iw)/external seal (w)

GC-U1Z Riv	GC-UV1Z Riv	GC-SU1Z Riv	GC-A2Z Riv
<b>602.1117.029</b>	<b>602.1317.030</b>	<b>602.1367.626</b>	<b>602.1817.172</b>
⊕ Zb	⊕ Zb	⊕ Zb	⊕ Za
●/-	●/-	-/●	●/-
iw	iw	iw	iw



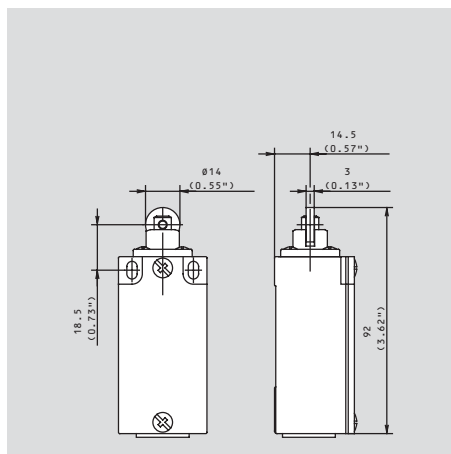
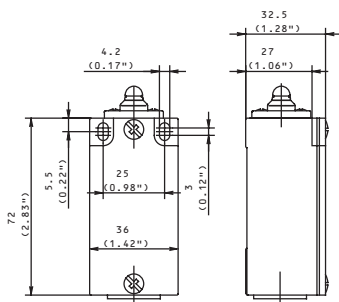
Voltage max.  
 Permanent current max.  
 In-rush current complies with standards  
 IEC 947-5-1 AC 15/DC 13  
 Switching frequency max.  
 Mechanical life – number of switching actions  
 Operating temperature min./max.

500 V AC	500 V AC	500 V AC	400 V AC
10 A	10 A	10 A	6 A
●	●	●	●
100/min.	100/min.	100/min.	100/min.
10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	3 x 10 <sup>6</sup>
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F

Approvals  
 Weight  
 Delivery: ex-stock/built to order

UL, CSA	UL, CSA	UL, CSA	-
0.15 kg/0.33 lb	0.15 kg/0.33 lb	0.15 kg/0.33 lb	0.15 kg/0.33 lb
●/-	●/-	●/-	●/-

All dimensions in mm (inch)





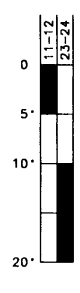
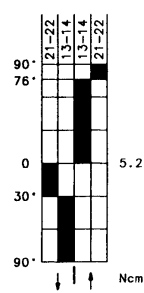
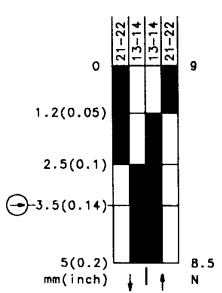
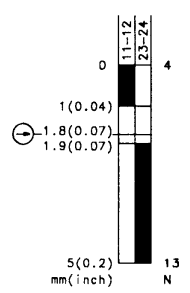
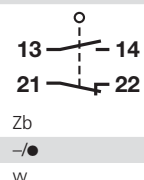
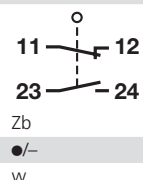
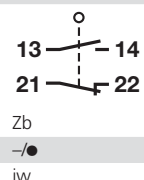
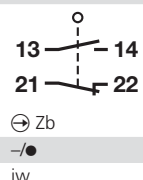
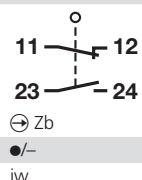
GC-U1Z Hiw  
602.1120.057

GC-SU1Z Hiw  
602.1370.629

GC-SU1 DR  
602.1191.099

GC-U1 FF  
602.1140.476

GC-SU1 FF  
602.1190.100



500 V AC  
10 A

500 V AC  
10 A

500 V AC  
10 A

500 V AC  
10 A

500 V AC  
10 A

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

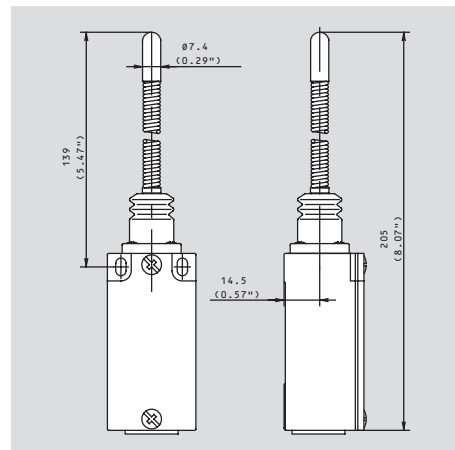
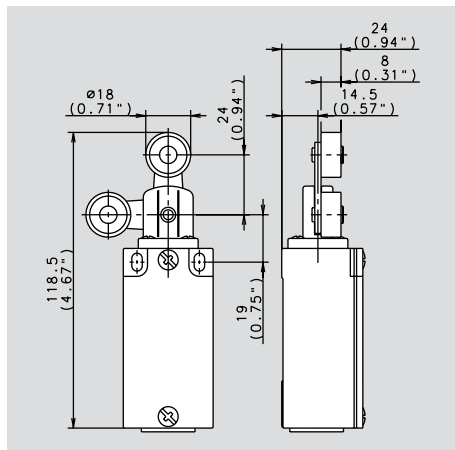
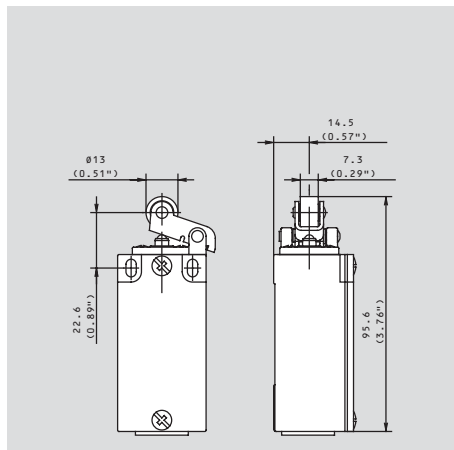
UL, CSA  
0.16 kg/0.35 lb

UL, CSA  
0.16 kg/0.35 lb

UL, CSA  
0.18 kg/0.40 lb

UL, CSA  
0.17 kg/0.37 lb

UL, CSA  
0.17 kg/0.37 lb

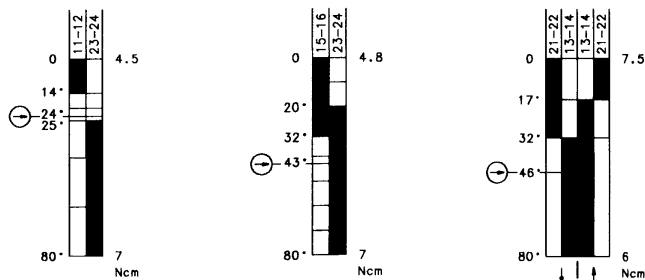
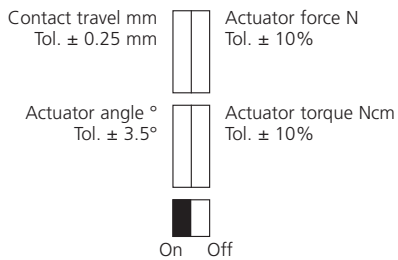






Designation  
**Part number**  
 Circuit diagram  
 ⊕ Forced disconnect to IEC 947-5-1 chapter 3  
 Za: not galvanically separated contacts  
 Zb: galvanically separated contacts  
 Slow make & break/snap-action  
 Internal seal (iw)/external seal (w)

GC-U1Z AH	GC-UV1Z AH	GC-SU1Z AH
<b>602.1135.102</b>	<b>602.1335.133</b>	<b>602.1385.634</b>
⊕ Zb	⊕ Zb	⊕ Zb
●/-	●/-	●/-
iw	iw	iw



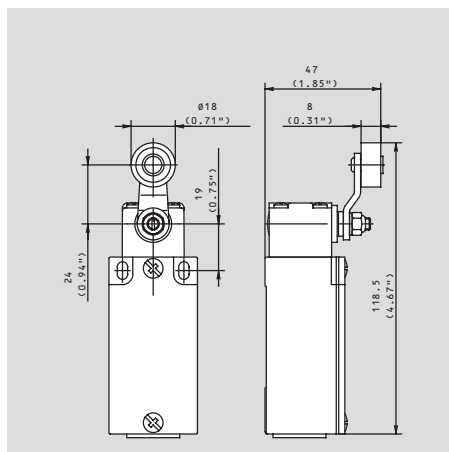
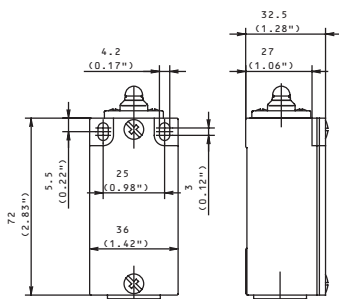
Voltage	max.
Permanent current	max.
In-rush current complies with standards	
IEC 947-5-1 AC 15/DC 13	
Switching frequency	max.
Mechanical life – number of switching actions	
Operating temperature	min./max.

500 V AC	500 V AC	500 V AC
10 A	10 A	10 A
●	●	●
100/min.	100/min.	100/min.
10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F

Approvals  
 Weight  
 Delivery: ex-stock/built to order

UL, CSA	UL, CSA	UL, CSA
0.20 kg/0.44 lb	0.20 kg/0.44 lb	0.20 kg/0.44 lb
●/-	●/-	●/-

All dimensions in mm (inch)





GC-U1 AV  
602.1136.104

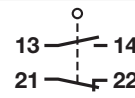
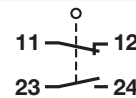
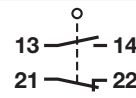
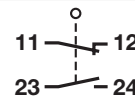
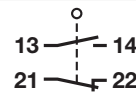
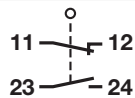
GC-SU1 AV  
602.1186.118

GC-U1 AD  
602.1137.103

GC-SU1 AD  
602.1187.125

GC-U1 AF  
602.1139.106

GC-SU1 AF  
602.1189.128



Zb  
●/-  
iw

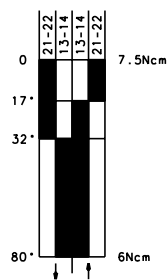
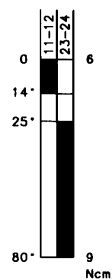
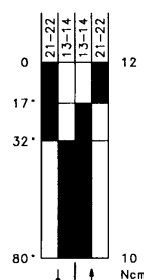
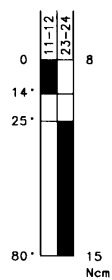
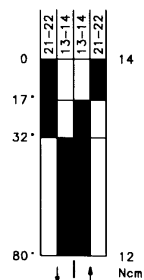
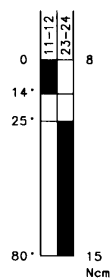
Zb  
-/  
iw

Zb  
●/-  
iw

Zb  
-/  
iw

Zb  
●/-  
iw

Zb  
-/  
iw



500 V AC  
10 A  
●

500 V AC  
10 A  
●

500 V AC  
10 A  
●

500 V AC  
10 A  
●

500 V AC  
10 A  
●

500 V AC  
10 A  
●

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

100/min.  
10 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

UL, CSA

UL, CSA

UL, CSA

UL, CSA

UL, CSA

UL, CSA

0.23 kg/0.51 lb  
●/-

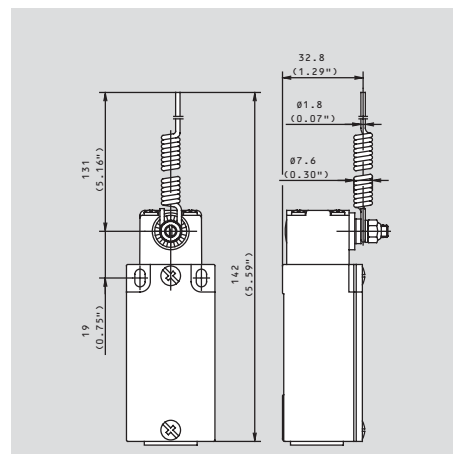
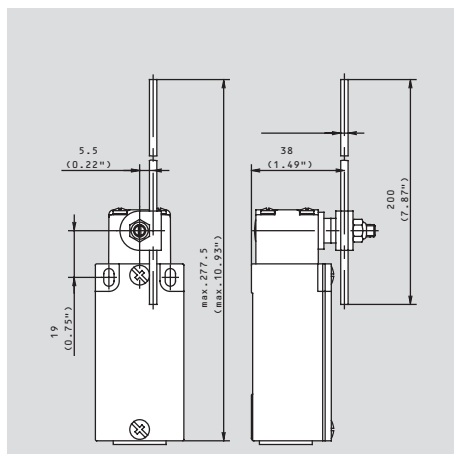
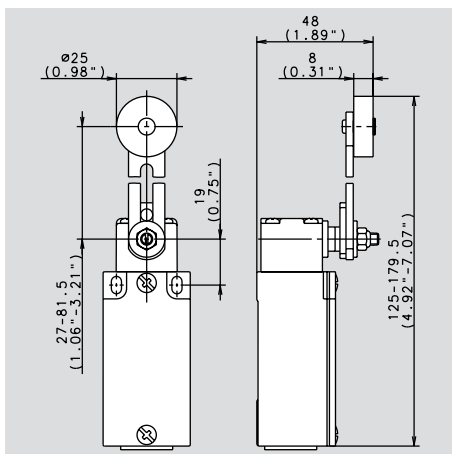
0.23 kg/0.51 lb  
●/-

0.22 kg/0.49 lb  
●/-

0.22 kg/0.49 lb  
●/-

0.21 kg/0.46 lb  
●/-

0.21 kg/0.46 lb  
●/-



# Metal-bodied limit switches

## SN 2

Versatile mounting options  
Protection class IP 65



CE



- Large range of actuators
- Snap action/slow make & break contacts
- Galvanically separated contacts
- Forced disconnection of NC contacts (type dependant)
- Protection class IP 65
- Aluminum body and lid
- 4 x 90° actuator positions
- Single direction operation of contacts with AH actuator (user selectable)
- Three cable entries M 20 x 1.5
- Adjustment of the AH lever arm position in 90° increments
- Terminals numbered in accordance with DIN EN 50013
- International approvals

### Mounting

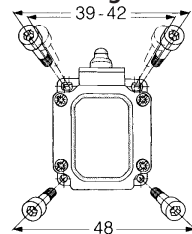


Fig. 1

- a) Adjustable – two slots for M 4 screws
- b) Fixed – two holes for M 5 screws for safety applications

### Benefits

- Three cable entries allow “through wiring”

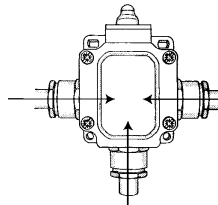


Fig. 2

- Two earth connection points

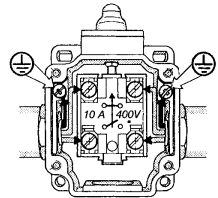


Fig. 3

- Spacious connection area
- Screw terminals with self lifting clamps for easy wiring
- Easily exchanged contact block with latch holding device
- Contact switch point finely adjustable with adjusting screw



### Options

- Contact status display with LED (LED protected within terminal chamber)
- Three contact slow make & break 2NC/1NO, U15, 400 V, 6 A (fig. 4)
- Three contact slow make & break 1NC/2NO, U16, 400 V, 6 A (fig. 4)

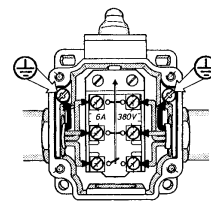


Fig. 4

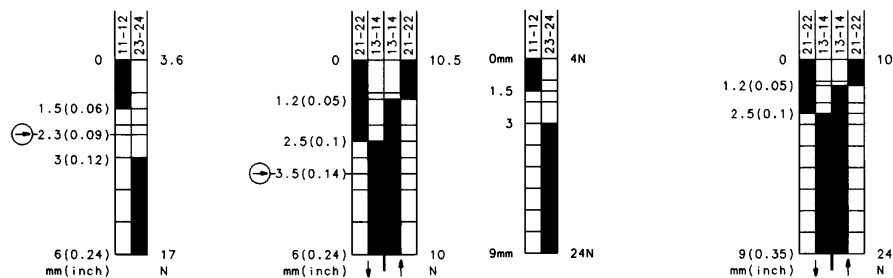
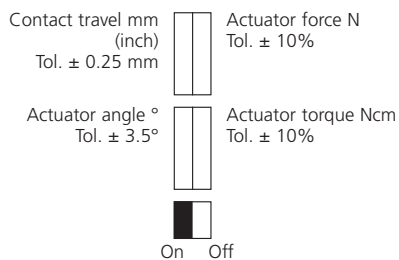
### Contact configuration

Contact type	Switch function	Switch contacts	Reference	Max. voltage	Max. constant current
Slow make & break	Changeover	1NC/1NO	U1/U1Z	400 V	10 A
Slow make & break	Changeover overlapping	1NC/1NO	UV1Z	400 V	10 A
Slow make & break	Changeover	1NC/1NO	SU1/SU1Z	400 V	10 A



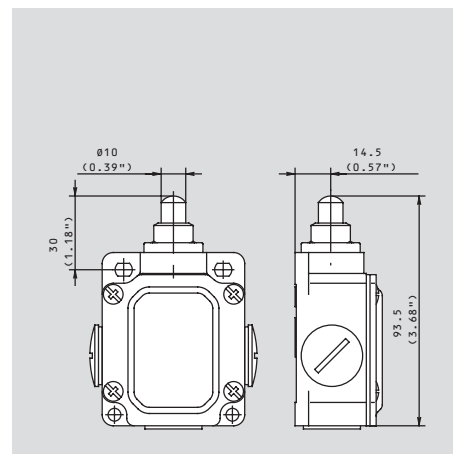
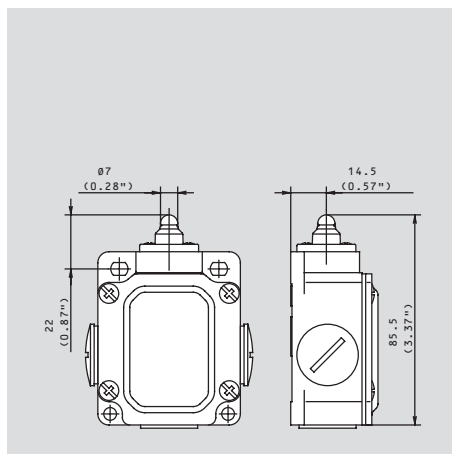
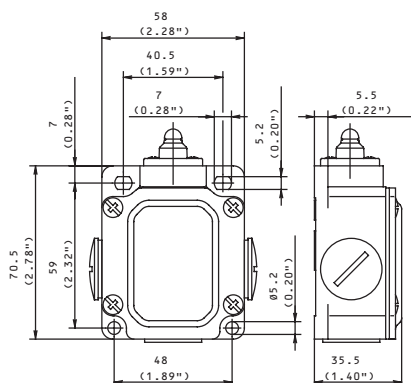
Designation  
**Part number**  
 Circuit diagram  
 ⊕ Forced disconnect to IEC 947-5-1 chapter 3  
 Za: not galvanically separated contacts  
 Zb: galvanically separated contacts  
 Slow make & break/snap-action  
 Internal seal (iw)/external seal (w)

SN2-U1Z w	SN2-SU1Z w	SN2-U1 Liw	SN2-SU1 Liw
<b>603.3103.023</b>	<b>603.3353.016</b>	<b>603.3144.024</b>	<b>603.3194.022</b>
⊕ Zb	⊕ Zb	Zb	Zb
●/-	-/●	●/-	-/●
w	w	iw	iw



Voltage	max.	400 V AC	400 V AC	400 V AC	400 V AC
Permanent current	max.	10 A	10 A	10 A	10 A
In-rush current complies with standards		●	●	●	●
IEC 947-5-1 AC 15/DC 13					
Switching frequency	max.	100/min.	100/min.	100/min.	100/min.
Mechanical life – number of switching actions		10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>
Operating temperature	min./max.	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F
Approvals		UL, CSA	UL, CSA	UL, CSA	UL, CSA
Weight		0.17 kg/0.37 lb	0.17 kg/0.37 lb	0.19 kg/0.42 lb	0.19 kg/0.42 lb
Delivery: ex-stock/built to order		-/●	●/-	-/●	●/-

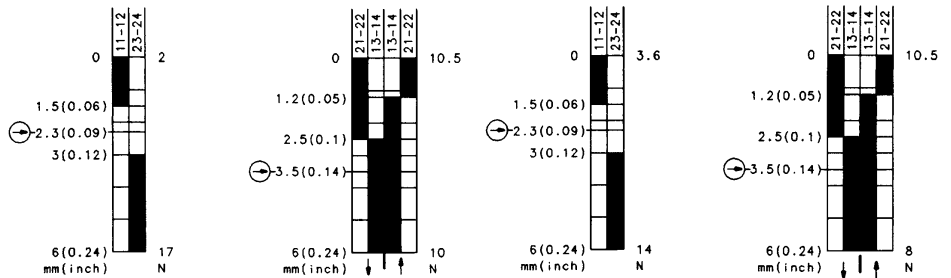
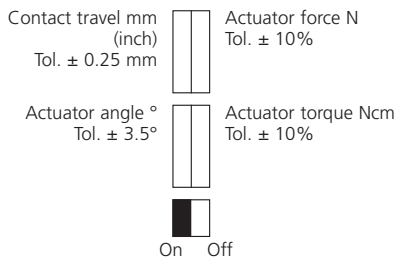
All dimensions in mm (inch)





Designation  
**Part number**  
 Circuit diagram  
 ⊕ Forced disconnect to IEC 947-5-1 chapter 3  
 Za: not galvanically separated contacts  
 Zb: galvanically separated contacts  
 Slow make & break/snap-action  
 Internal seal (iw)/external seal (w)

SN2-U1Z Riv	SN2-SU1Z Riv	SN2-U1Z Hw	SN2-SU1Z Hw
<b>603.3117.025</b>	<b>603.3367.017</b>	<b>603.3121.007</b>	<b>603.3371.006</b>
⊕ Zb	⊕ Zb	⊕ Zb	⊕ Zb
●/-	-/●	●/-	-/●
iw	iw	w	w



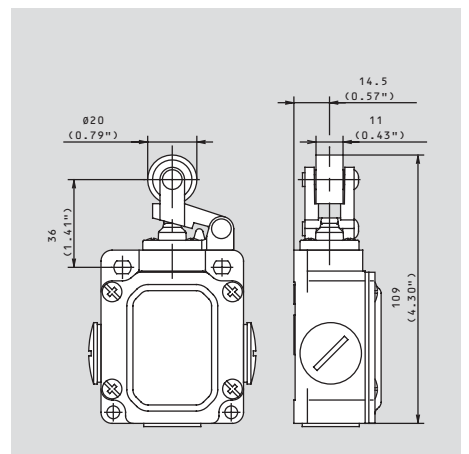
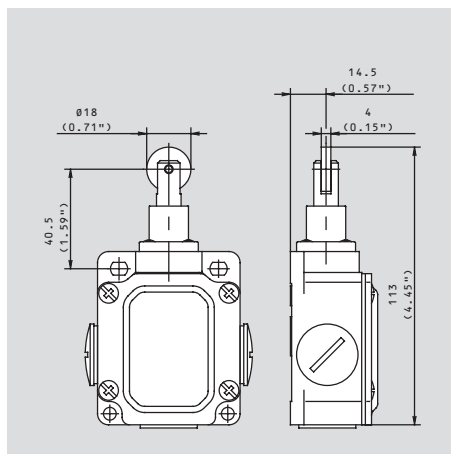
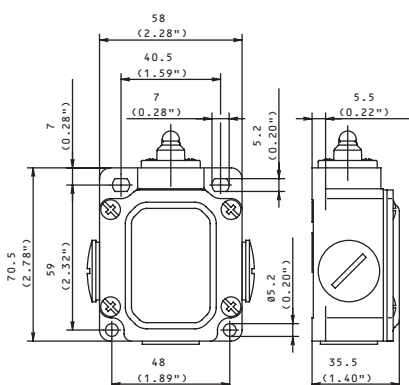
Voltage max.  
 Permanent current max.  
 In-rush current complies with standards  
 IEC 947-5-1 AC 15/DC 13  
 Switching frequency max.  
 Mechanical life – number of switching actions  
 Operating temperature min./max.

400 V AC	400 V AC	400 V AC	400 V AC
10 A	10 A	10 A	10 A
●	●	●	●
100/min.	100/min.	100/min.	100/min.
10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F

Approvals  
 Weight  
 Delivery: ex-stock/built to order

UL, CSA	UL, CSA	UL, CSA	UL, CSA
0.20 kg/0.44 lb	0.20 kg/0.44 lb	0.22 kg/0.49 lb	0.22 kg/0.49 lb
-/●	-/●	●/-	●/-

All dimensions in mm (inch)





SN2-U1Z DGHw  
603.3121.005

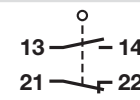
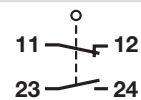
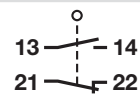
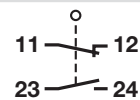
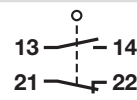
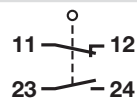
SN2-SU1Z DGHw  
603.3371.004

SN2-U1Z DGkw  
603.3127.010

SN2-SU1Z DGkw  
603.3377.011

SN2-U1Z AHS  
603.3135.002

SN2-SU1Z AHS  
603.3385.018



⊖ Zb

⊖ Zb

⊖ Zb

⊖ Zb

⊖ Zb

⊖ Zb

●/-

-/●

●/-

-/●

●/-

-/●

W

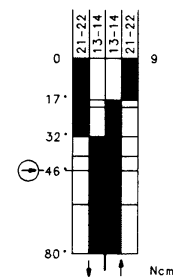
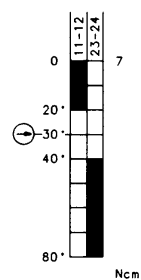
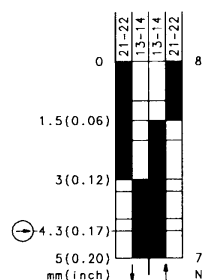
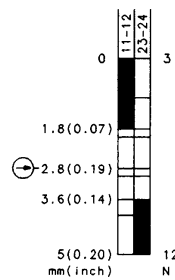
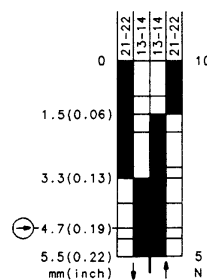
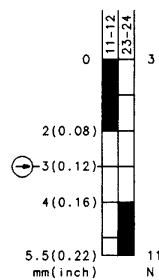
W

W

W

iW

iW



400 V AC  
10 A

400 V AC  
10 A

400 V AC  
10 A

400 V AC  
10 A

400 V AC  
10 A

400 V AC  
10 A

●

●

●

●

●

●

100/min.

100/min.

100/min.

100/min.

100/min.

100/min.

10 x 10<sup>6</sup>

10 x 10<sup>6</sup>

10 x 10<sup>6</sup>

10 x 10<sup>6</sup>

10 x 10<sup>6</sup>

10 x 10<sup>6</sup>

-30 °C/+80 °C

-30 °C/+80 °C

-30 °C/+80 °C

-30 °C/+80 °C

-30 °C/+80 °C

-30 °C/+80 °C

-22 °F/+176 °F

-22 °F/+176 °F

-22 °F/+176 °F

-22 °F/+176 °F

-22 °F/+176 °F

-22 °F/+176 °F

UL, CSA

UL, CSA

UL, CSA

UL, CSA

UL, CSA

UL, CSA

0.23 kg/0.51 lb

0.23 kg/0.51 lb

0.23 kg/0.51 lb

0.23 kg/0.51 lb

0.25 kg/0.55 lb

0.25 kg/0.55 lb

-/●

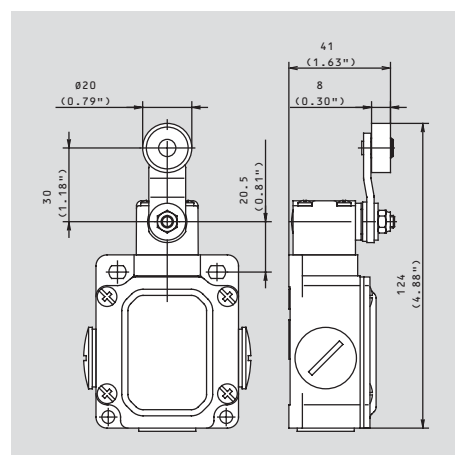
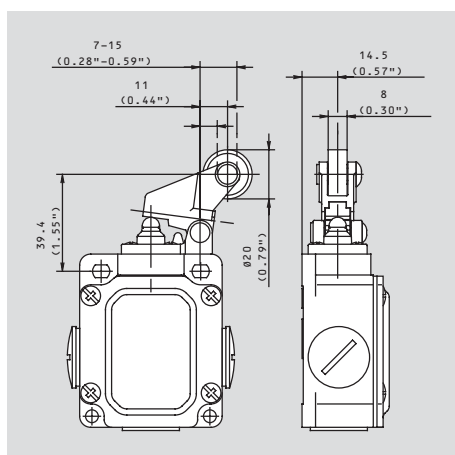
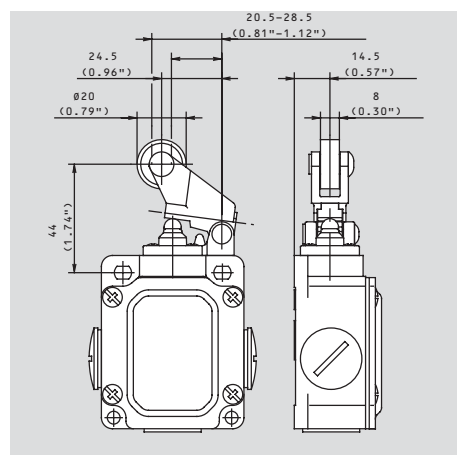
●/-

-/●

-/●

●/-

●/-



# Metal-bodied limit switches

## ENM 2

Standard switch according to DIN EN 50041  
Protection class IP 65



- Increased number of switching functions for safety applications
- Galvanically separated contacts
- Forced disconnection of NC contacts (type dependant)
- Person-protection function ⊕ (depending on model)
- Protection class IP 65
- Aluminum body and lid
- Operating device: 4 x 90° actuator positions
- Cable entry M 20 x 1.5
- International approvals

### Mounting

- 2 x M 5 screws, adjustment via elongated holes
- 2 x M 5 screws for safety applications without additional attachment

### Mounting advantages

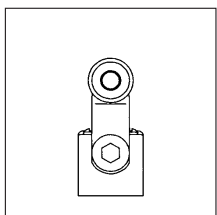
- Increased wiring space
- Earthing surface on same level as switching system
- Turret  
Lever: 7.5° / 15° adjustable
- Contact made independent of direction
- Screw terminals with self lifting clamps for easy wiring
- Fine adjustment of switching point via adjusting screw
- Captive lid screws

### Options

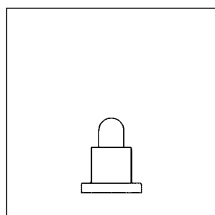
- Latching with contact locking (strain lock-release for safety reasons)
- LED indication of switching status
- EEx certificated versions available acc. ATEX 100 a



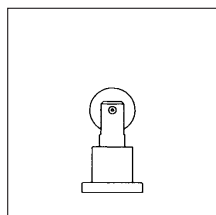
### Standard actuating element DIN EN 50041



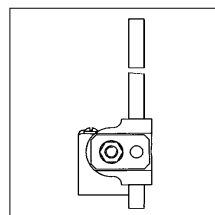
Form A



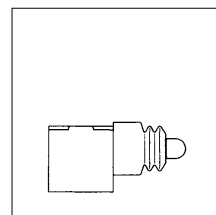
Form B



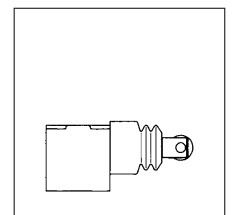
Form C



Form D



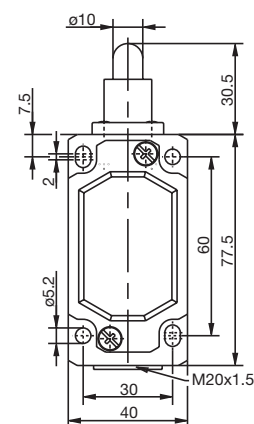
Form F  
(available upon request)



Form G  
(available upon request)

### Standard contact configuration

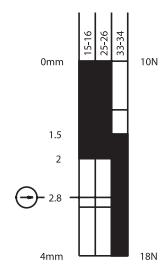
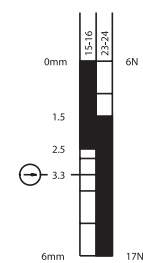
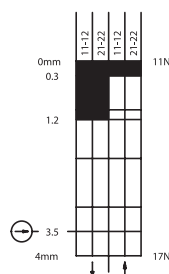
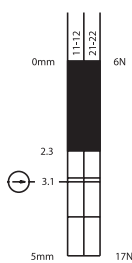
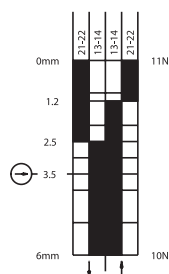
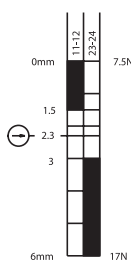
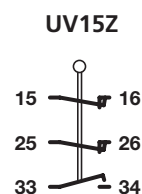
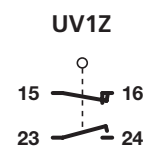
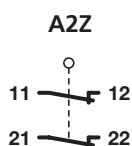
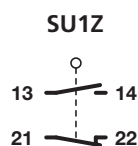
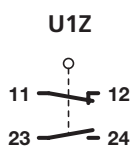
Switching element	Switch function	Switch contact	Designation	Voltage	Continuous current
Slow-action	changeover	1NC/1NO	U1/U1Z	400 V	10 A
Snap-action	changeover	1NC/1NO	SU1/SU1Z	400 V	10 A
Slow-action	normally-closed	2NC	A2/A2Z	400 V	10 A
Snap-action	normally-closed	2NC	SA2/SA2Z	250 V	10 A
Slow-action (overlapping)	changeover	1NC/1NO	UV1/UV1Z	400 V	10 A
Slow-action (overlapping)	changeover	2NC/1NO	UV15/UV15Z	400 V	5 A



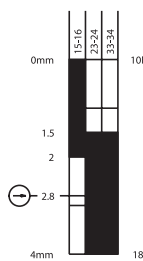
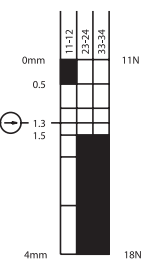
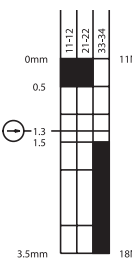
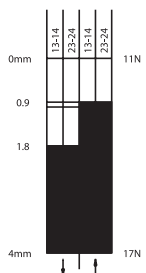
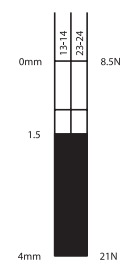
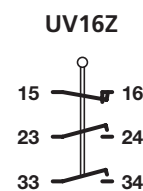
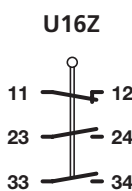
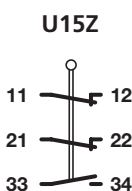
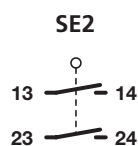
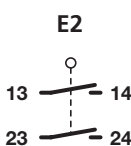
### Optional contact configuration

Switching element	Switch function	Switch contact	Designation	Voltage	Continuous current
Slow-action	normally-open	2NO	E2	250 V	10 A
Snap-action	normally-open	2NO	SE2	250 V	10 A
Slow-action	changeover	2NC/1NO	U15/U15Z	400 V	5 A
Slow-action	changeover	1NC/2NO	U16/U16Z	400 V	5 A
Slow-action (overlapping)	changeover	1NC/2NO	UV16/UV16Z	400 V	5 A

### Contact travel diagrams and graphic symbols



### On request

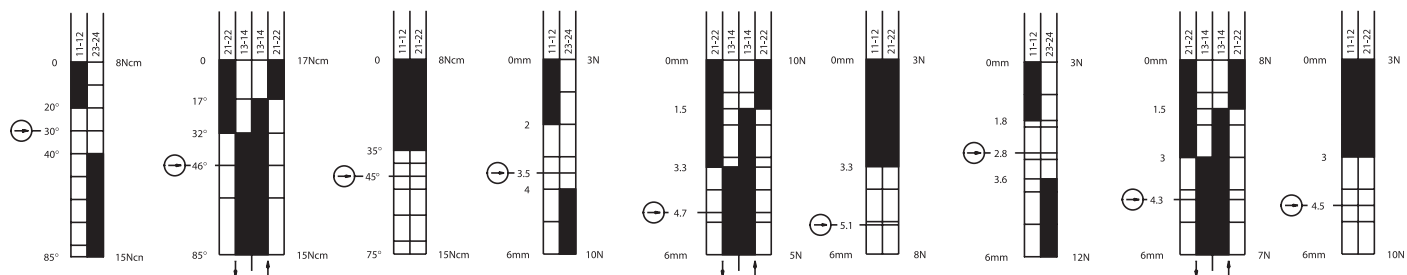




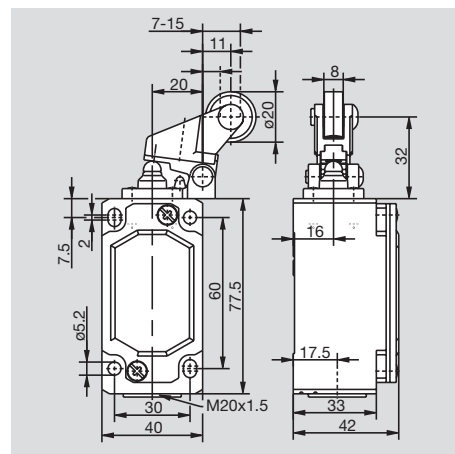
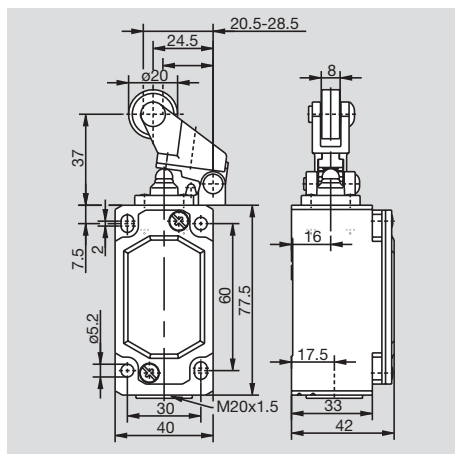
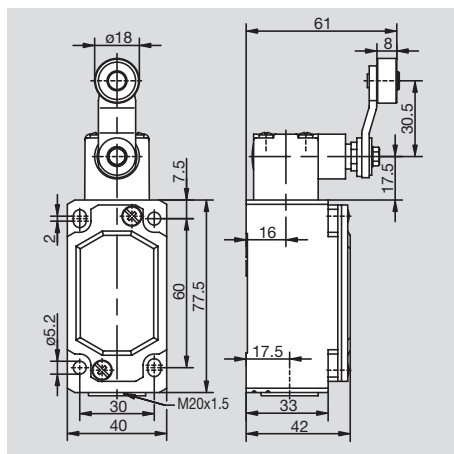




ENM2-U1Z AHS-V 608.7135.013	ENM2-SU1Z AHS-V 608.7385.014	ENM2-A2Z AHS-V 608.7835.015	ENM2-U1Z DGHW 608.7121.007	ENM2-SU1Z DGHW 608.7371.008	ENM2-A2Z DGHW 608.7821.009	ENM2-U1Z DGKW 608.7127.010	ENM2-SU1Z DGKW 608.7377.011	ENM-A2Z DGKW 608.7827.012
⊖ Zb	⊖ Zb	⊖ Zb	⊖ Zb	⊖ Zb	⊖ Zb	⊖ Zb	⊖ Zb	⊖ Zb
●/-	-/●	●/-	●/-	-/●	●/-	●/-	-/●	●/-
iV	iV	iV	W	W	W	W	W	W



400 V AC	400 V AC	400 V AC	400 V AC	400 V AC	400 V AC	400 V AC	400 V AC	400 V AC
10 A	10 A	10 A	10 A	10 A	10 A	10 A	10 A	10 A
●	●	●	●	●	●	●	●	●
100/min.	100/min.	100/min.	100/min.	100/min.	100/min.	100/min.	100/min.	100/min.
10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F
A	A	A	-	-	-	-	-	-
UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA
0.28 kg	0.28 kg	0.28 kg	0.23 kg	0.23 kg	0.23 kg	0.23 kg	0.23 kg	0.23 kg
●/-	●/-	●/-	-/●	-/●	-/●	-/●	-/●	-/●

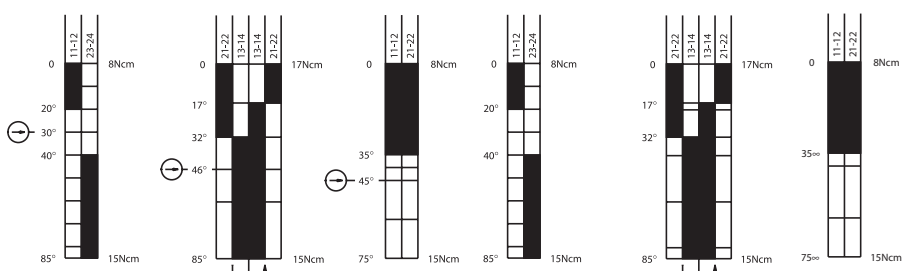




Designation	ENM2-U1 AD	ENM2-SU1 AD	ENM2-A2 AD	ENM2-U1 AV	ENM2-SU1 AV	ENM2-A2 AV
<b>Part number</b>	<b>608.7137.018</b>	<b>608.7387.019</b>	<b>608.7837.029</b>	<b>608.7136.016</b>	<b>608.7386.017</b>	<b>608.7836.028</b>
Switching diagram						
⊕ Positive break according to IEC 947-5-1 Chap. 3	<p>Za: changeover contact is not galvanically isolated          Zb: changeover contact is galvanically isolated</p>					
Slow-action contact / snap-action contact	●/-					
Gasket inside (iw)/outside (w)	iw					

ENM2-U1 AD	ENM2-SU1 AD	ENM2-A2 AD	ENM2-U1 AV	ENM2-SU1 AV	ENM2-A2 AV
11-12	13-14	11-12	11-12	13-14	11-12
23-24	21-22	21-22	23-24	21-22	21-22
(*)/Zb	(*)/Zb	(*)/Zb	(*)/Zb	(*)/Zb	(*)/Zb
●/-	-/●	●/-	●/-	-/●	●/-
iw	iw	iw	iw	iw	iw

Contact travel mm Tol. ± 0.25 mm	Actuating force N Tol. ± 10%
Switch angle degree Tol. ± 3.5°	Actuating torque Ncm Tol. ± 10%
In	Out



Voltage	max.	400 V AC
Continuous current	max.	10 A
Making current, acc. to IEC 947-5-1 AC 15/DC 13		●
Switching frequency	max.	100/min.
Mech. operational life – number of switching cycles		10 x 10 <sup>6</sup>
Ambient temperature	min./max.	-30 °C/+80 °C -22 °F/+176 °F

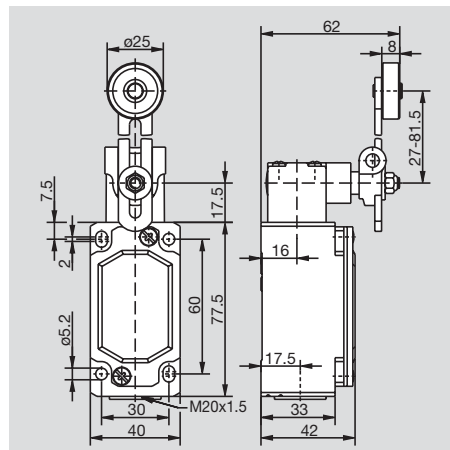
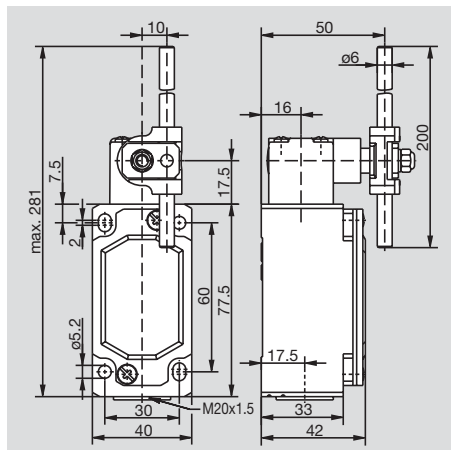
400 V AC	400 V AC	400 V AC	400 V AC	400 V AC	400 V AC
10 A	10 A	10 A	10 A	10 A	10 A
●	●	●	●	●	●
100/min.	100/min.	100/min.	100/min.	100/min.	100/min.
10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>
-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F

Standard actuating element	Form
Approvals (applied for)	
Weight	
Delivery: ex-stock/built to order	

D	D	D	-	-	-
UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA
0.29 kg	0.29 kg	0.29 kg	0.30 kg	0.30 kg	0.30 kg
●/-	●/-	-/●	●/-	●/-	-/●

All dimensions in mm

(\*) Adjustable operating devices are not recommended for safety applications.





# Metal-bodied limit switches

## D I

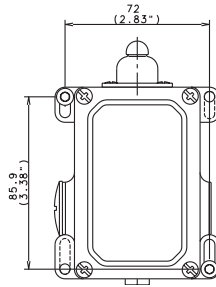
Heavy duty housing  
For harsh operating environment  
Robust design of actuator assembly  
and contact systems  
Protection class IP 65



- Robust contact assembly
- Guide bushings resistant to wear & tear
- Large range of actuators
- Snap action or slow make & break contacts
- Extended body (D II) for multiple pole contact versions
- Forced disconnections of NC contacts (type dependant)
- Protection class IP 65
- Aluminum body and lid
- 4 x 90° actuator positions (type dependant)
- Two cable entries M 20 x 1.5 (type D I)
- International approvals

- On request: Two cable entries M 20 x 1.5 (type D II) for increased contact functions

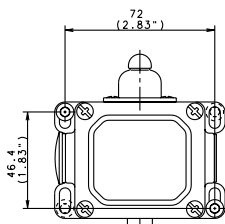
Type D II



### Installation benefits

- Two cable entries for easy "through wiring"
- Spacious connection area
- Captive lid screws
- Slotted mounting holes

Type D I

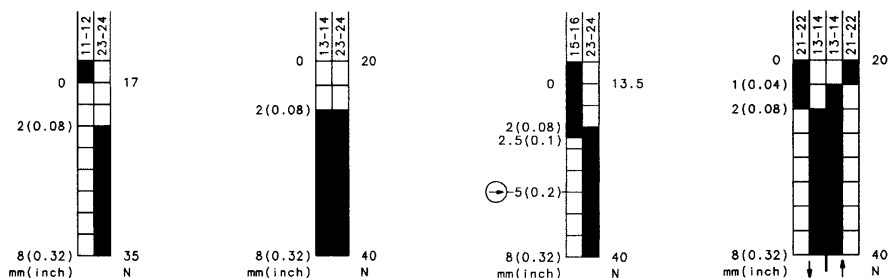
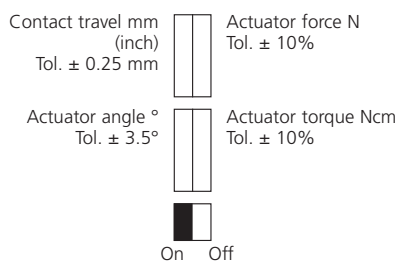


### Contact configuration

Contact type	Switch function	Switch contacts	Reference	Max. voltage	Max. constant current
Slow make & break	Changeover	1NC/1NO	U1	500 V	16 A
Slow make & break	Changeover	1NC/1NO	U11	500 V	16 A
Slow make & break	Changeover overlapping	1NC/1NO	UV1/UV1Z	400 V	16 A
Slow make & break	Changeover	2NC/2NO	U2	500 V	16 A
Slow make & break	NO	2NO	E2	400 V	16 A
Slow make & break	NC	1NC	A1Z	400 V	16 A
Slow make & break	NC	3NC	A3Z	400 V	16 A
Snap action	Changeover	1NC/1NO	SU1	500 V	16 A
Snap action	Changeover	2NC/2NO	SU2	500 V	16 A

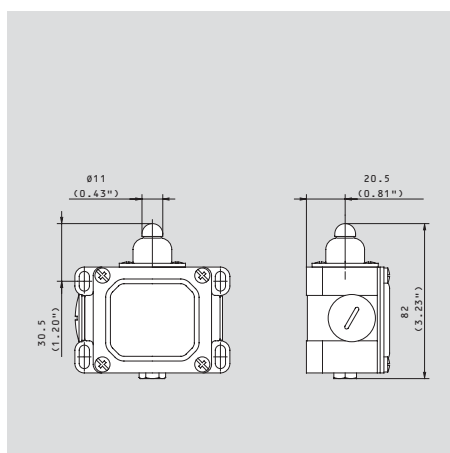
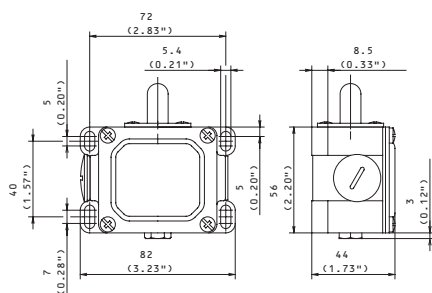


Designation	D-U1 w	D-E2 w	D-UV1Z w	D-SU1 w
<b>Part number</b>	<b>604.1103.002</b>	<b>604.1803.046</b>	<b>604.1303.134</b>	<b>604.1153.156</b>
Circuit diagram				
⊕ Forced disconnect IEC 947-5-1 chapter 3				
Za: not galvanically separated contacts				
Zb: galvanically separated contacts			⊕ Zb	
Slow make & break/snap-action	●/-	●/-	●/-	-/●
Internal seal (iw)/external seal (w)	w	w	w	w



Voltage	max.	500 V AC	400 V AC	400 V AC	500 V AC
Permanent current	max.	16 A	16 A	16 A	16 A
In-rush current complies with standards		●	●	●	●
IEC 947-5-1 AC 15/DC 13					
Switching frequency	max.	100/min.	100/min.	100/min.	100/min.
Mechanical life – number of switching actions		10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>
Operating temperature	min./max.	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F
Approvals		CSA	CSA	CSA	CSA
Weight		0.27 kg/0.60 lb	0.27 kg/0.60 lb	0.27 kg/0.60 lb	0.27 kg/0.60 lb
Delivery: ex-stock/built to order		●/-	●/-	●/-	●/-

All dimensions in mm (inch)

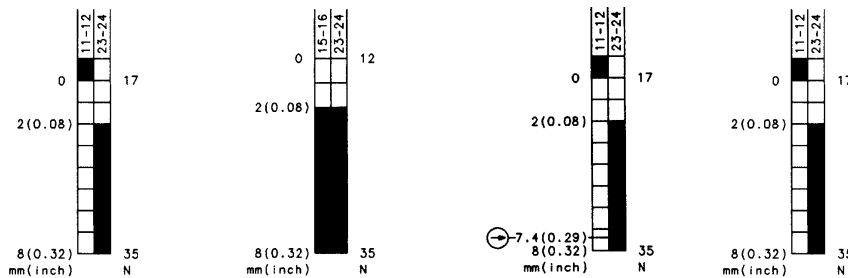




Designation  
**Part number**  
 Circuit diagram  
 ⊕ Forced disconnect to IEC 947-5-1 chapter 3  
 Za: not galvanically separated contacts  
 Zb: galvanically separated contacts  
 Slow make & break/snap-action  
 Internal seal (iw)/external seal (w)

D-U1 Pw	D-E2 Pw	D-U1Z Rw	D-U1 Rw
<b>604.1113.006</b>	<b>604.1813.050</b>	<b>604.1118.229</b>	<b>604.1118.008</b>
-	-	⊕ Za	-
●/-	●/-	●/-	●/-
w	w	w	w

Contact travel mm (inch) Tol. ± 0.25 mm  
 Actuator force N Tol. ± 10%  
 Actuator angle ° Tol. ± 3.5°  
 Actuator torque Ncm Tol. ± 10%  
 On Off



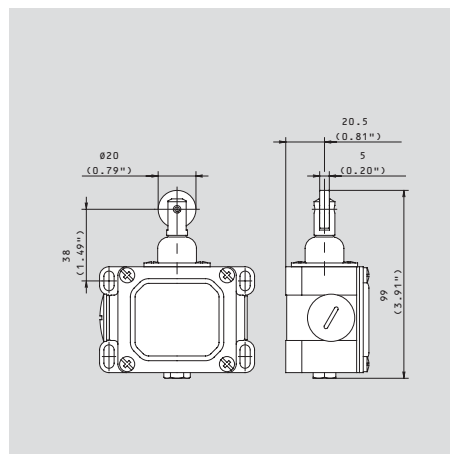
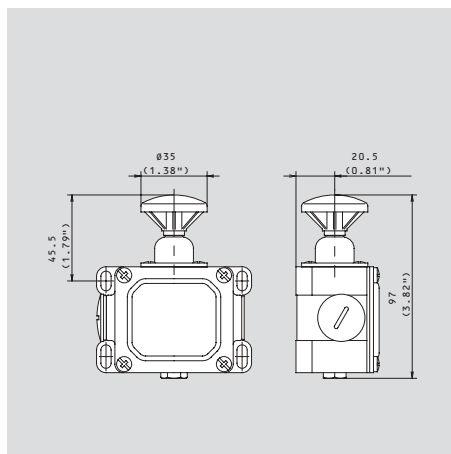
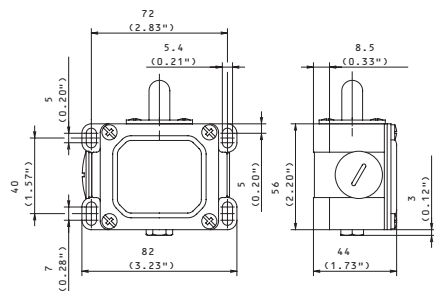
Voltage max.  
 Permanent current max.  
 In-rush current complies with standards  
 IEC 947-5-1 AC 15/DC 13  
 Switching frequency max.  
 Mechanical life – number of switching actions  
 Operating temperature min./max.

500 V AC	400 V AC	500 V AC	500 V AC
16 A	16 A	16 A	16 A
●	●	●	●
100/min.	100/min.	100/min.	100/min.
10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F

Approvals  
 Weight  
 Delivery: ex-stock/built to order

CSA	CSA	CSA	CSA
0.28 kg/0.62 lb	0.28 kg/0.62 lb	0.28 kg/0.62 lb	0.28 kg/0.62 lb
●/-	●/-	●/-	●/-

All dimensions in mm (inch)







D-UV1Z Rw  
604.1318.140

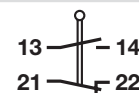
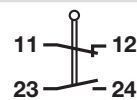
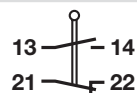
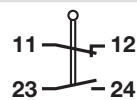
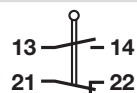
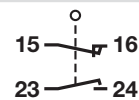
D-SU1 Rw  
604.1168.162

D-U1 Hw  
604.1121.010

D-SU1 Hw  
604.1171.164

D-U1 AH  
604.1135.019

D-SU1 AH  
604.1185.173



⊖ Zb

-

-

-

-

-

●/-

-/●

●/-

-/●

●/-

-/●

w

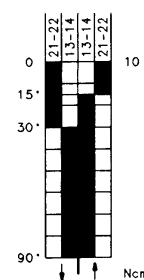
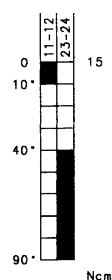
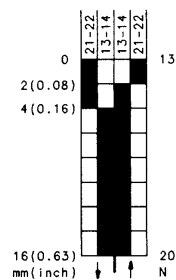
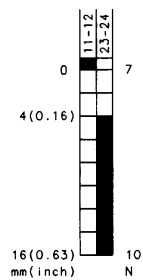
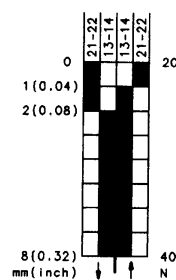
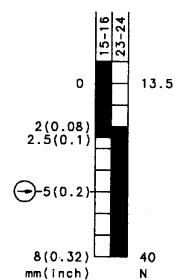
w

w

w

iw

iw



400 V AC  
16 A

500 V AC  
16 A

500 V AC  
16 A

500 V AC  
16 A

500 V AC  
16 A

500 V AC  
16 A

●

●

●

●

●

●

100/min.

100/min.

100/min.

100/min.

100/min.

100/min.

10 x 10<sup>6</sup>

10 x 10<sup>6</sup>

10 x 10<sup>6</sup>

10 x 10<sup>6</sup>

10 x 10<sup>6</sup>

10 x 10<sup>6</sup>

-30 °C/+80 °C

-30 °C/+80 °C

-30 °C/+80 °C

-30 °C/+80 °C

-30 °C/+80 °C

-30 °C/+80 °C

-22 °F/+176 °F

-22 °F/+176 °F

-22 °F/+176 °F

-22 °F/+176 °F

-22 °F/+176 °F

-22 °F/+176 °F

CSA

CSA

CSA

CSA

CSA

CSA

0.28 kg/0.62 lb

0.28 kg/0.62 lb

0.33 kg/0.73 lb

0.33 kg/0.73 lb

0.40 kg/0.88 lb

0.40 kg/0.88 lb

●/-

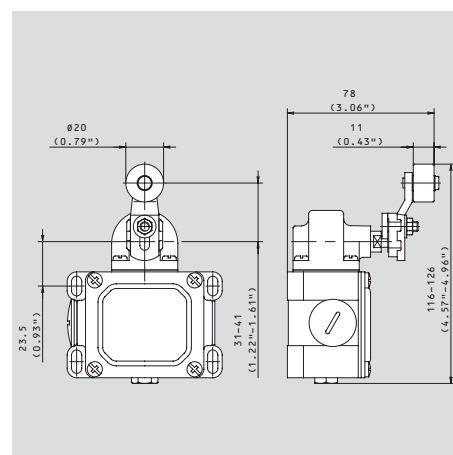
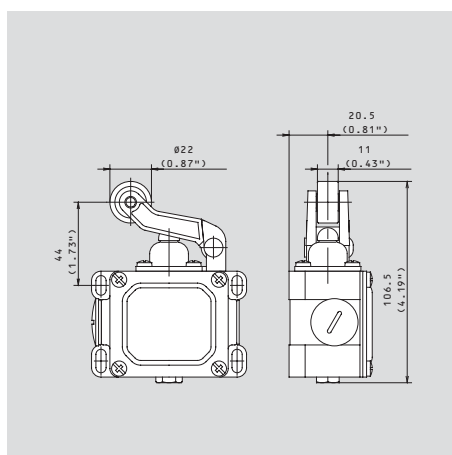
●/-

●/-

●/-

●/-

●/-



## Actuator selection table

Actuator	Code	Seal iw = internally w = externally	Plastic bodied					Metal bodied			
			COMBI Page 10	TINY Page 14	I 88 Page 19	BIGGY Page 25	ENK Page 28	GC I Page 32	SN 2 Page 38	ENM 2 Page 42	D I Page 46
Plunger	-	iw	-	-	-	-	●	-	-	-	-
	-	w	-	●	●	●	-	-	-	-	-
	-	IP 30	●	-	-	-	-	-	-	-	-
	-	IP 43	-	-	-	-	-	-	-	-	○
Roller ball	KU	iw	-	-	-	-	-	○	○	○	-
Mushroom	P	w	-	-	-	-	-	-	-	-	●
Telescopic plunger	L	iw	-	-	-	-	-	●	○	○	-
Plunger (adjustable)	ST	w	-	-	-	-	-	●	○	○	●
	ST	iw	-	-	-	-	-	●	○	○	-
	ST	IP 30	●	-	-	-	-	-	-	-	-
Button	K	IP 30	●	-	-	-	-	-	-	-	-
Roller plunger	R	IP 30	●	-	-	-	-	-	-	-	-
	R	iw	-	●	○	●	●	●	●	●	-
		w	-	-	-	-	-	-	-	-	●
		IP 43	-	-	-	-	-	-	-	-	○
Roller plunger (long)	R...L	iw	-	○	●	○	-	-	-	-	-
Roller plunger (short)	R...K	iw	-	○	●	○	-	-	-	-	-
Roller lever	H	IP 30	●	-	-	-	-	-	-	-	-
	H	w	-	●	●	●	●	-	-	-	-
	H, HT	iw	-	-	-	-	-	●	○	○	-
	Roller lever (long)	H/D-WI	w	-	-	-	-	-	●	●	○
HL		iw	-	-	-	-	-	●	○	○	-
HL/D-H		w	-	-	-	-	-	●	○	○	●
D-H		IP 43	-	-	-	-	-	-	-	-	○
Roller lever (adjustable)	DGH	w	-	○	●	○	○	○	●	●	-
Roller lever (adjustable)	DGK	w	-	○	●	○	○	○	●	●	-
Angled roller lever	KN	iw	-	-	-	-	-	●	○	○	-
	KN	w	-	○	●	○	-	●	○	○	○
Roller lever (directional)	KG	iw	-	-	-	-	-	●	○	○	-
	KG	w	-	○	●	○	-	●	○	○	-
Bi-stable roller lever	DR	iw	-	-	-	-	-	●	○	○	-
Wobble stick	FF	iw	-	-	-	-	-	●	●	○	-
	FF	w	-	●	○	●	●	-	-	-	-
Wobble stick (long)	FFL	w	-	-	-	-	-	●	○	○	-
Turret head	AH	iw	-	●	●	●	-	●	○	○	●
Turret head (star clamp)	AHS	iw	-	●	●	●	-	○	●	○	-
Turret head (positive drive)	AHS-V	iw	-	-	-	-	●	○	●	●	-
Turret head (or force disconnection in forward & return travel)	AHZ	iw	-	-	-	-	-	○	○	●	-
Turret head (adjustable)	AV	iw	-	●	●	●	●	●	○	●	●
Turret head (adjustable rod)	AD	iw	-	●	●	●	●	●	○	●	○
Turret head (spring)	AF	iw	-	○	●	○	○	●	●	○	-

● Catalogue model (stock item or to order)

○ Technically possible (on request)

- Not available

Operating direction	Plunger direction		Approach speed/angle						Notes
			m/s	0.1	0.5	1	2	5	
	↓	Metal	A	20°	20°	10°	5°	-	<ul style="list-style-type: none"> <li>The information shown in the diagrams for contact travel / switching force is valid <b>in plunger direction</b>.</li> </ul>
		B	20°	20°	10°	5°	-		
		Plastic	A	20°	20°	10°	5°	-	
		B	20°	20°	10°	5°	-		
	↓	Metal	A	30°	5°	-	-	-	<ul style="list-style-type: none"> <li>The information shown in the diagrams for contact travel / switching force is valid <b>in plunger direction</b>.</li> <li>Plunger tip is adjustable on type ST</li> </ul>
		B	30°	5°	-	-	-		
		Plastic	A	30°	5°	-	-	-	
		B	30°	5°	-	-	-		
	↓	Metal	A	30°	30°	20°	10°	5°	<ul style="list-style-type: none"> <li>The information shown in the diagrams for contact travel / switching force is valid <b>in plunger direction</b>.</li> </ul>
		B	30°	30°	20°	10°	5°		
		Plastic	A	30°	30°	20°	10°	5°	
		B	30°	30°	20°	10°	5°		
	↓	Metal	A	-	30°	30°	20°	10°	<ul style="list-style-type: none"> <li>The information shown in the diagrams for contact travel / switching force is valid <b>in plunger direction</b>.</li> </ul>
		B	20°	20°	10°	-	-		
		Plastic	A	-	30°	30°	20°	10°	
		B	40°	40°	30°	20°	10°		
	↓	Metal	A	-	30°	30°	20°	10°	<ul style="list-style-type: none"> <li>The information shown in the diagrams for contact travel / switching force is valid <b>in plunger direction</b>.</li> <li>Upper part of the actuator with roller – adjustable</li> </ul>
		B	20°	20°	10°	-	-		
		Plastic	A	-	30°	30°	20°	10°	
		B	40°	40°	30°	20°	10°		
	↓	Metal	A	-	-	-	-	-	<ul style="list-style-type: none"> <li>The information shown in the diagrams for contact travel / switching force is valid <b>90° to the plunger direction</b>.</li> <li>Upper part of the actuator with roller – adjustable</li> </ul>
		B	30°	30°	20°	10°	-		
		Plastic	A	-	-	-	-	-	
		B	40°	40°	40°	30°	20°		
	↓	Metal	A	-	-	-	-	-	<ul style="list-style-type: none"> <li>The information shown in the diagrams for contact travel / switching force is valid <b>90° to the plunger direction</b>.</li> </ul>
		B	30°	30°	20°	10°	-		
		Plastic	A	-	-	-	-	-	
		B	40°	40°	40°	30°	20°		
	↓	Metal	A	-	-	-	-	-	<ul style="list-style-type: none"> <li>The information shown in the diagrams for contact travel / switching force is valid <b>in plunger direction</b>.</li> </ul>
		B	40°	40°	30°	20°	-		
		Plastic	A	-	-	-	-	-	
		B	40°	40°	40°	30°	20°		
	↓	Metal	A	45°	45°	40°	30°	-	<ul style="list-style-type: none"> <li>The information shown in the diagrams for contact travel / switching force is valid <b>in direction of rotation</b>.</li> <li>Switch position will remain until return actuation</li> </ul>
		B	45°	45°	40°	30°	-		
		Plastic	A	-	-	-	-	-	
		B	-	-	-	-	-		
	↓	Metal	A	60°	50°	45°	-	-	<ul style="list-style-type: none"> <li>The information shown in the diagrams for switching angle/actuator torque is valid <b>for any operating direction</b>.</li> <li>Not suitable for operators protection</li> </ul>
		B	-	-	-	-	-		
		Plastic	A	20°	20°	10°	5°	-	
		B	-	-	-	-	-		
	↓	Metal	A	45°	45°	45°	40°	30°	<ul style="list-style-type: none"> <li>The information shown in the diagrams for switching angle/actuator torque is valid <b>in direction of rotation</b>.</li> <li>Roller lever adjustable on the shaft gradually (step by step) in radial direction and can be turned by 180°</li> </ul>
		B	45°	45°	45°	40°	30°		
		Plastic	A	45°	45°	45°	40°	30°	
		B	45°	45°	45°	40°	30°		
	↓	Metal	A	45°	45°	45°	40°	30°	<ul style="list-style-type: none"> <li>The information shown in the diagrams for switching angle/actuator torque is valid <b>in direction of rotation</b>.</li> <li>Roller lever adjustable in longitudinal &amp; radial direction on the shaft and can be turned by 180°</li> <li>Not suitable for operators protection</li> </ul>
		B	45°	45°	45°	40°	30°		
		Plastic	A	45°	45°	45°	40°	30°	
		B	45°	45°	45°	40°	30°		
	↓	Metal	A	45°	45°	40°	30°	20°	<ul style="list-style-type: none"> <li>The information shown in the diagrams for switching angle/actuator torque is valid <b>in direction of rotation</b>.</li> <li>Rod adjustable in longitudinal &amp; radial (step by step) direction</li> </ul>
		B	45°	45°	40°	30°	20°		
		Plastic	A	45°	45°	40°	30°	20°	
		B	45°	45°	40°	30°	20°		
	↓	Metal	A	45°	45°	40°	30°	20°	<ul style="list-style-type: none"> <li>The information shown in the diagrams for switching angle/actuator torque is valid <b>in direction of rotation</b>.</li> <li>Spring adjustable in radial direction on the shaft</li> <li>Not suitable for operators protection</li> </ul>
		B	45°	45°	40°	30°	20°		
		Plastic	A	45°	45°	40°	30°	20°	
		B	45°	45°	40°	30°	20°		

# Limit switches

## Technical data

### Switches with turret head housing

When supplied the contacts work in both directions according to the contact travel diagrams

#### Adjustment of the actuator standard position on the shaft:

The standard position of the unit can be changed and fixed step by step for exact positioning.

– AH, AHS, AHZ, AF, AD, AV:  
Adjustment in 15° steps (fig. 1)

– AHS-V  
Adjustment in 7,5° increments or 15° positive drive steps selected by reversing the drive washer between the lever and head (fig. 2)

– Adjustment AV, AD  
Adjustment in radial direction

– AH, AHS, AHS-V, AHZ, AV:  
By rotating 180° the roller lever is usable at a different axial level (fig 3. and 4)

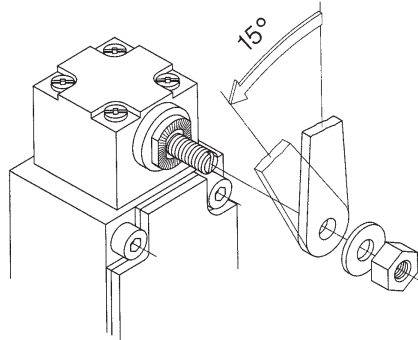


Fig. 1

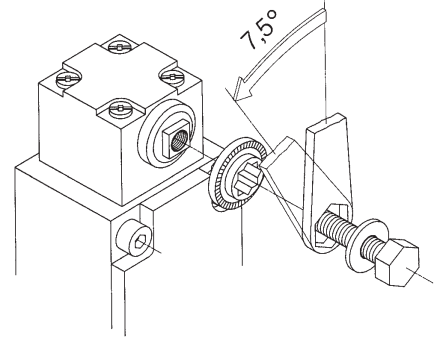


Fig. 2

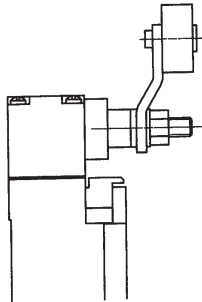


Fig. 3

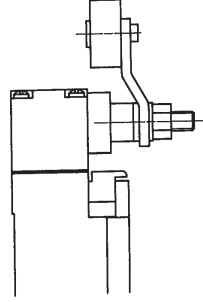


Fig. 4

### Adjustment for switching (dependent on direction)

With actuators AHS, AHS-V, AV, AD

When supplied as standard the contacts work in both directions according to the contact travel diagrams. By simply changing the actuator push rod, an idle run function can be achieved in the chosen direction (fig 5. and 6). The idle run function may be used in control systems, which cannot handle successive signals due to the return "over swing" of very long actuators AV/AD.

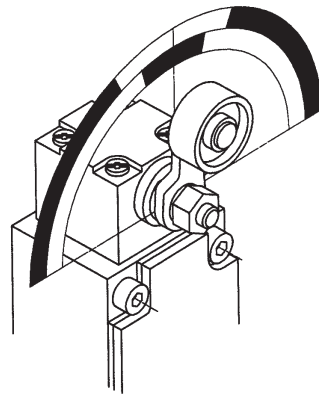


Fig. 5

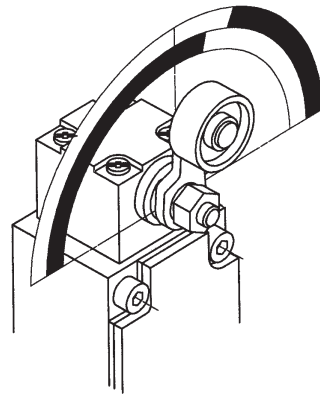


Fig. 6

### Forced disconnect

#### Forward and return movement AHZ

For special safety applications the forced disconnection of the NC contacts may be required in the forward movement (moving in one direction) as well as in the return movement (back to normal position). For operator safety applications the roller must be positively guided in both directions (see fig. 7 and 8).

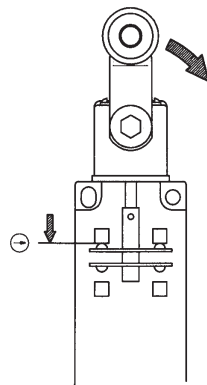


Fig. 7

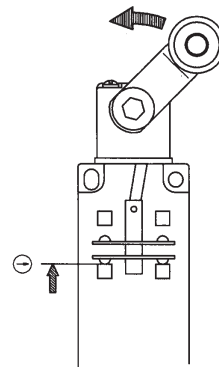


Fig. 8

**Note – when altering actuators AH, AHS, AHS-V, AHZ, AF, AD, AV, DGH, DGK**

– the assured conditions of supply will change.

After the adjustment, the user must make sure that the part reaches the necessary safety levels.

## Accessories for plastic bodied limit switches

### Fixing support



For type

**Part number**

Stock status: Ex stock / Built to order

I 88

**319.1871.157**

-/●

Bi

**319.1871.158**

-/●

ENK

**319.1871.154**

-/●

### Finger protection



For type

**Part number**

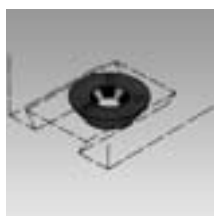
Stock status: Ex stock / Built to order

I 88, Bi, ENK

**359.5900.060**

●/-

### Guide disc



For type

**Part number**

Stock status: Ex stock / Built to order

I 88

**351.5900.209**

●/-

# Footswitches

## Selection table: contact arrangements

- Catalogue model (stock item or to order)
- Technically possible (to special order)
- not available

## Options

- EEx certificated versions available acc. ATEX 100 a

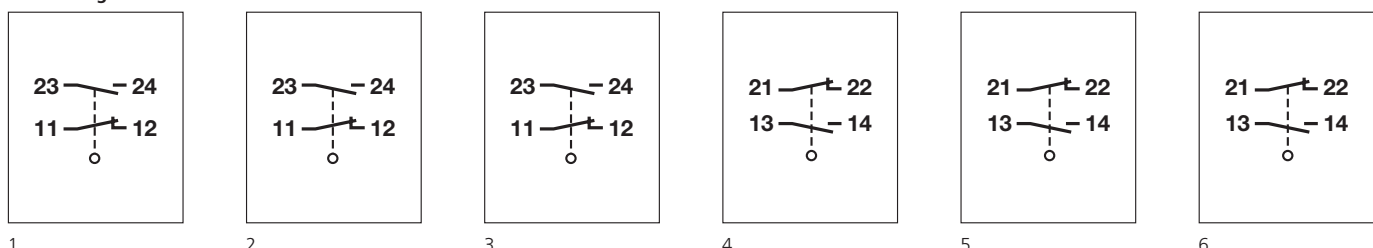


## Contacts/Pedals

## Additional features

Function	Contacts	Circuit diagram	Contacts Ref:	Additional features Ref:
Slow make & break	1NC/1NO	1	U1/U1Z	
Slow make & break	1NC/1NO	2	U1	Latch switch
Slow make & break	1NC/1NO	3	U1	Emergency stop button NA2
Snap action	1NC/1NO	4	SU1/SU1Z	
Snap action	1NC/1NO	5	SU1Z	Pressure point D
Snap action	1NC/1NO	6	SU1	Latch switch Y
Snap action	1NC/1NO	7	SU1Z	Power contactor LS 22
Snap action	1NC/1NO	8	SU1Z	Latch switch/power contactor Y/LS 22
Snap action	2NC/2NO	9	SU1 Mi	Potentiometer RG
Snap action/slow make & break	1NC/2NO	10	SU1Z/UV1	Safety function with pressure point D
Slow make & break	2NC/2NO	11	U2Z	
Slow make & break	2NC/2NO	12	U2Z	Pressure point D
Snap action	2NC/2NO	13	SU2Z	
			Electronic output	ES
			Pedal protection	PS
			Pedal latch	AT
			Foot support	FS
			Drop down pedal guard	UK

## Circuit diagrams



### Ordering instructions for footswitches

The following part numbers or type references of our catalogue versions are sufficient to place an order for a Bernstein footswitch. To ensure correct supply of footswitches with non-standard contact combinations or accessories, which are not shown in the catalogue we require the exact type reference.

- 1. Type**  
of footswitch requested – F1, F2, F3 or FG
- 2. Number and type of contact inserts**  
for multiple-pedal switches, list in order from left to right.  
Example: F3-U1Z/SU1Z/U2Z

- 3. Information about additional functions, design or pedal accessories**  
This must be indicated in the type reference directly after the appropriate contact element.  
Example: With latch & pressure point – F3-U1Z/SU1Y/U2ZD

Type	Pedal 1	Pedal 2		Pedal 3		Pedal independent addition
<b>F1</b>	–	Contact type	Additional function			Accessory
<b>F2</b>	–	Contact type	Additional function	Contact type	Additional function	Accessory
<b>F3</b>	–	Contact type	Additional function	Contact type	Additional function	Contact type

Example:

<b>F3</b>	–	U1	SU1 Y	U2 D	UN	
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**Type F1**  
Page 56



**Type F1 UN**  
Page 58



**Type F2**  
Page 61



**Type F2 UN**  
Page 62



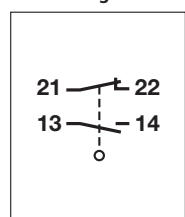
**Type F3**  
Page 63



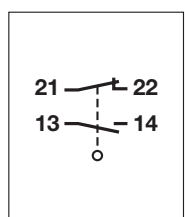
**Type F3 UN**  
Page 63

●	●	●	●	●	●
●	●	○	○	○	○
–	●	–	○	–	○
●	●	○	●	○	○
○	○	○	●	○	○
○	○	○	○	○	○
–	○	–	○	–	○
–	○	–	○	–	○
●	○	○	○	○	○
–	●	–	○	–	–
●	●	●	●	○	○
●	●	○	●	○	○
○	○	○	○	○	○
○	○	○	○	○	○
○	○	○	○	○	○
○	● U1Z	○	○	○	○
○	○	○	○	○	○
○	–	–	–	–	–

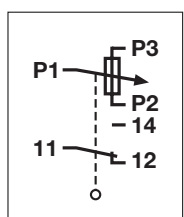
### Circuit diagrams



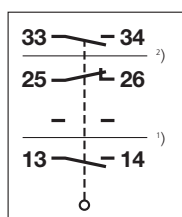
7



8

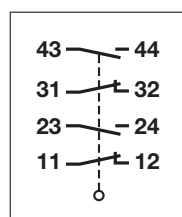


9

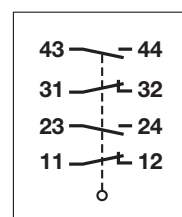


10

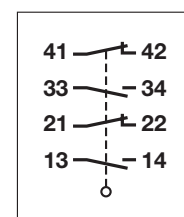
<sup>1)</sup> Pressure point  
<sup>2)</sup> Latch



11



12



13



# Footswitches with single pedal

## F1

Protection class IP 65

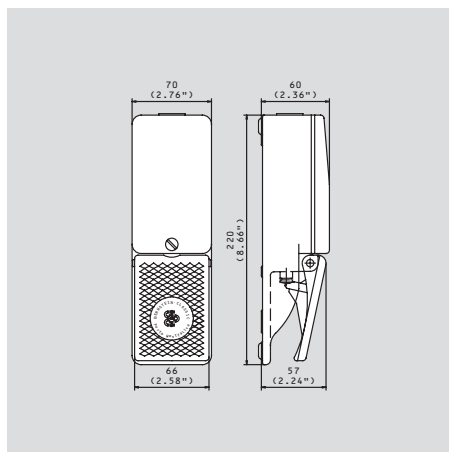


Designation	F1-U1Z	F1-U1Y	F1-SU1Z	F1-SU1 Mi RG
<b>Part number</b>	<b>606.1100.005</b>	<b>606.1100.001</b>	<b>606.1300.011</b>	<b>616.1300.327</b>
Circuit diagram				
	<sup>1)</sup> pressure point			
Slow make & break/snap action	●/-	●/-	-/●	-/●
Pressure point	-	-	-	-
Latching switch	-	●	-	-
Potentiometer	-	-	-	● 10 kΩ 2 W <sup>2)</sup>
Pedal interlocking	-	-	-	-
Emergency stop function	-	-	-	-
Power contactor	-	-	-	-
Voltage	500 V AC	500 V AC	500 V AC	250 V AC DC
Permanent current	10 A	10 A	10 A	5 A
In-rush current complies with standards IEC 947-5-1 AC 15/DC 13	●	●	●	●
Switching frequency	50/min.	50/min.	50/min.	20/min.
Mechanical life – number of switching actions	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>
Mechanical life – number of revolutions	-	-	-	50 x 10 <sup>3</sup> <sup>3)</sup>
Operating temperature	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F
Approvals	BG, CSA, UL	BG, CSA, UL	BG, CSA, UL	-
Cable entry	1 x M 20	1 x M 20	1 x M 20	1 x M 20
Weight	0.60 kg/1.3 lb	0.60 kg/1.3 lb	0.60 kg/1.3 lb	0.75 kg/1.65 lb
Delivery: ex-stock/built to order	●/-	●/-	●/-	●/-

All dimensions in mm (inch)

<sup>2)</sup> other resistance figures on request

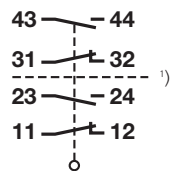
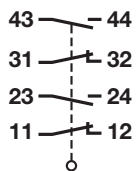
<sup>3)</sup> number of revolutions available up to 5 x 10<sup>6</sup>





F1-U2Z  
606.1200.003

F1-U2Z D  
606.1200.007



●/-	●/-
-	●
-	-
-	-
-	-
-	-

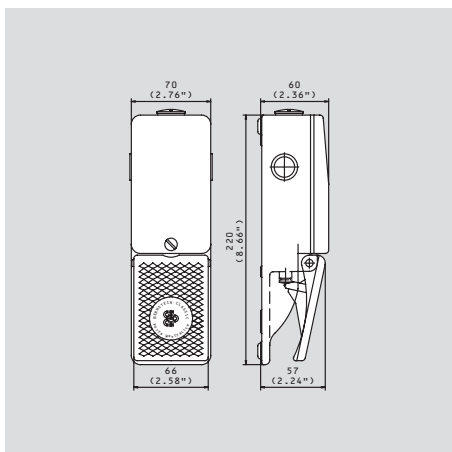
500 V AC	500 V AC
10 A	10 A
●	●

50/min.	50/min.
10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>
-	-
-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F

BG, CSA, UL      BG, CSA, UL

3 x M 20      3 x M 20

0.60 kg/1.3 lb	0.70 kg/1.5 lb
●/-	●/-



# Footswitches with single pedal (guarded)

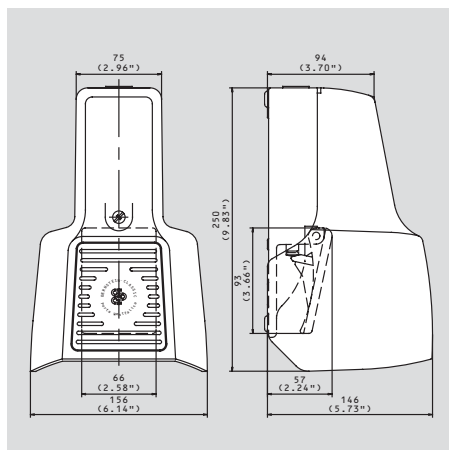
## F1 UN

Protection class IP 65



Designation	F1-U1Z UN	F1-U1Y UN	F1-SU1Z UN
<b>Part number</b>	<b>606.1600.006</b>	<b>606.1600.002</b>	<b>606.1800.012</b>
Circuit diagram			
	1) pressure point 2) Emergency stop button – self latching		
Slow make & break/snap action	●/–	●/–	–/●
Pressure point	–	–	–
Latching switch	–	●	–
Potentiometer	–	–	–
Pedal interlocking	–	–	–
Emergency stop function	–	–	–
Power contactor	–	–	–
Voltage	max. 500 V AC	max. 500 V AC	max. 500 V AC
Permanent current	max. 10 A	max. 10 A	max. 10 A
In-rush current complies with standards IEC 947-5-1 AC 15/DC 13	●	●	●
Switching frequency	max. 50/min.	max. 50/min.	max. 50/min.
Mechanical life – number of switching actions	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>
Mechanical life – number of revolutions	–	–	–
Operating temperature	min./max. –30 °C/+80 °C –22 °F/+176 °F	min./max. –30 °C/+80 °C –22 °F/+176 °F	min./max. –30 °C/+80 °C –22 °F/+176 °F
Approvals	BG, CSA, UL	BG, CSA, UL	BG, CSA, UL
Cable entry	1 x M 20	1 x M 20	1 x M 20
Weight	1.50 kg/3.3 lb	1.50 kg/3.3 lb	1.50 kg/3.3 lb
Delivery: ex-stock/built to order	●/–	●/–	●/–

All dimensions in mm (inch)



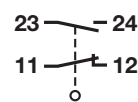
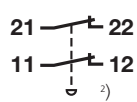
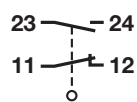
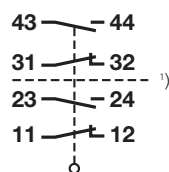
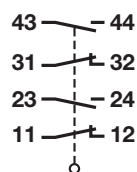


F1-U2Z UN  
606.1700.004

F1-U2ZD UN  
606.1700.008

F1-U1Z NA2 UN  
606.1600.435

F1-U1Z AT UN  
616.1600.400



●/-
-
-
-
-
-
-

●/-
●
-
-
-
-
-

●/-
-
-
-
●
-
-

●
-
-
-
●
-
-

500 V AC  
10 A

500 V AC  
10 A

500 V AC  
10 A

600 V AC  
10 A

500 V AC  
10 A

50/min.  
10 x 10<sup>6</sup>

50/min.  
10 x 10<sup>6</sup>

50/min.  
10 x 10<sup>6</sup>

50/min.  
10 x 10<sup>6</sup>

-30 °C/+80 °C  
-22 °F/+176 °F

-30 °C/+80 °C  
-22 °F/+176 °F

-30 °C/+80 °C  
-22 °F/+176 °F

-30 °C/+80 °C  
-22 °F/+176 °F

BG, CSA, UL

BG, CSA, UL

BG, CSA, UL

BG, CSA, UL

3 x M 20

3 x M 20

3 x M 20

1 x M 20

1.50 kg/3.3 lb

1.60 kg/3.5 lb

1.60 kg/3.5 lb

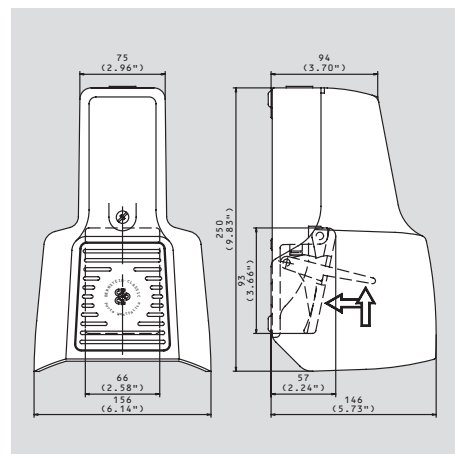
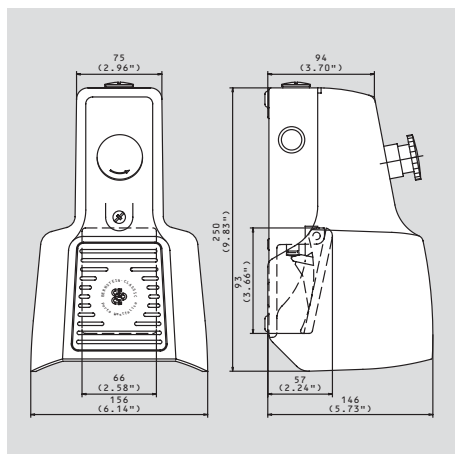
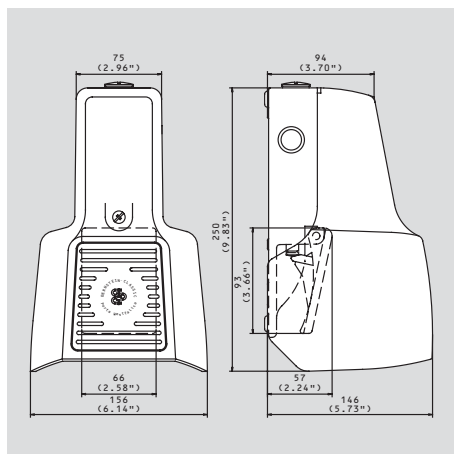
1.50 kg/3.3 lb

●/-
-----

●/-
-----

●/-
-----

-/●
-----



# Safety footswitch

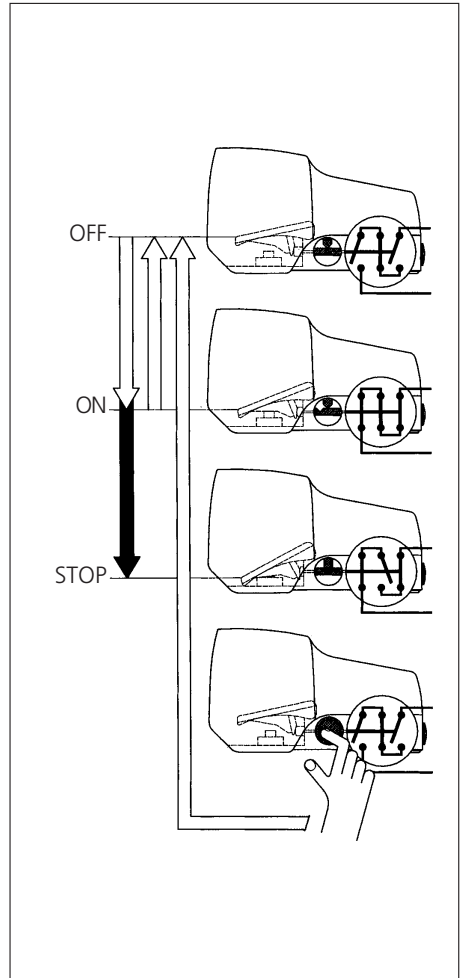
Safety latch with manual reset

Protection class IP 65



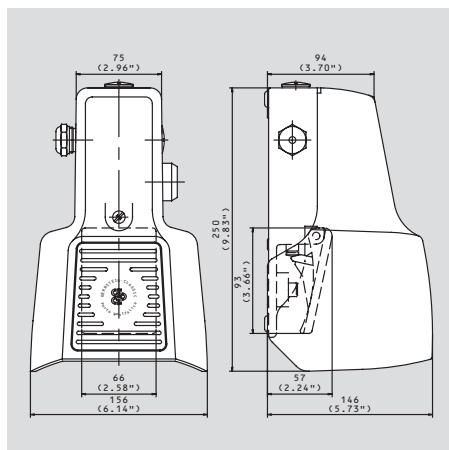
Designation		F1-SU1Z/UV1 DUN
<b>Part number</b>		<b>616.1000.203</b>
Circuit diagram		<p>1) pressure point</p> <p>2) latch</p>
Slow make & break/snap action		●●
Pressure point		●
Latching switch		●
Potentiometer		-
Pedal interlocking		-
Emergency stop function		-
Power contactor		●
Voltage		max. 500 V AC
Permanent current		max. 10 A
In-rush current complies with standards		●
IEC 947-5-1 AC 15/DC 13		
Switching frequency		max. 50/min.
Mechanical life – number of switching actions		10 x 10 <sup>6</sup>
Mechanical life – number of revolutions		
Operating temperature		min./max. -30 °C/+80 °C -22 °F/+176 °F
Approvals		BG, UL, CSA
Cable entry		1 x M 20
Weight		1.50 kg/3.3 lb
Delivery: ex-stock/built to order		●/-

Designation		F1-SU1Z/UV1 DUN
<b>Part number</b>		<b>616.1000.203</b>
Circuit diagram		<p>1) pressure point</p> <p>2) latch</p>
Slow make & break/snap action		●●
Pressure point		●
Latching switch		●
Potentiometer		-
Pedal interlocking		-
Emergency stop function		-
Power contactor		●
Voltage		max. 500 V AC
Permanent current		max. 10 A
In-rush current complies with standards		●
IEC 947-5-1 AC 15/DC 13		
Switching frequency		max. 50/min.
Mechanical life – number of switching actions		10 x 10 <sup>6</sup>
Mechanical life – number of revolutions		
Operating temperature		min./max. -30 °C/+80 °C -22 °F/+176 °F
Approvals		BG, UL, CSA
Cable entry		1 x M 20
Weight		1.50 kg/3.3 lb
Delivery: ex-stock/built to order		●/-



1. Depressing the pedal to the pressure point closes the contact and the operating process starts.
2. In an emergency situation the pressure point is overcome – the contact is opened and locked – the operating process is then interrupted. The latching mechanism holds the contact in the off position ensuring that an uncontrolled restart or new start of the machine cannot happen.
3. Interlocking: Only by releasing the locking device manually (reset button on the side of the housing), after the dangerous situation has been cleared, can the contacts be set to normal again. The operating process can then be repeated by operating the pedal to the pressure point.

All dimensions in mm (inch)



## Footswitches with two pedals

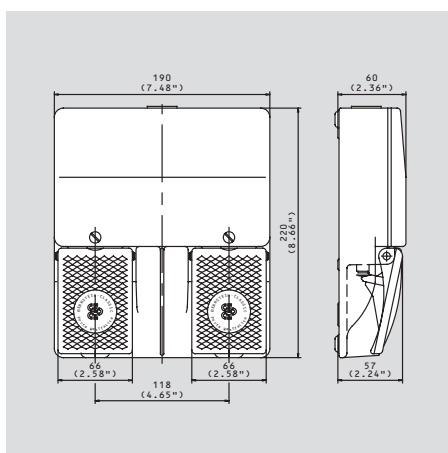
### F2

Protection class IP 65



Designation	F2-U1Z/U1Z	F2-U2Z/U2Z
<b>Part number</b>	<b>606.2110.013</b>	<b>606.2220.015</b>
Circuit diagram		
Slow make & break/snap action	●/-	●/-
Pressure point	-	-
Latching switch	-	-
Potentiometer	-	-
Pedal interlocking	-	-
Emergency stop function	-	-
Power contactor	-	-
Voltage	max. 500 V AC	500 V AC
Permanent current	max. 10 A	10 A
In-rush current complies with standards IEC 947-5-1 AC 15/DC 13	●	●
Switching frequency	max. 50/min.	50/min.
Mechanical life – number of switching actions	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>
Mechanical life – number of revolutions	-	-
Operating temperature	min./max. -30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F
Approvals	BG, CSA, UL	BG, CSA, UL
Cable entry	1 x M 20	1 x M 20
Weight	1.70 kg/3.7 lb	1.70 kg/3.7 lb
Delivery: ex-stock/built to order	●/-	●/-

All dimensions in mm (inch)



## Footswitches with two pedals (guarded) F2 UN

### With three pedals F3

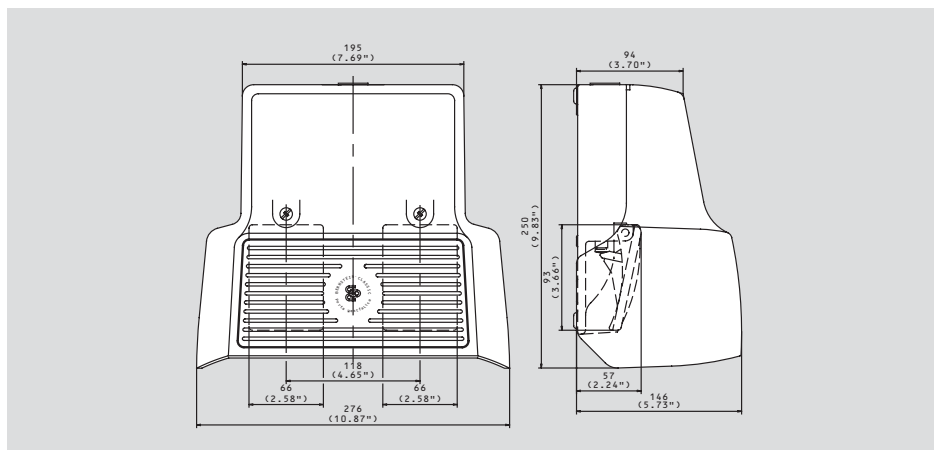
## With three pedals (guarded) F3 UN

Protection class IP 65



Designation	F2-U1Z/U1Z UN	F2-SU1Z/SU1Z UN	F2-U2Z/U2Z UN	F2-U2ZD/U2ZD UN
<b>Part number</b>	<b>606.2610.014</b>	<b>606.2830.022</b>	<b>606.2720.016</b>	<b>606.2720.020</b>
Circuit diagram				
	<p>1) pressure point</p>			
Slow make & break/snap action	●/-	●/-	-/●	-/●
Pressure point	-	-	-	●
Latching switch	-	-	-	-
Potentiometer	-	-	-	-
Pedal interlocking	-	-	-	-
Emergency stop function	-	-	-	-
Power contactor	-	-	-	-
Voltage	max. 500 V AC	max. 500 V AC	max. 500 V AC	max. 500 V AC
Permanent current	max. 10 A	max. 10 A	max. 10 A	max. 10 A
In-rush current complies with standards IEC 947-5-1 AC 15/DC 13	●	●	●	●
Switching frequency	max. 50/min.	max. 50/min.	max. 50/min.	max. 50/min.
Mechanical life – number of switching actions	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>
Mechanical life – number of revolutions	-	-	-	-
Operating temperature	min./max. -30 °C/+80 °C -22 °F/+176 °F	min./max. -30 °C/+80 °C -22 °F/+176 °F	min./max. -30 °C/+80 °C -22 °F/+176 °F	min./max. -30 °C/+80 °C -22 °F/+176 °F
Approvals	BG, CSA, UL	BG, CSA, UL	BG, CSA, UL	BG, CSA, UL
Cable entry	1 x M 20	1 x M 20	1 x M 20	1 x M 20
Weight	2.60 kg/5.7 lb	2.60 kg/5.7 lb	2.60 kg/5.7 lb	2.80 kg/6.2 lb
Delivery: ex-stock/built to order	●/-	●/-	●/-	●/-

All dimensions in mm (inch)

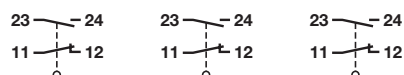
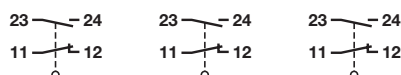




F2-SU1ZD/SU1ZD UN  
606.2830.417

F3-U1Z/U1Z/U1Z  
606.3111.025

F3-U1Z/U1Z/U1Z UN  
606.3611.026



-/●	-/●	●/-	●/-	●/-	●/-	●/-	●/-
●	●	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

500 V AC  
10 A

500 V AC  
10 A

500 V AC  
10 A

●	●	●	●	●	●	●	●
50/min.	50/min.	50/min.	50/min.	50/min.	50/min.	50/min.	50/min.
10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>
-	-	-	-	-	-	-	-
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F

BG, CSA, UL

BG, CSA, UL

BG, CSA, UL

1 x M 20

2 x M 20

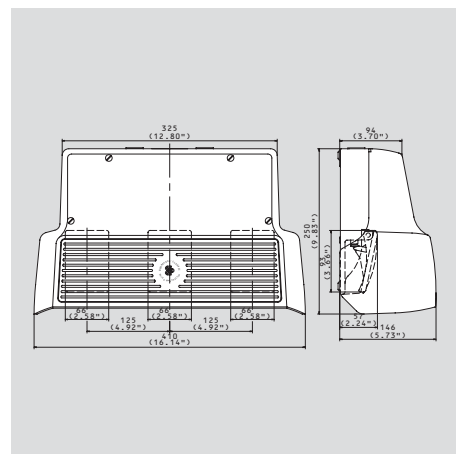
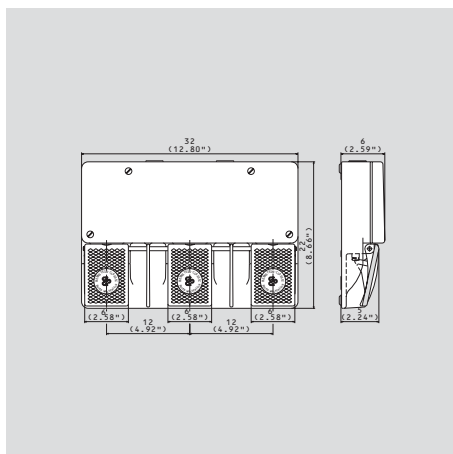
2 x M 20

2.80 kg/6.2 lb

3.10 kg/6.8 lb

5.40 kg/11.9 lb

●/-	●/-	●/-
-----	-----	-----





# Interlocking safety switches

## SKT

Protection class IP 65



The SKT is the smallest safety switch with a separate actuator offering the same features, relating to safety, as all other products in this range. The SKT is perfect for applications that require a particularly slim and compact switching device. The rotating head, two actuator openings and different switching functions are proof of its versatility.

The SKT offers further options enabling it to suit a wide variety of applications.

- Integrated forced ejection function (FE): The actuator is ejected from the switch:
  - preventing unauthorized use of a spare actuator to defeat the safety function
  - ensuring the guard must be closed securely to enable the machine to run
- Integrated actuator holding force (FI50 = 50 N):

Guard doors which may open due to vibration can be held shut by using the SKT with increased actuator holding force up to 50 N, without the need for bulky external latches. In addition several doors mounted in a straight line on one machine are kept closed.

- Universal radius actuator (MRU): In addition to the standard straight-on actuator made from stainless steel (operating radius 150 mm), the universal radius actuator offers an adjustable operating radius to a minimum 50 mm both horizontally and vertically.

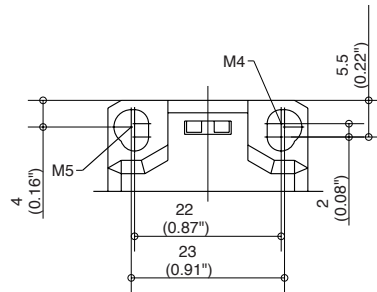
The SKT offers a variety of different switching functions in a highly compact enclosure. All systems are fitted with galvanically isolated contacts, the normally-closed being positive break. Snap-action contacts have been designed for control systems that require a simultaneous signal.

Available are:

- 1 NC  $\leftrightarrow$ /1 NO slow-action device
- 1 NC  $\leftrightarrow$ /1 NO snap-action device
- 2 NC  $\leftrightarrow$  slow-action device
- 2 NC  $\leftrightarrow$  snap-action device

### Mechanical data

- Enclosure and lid made from highly durable fiberglass reinforced thermoplastic (UL 94-VO)
- Operating mechanism: head made from PA, clasp from Zn, rivets from stainless steel
- Actuator made from stainless steel
- Cable entry M 16 x 1.5



### Mounting and installation

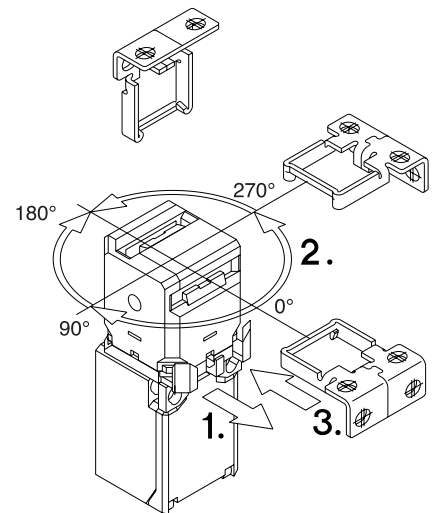
- The safety switch is mounted using 2 x M5 screws in the provided locating and mounting holes (23 mm centres).
- The separate actuator is attached using 2 x M4 screws (20 mm centres).

The safety switch and the actuator should be secured well, in order to prevent unintentional loosening (one-way and break-off screws, rivets etc.)



### Positioning the actuator head

- Rotation in 4 x 90° increments: when mounted, the head is fixed into position by the clasp
- Horizontal or vertical operation



### Warning

- **The safety switch must not be used as a mechanical end stop.**
- To preserve the level of safety, the safety switch must only be used in conjunction with the correct actuator.

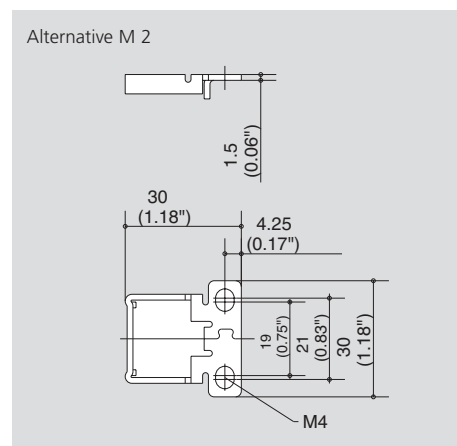
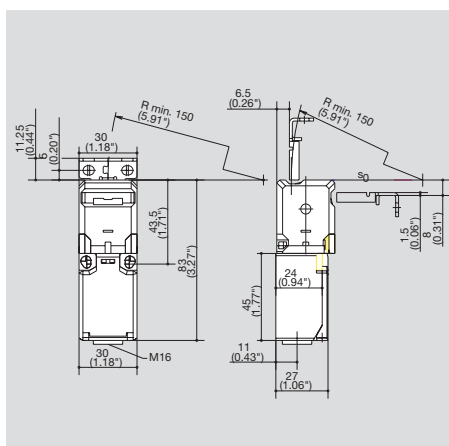
### Contact configuration

Switching element	Switch function	Switch contact	Designation	Voltage	Continuous current
Slow-action	changeover	1 NC/1 NO	U1Z	250 V	10 A
Snap-action	changeover	1 NC/1 NO	SU1Z	250 V	10 A
Slow-action	normally-closed	2 NC	A2Z	250 V	10 A
Snap-action	normally-closed	2 NC	SA2Z	250 V	10 A



Designation	SKT-U1Z M3	SKT-SU1Z M3	SKT-A2Z M3	SKT-SA2Z M3
<b>Part number</b>	<b>601.6419.059</b>	<b>601.6409.060</b>	<b>601.6469.066</b>	<b>601.6469.067</b>
Switching diagram				
⊕ positive break according to IEC 947-5-1 Chap. 3				
Za: changeover contact is not galvanically isolated				
Zb: changeover contact is galvanically isolated				
Slow-action contact/snap-action contact				
Gasket inside (iw)/outside (w)				
<p>Contact travel mm (inch) Tol. ± 0.25 mm</p> <p>Switch angle degree Tol. ± 3.5°</p> <p>In      Out</p> <p>Actuating force N Tol. ± 10%</p> <p>Actuating torque Ncm Tol. ± 10%</p> <p><sup>1)</sup> actuator in <sup>2)</sup> actuator out</p>				
Voltage	max. 250 V AC	max. 250 V AC	max. 250 V AC	max. 250 V AC
Continuous current	max. 10 A	max. 10 A	max. 10 A	max. 10 A
Making current, acc. to IEC 947-5-1 AC 15/DC 13	●	●	●	●
Switching frequency	max. 30/min.	max. 30/min.	max. 30/min.	max. 30/min.
Mech. operational life – number of switching cycles	1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>
Ambient temperature	min./max. -30 °C/+80 °C -22 °F/+176 °F	min./max. -30 °C/+80 °C -22 °F/+176 °F	min./max. -30 °C/+80 °C -22 °F/+176 °F	min./max. -30 °C/+80 °C -22 °F/+176 °F
Approvals	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA
Weight	0.13 kg/0.29 lb	0.13 kg/0.29 lb	0.13 kg/0.29 lb	0.13 kg/0.29 lb
Delivery: ex-stock/built to order	●/-	●/-	●/-	●/-

All dimensions in mm (inch)



# Interlocking safety switches

## SKI

Protection class IP 65



The slim design and dimensions of the SKI (according to EN 50047) allow it to be mounted onto narrow profile systems and in confined spaces. Operation can be performed both horizontally and vertically. This flexible form of mounting is supported by the ability to position the actuating head in 4 x 90° increments.

The SKI has the option of two new built-in operating functions.

- Integrated forced ejection function (FE): The actuator is ejected from the switch:
  - preventing unauthorized use of a spare actuator to defeat the safety function
  - ensuring the guard must be closed securely to enable the machine to run
- Integrated actuator holding force (FI 50 = 50 N): Guard doors which may open due to vibration can be held shut by using the SKI with increased actuator holding force of 50 N, without the need for bulky external latches. In addition several doors mounted in a straight line on one machine are kept closed.

The SKI is equipped with positive-break and galvanically-isolated contacts.

Available are:

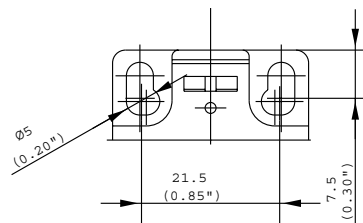
- 1 NC  $\leftrightarrow$ /1 NO slow-action device
- 1 NC  $\leftrightarrow$ /1 NO snap-action device
- 2 NC  $\leftrightarrow$  slow-action device
- 2 NC  $\leftrightarrow$ /1 NO slow-action device

### Mechanical data

- Enclosure and lid made from glass-fibre reinforced PA 6 (UL 94-V0)
- Switching device made from PA/St and stainless steel
- Actuator made from stainless steel
- Cable entry M 20 x 1.5 (optional: M 16 x 1.5)

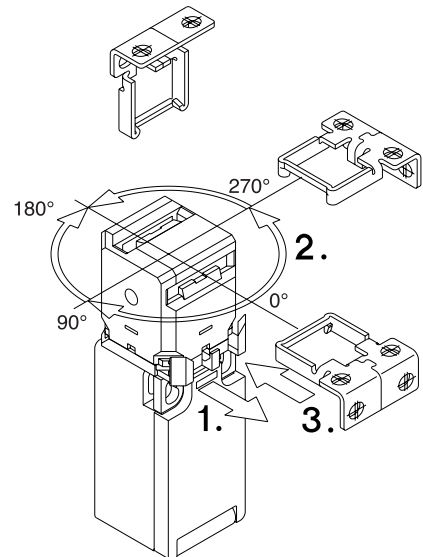
### Mounting and installation

- The safety switch is mounted using 2 x M5 screws in the locating and mounting holes.
- The separate actuator is mounted using 2 x M4 screws. The safety switch and the actuator should be secured well, in order to prevent unintentional loosening (one-way and break-off screws, rivets etc.).



### Positioning the actuator head

- Rotation in 4 x 90° increments: when mounted, the head is fixed into position by the clasp
- Horizontal or vertical operation



### Warning

- **The safety switch must not be used as a mechanical end stop.**
- To preserve the level of safety, the safety switch must only be used in conjunction with the correct actuator.

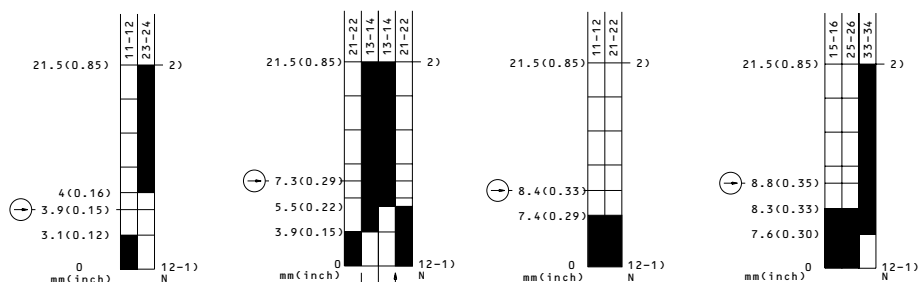
### Contact configuration

Switching element	Function	Contacts	Designation	Voltage	Continuous current
Slow-action	changeover	1 NC/1 NO	U1Z	250 V	10 A
Snap-action	changeover	1 NC/1 NO	SU1Z	250 V	10 A
Slow-action	normally-closed	2 NC	A2Z	250 V	10 A
Slow-action	changeover, overlapping	2 NC/1 NO	UV15Z	400 V	6 A



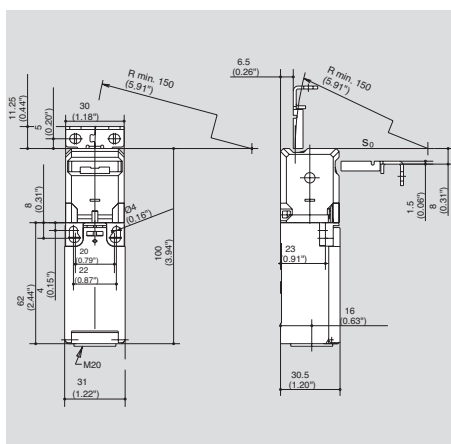
Designation	SKI-U1Z M3	SKI-SU1Z M3	SKI-A2Z M3	SKI-UV15Z M3
<b>Part number</b>	<b>601.6819.052</b>	<b>601.6809.057</b>	<b>601.6869.056</b>	<b>601.6869.058</b>
Switching diagram				
⊕ positive break according to IEC 947-5-1 Chap. 3				
Za: changeover contact is not galvanically isolated				
Zb: changeover contact is galvanically isolated				
Slow-action contact/snap-action contact				
Gasket inside (iw)/outside (w)				

Contact travel mm (inch) Tol. ± 0.25 mm		Actuating force N Tol. ± 10%
Switch angle degree Tol. ± 3.5°		Actuating torque Ncm Tol. ± 10%
		1) actuator in 2) actuator out
	In Out	



Voltage	max.	250 V AC	250 V AC	250 V AC	400 V AC
Continuous current	max.	10 A	10 A	10 A	6 A
Making current, acc. to IEC 947-5-1 AC 15/DC 13		●	●	●	●
Switching frequency	max.	30/min.	30/min.	30/min.	30/min.
Mech. operational life – number of switching cycles		1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>
Ambient temperature	min./max.	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F
Approvals		BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA
Weight		0.13 kg/0.29 lb	0.13 kg/0.29 lb	0.13 kg/0.29 lb	0.13 kg/0.29 lb
Delivery: ex-stock/built to order		●/-	●/-	●/-	●/-

All dimensions in mm (inch)



# Plastic-bodied interlocking safety switch

**SKC  
SK**

Protection class IP 65



Designation  
**Part number**  
 Circuit diagram  
 ⊕ Forced disconnect to IEC 947-5-1 chapter 3  
 Za: not galvanically separated contacts  
 Zb: galvanically separated contacts  
 Slow make & break/snap-action  
 Internal seal (iw)/external seal (w)

SKC-A1Z M  
**601.6169.039**



⊕ Zb

●/-

iw

SK-U1Z M  
**601.6119.016**

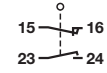


⊕ Zb

●/-

iw

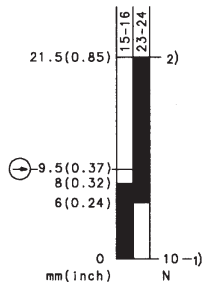
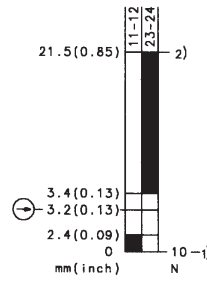
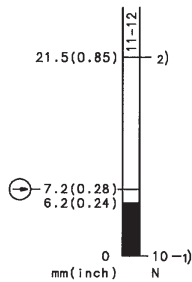
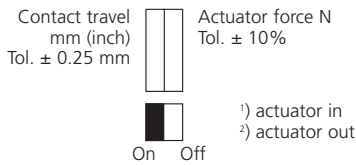
SKC-UV1Z M  
**601.6139.034**



⊕ Zb

●/-

iw



Voltage max.  
 Permanent current max.  
 In-rush current complies with standards  
 IEC 947-5-1 AC 15/DC 13  
 Switching frequency max.  
 Mechanical life – number of switching actions  
 Operating temperature min./max.

500 V AC  
 10 A  
 ●  
 30/min.  
 1 x 10<sup>6</sup>  
 -30 °C/+80 °C  
 -22 °F/+176 °F

500 V AC  
 10 A  
 ●  
 30/min.  
 1 x 10<sup>6</sup>  
 -30 °C/+80 °C  
 -22 °F/+176 °F

500 V AC  
 10 A  
 ●  
 30/min.  
 1 x 10<sup>6</sup>  
 -30 °C/+80 °C  
 -22 °F/+176 °F

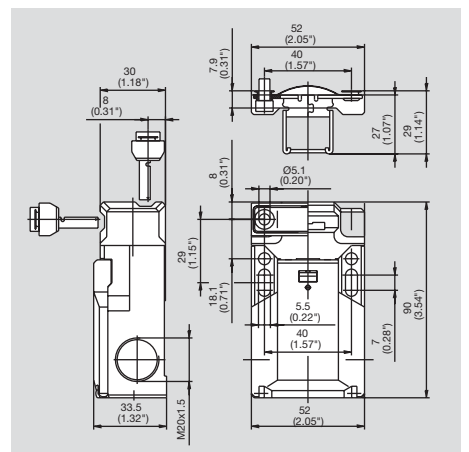
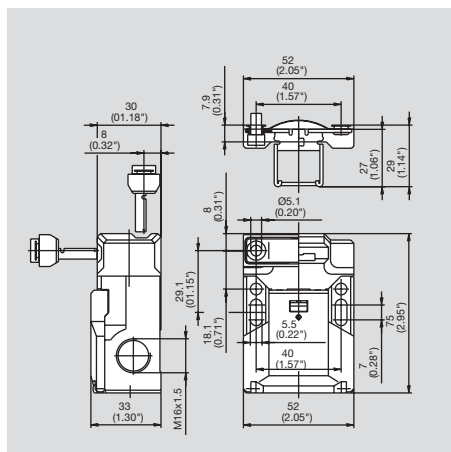
Approvals  
 Weight  
 Delivery: ex-stock/built to order

BG, UL, CSA  
 0.11 kg/0.24 lb  
 ●/-

BG, UL, CSA  
 0.13 kg/0.29 lb  
 ●/-

BG, UL, CSA  
 0.13 kg/0.29 lb  
 ●/-

All dimensions in mm (inch)



SK-UV15Z M	SK-UV16Z M	SK-A2Z M
<b>601.6169.026</b>	<b>601.6169.027</b>	<b>601.6169.036</b>
●/-	●/-	●/-
iv	iv	iv
400 V AC	400 V AC	500 V AC
6 A	6 A	10 A
●	●	●
30/min.	30/min.	30/min.
1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F
BG, UL, CSA	BG, UL, CSA	BG, UL, CSA
0.13 kg/0.29 lb	0.13 kg/0.29 lb	0.13 kg/0.29 lb
●/-	●/-	●/-

# Actuator selection table

## SKC/SK

Safety switch  
DIN EN 60947-5-1

- Forced disconnection of NC contacts
- Galvanically separated contacts according to Zb form

### Approvals

- UL, CSA
- BG



### Actuator M

- Metal
- Stainless steel



### Actuator P

- Thermoplastic
- Polyamide

Standard models	Actuator retention force	Contact diagram
Single & double poles		
SKC-A1Z	10N	
SKC-A1Z F30	30N	
SKC-A1Z Fi100	100N	
SK-U1Z	10N	
SK-U1Z F30	30N	
SK-U1Z Fi100	100N	
SK-UV1Z	10N	
SK-UV1Z F30	30N	
SK-UV1Z Fi100	100N	
SK-A2Z	10N	
SK-A2Z F30	30N	
SK-A2Z Fi100	100N	
SK-SU1Z	10N	
SK-SU1Z F30	30N	
SK-SU1Z Fi100	100N	

Part number	Part number
Designation	Designation
<b>601.6169.039</b>	<b>601.6169.054</b>
SKC-A1Z M	SKC-A1Z P
○	○
<b>601.6169.003</b>	-
SKC-A1Z Fi100 M	
<b>601.6119.016</b>	<b>601.6119.035</b>
SK-U1Z M	SK-U1Z P
<b>611.6119.109</b>	○
SK-U1Z F30 M	
<b>601.6119.001</b>	-
SK-U1Z Fi100 M	
<b>601.6139.034</b>	○
SK-UV1Z M	○
○	○
○	-
<b>601.6169.036</b>	○
SK-A2Z M	
<b>601.6169.053</b>	○
SK-A2Z F30 M	
<b>601.6169.024</b>	-
SK-A2Z Fi100 M	
○	○
○	○
○	-

Standard models	Actuator retention force	Contact diagram
Three poles		
SK-UV15Z	10N	
SK-UV15Z F30	30N	
SK-UV15Z Fi100	100N	
SK-UV16Z	10N	
SK-UV16Z F30	30N	
SK-UV16Z Fi100	100N	

Part number	Part number
Designation	Designation
<b>601.6169.026</b>	○
SK-UV15Z M	
<b>601.6169.061</b>	○
SK-UV15Z F30 M	
<b>601.6169.025</b>	-
SK-UV15Z Fi100 M	
<b>601.6169.027</b>	○
SK-UV16Z M	
○	○
○	-

○ Technically possible (on request)  
- Not available





# Plastic-bodied safety switch with separate actuator

## ENK ... VTU

Protection class IP 65

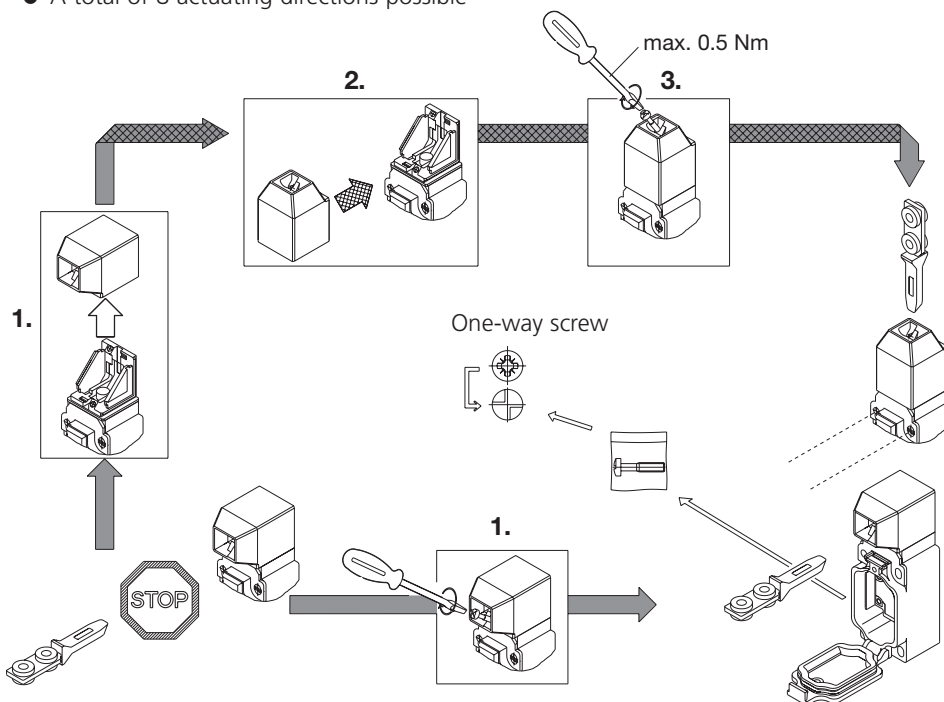


The safety switch ENK ...VTU offers the optimum combination of a cost-reducing plastic-bodied housing and an actuating system for difficult industrial demands.

The housing, made of glass-fibre reinforced polyamide, fulfils the demands required for isolated low-voltage switching and contact devices. Due to its pin shaped geometry, the particularly robust, separate actuator is suitable for use in tolerance-burdened protective equipment. Optional actuators, which can be adjustable or flexibly mounted, guarantee a high mechanical loading capacity.

- Mounting dimensions according to EN 50041
- Integrated mounting plate made of metal
- Actuation in horizontal and vertical directions
- A total of 8 actuating directions possible

- Safety contacts with positive break and galvanic isolation
- Contacts: 1NC+1NO, 2NC or 2NC+1NO (with overlapping contacts)
- Wiring space with hinged, self-locking lid
- Protection class IP 65
- Radius actuator and lateral actuator optional



Designation

**Part number**

Switching diagram

⊕ Forced disconnect

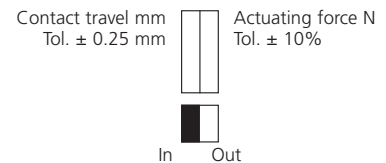
IEC 947-5-1 Chap. 3

Za: changeover contact is not galvanically isolated

Zb: changeover contact is galvanically isolated

Slow-action contact/snap-action contact

Gasket inside (iw)/outside (w)



Voltage max.

Continuous thermal current max.

Making current, acc. to IEC 947-5-1 AC 15/DC 13

Switching frequency max.

Mech. operational life – number of switching cycles

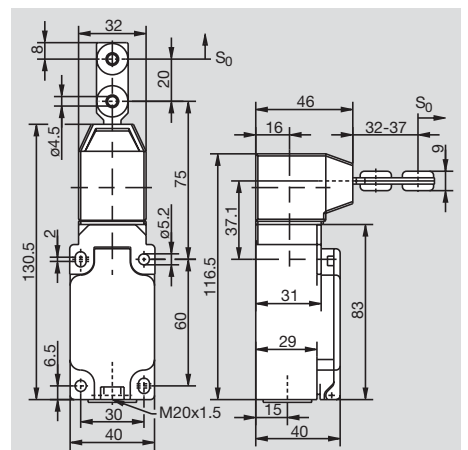
Ambient temperature min./max.

Approvals

Pending Approvals

Weight

Delivery: ex-stock/built to order



The positioning of the actuating head in either a horizontal or vertical actuating direction offers the choice of 8 actuating directions for the actuator.





## Interlocking solenoid safety switches with plastic body

### SLK

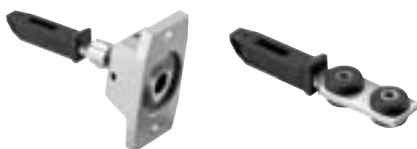
Safelock *Family*  
Plastic body  
Protection class IP 67  
Power to lock or unlock



#### Product advantages

- **Safety** built into the system through two independent safety circuits, flexible contact assembly with max. 4 NC →
- **Universal** integration into system due to multiple voltage supply 24–48 V DC and 24–230 V AC (Standard: 24 V AC/DC)
- **Flexible** integration due to rotatable actuating head (4 x 90°) and horizontal or vertical operation
- **Compact** design with slim dimensions with total length of 170 mm
- **Innovative** installation due to cage-clamp connection technology.
- **Function** according to GS ET 19, EN 60 204-1 and EN 60 947-5-1.

#### Safe application



The actuator made from stainless steel guarantees reliable operation. The coding prevents manipulation and bypassing in the "simplest possible way". The optional radius actuator allows smaller safety doors to be monitored. It can be installed horizontally or vertically, and is also made from stainless steel.

#### Innovative installation

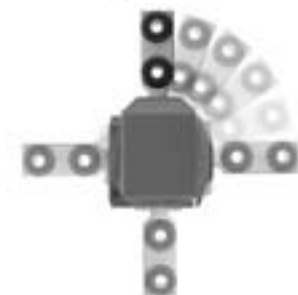


The electrical connection of the SLK is safe and reliable. A terminal block with cage-clamp terminal connectors is used. The terminal compartment is separate from all working parts ensuring that the connections are safely made. A terminal block with conventional screw-type connections is available as an option.

The terminal compartment is designed according to protection class IP 67.

The LED indicator showing the actual status is optional.

#### Flexible application



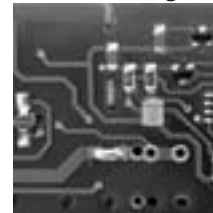
The SLK can be operated both horizontally and vertically. The necessary pre-setting is carried out before mounting by simply adjusting the actuating head. This flexible method of mounting is supported by the ability to position the actuating head in 4 x 90° increments.

#### Safety in demanding environmental conditions



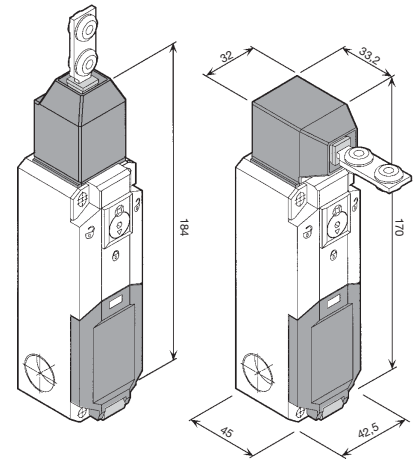
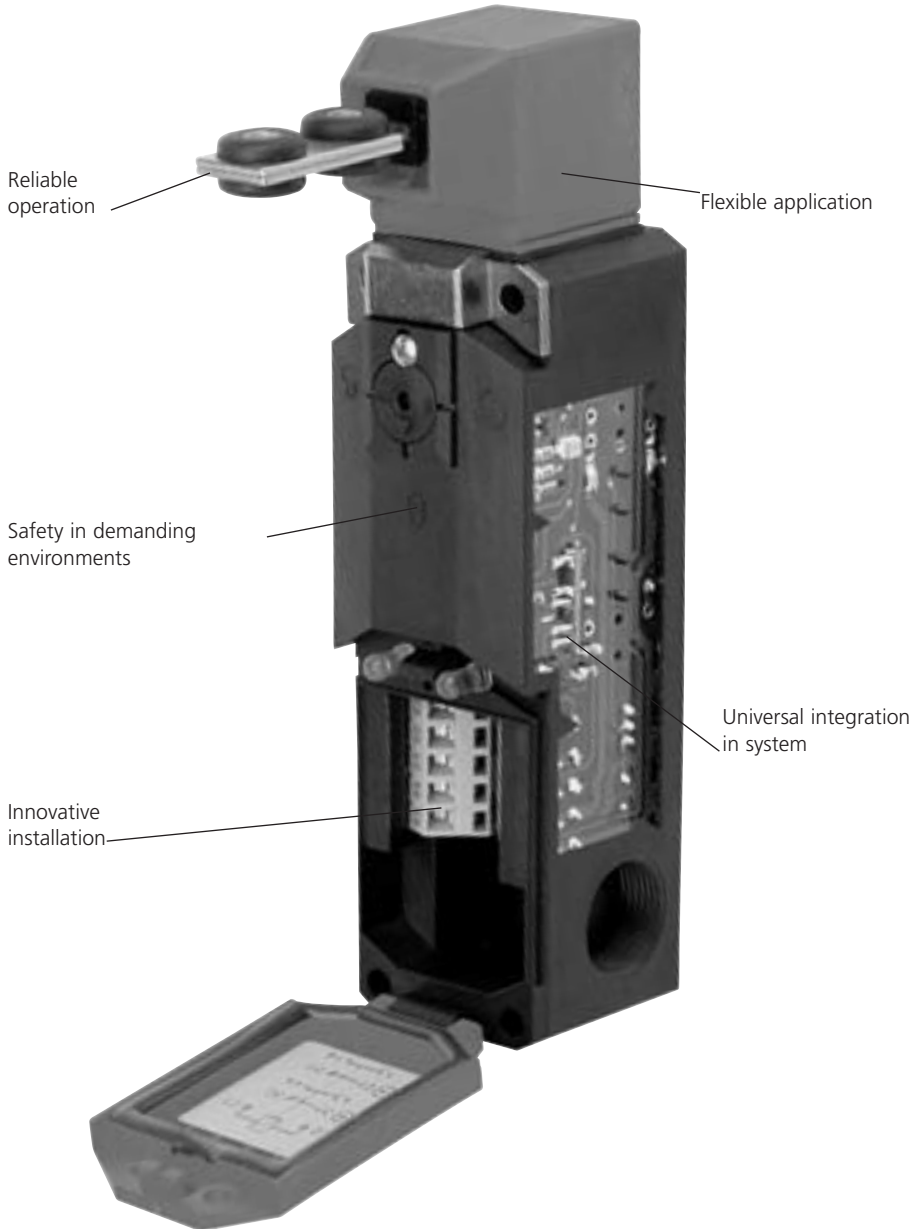
The use of an innovative electromechanical system (Bernstein patent) consisting of a solenoid actuator, electro-magnetic retention system and electronic controller, results in a very low power consumption. This allows reliable continuous operation even in high ambient temperatures.

#### Universal integration in system



In the multiple voltage version, the SLK can be connected to all control voltages from 24 to 48 V DC as well as from 24 to 230 V AC. The standard SLK is equipped for a control voltage of 24 V DC/AC.

## High-level safety at low cost



### Mounting

- The safety switch is mounted using a minimum of two M5 screws in the mounting holes.
- The separate actuator is to be suitably secured to prevent unintentional loosening (one-way and break-off screws, rivets).
- The user sets the actuating head to either horizontal or vertical operation before installation.
- This is achieved by changing the alignment of the actuating head and the upper and lower parts are then secured together using a security screw.
- The four operating directions are selected by pulling forward the clasp and turning the actuating head.

### Warning

- **The safety switch must not be used as a mechanical end stop.**
- The interlock of the safety device is maintained on power failure only with the types SLK-FVTU... (spring-locking).
- To operate the auxiliary release, first loosen the screw and turn the actuating lever.
- To maintain the safety level, the safety switch may only be used in conjunction with the corresponding actuator.

### Product designation system for SLK safety switches

Switch	Locking principle	Actuating device	Operating voltage	Two-digit contact code: 1st digit = Actuator contact(s) 2nd digit = Solenoid contact(s)	Auxiliary release function	Additional function
SLK	F Spring force M Magnet force	VTU	24UC- 24-230MC	1 = 1NF ⊕ 2 = 2NF ⊕ 3 = 1NO ⊕ 4 = 2NO ⊕ 5 = 1NF ⊕ 1NO 6 = no contact	AR Auxiliary release	L = LED R = Radius actuator S = Plug-in connector A = Adaptor X = Special design

Example : SLK FVTU24UC-55-ARR = type F, 24 V AC/DC, 1 NF ⊕ 1 NO on the interlock, 1 NF ⊕ 1 NO on the safety equipment, auxiliary release, radial actuator

## Table of standard products

### SLK

Part number	Designation	Locking	Connection assembly		Control voltage	Add. functions		Actuator
		Spring force Magnet force	Safety equipment	Locking		Auxiliary release (AR)	LED (L)	
601.8119.001	SLK-FVTU24UC-55-AR	Spring force	1NF ⊕ 1NO	1NF ⊕ 1NO	24 V AC/DC	AR	–	Standard
601.8119.002	SLK-FVTU24-230MC-55-AR	Spring force	1NF ⊕ 1NO	1NF ⊕ 1NO	24-48 V DC + 24-230 V AC	AR	–	Standard
601.8119.003	SLK-MVTU24UC-55	Magnet force	1NF ⊕ 1NO	1NF ⊕ 1NO	24 V AC/DC	–	–	Standard
601.8119.004	SLK-MVTU24-230MC-55	Magnet force	1NF ⊕ 1NO	1NF ⊕ 1NO	24-48 V DC + 24-230 V AC	–	–	Standard
601.8169.005	SLK-FVTU24UC-21-AR	Spring force	2NF ⊕	1NF ⊕	24 V AC/DC	AR	–	Standard
601.8169.006	SLK-FVTU24-230MC-21-AR	Spring force	2NF ⊕	1NF ⊕	24-48 V DC + 24-230 V AC	AR	–	Standard
601.8119.009	SLK-FVTU24UC-55-ARL	Spring force	1NF ⊕ 1NO	1NF ⊕ 1NO	24 V AC/DC	AR	L	Standard
601.8169.010	SLK-FVTU24UC-21-ARL	Spring force	2NF ⊕	1NF ⊕	24 V AC/DC	AR	L	Standard
601.8119.012	SLK-FVTU24-230MC-55-ARL	Spring force	1NF ⊕ 1NO	1NF ⊕ 1NO	24-48 V DC + 24-230 V AC	AR	L	Standard
601.8169.013	SLK-FVTU24-230MC-21-ARL	Spring force	2NF ⊕	1NF ⊕	24-48 V DC + 24-230 V AC	AR	L	Standard
601.8119.015	SLK-FVTU24UC-55-ARR	Spring force	1NF ⊕ 1NO	1NF ⊕ 1NO	24 V AC/DC	AR	–	Radius actuator
601.8169.016	SLK-FVTU24UC-21-ARR	Spring force	2NF ⊕	1NF ⊕	24 V AC/DC	AR	–	Radius actuator
601.8119.018	SLK-FVTU24-230MC-55-ARR	Spring force	1NF ⊕ 1NO	1NF ⊕ 1NO	24-48 V DC + 24-230 V AC	AR	–	Radius actuator
601.8169.019	SLK-FVTU24-230MC-21-ARR	Spring force	2NF ⊕	1NF ⊕	24-48 V DC + 24-230 V AC	AR	–	Radius actuator
601.8119.021	SLK-MVTU24UC-55-L	Magnet force	1NF ⊕ 1NO	1NF ⊕ 1NO	24 V AC/DC	–	L	Standard
601.8169.022	SLK-MVTU24UC-21-L	Magnet force	2NF ⊕	1NF ⊕	24 V AC/DC	–	L	Standard
601.8119.024	SLK-MVTU24UC-55-R	Magnet force	1NF ⊕ 1NO	1NF ⊕ 1NO	24 V AC/DC	–	–	Radius actuator
601.8169.025	SLK-MVTU24UC-21-R	Magnet force	2NF ⊕	1NF ⊕	24 V AC/DC	–	–	Radius actuator

According to the part designation systematic, customer specific versions (i.e. different contacts) are possible (see page 76)

## Electrical characteristics

### Switching devices

Rated isolated voltage Ui:	250 V
Application category:	AC 15 230 V/4 A
Thermal current Ith:	10 A
Short-circuit protection:	DIAZED - DIN VDE 0636 Part 1 6 A/inert gL/gG

### Electronic magnets

Duration of current:	3.4 / 100% ED
Temperature class:	E (120 °C)
Pulse power:	56 VA (0.2 s)
Holding power:	1.1 VA (constant)
Switching frequency:	600 / h max.

## Mechanical characteristics

Enclosure:	PA 6 GV (UL94-V0)
Lid:	PA 6 GV (UL94-V0)
Actuating device:	PA 6 GV / GD
Separate actuator:	St/PA
Ambient temperature:	-25 °C to + 70 °C
Switching function:	2 NC; 2 NO z. B.
Switching principal:	4 push-button devices
Mechanical life:	1 million cycles
Actuating radius:	R = 400 mm min.
Approach speed:	V = 0.5 m/s max.
Mounting:	4 x M5 screws
Connection cross section:	1.5 mm <sup>2</sup> flex. max.
Connection type:	cage clamp
Cable entries:	3x M 20 x 1.5
Weight:	approx. 0.3 kg
Protection class:	IP 67
Mounting position:	variable
Locking:	Power to lock or unlock
Locking force:	2 000 N
Isolated:	☐

# Interlocking solenoid safety switches with metal body

## SLM

Protection class IP 67



Machines, which have a "run down time" after they have been switched off, are often part of automatic production processes.

Safety devices should prevent access by the operator and must be kept locked until the dangerous movement has stopped. The safety-position switch (with suitable control) will ensure that safety guards, doors and other covers are kept closed as long as there is danger.

The safety switch has three main functions:

- Allowing the machine to operate while the guard is closed and locked
- Isolating the machine when the guard is open
- Monitoring the position of the guard and the actuator (open or closed)

With the safety switch SLM the user has a position switch with separate actuator and built in locking device, which meets the criteria of interlocking devices, according to EN 1088, the EN 292 part 1 and 2 are also valid since 01.01.1995 complying to the necessary machine guide-lines.

### System description

The safety switch SLM with lock is available in spring and solenoid interlocking design. The separate actuator is securely mounted to the closing guard. When the actuator is inserted into the switch the guard door position is then monitored and either locked or released (dependant on control system/status of machine).

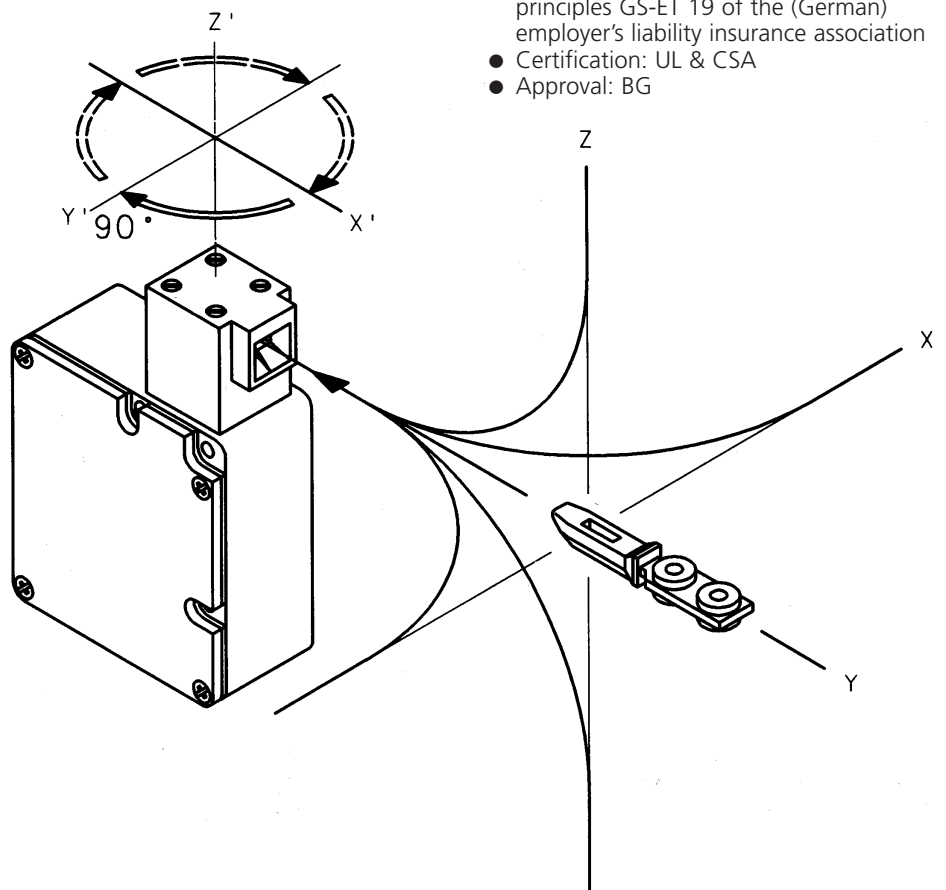
The separate actuator provides a very high level of "operator interference" protection because of its triple coding.

The locking device in the safety switch SLM is integrated into the switch housing. In the spring latch version locking is achieved with a spring mechanism, in the solenoid latch version locking is achieved by energizing an electromagnet. Both types link the actuator with a switch mechanism for position indication.



### Benefits of this system

- All elements are enclosed in one metal housing
- High resistance to heavy industrial use
- Compact housing for space saving installation
- Triple coded actuator with high interference protection
- Simple alteration of actuator approach direction in 90° positions (adjust only with actuator fitted)
- All switch functions enclosed in inner module
- Safe and easy wiring due to terminals in separate connection area.
- Individual contact configurations possible
- Integrated safety circuit protects against voltage peaks and incorrect termination
- Mounting with M 5 screws according to DIN EN 50041
- Construction design according to VDE 0660 part 200 IEC 947-5-1 control principles GS-ET 19 of the (German) employer's liability insurance association
- Certification: UL & CSA
- Approval: BG



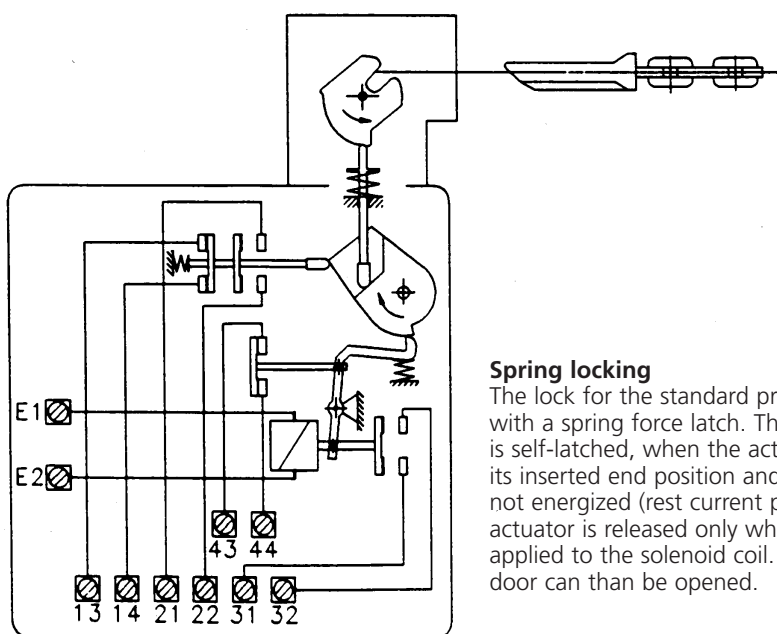
**Important note:**

The actuator head position may only be changed with the actuator inserted.



### Locking systems

SLM metal-bodied safety switches with separate actuators are available with spring locking as well as solenoid locking.



#### Spring locking

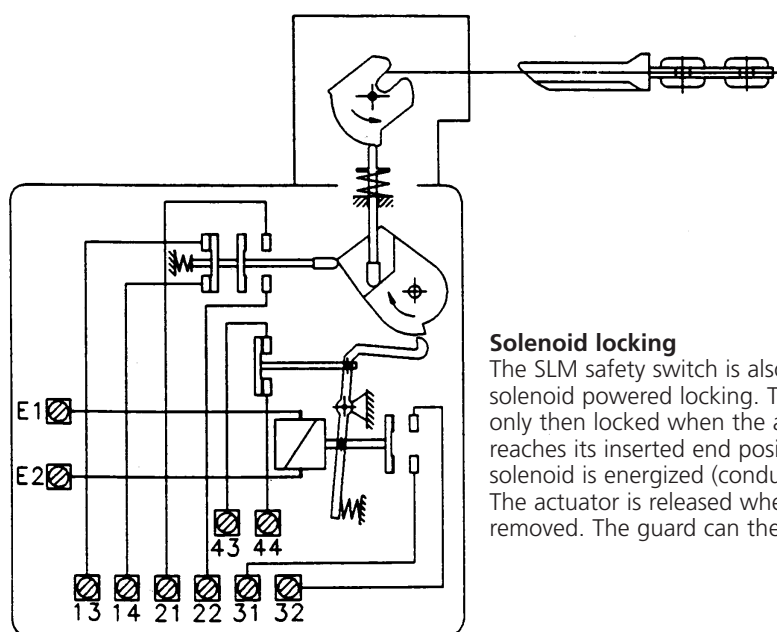
The lock for the standard product operates with a spring force latch. The safety device is self-latched, when the actuator reaches its inserted end position and the solenoid is not energized (rest current principle). The actuator is released only when current is applied to the solenoid coil. The guard door can then be opened.

### Options

- Individual contact configurations possible
- Radius actuator for actuating radius lower than 400 mm
- Auxiliary unlock
- Key override
- Emergency stop override
- Visual indication of operating status of the guard and lock
- Actuator for operating with head rotated 180° from standard
- Customised solutions

#### Important note:

Safety switch model SLM with emergency stop override must be installed **inside** the guarded (dangerous) area. The emergency stop should only be able to be activated to ensure escape from a dangerous area in case of a system error.



#### Solenoid locking

The SLM safety switch is also available with solenoid powered locking. The guard is only then locked when the actuator reaches its inserted end position and the solenoid is energized (conducting). The actuator is released when power is removed. The guard can then be opened.



# Interlocking solenoid safety switch SLM selection table: standard models

Type	Locking type		Actuator head	Operating voltage							Contact type: Actuator (guard) position			Contact type: Solenoid status		
	Spring locking	Solenoid locking		12 V DC	24 V DC	24 V AC	24 V UC	48 V AC	120 V AC	230 V AC	1NC	2NC	1NC 1NO	1NC	2NC	1NC 1NO
SLM			VTW													
●	●	-	●	-	●	-	-	-	-	-	-	-	●	-	-	●
●	●	-	●	-	-	-	-	-	●	-	-	-	●	-	-	●
●	●	-	●	-	-	-	-	-	-	●	-	-	●	-	-	●
●	●	-	●	-	●	-	-	-	-	-	-	-	●	●	-	-
●	●	-	●	-	-	-	-	-	-	●	-	-	●	-	-	●
●	●	-	●	-	-	-	-	-	-	●	-	-	●	-	-	●
●	●	-	●	-	-	-	-	-	-	●	-	-	●	-	-	●
●	●	-	●	-	-	-	-	-	-	●	-	-	●	-	-	●
●	●	-	●	-	-	-	-	-	-	●	-	-	●	-	-	●
●	-	●	●	-	●	-	-	-	-	-	-	-	●	-	-	●
●	-	●	●	-	-	-	-	-	●	-	-	-	●	-	-	●
●	-	●	●	-	●	-	-	-	-	-	-	-	●	●	-	-
●	-	●	●	-	-	-	-	-	-	●	-	-	●	●	-	-

### Description/Reference

SLM	F	M	VTW	12 DC	24 DC	24 DC	24 UC	48 AC	120 AC	230 AC	1	2	5	1	2	5
-----	---	---	-----	-------	-------	-------	-------	-------	--------	--------	---	---	---	---	---	---

### Example for Type description: Spring lock mechanism (F)

●	●	-	●	○	○	○	○	●	○	○	○	○	●	○	●	○	○
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

### Example for Type description: Solenoid lock mechanism (M)

●	-	●	●	●	○	○	○	○	○	○	○	○	○	●	○	○	○
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

- Standard functions
- Technically possible function combination
- Not available

Auxiliary unlock function				Additional functions	Additional functions	Additional functions	Additional functions	Additional functions	Designation	Part number	Page
– without	AR Auxiliary unlock	KR Key override	ER Emergency stop override								
–	●	–	–	–	–	–	–	–	SLM-FVTW 24DC-55-AR	<b>601.7119.020</b>	74
–	●	–	–	–	–	–	–	–	SLM-FVTW 120AC-55-AR	<b>601.7119.032</b>	74
–	●	–	–	–	–	–	–	–	SLM-FVTW 230AC-55-AR	<b>601.7119.022</b>	75
–	●	–	–	–	–	–	–	–	SLM-FVTW 24DC-51-AR	<b>601.7119.028</b>	75
–	●	–	–	–	–	–	–	–	SLM-FVTW 230AC-51-AR	<b>601.7119.029</b>	75
–	–	●	–	–	–	–	–	–	SLM-FVTW 230AC-55-KR	<b>601.7119.057</b>	76
–	–	–	● *)	–	–	–	–	–	SLM-FVTW 230AC-55-ER	<b>601.7119.058</b>	76
–	●	–	–	●	–	–	–	–	SLM-FVTW 120AC-55-ARL	<b>601.7119.051</b>	77
–	●	–	–	–	–	–	–	●	SLM-FVTW 230AC-55-AR180	<b>601.7119.060</b>	77
●	–	–	–	–	–	–	–	–	SLM-MVTW 24DC-55	<b>601.7119.023</b>	78
●	–	–	–	–	–	–	–	–	SLM-MVTW 120AC-55	<b>601.7119.033</b>	78
●	–	–	–	–	–	–	–	–	SLM-MVTW 230AC-55	<b>601.7119.024</b>	79
●	–	–	–	–	–	–	–	–	SLM-MVTW 24DC-51	<b>601.7119.030</b>	79
●	–	–	–	–	–	–	–	–	SLM-MVTW 230AC-51	<b>601.7119.031</b>	79
–	AR	KR	ER	L	R	S	A	180			
–	○	●	○ *)	○	○	●	○	○	SLM-FVTW 48AC-21-KRS	<b>on request</b>	
●	–	–	○ *)	○	●	○	○	○	SLM-MVTW 12DC-22-R	<b>on request</b>	

\*) Important note: Safety switch model SLM with emergency stop override must be installed **inside** the guarded (dangerous) area. The emergency stop should only be able to be activated to ensure escape from a dangerous area in case of a system error.

# Interlocking solenoid safety switch – spring force version –

## SLM

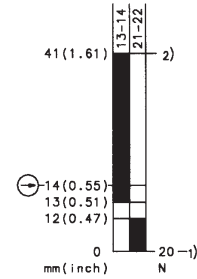
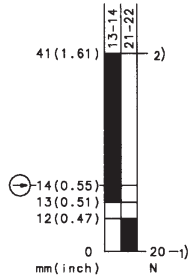
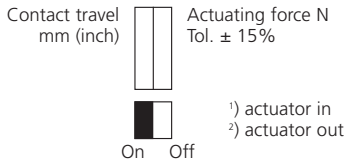
Protection class IP 67



Designation	SLM-FVTW 24DC-55-AR	SLM-FVTW 120AC-55-AR
<b>Part number</b>	<b>601.7119.020</b>	<b>601.7119.032</b>
Circuit diagram		
⊕ Forced disconnect to IEC 947-5-1 chapter 3		
Za: not galvanically separated contacts		
Zb: galvanically separated contacts		
Slow make & break/snap-action		
Internal seal (iw)/external seal (w)		

⊕ Zb	●/-	1000 N
⊕ Zb	●/-	1000 N

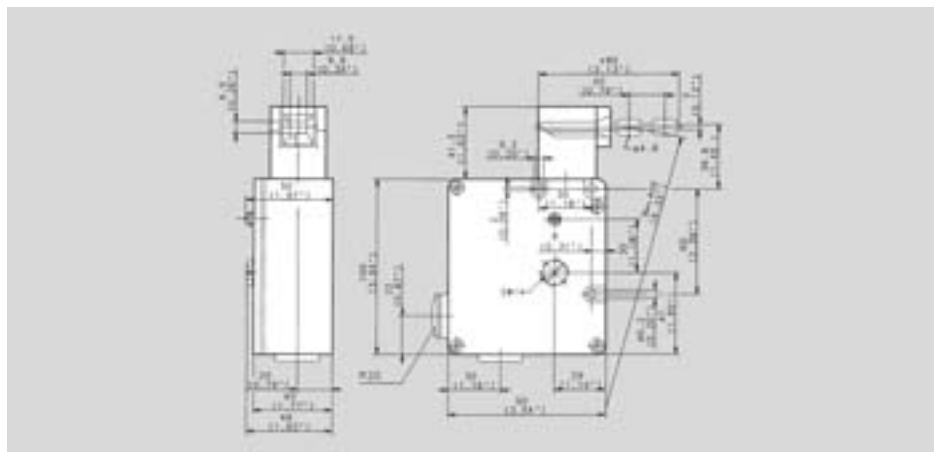
⊕ Zb	●/-	1000 N
⊕ Zb	●/-	1000 N



Voltage	max.	250 V
Permanent current	max.	10 A
In-rush current complies with standards IEC 947-5-1 AC 15/DC 13		
Mechanical life – number of switching actions		1 x 10 <sup>6</sup>
Operating temperature	min./max.	-30 °C/+60 °C -22 °F/+140 °F
Approvals		BG, UL, CSA
Weight		0.81 kg/1.79 lb
Delivery: ex-stock/built to order		●/-

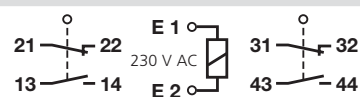
Voltage	max.	250 V
Permanent current	max.	10 A
In-rush current complies with standards IEC 947-5-1 AC 15/DC 13		
Mechanical life – number of switching actions		1 x 10 <sup>6</sup>
Operating temperature	min./max.	-30 °C/+60 °C -22 °F/+140 °F
Approvals		BG, UL, CSA
Weight		0.81 kg/1.79 lb
Delivery: ex-stock/built to order		●/-

All dimensions in mm (inch)



SLM-FVTW 230AC-55-AR

601.7119.022



⊖ Zb

●/-

1000 N

SLM-FVTW 24DC-51-AR

601.7119.028



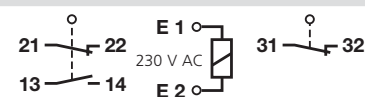
⊖ Zb

●/-

1000 N

SLM-FVTW 230AC-51-AR

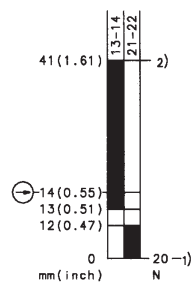
601.7119.029



⊖ Zb

●/-

1000 N



250 V

10 A

●

1 x 10<sup>6</sup>

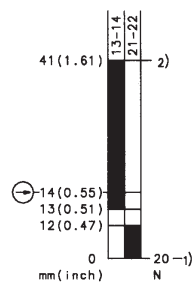
-30 °C/+60 °C

-22 °F/+140 °F

BG, UL, CSA

0.81 kg/1.79 lb

●/-



250 V

10 A

●

1 x 10<sup>6</sup>

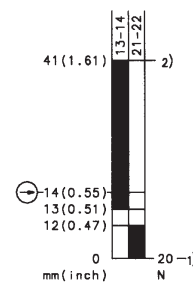
-30 °C/+60 °C

-22 °F/+140 °F

BG, UL, CSA

0.81 kg/1.79 lb

-/●



250 V

10 A

●

1 x 10<sup>6</sup>

-30 °C/+60 °C

-22 °F/+140 °F

BG, UL, CSA

0.81 kg/1.79 lb

-/●

# Interlocking solenoid safety switch – spring force version –

## SLM

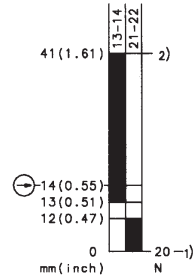
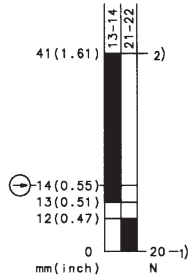
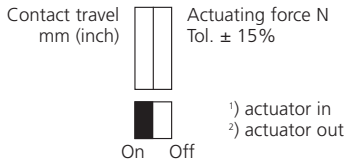
Protection class IP 67



Designation	SLM-FVTW 230AC-55-KR
<b>Part number</b>	<b>601.7119.057</b>
Circuit diagram	
⊕ Forced disconnect to IEC 947-5-1 chapter 3	
Za: not galvanically separated contacts	
Zb: galvanically separated contacts	
Slow make & break/snap-action	
Internal seal (iw)/external seal (w)	

Designation	SLM-FVTW 230AC-55-ER
<b>Part number</b>	<b>601.7119.058</b>
Circuit diagram	
⊕ Zb	⊕ Zb
●/-	●/-
1000 N	1000 N

Designation	SLM-FVTW 230AC-55-ER
<b>Part number</b>	<b>601.7119.058</b>
Circuit diagram	
⊕ Zb	⊕ Zb
●/-	●/-
1000 N	1000 N

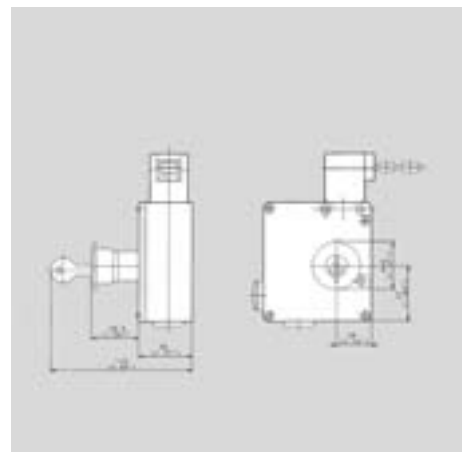
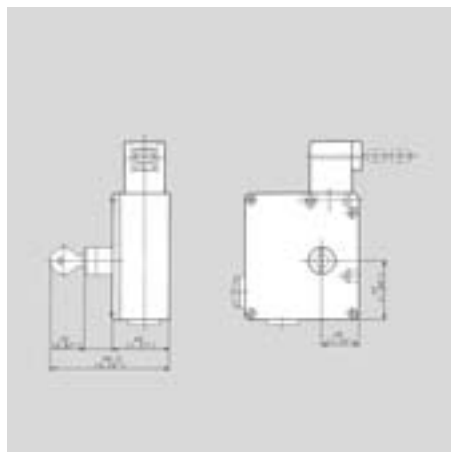


Voltage	max.	250 V
Permanent current	max.	10 A
In-rush current complies with standards IEC 947-5-1 AC 15/DC 13		
Mechanical life – number of switching actions		1 x 10 <sup>6</sup>
Operating temperature	min./max.	-30 °C/+60 °C -22 °F/+140 °F
Approvals		BG, UL, CSA
Weight		0.88 kg/1.49 lb
Delivery: ex-stock/built to order		●/-

Voltage	max.	250 V
Permanent current	max.	10 A
In-rush current complies with standards IEC 947-5-1 AC 15/DC 13		
Mechanical life – number of switching actions		1 x 10 <sup>6</sup>
Operating temperature	min./max.	-30 °C/+60 °C -22 °F/+140 °F
Approvals		BG, UL, CSA
Weight		0.94 kg/2.08 lb
Delivery: ex-stock/built to order		●/-

Voltage	max.	250 V
Permanent current	max.	10 A
In-rush current complies with standards IEC 947-5-1 AC 15/DC 13		
Mechanical life – number of switching actions		1 x 10 <sup>6</sup>
Operating temperature	min./max.	-30 °C/+60 °C -22 °F/+140 °F
Approvals		BG, UL, CSA
Weight		0.94 kg/2.08 lb
Delivery: ex-stock/built to order		●/-

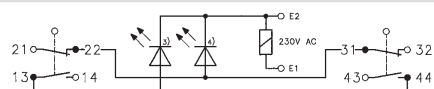
All dimensions in mm (inch)





SLM-FVTW 120AC-55-ARL

601.7119.051



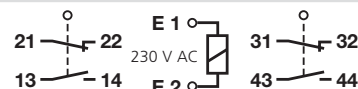
⊖ Zb                      ⊖ Zb

●/-                        ●/-

1000 N

SLM-FVTW 230AC-55-AR180

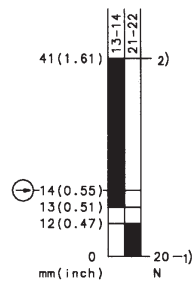
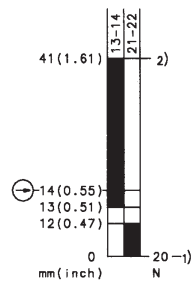
601.7119.060



⊖ Zb                      ⊖ Zb

●/-                        ●/-

1000 N



250 V

10 A

●

250 V

10 A

●

1 x 10<sup>6</sup>

-30 °C/+60 °C

-22 °F/+140 °F

1 x 10<sup>6</sup>

-30 °C/+60 °C

-22 °F/+140 °F

BG, UL, CSA

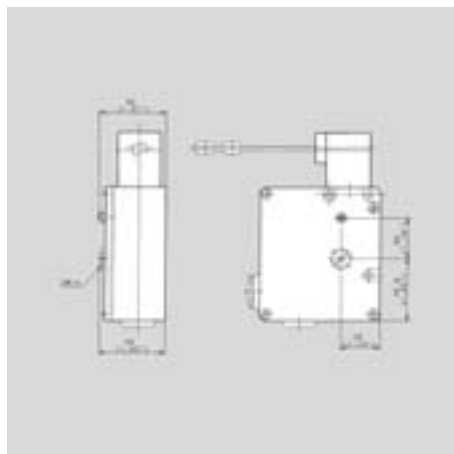
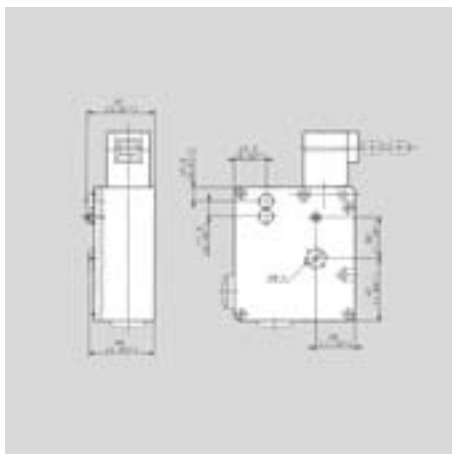
BG, UL, CSA

0.83 kg/1.83 lb

●/-

0.83 kg/1.83 lb

●/-



# Metal bodied safety switches with separate actuator and solenoid latch interlocking

## SLM

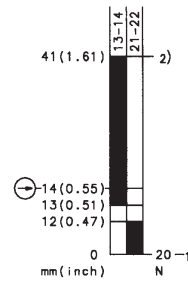
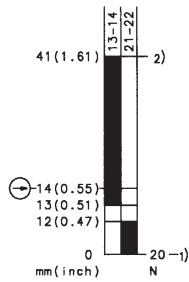
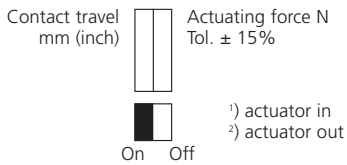
Protection IP 67



Reference type	SLM-MVTW 24DC-55	SLM-MVTW 120AC-55
<b>Part number</b>	<b>601.7119.023</b>	<b>601.7119.033</b>
Circuit diagram		
⊕ Forced disconnect to IEC 947-5-1 chapter 3		
Za: not galvanically separated contacts		
Zb: galvanically separated contacts		
Slow make & break/snap-action		
Internal seal (iw)/external seal (w)		

Reference type	SLM-MVTW 24DC-55	SLM-MVTW 120AC-55
<b>Part number</b>	<b>601.7119.023</b>	<b>601.7119.033</b>
Circuit diagram		
⊕ Zb	⊕ Zb	⊕ Zb
●/-	●/-	●/-
1000 N	1000 N	1000 N

Reference type	SLM-MVTW 24DC-55	SLM-MVTW 120AC-55
<b>Part number</b>	<b>601.7119.023</b>	<b>601.7119.033</b>
Circuit diagram		
⊕ Zb	⊕ Zb	⊕ Zb
●/-	●/-	●/-
1000 N	1000 N	1000 N

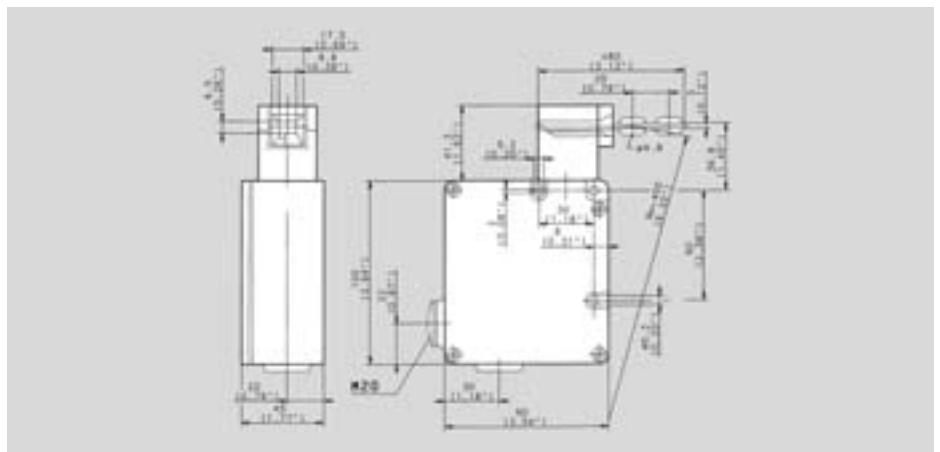


Voltage	max.	250 V
Permanent current	max.	10 A
In-rush current complies with standards		
IEC 947-5-1 AC 15/DC 13		
Mechanical life – number of switching actions		1 x 10 <sup>6</sup>
Operating temperature	min./max.	-30 °C/+60 °C -22 °F/+140 °F
Approvals		UL, CSA
Weight		0.81 kg/1.79 lb
Stock status: Ex stock/Built to order		●/-

Voltage	max.	250 V
Permanent current	max.	10 A
In-rush current complies with standards		
IEC 947-5-1 AC 15/DC 13		
Mechanical life – number of switching actions		1 x 10 <sup>6</sup>
Operating temperature	min./max.	-30 °C/+60 °C -22 °F/+140 °F
Approvals		UL, CSA
Weight		0.81 kg/1.79 lb
Stock status: Ex stock/Built to order		●/-

Voltage	max.	250 V
Permanent current	max.	10 A
In-rush current complies with standards		
IEC 947-5-1 AC 15/DC 13		
Mechanical life – number of switching actions		1 x 10 <sup>6</sup>
Operating temperature	min./max.	-30 °C/+60 °C -22 °F/+140 °F
Approvals		UL, CSA
Weight		0.81 kg/1.79 lb
Stock status: Ex stock/Built to order		●/-

All dimensions in mm (inch)



SLM-MVTW 230AC-55 <b>601.7119.024</b>	SLM-MVTW 24DC-51 <b>601.7119.030</b>	SLM-MVTW 230AC-51 <b>601.7119.031</b>
⊖ Zb	⊖ Zb	⊖ Zb
●/-	●/-	●/-
1000 N	1000 N	1000 N
250 V	250 V	250 V
10 A	10 A	10 A
●	●	●
1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>
-30 °C/+60 °C	-30 °C/+60 °C	-30 °C/+60 °C
-22 °F/+140 °F	-22 °F/+140 °F	-22 °F/+140 °F
UL, CSA	UL, CSA	UL, CSA
BG	BG	BG
0.81 kg/1.79 lb	0.81 kg/1.79 lb	0.81 kg/1.79 lb
●/-	●/-	-/●



## Plastic-bodied safety switches for hinged lids/guards I88-VKS, I88-VKW

Protection class IP 65



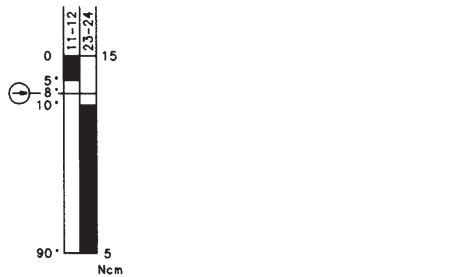
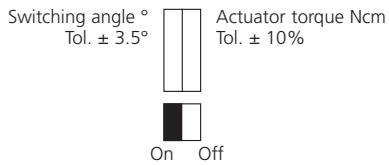
## Metal-bodied safety switches for hinged lids/guards GC-VKS, GC-VKW

Protection class IP 65



Designation	
<b>Part number</b>	
Circuit diagram	
⊕ Forced disconnect to IEC 947-5-1 chapter 3	
Za: not galvanically separated contacts	
Zb: galvanically separated contacts	
Slow make & break/snap-action	
Internal seal (iw)/external seal (w)	

I88-U1Z VKS	I88-U1Z VKW RE
<b>608.6100.093</b>	<b>608.6100.094</b>
⊕ Zb	⊕ Zb
●/-	●/-
iw	iw

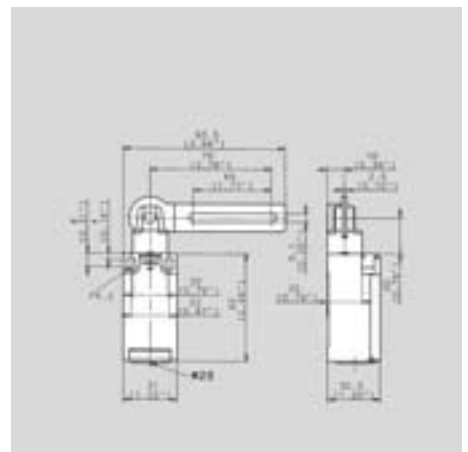
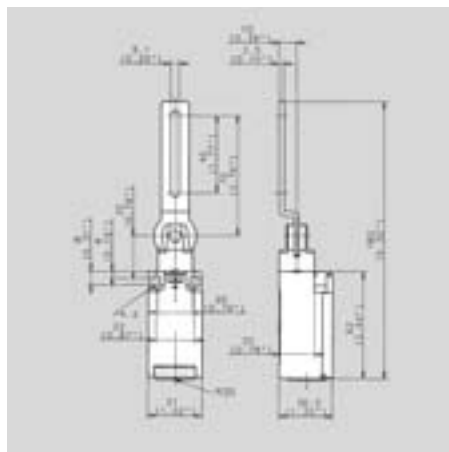


Voltage	max.
Permanent current	max.
In-rush current complies with standards IEC 947-5-1 AC 15/DC 13	
Switching frequency	max.
Mechanical life – number of switching actions	
Operating temperature	min./max.
Approvals	
Weight	
Delivery: ex-stock/built to order	

500 V AC	500 V AC
10 A	10 A
●	●
50/min.	50/min.
1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>
-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F
BG, UL, CSA	BG, UL, CSA
0.09 kg/0.20 lb	0.09 kg/0.20 lb
-/●	-/●

500 V AC	500 V AC
10 A	10 A
●	●
50/min.	50/min.
1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>
-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F
BG, UL, CSA	BG, UL, CSA
0.09 kg/0.20 lb	0.09 kg/0.20 lb
-/●	-/●

All dimensions in mm (inch)

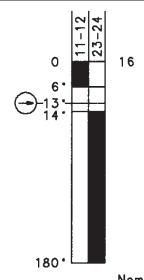
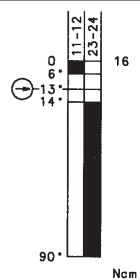
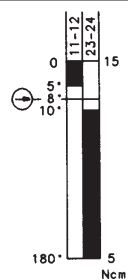
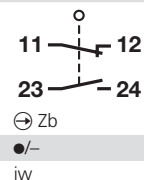
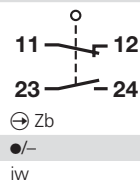
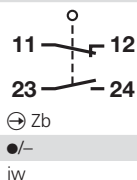




I88-U1Z VKW LI  
608.6100.095

GC-U1Z VKS  
612.1100.622

GC-U1Z VKW  
612.1100.623



500 V AC  
10 A

500 V AC  
10 A

500 V AC  
10 A

50/min.  
1 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

20/min.  
1 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

20/min.  
1 x 10<sup>6</sup>  
-30 °C/+80 °C  
-22 °F/+176 °F

BG, UL, CSA

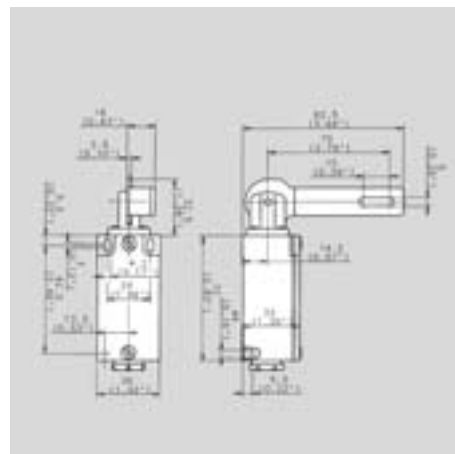
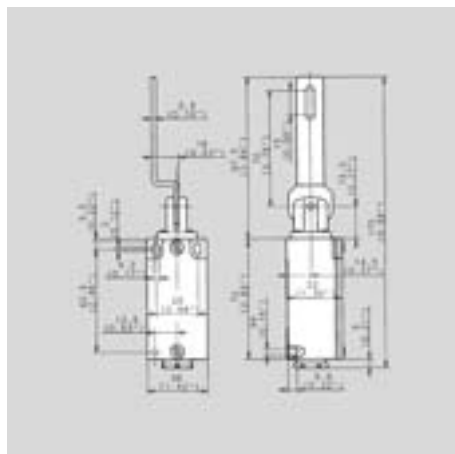
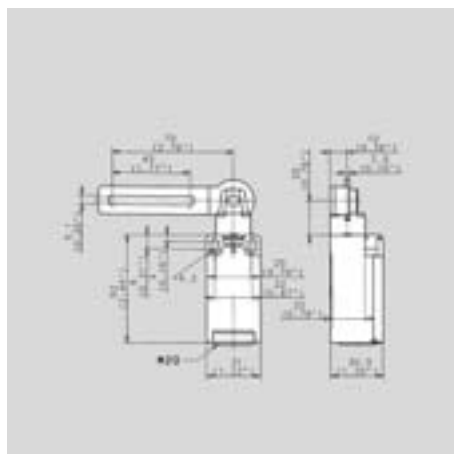
BG, UL, CSA

BG, UL, CSA

0.09 kg/0.20 lb  
-/●

0.20 kg/0.44 lb  
●/-

0.20 kg/0.44 lb  
●/-





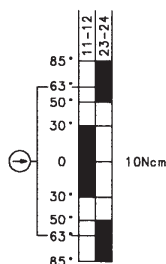
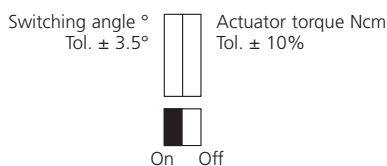
## Metal-bodied safety switch with personnel protection function in forward and reverse movement

### ENM2-AHZ

Protection class IP 65

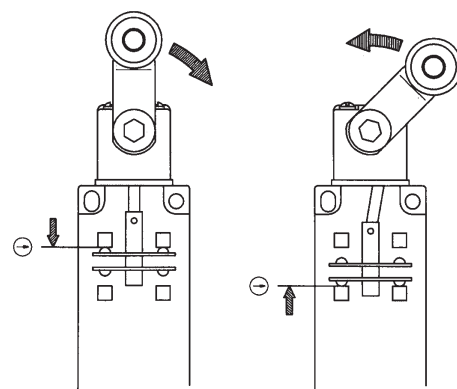
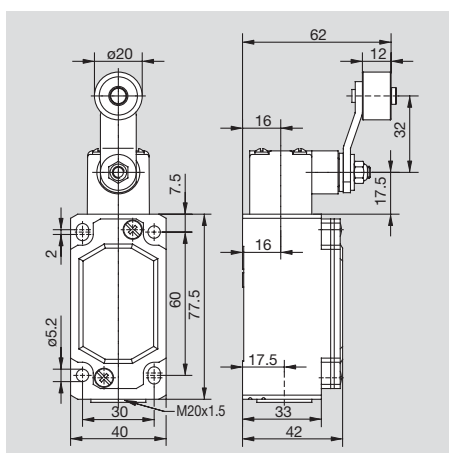


Designation	ENM2-U1Z AHZ
<b>Part number</b>	<b>608.7135.030</b>
Circuit diagram	
<p>⊕ Forced disconnect to IEC 947-5-1 chapter 3</p> <p>Za: not galvanically separated contacts</p> <p>Zb: galvanically separated contacts</p>	<p>⊕ Zb</p> <p>●/-</p> <p>iw</p>
Slow make & break/snap-action	
Internal seal (iw)/external seal (w)	



Voltage	max.	400 V AC
Permanent current	max.	10 A
In-rush current complies with standards		●
IEC 947-5-1 AC 15/DC 13		
Switching frequency	max.	100/min.
Mechanical life – number of switching actions		1 x 10 <sup>6</sup>
Operating temperature	min./max.	-30 °C/+80 °C -22 °F/+176 °F
Approvals		BG, UL, CSA
Weight		0,28 kg/0,62 lb
Delivery: ex-stock/built to order		●/-

All dimensions in mm (inch)



#### Forced disconnect in forward and reverse travel AHZ

For special safety applications the forced disconnection of the NC contacts is not only achieved in the forward direction, but also in the reverse direction (back to standard position). For operator safety applications the roller must be positively guided in both directions.

# Safety Hinge Switch

## SHS

IP 67 Metal housing



Hinged machinery guards and covers as well as safety fence doors may be found in every type of industry.

**The safety hinge switch SHS is the logical integration of the safety switch and load-bearing hinge for industrial applications.**

Designed to facilitate mounting onto extruded aluminium profiles, steel or plastic doors, the slim profile of the SHS even when fully closed, allows the hinge to be readily mounted where space is constrained.

Traditional safety switches with separate actuator keys are often subject to mechanical wear, particularly when mounted on the closing edge of guards where accumulated tolerances can cause misalignment. The SHS removes this problem with the safety contact mounted internally, inaccessible to the user and therefore providing excellent tamper protection. One or more switches may be used dependent on the category of safety protection required. Matching hinges without safety contacts are also available, allowing the style to be standardised for general use. In operation, consideration must simply be given to the required contact operation angle, which is determined by guard size and the maximum allowable guard opening distance before actuation.



(approval pending)

**Safe:**

- 2 SHS hinge switches each with a force disconnect safety contact allow safety category 4 systems to be configured subject to the required risk analysis and safety contact monitoring.

**Flexible:**

- The hinge operating angle is 0–180°.
- The switch point may similarly be selected through 180°.
- AC/DC to 250 V or 60 V DC versions available.

**Fast:**

- Industry standard M12 x 1 connectors with axial and radial (rear) mounting available as well as fixed cable version.

**Reliable:**

- A cast Zinc alloy body allows the SHS a high degree of mounting freedom.
- In its hinge capacity the SHS can bear up to 750 N axially and over 1000 N radially, after the switching point has been set.
- Ingress protection to IP 67.

**SHS configuration summary**

**With M12x1 connector, for 60 V DC applications, without earth connection**

SHS-A1Z-SR	DC	601.9261.010	Radial Plug	Ex-stock
SHS-A1Z-SA	DC	601.9261.015	Axial Plug	Ex-stock

**With M12x1 connector, for AC/DC applications to 250 V, with earth connection**

SHS-A1Z-SA	AC/DC	601.9261.009	Axial Plug	Ex-stock
SHS-A1Z-SR	AC/DC	601.9261.016	Radial Plug	Ex-stock

**With fixed cable**

SHS-A1Z-KR5	AC/DC	601.9261.014	fixed cable radial	To order
SHS-A1Z-KA5	DC	601.9261.011	fixed cable axial	To order

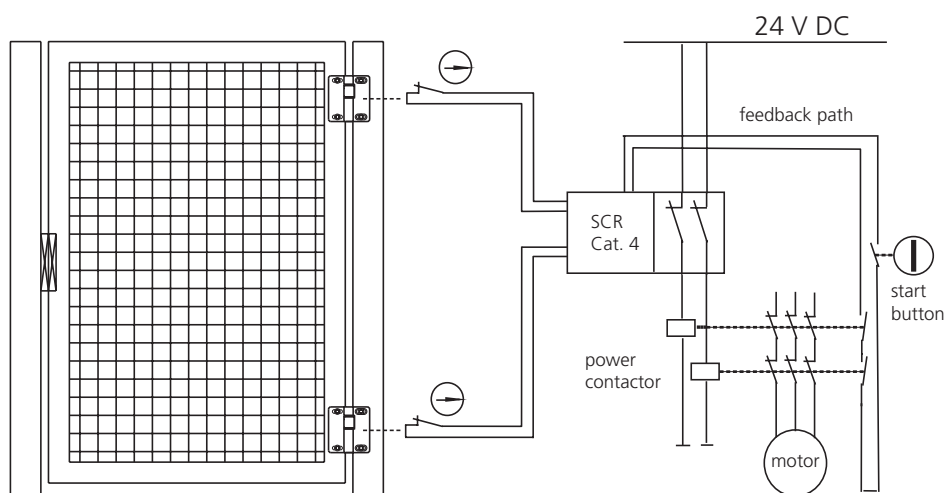
**Standard hinge**

SHS-OZ		601.9291.013	<b>No connection</b>	Ex-stock
--------	--	--------------	----------------------	----------

## True Category 4 (EN 954-1/2)

- true electrical redundancy
- true mechanical redundant safety
- avoids mechanical common mode failure

Installation example:



## Plug

### M 12 x 1

with moulded cable

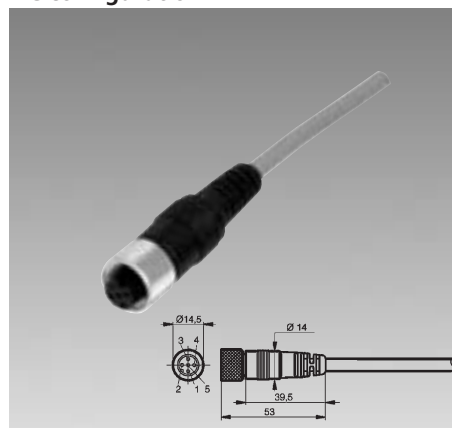
#### Terminal code, DC configuration

- 1 = brown
- 2 = -
- 3 = blue
- 4 = black

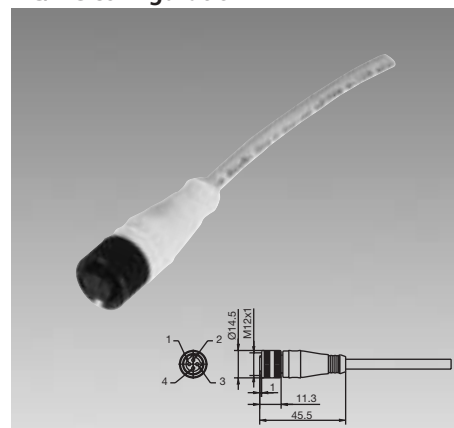
#### Terminal code, AC/DC configuration

- 1 = brown
- 2 = black
- 3 = blue
- 4 = green-yellow

#### DC configuration



#### AC/DC configuration



Cable length	Model description
2 m	<b>Part number</b>
Cable length	Model description
5 m	<b>Part number</b>
Cable length	Model description
10 m	<b>Part number</b>

Straight line	Right-angled
AN-KAB.SHS 2M DC	AN-KAB.SHS 2M DC
<b>325.1003.221</b>	<b>325.1003.224</b>
AN-KAB.SHS 5M DC	AN-KAB.SHS 5M DC
<b>325.1003.222</b>	<b>325.1003.225</b>
AN-KAB.SHS 10M DC	AN-KAB.SHS 10M DC
<b>325.1003.223</b>	<b>325.1003.226</b>

Straight line	Right-angled
<b>on request</b>	<b>on request</b>
AN-KAB.SHS 5M AC	AN-KAB.SHS 5M AC
<b>325.1004.219</b>	<b>325.1004.220</b>
<b>on request</b>	<b>on request</b>

Material of cable sleeve	PVC/PVC
Material body/Contact carrier	PUR/PUR
Rated voltage	max.
Current carrying capacity	max.
Temperature range	min./max.
Cable structure	mm <sup>2</sup>
Protection class after installation	IP 67

Material of cable sleeve	PVC/PVC
Material body/Contact carrier	PUR/Nylon 6.6
Rated voltage	300 V AC
Current carrying capacity	4.0 A
Temperature range	-5 °C/+70 °C +23 °F/+158 °F
Cable structure	4 x 0.34
Protection class after installation	IP 68

Material of cable sleeve	PVC/PVC
Material body/Contact carrier	PUR/Nylon 6.6
Rated voltage	300 V AC
Current carrying capacity	4.0 A
Temperature range	-5 °C/+70 °C +23 °F/+158 °F
Cable structure	4 x 0.34
Protection class after installation	IP 68

# Safety Hinge Switch

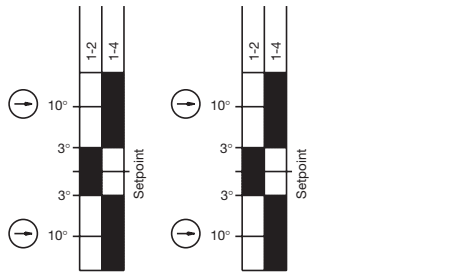
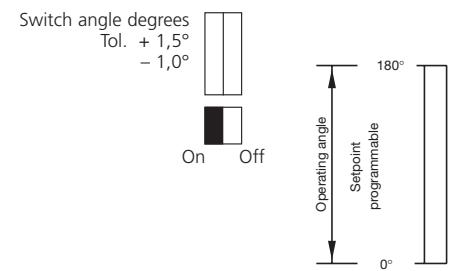
## SHS



Designation  
**Part number**  
 Contact diagram  
 ⊕ Forced disconnect to IEC 947-5-1 annex k  
 Za: non-galv. separated contact  
 Zb: galv. separated contact  
 Slow make and break/Snap action  
 Sealed internally (iw)/externally (w)

SHS-A1Z-SR      SHS-A1Z-SR      SHS-A1Z-KR 5  
**601.9261.010**    **601.9261.016**      **601.9261.014**  
  
 ⊕ C  
 ●/-  
 iw

⊕ C  
 ●/-  
 iw

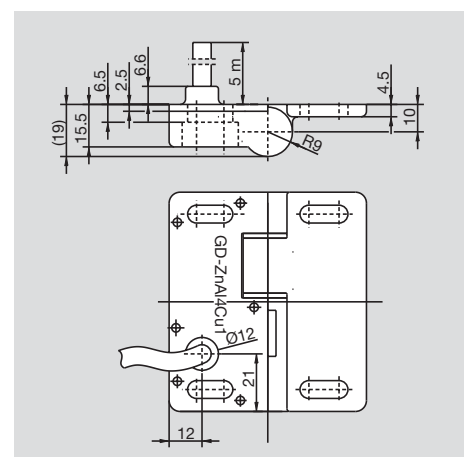
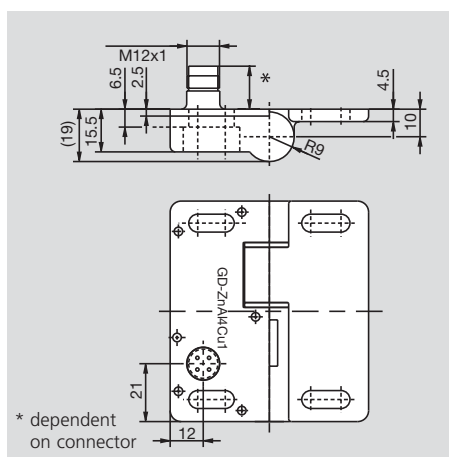
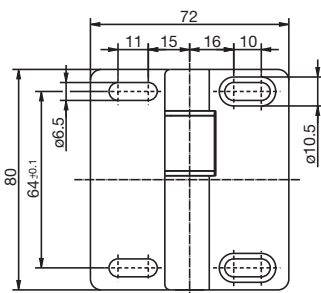


Voltage max.  
 Thermal current max.  
 Utilization category per IEC 947-5-1 AC 15/DC 13  
 Switching frequency max.  
 Mechanical life – switching operations  
 Operating temperature min./max.

250 VAC      250 VAC  
 3 A      3 A  
 60 V/0.5 A      60 V/0.5 A      230 V/1.5 A  
 (DC 13)      (DC 13)      (AC 15)  
 1200/h      1200/h  
 1 x 10<sup>6</sup>      1 x 10<sup>6</sup>  
 -25 °C/+70 °C      -25 °C/+70 °C  
 -13 °F/+158 °F      -13 °F/+158 °F

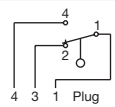
250 VAC  
 3 A  
 60 V/0.5 A      230 V/1.5 A  
 (DC 13)      (AC 15)  
 1200/h  
 1 x 10<sup>6</sup>  
 -25 °C/+70 °C  
 -13 °F/+158 °F

All dimensions in mm





SHS-A1Z-SA  
601.9261.015

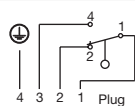


⊕ C

●/-

iw

SHS-A1Z-SA  
601.9261.009

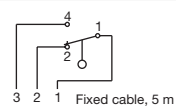


⊕ C

●/-

iw

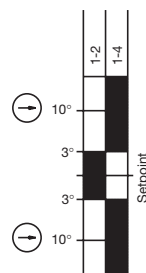
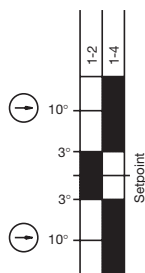
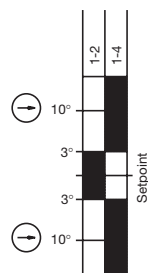
SHS-A1Z-KA 5  
601.9261.011



⊕ C

●/-

iw



250 VAC  
3 A  
60 V/0.5 A  
(DC 13)  
1200/h  
1 x 10<sup>6</sup>  
-25 °C/+70 °C  
-13 °F/+158 °F

250 VAC  
3 A  
60 V/0.5 A 230 V/1.5 A  
(DC 13) (AC 15)  
1200/h  
1 x 10<sup>6</sup>  
-25 °C/+70 °C  
-13 °F/+158 °F

250 VAC  
3 A  
60 V/0.5 A  
(DC 13)  
1200/h  
1 x 10<sup>6</sup>  
-25 °C/+70 °C  
-13 °F/+158 °F

BG, UL, CSA

0.4 kg

●/-

BG, UL, CSA

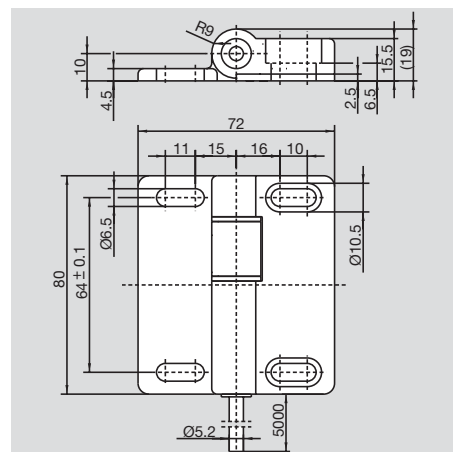
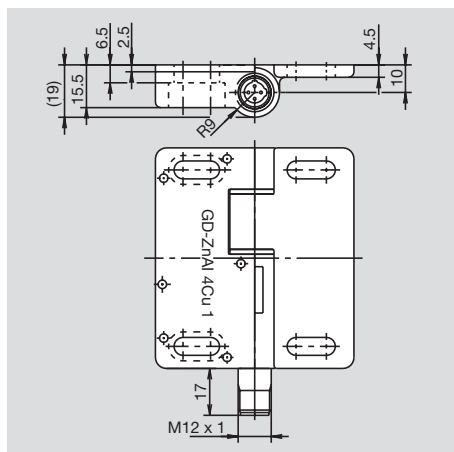
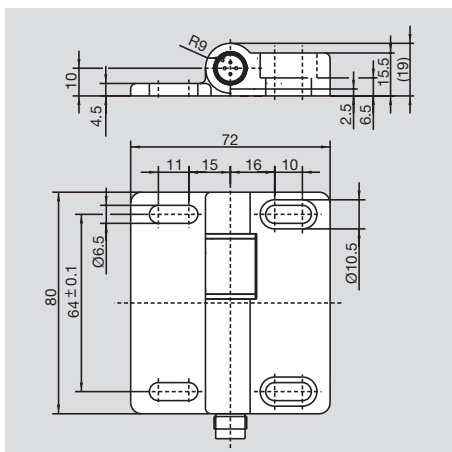
0.4 kg

●/-

BG, UL, CSA

0.4 kg

-/●





## Plastic-bodied Rope Pull switch S/Si

Protection class IP 65



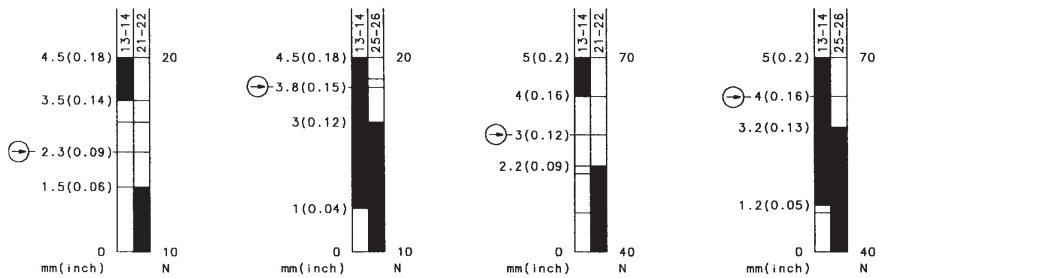
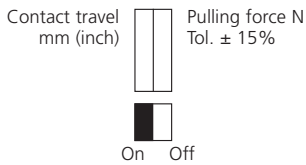
## Metal-bodied Rope Pull switch S/Si

Protection class IP 65



Designation
<b>Part number</b>
Circuit diagram
⊕ Forced disconnect to IEC 947-5-1 chapter 3
Za: not galvanically separated contacts
Zb: galvanically separated contacts
Slow make & break/snap-action
Internal seal (iw)/external seal (w)

Si-U1Z	SiL-UV1Z	SEK-U1Z	SiEK-UV1Z
<b>601.3812.075</b>	<b>601.3832.076</b>	<b>601.1811.133</b>	<b>601.1831.134</b>
⊕ Zb	⊕ Zb	⊕ Zb	⊕ Zb
●/-	●/-	●/-	●/-
-	-	-	-



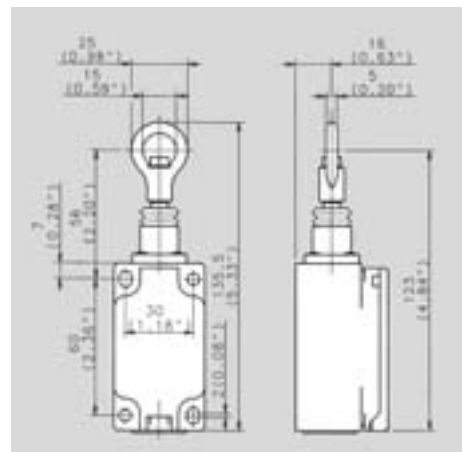
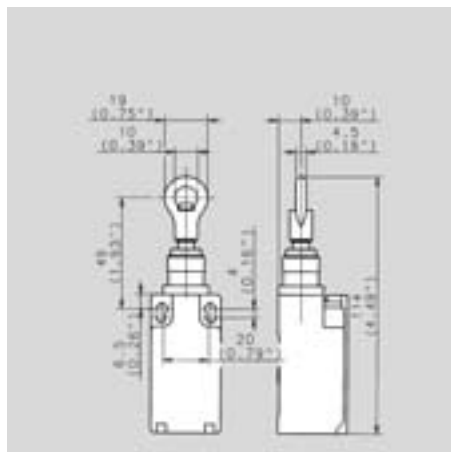
Voltage	max.
Permanent current	max.
In-rush current complies with standards	
<b>Maximum rope length</b>	
Switching frequency	max.
Mechanical life – number of switching actions	
Operating temperature	min./max.

500 V AC	500 V AC	500 V AC	500 V AC
10 A	10 A	10 A	10 A
●	●	●	●
<b>2 m</b>	<b>2 m</b>	<b>5 m</b>	<b>5 m</b>
50/min.	50/min.	50/min.	50/min.
1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F

Approvals
Cable entry
Weight
Delivery: ex-stock/built to order

UL, CSA	UL, CSA	BG, UL, CSA	BG, UL, CSA
1 x M 20 x 1.5	1 x M 20 x 1.5	1 x M 20 x 1.5	1 x M 20 x 1.5
0.09 kg/0.20 lb	0.09 kg/0.20 lb	0.17 kg/0.37 lb	0.17 kg/0.37 lb
●/-	●/-	●/-	●/-

All dimensions in mm (inch)





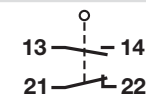
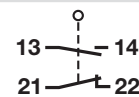
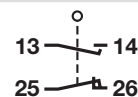
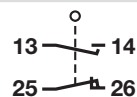
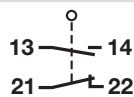
SEM2-U1Z  
601.2811.029

SIEM2-UV1Z  
601.2831.022

SIEM2-UV1Z Rast  
601.2831.023

SD-U1  
601.1411.856

SD-U1  
611.1411.029



⊖ Zb

⊖ Zb

⊖ Zb

-

-

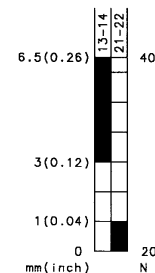
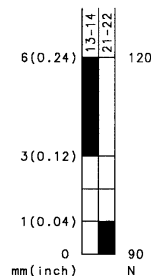
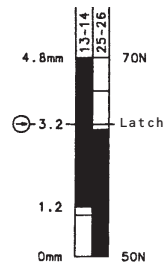
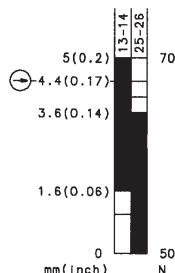
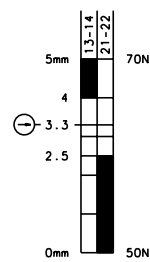
●/-

●/-

-

●/-

●/-



400 V AC  
10 A

400 V AC  
10 A

400 V AC  
10 A

500 V AC  
16 A

500 V AC  
16 A

●

●

●

●

●

5 m

5 m

5 m

50/min.

50/min.

50/min.

50/min.

17/min.

1 x 10<sup>6</sup>

1 x 10<sup>6</sup>

1 x 10<sup>6</sup>

1 x 10<sup>6</sup>

1 x 10<sup>6</sup>

1 x 10<sup>6</sup>

1 x 10<sup>6</sup>

-30 °C/+80 °C

-30 °C/+80 °C

-30 °C/+80 °C

-30 °C/+80 °C

-30 °C/+80 °C

-22 °F/+176 °F

-22 °F/+176 °F

-22 °F/+176 °F

-22 °F/+176 °F

-22 °F/+176 °F

BG, UL, CSA

BG, UL, CSA

BG, UL, CSA

UL, CSA

UL, CSA

1 x M 20 x 1.5

1 x M 20 x 1.5

1 x M 20 x 1.5

2 x M 20 x 1.5

2 x M 20 x 1.5

0.22 kg/0.49 lb

0.22 kg/0.49 lb

0.26 kg/0.57 lb

0.33 kg/0.73 lb

0.33 kg/0.73 lb

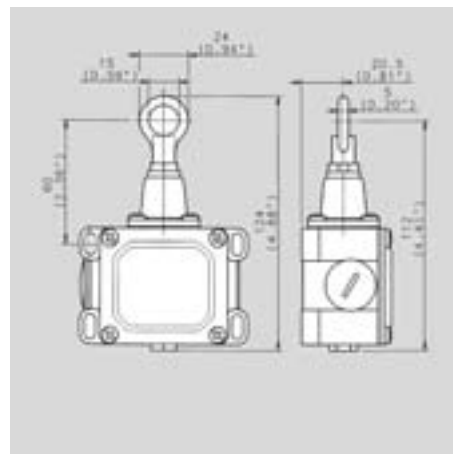
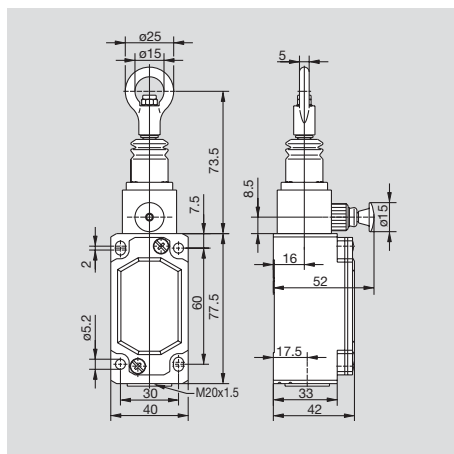
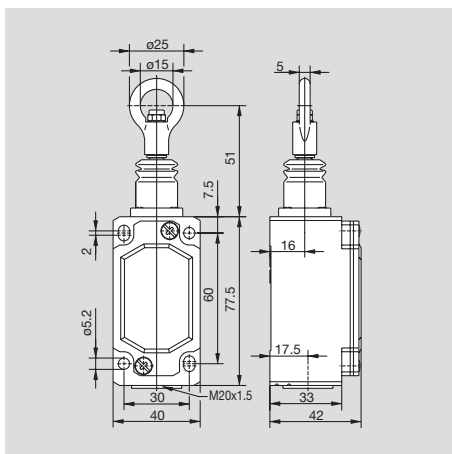
●/-

●/-

●/-

●/-

●/-



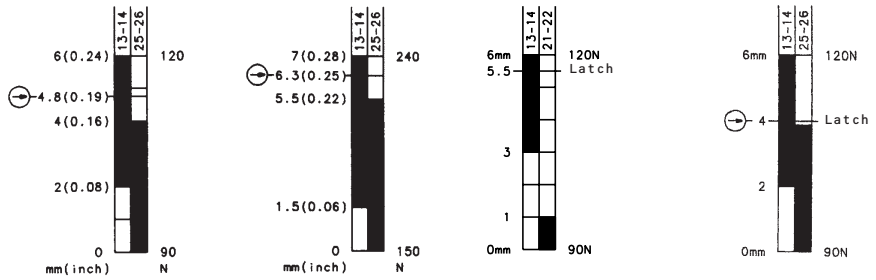
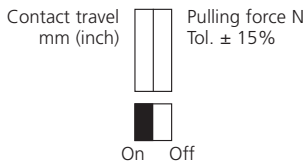
# Metal-bodied Rope Pull switch S/Si

Protection class IP 65



Designation
<b>Part number</b>
Circuit diagram
⊕ Forced disconnect to IEC 947-5-1 chapter 3
Za: not galvanically separated contacts
Zb: galvanically separated contacts
Slow make & break/snap-action
Internal seal (iw)/external seal (w)

SiD-UV1Z	SiD-UV1Z	SD-U1	SiD-UV1Z Rast
<b>601.1431.857</b>	<b>611.1431.022</b>	<b>601.1411.868</b>	<b>601.1431.869</b>
⊕ Zb	⊕ Zb	-	⊕ Zb
●/-	●/-	●/-	●/-
-	-	●	●



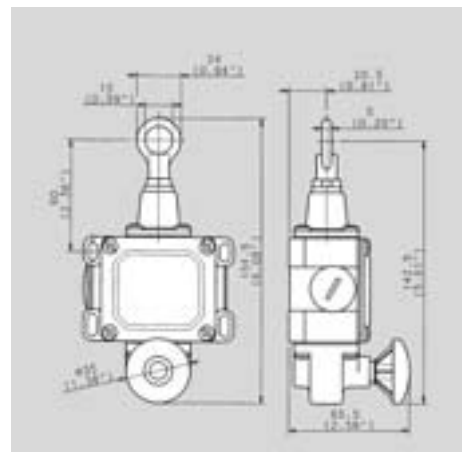
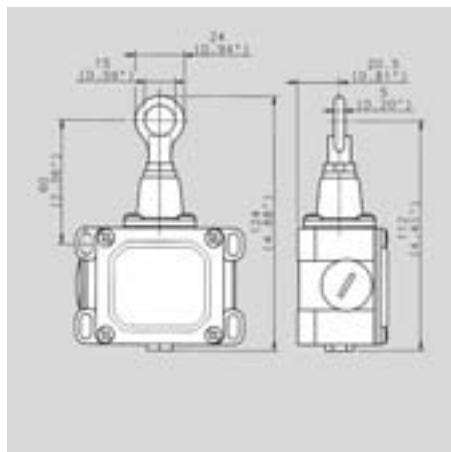
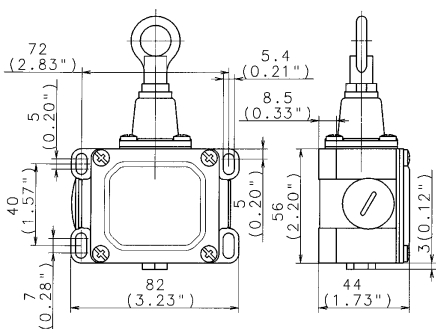
Voltage	max.
Permanent current	max.
In-rush current complies with standards	
<b>Maximum rope length</b>	
Switching frequency	max.
Mechanical life – number of switching actions	
Operating temperature	min./max.

400 V AC	400 V AC	500 V AC	400 V AC
16 A	16 A	16 A	16 A
●	●	●	●
<b>5 m</b>	<b>10 m</b>	<b>10 m</b>	<b>10 m</b>
50/min.	50/min.	20/min.	20/min.
1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F

Approvals	UL, CSA
Cable entry	2 x M 20 x 1.5
Weight	0.33 kg/0.73 lb
Delivery: ex-stock/built to order	

UL, CSA	UL, CSA	UL, CSA	UL, CSA
2 x M 20 x 1.5	2 x M 20 x 1.5	2 x M 20 x 1.5	2 x M 20 x 1.5
0.33 kg/0.73 lb	0.33 kg/0.73 lb	0.49 kg/1.08 lb	0.49 kg/1.08 lb
●/-	●/-	●/-	●/-

All dimensions in mm (inch)



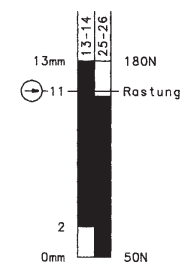
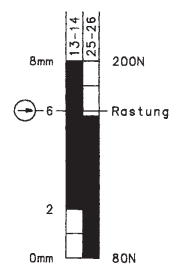
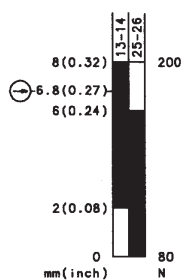
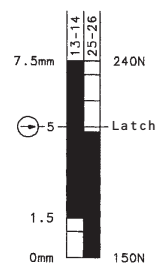
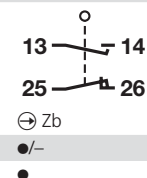
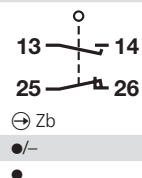
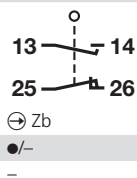
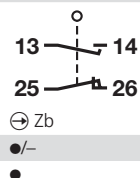


SID-UV1Z Rast  
611.1431.060

SID-UV1Z  
601.2431.877

SID-UV1Z Rast  
601.2431.883

SID-UV1Z Rast  
611.2431.050



400 V AC  
16 A

500 V AC  
16 A

500 V AC  
16 A

500 V AC  
16 A

20 m

50/min.

20/min.

20/min.

1 x 10<sup>6</sup>

1 x 10<sup>6</sup>

1 x 10<sup>6</sup>

1 x 10<sup>6</sup>

-30 °C/+80 °C

-30 °C/+80 °C

-30 °C/+80 °C

-30 °C/+80 °C

-22 °F/+176 °F

-22 °F/+176 °F

-22 °F/+176 °F

-22 °F/+176 °F

UL, CSA

UL, CSA

UL, CSA

UL, CSA

2 x M 20 x 1.5

2 x M 20 x 1.5

2 x M 20 x 1.5

2 x M 20 x 1.5

0.53 kg/1.17 lb

0.47 kg/1.04 lb

0.70 kg/1.54 lb

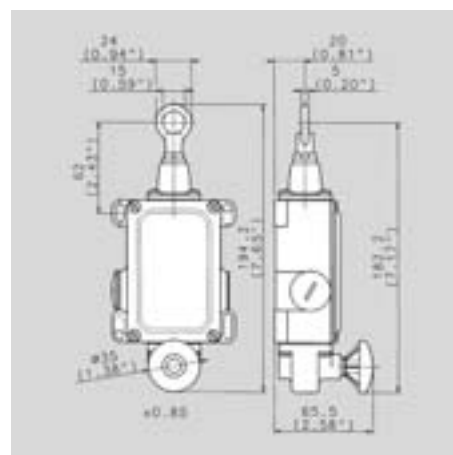
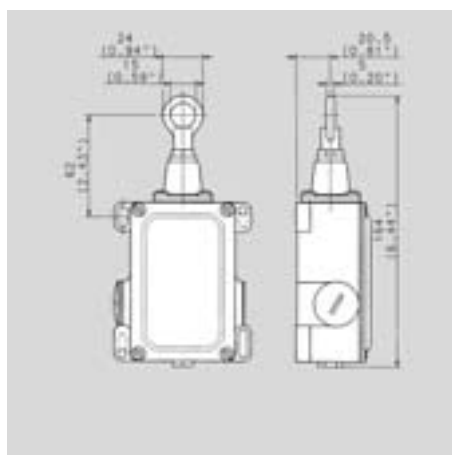
0.64 kg/1.41 lb

●/-

●/-

●/-

●/-



# Metal bodied Rope Pull switches S/Si

Protection class IP 65

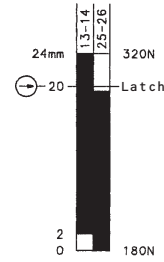
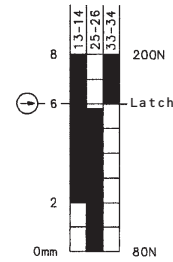
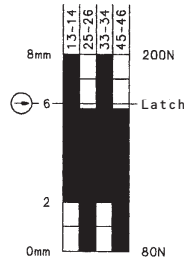
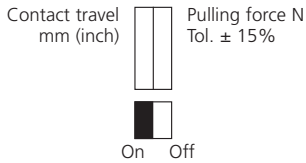
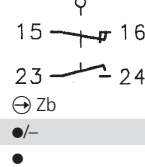
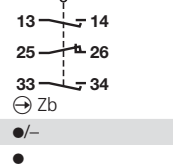
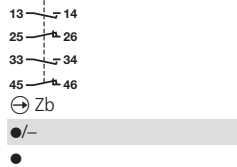


Designation  
**Part number**  
 Circuit diagram  
 ⊕ Forced disconnect to IEC 947-5-1 chapter 3  
 Za: not galvanically separated contacts  
 Zb: galvanically separated contacts  
 Slow make & break/snap-action  
 Internal seal (iw)/external seal (w)

SiD-UV2Z Rast  
**601.2441.907**

SiD-UV1Z/E1 Rast  
**611.2461.041**

SiN-UV1Z P-Rast  
**601.3531.367**



Voltage max. 400 V AC  
 Permanent current max. 16 A  
 In-rush current complies with standards  
**Maximum rope length**  
 Switching frequency max. 20/min.  
 Mechanical life – number of switching actions 1 x 10<sup>6</sup>  
 Operating temperature min./max. -30 °C/+80 °C  
 -22 °F/+176 °F

400 V AC  
 16 A  
 ●  
**10 m**  
 20/min.  
 1 x 10<sup>6</sup>  
 -30 °C/+80 °C  
 -22 °F/+176 °F

400 V AC  
 16 A  
 ●  
**10 m**  
 20/min.  
 1 x 10<sup>6</sup>  
 -30 °C/+80 °C  
 -22 °F/+176 °F

500 V AC  
 16 A  
 ●  
**50 m**  
 20/min.  
 1 x 10<sup>6</sup>  
 -30 °C/+80 °C  
 -22 °F/+176 °F

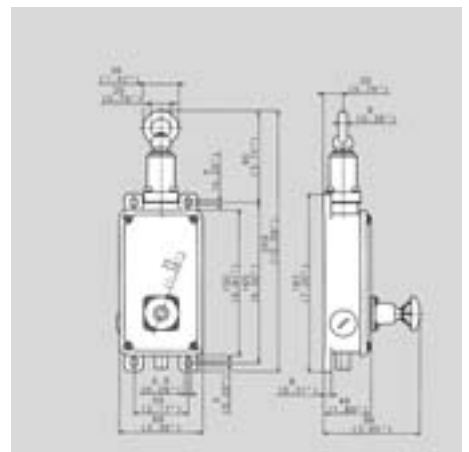
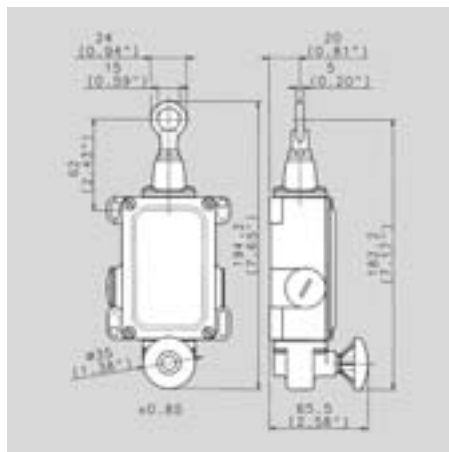
Approvals  
 Cable entry 2 x M 20 x 1.5  
 Weight 0.70 kg/1.54 lb  
 Delivery: ex-stock/built to order

UL, CSA  
 2 x M 20 x 1.5  
 0.70 kg/1.54 lb  
 ●/-

UL, CSA  
 2 x M 20 x 1.5  
 0.70 kg/1.54 lb  
 ●/-

UL, CSA  
 2 x M 20 x 1.5  
 1.30 kg/2.87 lb  
 ●/-

All dimensions in mm (inch)

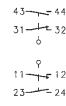
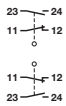




SI1-U2Z AK R-Rast  
**601.4735.001**

SI1-U1Z/U1Z AK R-Rast  
**601.4735.025**

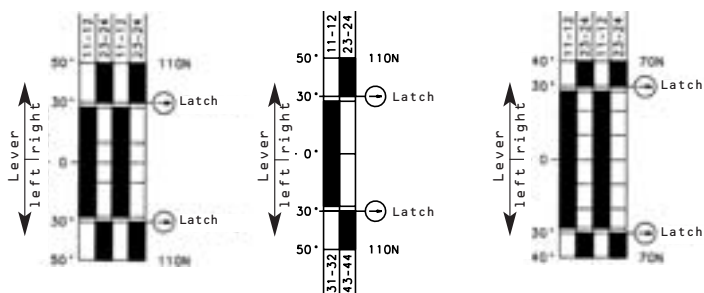
SI2-U2Z AK R-Rast  
**601.5735.002**



⊕ Zb  
●/-  
●

⊕ Zb  
●/-  
●

⊕ Zb  
●/-  
●



250 V AC  
10 A

250 V AC  
10 A

500 V AC  
10 A

●  
**100 m**

●  
**100 m**

●  
**100 m**

10/min.

10/min.

10/min.

1 x 10<sup>6</sup>

1 x 10<sup>6</sup>

1 x 10<sup>6</sup>

-30 °C/+80 °C

-30 °C/+80 °C

-30 °C/+80 °C

-22 °F/+176 °F

-22 °F/+176 °F

-22 °F/+176 °F

UL, CSA

BG, UL, CSA

UL, CSA

1 x M 20 x 1.5

1 x M 20 x 1.5

3 x M 20 x 1.5

1.60 kg/3.53 lb

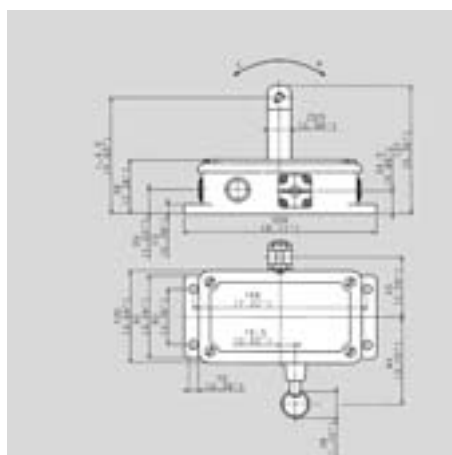
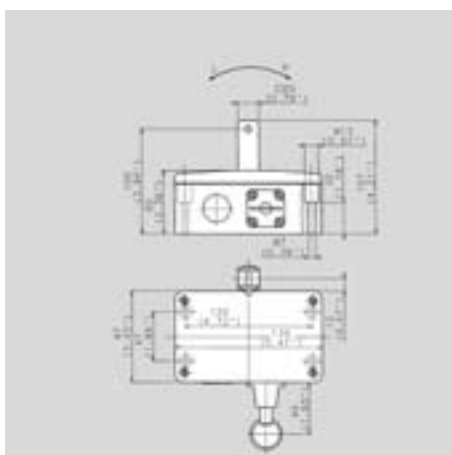
1.60 kg/3.53 lb

3.80 kg/8.38 lb

●/-

●/-

●/-



# Safety Rope Pull switches

## SR

Plastic housing  
Protection class IP 67

**EMERGENCY STOP switch gear**  
acc. IEC 947-5-5

**Integrated EMERGENCY STOP**  
**push button**

**Quick mounting device for**  
**rope installation**



### Safe:

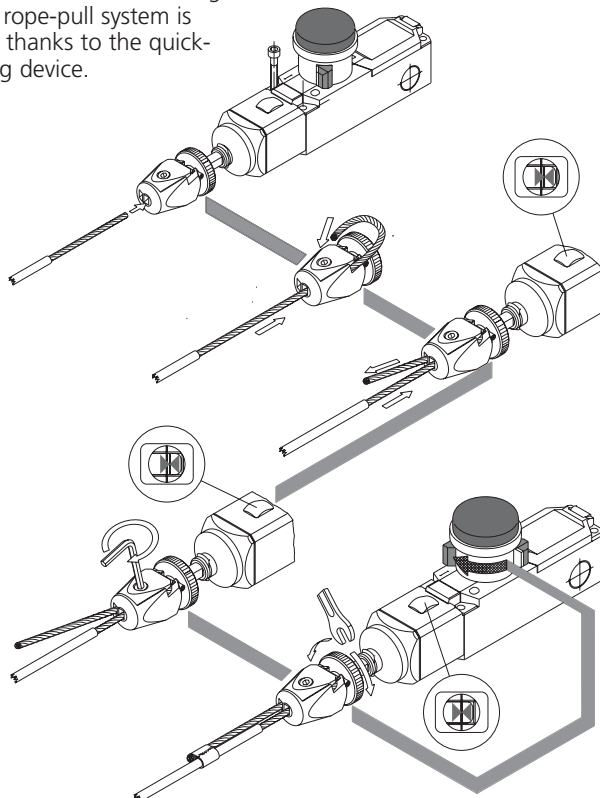
- The EMERGENCY STOP function is enabled by positive-break safety contacts following actuation or failure of the rope-pull system.
- The SR ... NA QF has an integrated EMERGENCY STOP push button, which, due to its design, is particularly well protected against external mechanical influences and blocking.

### Flexible:

- 2 NC and 2 NO contacts is the standard contact configuration. According to customer preference, separate specification of the 4 switching elements is possible; thus allowing system integration close to the application.

### Fast:

- The fast rope attachment of the SR ... NA QF is shown in the drawing on the left. The rope-pull system is quickly installed thanks to the quick-change clamping device.



- The correct rope tension is clearly and visibly indicated.
- Also clearly recognisable is the circuit status indication, combined with the reset function, of the E-STOP device.
- The electrical connection is made via "cage clamp"-connection terminals.

### Reliable:

- The glass-fibre reinforced polyamide housing can cope with the roughest operating conditions. The SR is mounted using a mounting plate made of metal.
- Protection class IP 67.

### In the future:

- Two integrated diffuse reflective sensors are to be offered, which will signal if the rope tension is exceeded. This facilitates "preventative maintenance".

Designation

### Part number

Switching diagram

⊖ Forced disconnect

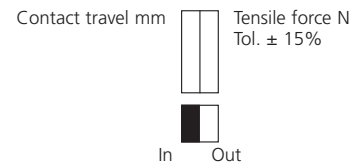
IEC 947-5-1 Chap. 3

Za: changeover contact is not galvanically isolated

Zb: changeover contact is galvanically isolated

Slow-action contact/snap-action contact

Latching mechanism



Voltage max.

Continuous terminal current max.

Utilization category acc. to IEC 947-5-1 AC 15 /DC 13

Switching frequency max.

Mech. operational life acc. to IEC 947-5-5

Ambient temperature min./max.

### Approvals

Pending Approvals

cable conduit

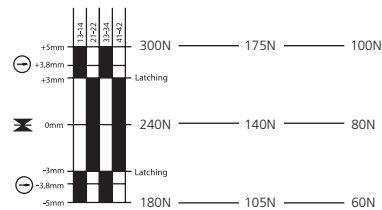
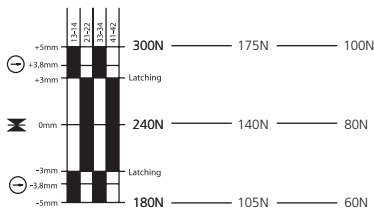
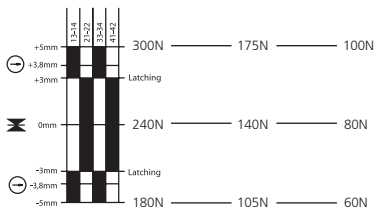
Weight

Delivery: ex stock/built to order

All dimensions in mm

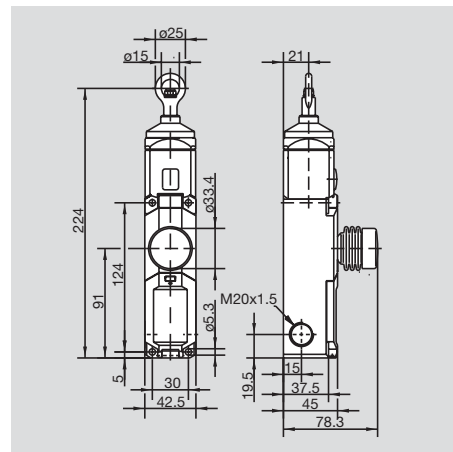
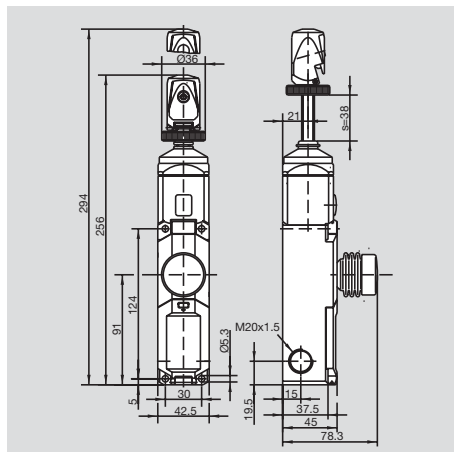
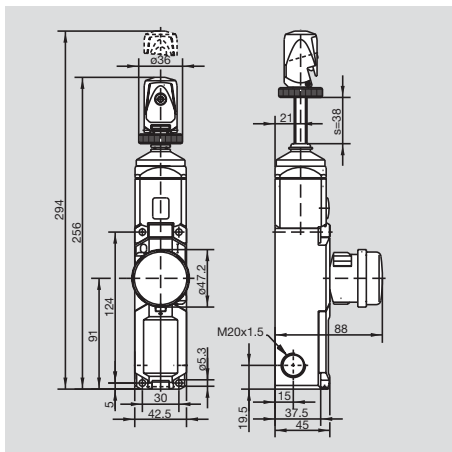


SR-UZZ-NA-QF 300	SR-UZZ-NA-QF 175	SR-UZZ-NA-QF 100	SR-UZZ-QF 300	SR-UZZ-QF 175	SR-UZZ-QF 100	SR-UZZ 300	SR-UZZ 175	SR-UZZ 100
601.1629.019	601.1629.027	601.1629.031	601.1629.028	601.1629.024	601.1629.032	601.1620.020	601.1621.026	601.1621.030
⊖ Zb	⊖ Zb	⊖ Zb	⊖ Zb	⊖ Zb	⊖ Zb	⊖ Zb	⊖ Zb	⊖ Zb
●/-	●/-	●/-	●/-	●/-	●/-	●/-	●/-	●/-



250 VAC	250 VAC	250 VAC	250 VAC	250 VAC	250 VAC	250 VAC	250 VAC	250 VAC
10 A	10 A	10 A	10 A	10 A	10 A	10 A	10 A	10 A
230 V/4 A	230 V/4 A	230 V/4 A	230 V/4 A	230 V/4 A	230 V/4 A	230 V/4 A	230 V/4 A	230 V/4 A
(AC 15)	(AC 15)	(AC 15)	(AC 15)	(AC 15)	(AC 15)	(AC 15)	(AC 15)	(AC 15)
20/min.	20/min.	20/min.	20/min.	20/min.	20/min.	20/min.	20/min.	20/min.
●	●	●	●	●	●	●	●	●
-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C
-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F

-	-	-	-	-	-	-	-	-
BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA
3x M20 x 1.5	3x M20 x 1.5	3x M20 x 1.5	3x M20 x 1.5	3x M20 x 1.5	3x M20 x 1.5	3x M20 x 1.5	3x M20 x 1.5	3x M20 x 1.5
0.6 kg	0.6 kg	0.6 kg	0.6 kg	0.6 kg	0.6 kg	0.5 kg	0.5 kg	0.5 kg
●/-	●/-	●/-	●/-	●/-	●/-	●/-	●/-	●/-





# Rope Pull safety switches

## SiRK

Plastic body  
Two-sided spanning (max. 2x 75 m)  
Protection class IP 65



### Application

The SiRK rope pull safety switch has been developed for larger system spans in a corrosion free material. The SiRK can also be delivered with an indicator lamp.

### Utilization

When larger machines or entire installations are to be protected, the emergency-stop command can be initiated from any point in the plant using rope-pull safety switches. This can be advantageous compared to individually mounted emergency-stop buttons when preventing injury to persons and damage to machinery. The SiRK can be adapted to suit a wide range of applications thanks to the individual selection of rope lengths and various mounting positions.

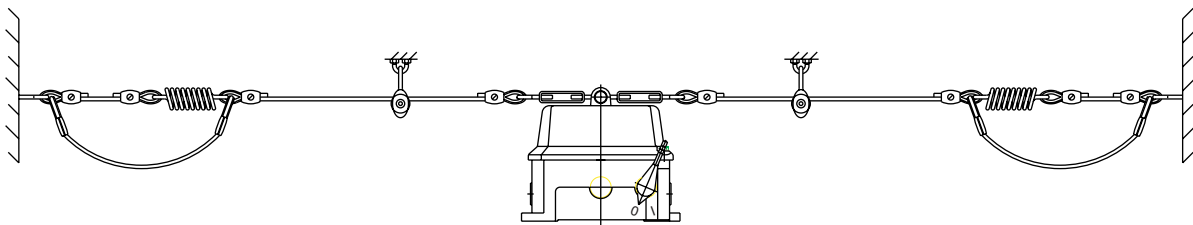
### Construction

The plastic insulated body offers superior electrical protection for the user. The switching parts allow for wide range of multi-pole protective circuits. The switching mechanism has been constructed so that the switch remains in function even when the spring element has broken. Construction and function fulfil all requirements according to EN 418 and EN 60947-5-5.

### Product characteristics

- Tamper-proof switching mechanism (EN 418)
- Automatic latching when pulled and by slack or broken rope
- Low actuating force
- Available with or without multi-voltage indicator lamp
- 6-pole terminal for daisy-chaining
- Maintenance-free construction
- Switching device simple to mount with 2 x M10 screws
- Enclosure lid simple to attach with 2 x M5 screws (captive)
- Protection class IP 65

### System configuration

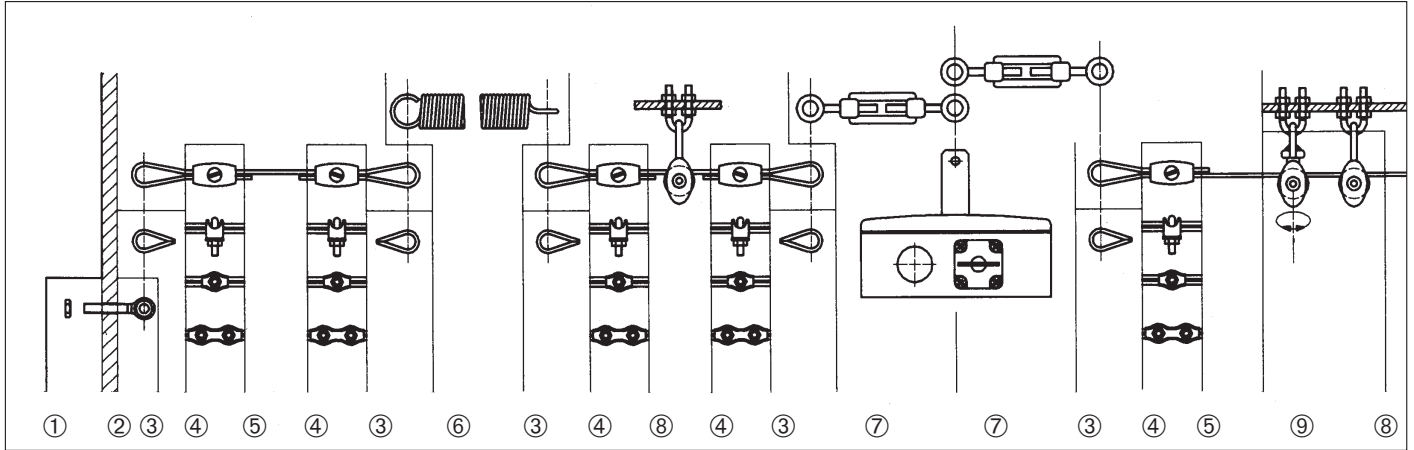


Switch	Contacts	Function	Voltage	Current
SiRK - U2Z R	2NC/2NO	Latch function	250 V	10 A
SiRK - U2Z R MLED	2NC/2NO	Latch function/indicator lamp*	250 V	10 A

\* Indicator lamp for multiple voltages with additional 6-pole terminal for daisy-chaining.



# Rope Pull switch accessories



<b>① Nut</b>	
M 6	260.0439.090
M 8	260.0439.187
M 10	260.0934.092



<b>④ Rope clamp</b>	
D 2	269.0000.004
D 3	269.0000.005
D 4	269.0000.006



<b>⑦ Tension adjuster</b>	
M 5 x 50	269.1480.016
M 6 x 60	269.1480.017
M 6 x 110	269.1480.025



<b>② Eye bolt</b>	
M 10 x 50	260.0444.076
M 6 x 50	260.0444.185
M 8 x 50	260.0444.186



<b>④ Rope clamp (simplex)</b>	
D 2	269.0000.007
D 3	269.0000.008
D 4	269.0000.009



<b>⑦ Turnbuckle nut</b>	
M 6	260.1479.188
M 8	260.1479.189



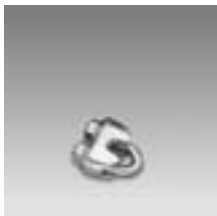
<b>③ Thimble</b>	
D 2.5	269.6899.013
D 3	269.6899.014
D 4	269.6899.015
D 5	269.6899.001



<b>④ Rope clamp (duplex)</b>	
D 2	269.0000.010
D 3	269.0000.011
D 4	269.0000.012



<b>⑧ Pulley block</b>	
	269.0000.022



<b>④ Rope clamp</b>	
D 5	269.0741.002



<b>⑤ Rope</b>	
Line- $\varnothing$ /sleeve- $\varnothing$	
D 1.8/D 5	369.9100.008
D 2/D 2.5	369.9100.024
D 3/D 4	369.9100.025
D 4/D 5	369.9100.026



<b>⑨ Pulley block</b>	
swivel	269.0000.023



<b>⑥ Spring</b>	
18 N	365.2100.331
24 N	365.2100.332



<b>Pulley block clamp for ⑧ and ⑨</b>	
	391.1751.437



# Emergency-stop button with turn and key release

## SNA

Tamper-resistant according to EN 418  
Protection class IP 65



Every moving part of plant or machinery should be brought to a halt as soon as there is danger to man or machine. The trigger for this often life-saving action can be, in addition to electronic safety equipment, the emergency-stop button. The SNA product range fulfills all safety relevant requirements, for example, an automatic latch as soon as the clearly defined pressure point is exceeded. The control device locks itself into an off position, the contacts of switching device open simultaneously. They thereby fulfil all the requirements of EN 418 "Emergency-Stop Devices", i.e. each operation of the emergency-stop button is latched, and is preceded by the opening of the safety contacts.

No manipulation can lead to the contacts being closed again. The button is released by turning the key or the mushroom-head slam button. The specially formed slam button cannot be blocked by any objects positioned under the button.

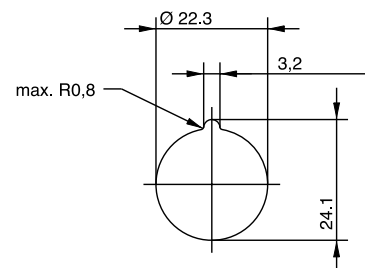
- Tamper-proof according to EN 418
- Red Ø 37 mm latching push button, released by turning in direction of arrow or by turning key in direction of arrow.
- Standard design front fitting
  - 1 normally-closed contact ⊕
  - Standard design enclosure assembly
  - 1 normally-closed contact ⊕,
  - 1 normally-open contact
  - Extending possible by mounting further NO/NC devices, max. 3 elements.
- Terminal labelling according to DIN EN 50013
- Terminal cross-section:
  - Solid core: 0.50 mm<sup>2</sup> to 2.5 mm<sup>2</sup>
  - Stranded core: 0.75 mm<sup>2</sup> to 1.5 mm<sup>2</sup>
  - Stranded core with wire-end ferrules: 0.50 mm<sup>2</sup> to 2.5 mm<sup>2</sup>
- Materials: (UL-listed plastics, Cd-free)
  - Control device: PA 6, PA 12, PC
  - Switching devices: PC, PA 6.6 self-extinguishing
  - Contact material: Ag-Ni compound
  - Built-on enclosure, yellow PC
- Cable entries/knockouts on base
- Protection class IP 65 according to IEC 529
- International certification: UL, CSA

### Complete devices for front installation

Construction:  
The switching contacts are clipped on the button assembly by means of a latching bar through the front adapter.

Mounting:

Mounting hole



Mounting hole with notch to prevent rotation according to IEC 947-5-1. Mounting hole without rotation protection can be accomplished by removing the lug from the attachment elements. The grid dimensions for the emergency-stop button should measure at least 40 x 50 mm.

### Complete devices with enclosure

Construction:  
The different switching elements are locked onto the standard base adaptors in the enclosure. This allows wiring to be connected independently from the control device.

Mounting enclosure:  
2 x M5 screws for safety devices without additional fixing, and 2 additional M5 screws for adjustment purposes in both horizontal directions.

## Emergency-stop button with turn and key release for front-side mounting

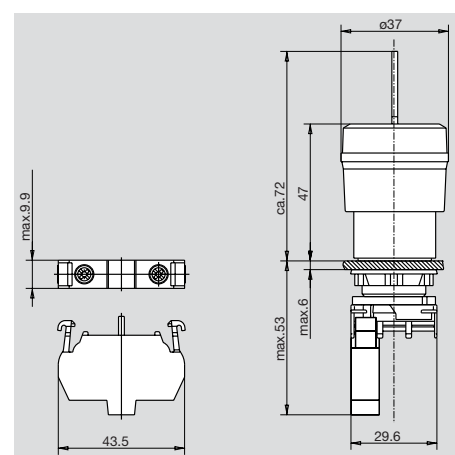
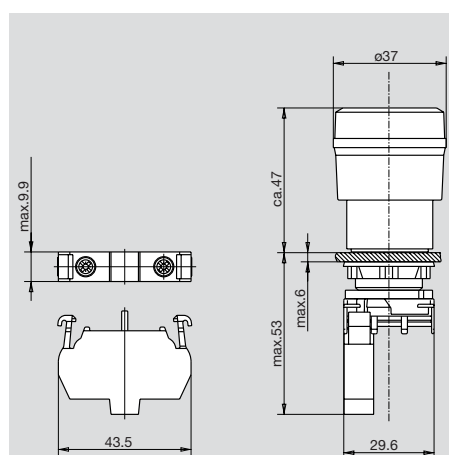
### SNA

Tamper-resistant according to EN 418  
Protection class IP 65



Designation	SNA-A1Z P	SNA-A1Z K
<b>Part number</b>	<b>601.9169.001</b>	<b>601.9169.002</b>
Switching diagram		
⊕ positive break according to IEC 947-5-1 Chap. 3		
Slow-action contact/snap-action contact	●/-	●/-
Lock-in function	●	●
Turn-to-release/key-release	●/-	-/●
Contact travel mm	approx. 6 mm	6 mm
Actuating force	≤ 70 N	≤ 70 N
Rated voltage isolation $U_i$	660 V	660 V
Rated thermal current $I_{th}$	10 A	10 A
Making current acc. to IEC 947-5-1 AC 15/DC 13		
Mech. operating life – Number of switching cycles	$0.5 \times 10^5$	$0.5 \times 10^5$
Ambient temperature min./max.	- 25 °C/+ 60 °C - 13 °F/+ 140 °F	- 25 °C/+ 60 °C - 13 °F/+ 140 °F
Approvals	UL, CSA, GL, VDE	UL, CSA, GL, VDE
Weight	0.06 kg	0.08 kg
Delivery: ex-stock/built to order	●/-	●/-

All dimensions in mm



# Emergency-stop button with turn and key release complete with enclosures

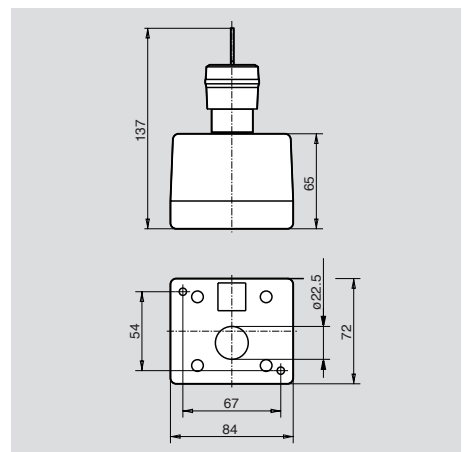
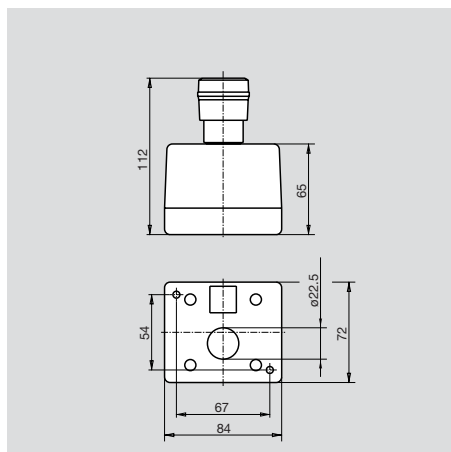
## SNA

Tamper-resistant according to EN 418  
Protection class IP 65



Designation	SNA-A1Z/E1 AP	SNA-A1Z/E1 AK
<b>Part number</b>	<b>601.9169.003</b>	<b>601.9169.004</b>
Switching diagram		
⊕ positive break according to IEC 947-5-1 Chap. 3	⊕	⊕
Slow-action contact/snap-action contact	●/-	●/-
Lock-in function	●	●
Turn-to-release/key-release	●/-	-/●
Contact travel mm	6 mm approx.	6 mm
Actuating force	≤ 70 N	≤ 70 N
Rated voltage isolation $U_i$	660 V	660 V
Rated thermal current $I_{th}$	10 A	10 A
Making current acc. to IEC 947-5-1 AC 15/DC 13		
Mech.operating life – Number of switching cycles	$0,5 \times 10^5$	$0,5 \times 10^5$
Ambient temperature min./max.	- 25 °C/+ 60 °C - 13 °F/+ 140 °F	- 25 °C/+ 60 °C - 13 °F/+ 140 °F
Approvals	VDE	VDE
Weight	0.23 kg	0.25 kg
Delivery: ex-stock/built to order	●/-	●/-

All dimensions in mm



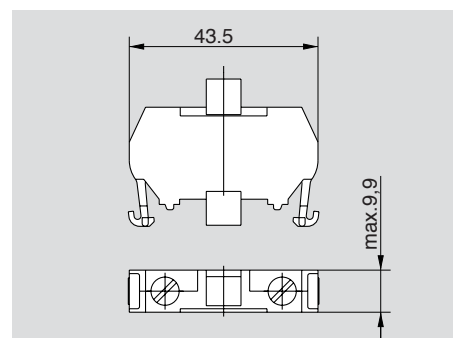
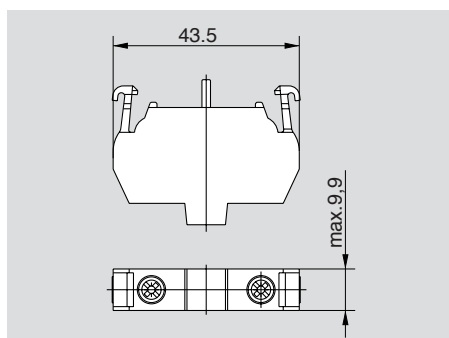
## Accessories

### Switching elements for emergency stop button

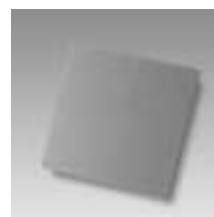


For type range	Emergency stop button Front attachment	Emergency stop button Front attachment	Emergency stop button Built-on enclosure	Emergency stop button Built-on enclosure
<b>Part number</b>	<b>601.9169.005</b>	<b>601.9169.006</b>	<b>601.9169.007</b>	<b>601.9169.008</b>
Slow-action contact/snap-action contact	●/-	●/-	●/-	●/-
Switching diagram				
⊕ positive break according to IEC 947-5-1 Chap. 3	⊕		⊕	
Contact travel mm (inch)				
Delivery: ex-stock/built to order	●/-	●/-	●/-	●/-

All dimensions in mm



## Accessories



**Legend plate for emergency-stop button/front-side attachment**  
Self-adhesive, yellow  
Protection class IP 65 is guaranteed after the removal of the protective film

**Legend plate for emergency-stop button/built-on encl.**  
Plastic (alu-coated)  
self-adhesive, not labelled

For type range	Emergency stop button Front-side mounting Ø 45 mm	Emergency stop button Front-side mounting Ø 60 mm	Emergency stop button Front-side mounting Ø 90 mm	Emergency stop button Built-on enclosures 19 x 19 mm
<b>Label language</b>	<b>Part number</b>			
without labelling	<b>321.4000.037</b>	<b>321.4000.041</b>	<b>321.4000.045</b>	<b>321.4000.049</b>
NOT-AUS	<b>321.4000.038</b>	<b>321.4000.042</b>	<b>321.4000.046</b>	
Emergency Stop	<b>321.4000.039</b>	<b>321.4000.043</b>	<b>321.4000.047</b>	
ARRET D'URGENCE	<b>321.4000.040</b>	<b>321.4000.044</b>	<b>321.4000.048</b>	
Delivery: ex-stock/ built to order	●/-	●/-	●/-	●/-



## Safety relay

### SCR

Control category 3 and 4  
according to EN 954-1  
With extended output functions  
and up to 4 safety outputs



(in preparation)

The SCR safety relay is another new member of the Safelock *Family*, designed to monitor, for example, safety position switches and emergency-stop buttons. It thereby makes it possible to build safety systems up to control category 4 with Bernstein safety switches. Bernstein now offers all necessary safety components for monitoring safety doors or guards outside of the power stage.

The SCR module monitors the position and function of the safety sensing equipment including the safety contacts of the position switches. Control system devices such as frequency converters or power contactors are driven according to the safety evaluation. Additionally, the actual status of the power contactors are verified and compared to the input position in order to monitor their correct function. To meet the requirements of safety category 4, each fault has to be recognised immediately or at the next machine start. For this reason, it is necessary to perform a start-up test.

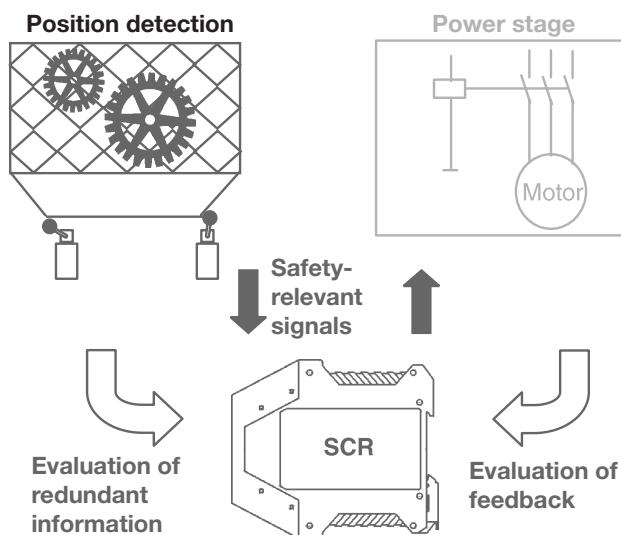
#### Operating method

The SCR continuously analyses two galvanically-isolated, normally-closed contacts that are operated in a synchronised manner within the system (i.e. the normally-closed contacts belonging to two position switches on the same door). The power device can only be operated when both normally-closed contacts are actually closed. As soon as one of the two input circuits is interrupted, by the opening of a safety contact or a fault occurs, the safety outputs open and the machine is turned off.

Should the switch-off be due to a fault in one of the input circuits or in the output device in the control system, then the SCR prevents a renewed start-up, until the fault has been repaired.

The SCR 4 modules also have a status indicator for both channels to simplify the task of maintenance personnel in identifying the fault.

All SCR modules are optionally suitable for automatic or manual starts. The SCR 4 modules also allow the start button to be monitored.





### System advantages

- Monitoring of two independent, galvanically-isolated safety circuits.
- Cross-connection safety, i.e. possible cross-connections between the cables to the safety position switches will be recognised and the green LED "Power" extinguishes. This is made possible because both input circuits work on different operating voltages. A faulty cross-connection leads to a short-circuit and the triggering of the internal fuse.
- Start-up testing, i.e. before the machine can be restarted by means of a start button, a start-up test ascertains that no fault exists in the control system.
- Safety outputs, i.e. at least 2 safety outputs made up of normally-open contacts are available to redundantly drive two power contactors.
- Feedback circuit or external device monitoring (EDM), i.e. correct operation of the power contactors is monitored by wiring the "EDM loop" through the auxiliary NC contacts. This means: should a power contactor fail to release, the normally-closed contacts, connected in series to the start button, prevent a renewed machine start.
- As well as the two standard LEDs for indicating the voltage supply (Pow) and output status (out), the SCR 4 has two additional yellow LEDs (Ch1 and Ch2). These are lit when a fault occurs, and indicate which channel is faulty.
- The SCR safety relays have the following approvals UL, CSA and BG.
- Standardised enclosure widths 22.5 and 52.5 mm.
- Mounting on TS35 mounting rails.

### The SCR family

**SCR 3-W22-3.6-D:**  
The SCR 3 has been designed for category 3 control systems according to EN 954-1. The control module guarantees one-fault safety for the entire system, i.e. the occurrence of a single fault does not place the entire system into a dangerous state.

**SCR 4-W22-2.6-SD:**  
In addition to the safety function of SCR 3, the SCR 4 recognises each fault either immediately or on the next attempt to re-start the machine. This characteristic corresponds to control systems for category 4 according to EN 954-1. An additional programmable option allows for the start button to be monitored.

**SCR 4-W52-4.10-SD:**  
Incorporating all of the features of SCR 4-W22, the SCR 4-W52 has additional safety outputs.

## Possible SCR connections

### Two-channel circuit with monitored start

- Connect a safety switch to each of the terminals S11/S12 and S21/S22
- Connect the start button and the feedback contacts from an external contactor to terminals X1/X2

The green LED "POWER" is lit when voltage is applied. When the start button is pushed, the green LED "Output" lights and the safety outputs are closed.

The machine must be restarted following each opening and closing of the safety door.

For emergency-stop applications, both safety-switches are replaced by an emergency-stop button or a rope-pull safety switch with two positive break contacts.

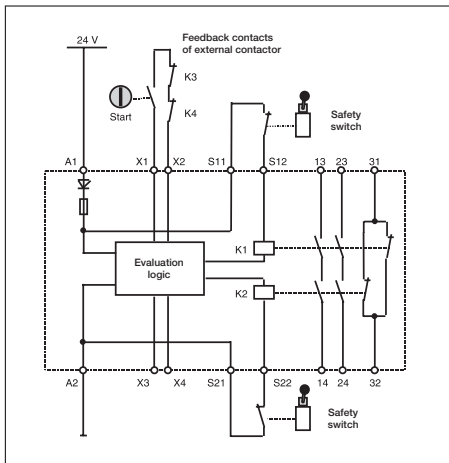
### Two-channel circuit with automatic start

- Connect a safety switch to each of the terminals S11/S12 and S21/S22
- Connect the feedback contacts to terminals X1/X2
- Bridge the terminals X1/X2 and X3/X4

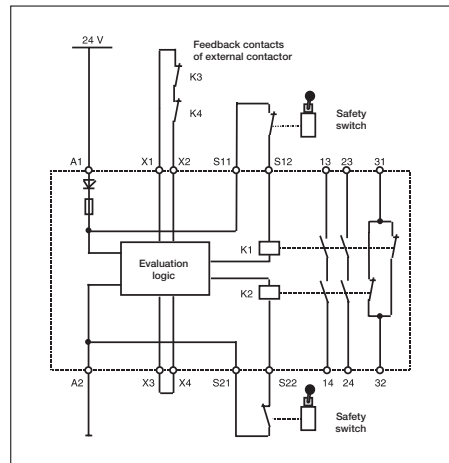
The green LED "POWER" lights up when voltage is supplied. The safety outputs close immediately and the green LED "Output" lights up.

The machine starts up immediately following each opening and closing of the protective door.

Two-channel circuit with monitored start



Two-channel circuit with automatic start



Designation

**Part number**

Control category

Enabling path

**Function**

Analysable contact-pair

Start function

automatic

manual

manual (start button monitored)

Data outputs (normally-closed contact)

**Voltage supply**

Operating voltage

Max. power consumption

**Outputs**, user categories

Switching voltage max.

Switching current max.

Power rating max.

LED: Operating voltage (green)

Switching output (green)

Error diagnosis (2 x yellow)

Switching cycles, mechanical

**Ambient conditions**

Temperature range min./max.

Protection class (according to DIN 40050)

for terminal range

Enclosure material

Mounting possibilities

Connection type: terminal block/cable (braided)

Weight

Dimensions (W x H x D) max.

Approvals

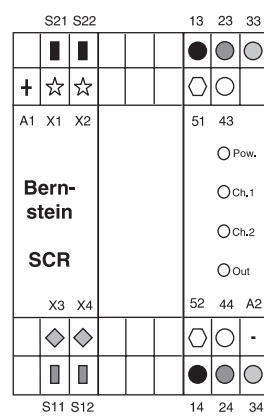
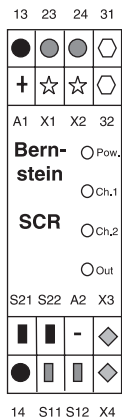
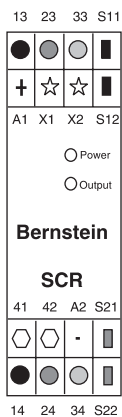
Pending Approvals

Delivery: ex-stock/built to order

- Safety output 1
- Safety output 2
- Safety output 3
- Safety output 4
- Data output (normally-closed contact)
- + - Voltage supply 24 V AC/DC
- Connection for safety contact 1
- Connection for safety contact 2
- ☆ Connection for feedback (EDM) and start button
- ◇ Program input: Change from monitored start to automatic start achieved by bridging the terminals



SCR 3-W22-3.6-D 607.5111.003	SCR 4-W22-2.6-SD 607.5111.001	SCR 4-W52-4.10-SD 607.5141.002
3	4	4
3	2	4
2 Ö	2 Ö	2 Ö
•	•	•
•	•	•
-	•	•
1	1	1
24 V AC/DC	24 V AC/DC	24 V AC/DC
60 mA	60 mA	150 mA
AC 15 250 V/6 A DC 13 24 V/6 A	AC 15 250 V/6 A DC 13 24 V/6 A	AC 15 250 V/5 A DC 13 24 V/2 A
250 V	250 V	250 V
6 A	6 A	10 A
1500 VA	1500 VA	2500 VA
150 W	150 W	240 W
•	•	•
•	•	•
-	•	•
10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	30 x 10 <sup>6</sup>
0-70 °C	0-70 °C	0-55 °C
+ 32 °F/+ 158 °F	+ 32 °F/+ 158 °F	+ 32 °F/+ 131 °F
IP 40	IP 40	IP 40
IP 20	IP 20	IP 20
PA 6.6	PA 6.6	PA 6.6
TS 35	TS 35	TS 35
2.5 mm	2.5 mm	2.5 mm
0,2 kg	0,2 kg	0,4 kg
22.5 x 99 x 114.5	22.5 x 99 x 114.5	52.5 x 99 x 114.5
BG	BG	BG
•/-	•/-	•/-



# Safety Control Relay

## SCR

Control categories 2 up to 4 (EN 954-1)

### SCR 4-W70-3.8-DT

Safety relay with integrated, reliable timer

### SCR 4-W22-2.4-S

Safety relay in compact design

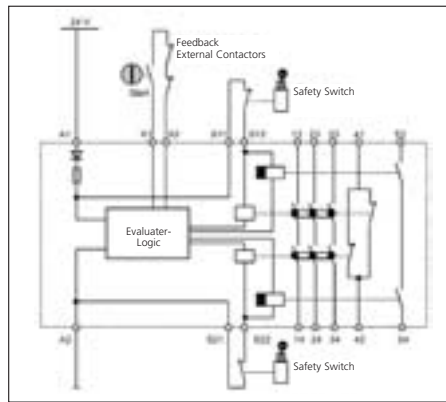
### SCR 2-W22-3.5-D

Low-cost safety relay up to SK2

#### SCR 4-W70-3.8-DT features

Control category according to regulations:  
– EN 954 Category 4

- Monitoring of "safety" guard and EMERGENCY STOP devices
- Monitoring of two redundant "safety" input signals
- Monitoring of short-circuiting in the "safety" input circuits
- Safe start up via monitored start button
- 3 enabling paths and 1 data output
- Monitoring of the power contactors via feedback circuit
- 1 enabling path with 10 s time delay, control category according to EN 954 Category 3

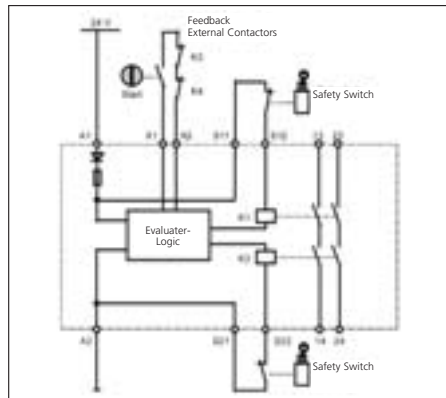


Circuitry: SCR 4-W70-3.8 DT

#### SCR 4-W22-2.4-S features

Control category according to regulations:  
– EN 954 Category 4

- Monitoring of safety guard and EMERGENCY STOP devices
- Monitoring of two redundant "safety" input signals
- Monitoring of short-circuiting in the "safety" input circuits
- Safe start up via monitored start button
- 2 enabling paths
- Monitoring of the power contactors via feedback circuit

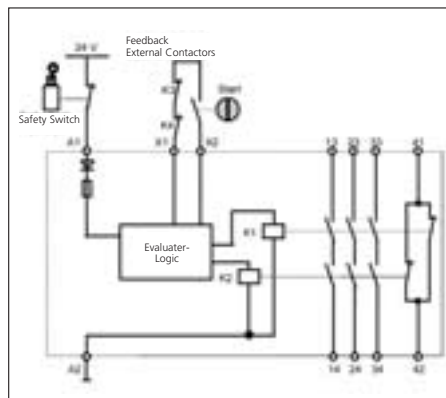


Circuitry: SCR 4-W22-2.4-S

#### SCR 2-W22-3.5-D features

Control category according to regulations:  
– EN 954 Category 2

- Monitoring of safety guard and EMERGENCY STOP devices
- Testing of safety control at every machine start
- One-channel "safety" input signal
- Automatic or manual machine starts possible
- 3 enabling paths
- Monitoring of the power contactors via feedback circuit



Circuitry: SCR 2-W22-3.5 D

Designation

**Part number**

Control category

Enabling path (not delayed/delayed)

**Function**

Contacts to be monitored

Start function

automatic

manual

manual (start-button monitored)

Data outputs (normally-closed contact)

**Electrical ratings**

Operating voltage

Max. power consumption

**Outputs, ratings**

Switching voltage

max.

Switching current

max.

Power rating

max.

LED: Operating voltage (green)

Switching output (green)

Function indication (green)

Mechanical life, switching cycles

**Ambient conditions**

Temperature range

min./max.

Protection class (acc. to IEC 529)

housing

terminals

Housing material

Installation

Connection type: terminal block (cable/stranded wire)

Weight

Dimensions (W x H x D)

max.

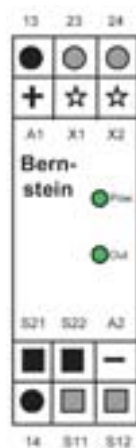
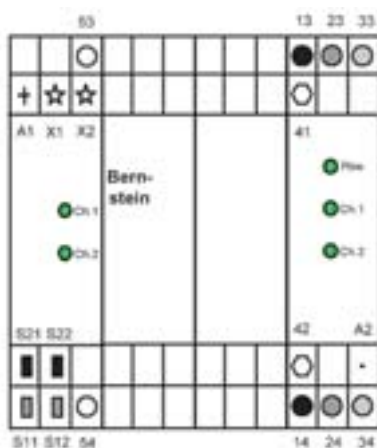
Approvals (in preparation)

Delivery: ex-stock/built to order

- Enabling path 1: (13/14)
- Enabling path 2: (23/24)
- Enabling path 3: (33/34)
- Enabling path 4: (53/54) delayed
- ◻ Data output (normally-closed contact)
- + - Supply voltage 24 V AC/DC
- Connection for safety contact 1
- Connection for safety contact 2
- ☆ Connection for feedback and start button















SCR 4-W70-3.8-DT <b>607.5151.006</b>	SCR 4-W22-2.4-S <b>607.5111.005</b>	SCR 2-W22-3.5 D <b>607.5111.007</b>
4/3	4	2
3/1 with 10 s	2/-	3/-
2 Ö	2 Ö	1 Ö
-	-	•
-	-	•
•	•	-
1	-	1
24 V AC/DC 180 mA	24 V AC/DC 60 mA	24 V AC/DC 60 mA
AC 15 230 V/5 A      DC 13 24V/2 A	AC 15 230 V/4 A      DC 13 24 V/4 A	AC 15 230 V/5 A      DC 13 24 V/4 A
250 V                  24 V	250 V                  24 V	250 V                  24 V
8 A                    8 A	4 A                    4 A	5 A                    5 A
2000 VA              200 W	1500 VA              150 W	1500 VA              150 W
•	•	•
-	•	-
• (2 x 2)	-	• (2)
30 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>
0-55 °C	0-70 °C	0-70 °C
+32 °F/+131 °F	+32 °F/+158 °F	+32 °F/158 °F
IP 40	IP 40	IP 40
IP 20	IP 20	IP 20
PA 6.6	PC	PC
TS 35	TS 35	TS 35
2.5 mm <sup>2</sup>	2 x 2.5 mm <sup>2</sup>	2 x 2.5 mm <sup>2</sup>
0.5 kg	0.2 kg	0.2 kg
70 x 99 x 114.5	22.5 x 82 x 98.8	22.5 x 82 x 118
BG	BG	BG
•/-	•/-	•/-






# Sensors

## Inductive sensors







Model	Page
<input type="checkbox"/> Introduction and definitions	120
 $\varnothing 3$ $\varnothing 4$ $\varnothing 6.5$	122
 M 4 x 0.5 M 5 x 0.5 M 8 x 1	124
 M 12 x 1	126
 M 18 x 1 M 30 x 1.5	132 135
 5 x 5 x 25 8 x 8 x 40 8 x 8 x 47 12 x 12 x 55	138
 27 x 10 x 5 28 x 16 x 11 40 x 26 x 12 50 x 25 x 10	140
 Multinorm	142
 Globaline	144
 Programmable inductive sensors • Teach-in function • Programmable operating distance 20–40 mm • Programmable speed monitoring 1–5000 Hz • Simple mounting and adjustment	148

Model	Page
 Inductive sensors with extended sensing distances • 200% Sn • Robust design • IP 67	150
 Inductive sensors temperature range $-40\text{ °C}$ to $+100\text{ °C}$ • M12 range • M18 range • M30 range	152
 Inductive sensors special-purpose design • N40, S12 plug • Ring sensor • Slot sensor	154
 NAMUR SENSORS NAMUR switching amplifiers	156
 PCS programmable universal switching device for: • Rotational speed master • Analog signal evaluation • Level and position detection • Switching point evaluation	158

## Capacitive sensors

Model	Seite
<input type="checkbox"/> Introduction and definitions	160
 M 12 x 1 M 18 x 1 M 30 x 1.5 M 32 x 1.5	164
 RD 20 RD 34	165
 Multinorm E 50 E 68 N 44	165

## Photoelectric sensors

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<input type="checkbox"/> Introduction and definitions	166
 OT12 RT OM12 RT • Diffuse reflective sensors • M12 • IP 67	168
 M 18 series • Length <60 mm • All important function types • Programmable output function	170
 OZ20 • Smooth stainless steel housing • All important function types • Programmable output function	174
 Analog output sensors • Programmable sensing distances • Voltage output 0–10 V • Current output 0–20 mA; 4–20 mA • Housing in plastic brass, or stainless steel	175
 OR05 • Through-beam sensors • Retroreflective sensors, polarized • Diffuse reflective sensors • Fibre optic controls • IP 67	177
 OR10 • Through-beam sensors • IP 67	180
 OR12 • Through-beam sensors • Through-beam sensors with reduced interior beam • Laser-through-beam sensors • Retroreflective sensors • Diffuse reflective sensors • IP 65	182
 OR17 • Through-beam sensors • Retroreflective sensors, polarised • Diffuse reflective sensors	186



## Photoelectric sensors

Model	Page
<input type="checkbox"/> Introduction and definitions	166



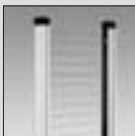
<b>OR20</b>	<b>188</b>
<ul style="list-style-type: none"> <li>• Through-beam sensors</li> <li>• Retroreflective sensors</li> <li>• Retroreflective sensors, polarised</li> <li>• Diffuse reflective sensors</li> <li>• Diffuse reflective sensors with background suppression</li> </ul>	



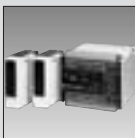
<b>OR90</b>	<b>192</b>
<ul style="list-style-type: none"> <li>• Through-beam sensors</li> <li>• Retroreflective sensors</li> </ul>	

## Photoelectric safety devices

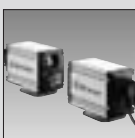
Model	Page
<input type="checkbox"/> Introduction and definitions	194



<b>Light barrier OSG 4</b>	<b>194</b>
<ul style="list-style-type: none"> <li>• Type 4</li> <li>• Compact design</li> <li>• EDM (external device monitoring)</li> <li>• Machine restart automatic/manual</li> <li>• Muting controller</li> </ul>	



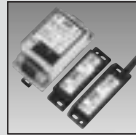
<b>Light barrier OSS2</b>	<b>198</b>
<ul style="list-style-type: none"> <li>• Type 2 to EN 61496-1</li> <li>• Sensing distance max. 20 m</li> <li>• Automatic restart or restart prevention</li> <li>• Connects up to 3 light barriers to the control device</li> <li>• permanent self-monitoring</li> </ul>	



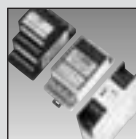
<b>Light barrier OSS4</b>	<b>198</b>
<ul style="list-style-type: none"> <li>• Type 4 to EN 61496-1</li> <li>• Sensing distance max. 40 m</li> <li>• Automatic restart or restart prevention</li> <li>• Integrated evaluation electronics</li> <li>• Permanent self-monitoring</li> </ul>	

## Safety magnetic controller

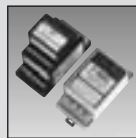
Model	Page
<input type="checkbox"/> General table	202



<b>System type 4</b>	<b>204</b>
<ul style="list-style-type: none"> <li>• According to EN 954-1 in safety category 4</li> <li>• Double-failsafe system with selfcontrol</li> <li>• IP 20</li> </ul>	



<b>System type 3</b>	<b>206</b>
<ul style="list-style-type: none"> <li>• According to EN 954-1 in safety category 3</li> <li>• Single-failsafe system with partial fault recognition</li> <li>• IP 20</li> </ul>	



<b>System type 1</b>	<b>209</b>
<ul style="list-style-type: none"> <li>• According to EN 954-1 in safety category 1</li> <li>• Standard, integrated redundancy</li> <li>• IP 20</li> </ul>	



<b>Coded magnetic switches</b>	<b>210</b>
<ul style="list-style-type: none"> <li>• IP 67</li> </ul>	

<input type="checkbox"/> Magnetic monitoring systems	212
<ul style="list-style-type: none"> <li>• Connection diagrams</li> </ul>	

## Magnetic switches

Model	Page
<input type="checkbox"/> General table	214



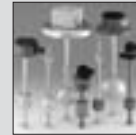
<b>Electromechanical magnetic switches</b>	<b>216</b>
<ul style="list-style-type: none"> <li>• Plastic</li> <li>• Metal</li> <li>• IP 67</li> </ul>	



<b>Electronic magnetic switches</b>	<b>226</b>
<ul style="list-style-type: none"> <li>• Plastic</li> <li>• Metal</li> <li>• IP 67</li> </ul>	

## Float switches

Model	Page
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<b>Standard float switches</b>	<b>240</b>
<ul style="list-style-type: none"> <li>• Stainless steel</li> <li>• Brass</li> <li>• PVC</li> </ul>	



<b>Mini level float switches</b>	<b>248</b>
<ul style="list-style-type: none"> <li>• Stainless steel</li> <li>• Brass</li> <li>• PP</li> <li>• PVC</li> </ul>	



<b>Adjustable float switches</b>	<b>252</b>
<ul style="list-style-type: none"> <li>• Stainless steel</li> <li>• Brass</li> <li>• PVC</li> </ul>	



<b>Accessories</b>	<b>256</b>
<ul style="list-style-type: none"> <li>• Floats</li> <li>• Technical data</li> <li>• Order form and questionnaire</li> </ul>	

## Appendix

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<input type="checkbox"/> Inductive sensors	262
<ul style="list-style-type: none"> <li>• Type matrix</li> <li>• Connection diagrams</li> <li>• Fixing material</li> </ul>	

<input type="checkbox"/> Capacitive sensors	267
<ul style="list-style-type: none"> <li>• Type matrix</li> <li>• Connection diagrams</li> </ul>	

<input type="checkbox"/> Opto-electronic sensors	270
<ul style="list-style-type: none"> <li>• Type matrix</li> <li>• Connection diagrams</li> <li>• Reflectors</li> </ul>	

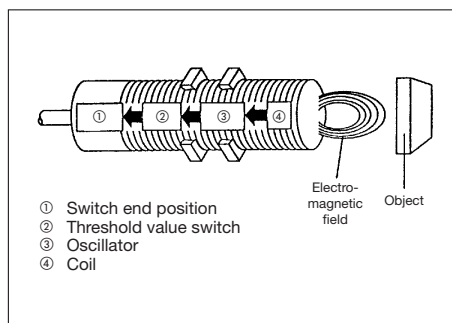
<input type="checkbox"/> Accessories	276
<ul style="list-style-type: none"> <li>• Plugs</li> <li>• Sensor testing unit</li> </ul>	



# Inductive sensors

## Principle of operation

In general, inductive proximity switches consist of four basic elements: the coil, an oscillator, a triggering circuit and an output switching device with short-circuit protection. The oscillator generates a high-frequency electromagnetic field, which is emitted from the coil, this in turn radiates from the sensor's sensing surface. When a metallic object enters this electromagnetic field, eddy currents are induced within the material. These eddy currents draw energy from both the electromagnetic field and the oscillator. This withdrawal of energy is called damping and increases when the metallic object is moved closer to the sensing surface. The trigger circuit activates the output switching device when a defined damping value is exceeded. For proximity switches in DC voltage units, the output switching device can be either an NPN transistor, which switches the connected load to the negative pole, or a PNP transistor, which switches the load to the positive pole. In AC voltage units a thyristor or triac can be the trigger circuit.

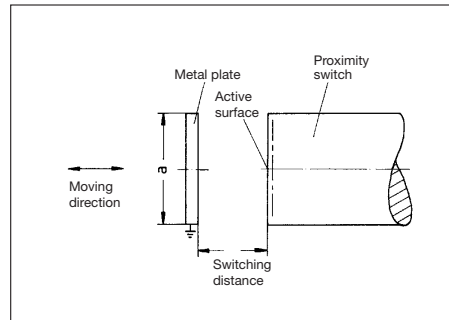


## Sensing distance

The sensing distance of a proximity sensor is determined by the diameter of the coil used. This means that the larger the coil and diameter of the sensor, the longer the sensing range will be. The size and material of the object to be detected also affects the sensing distance.

## Measuring plates

The measuring plate used to specify the sensing distance of a proximity sensor consists of a steel square (ST37) with a thickness of 1 mm. The side length is equal to the diameter of the active surface of the sensor, or three times the operating distance, whichever is greater.



## Nominal sensing distance: $S_n$

The nominal sensing distance of different models is a function of the diameter of the sensing coil.

## Real sensing distance: $S_r$

The real sensing distance is the sensing distance measured with nominal voltage and temperature. It must be between 90% and 110% of the nominal sensing distance.

## Effective sensing distance: $S_u$

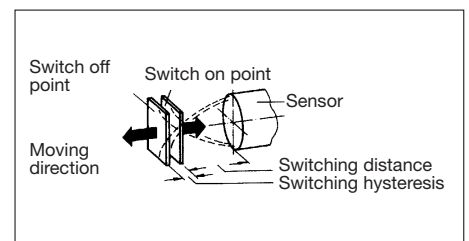
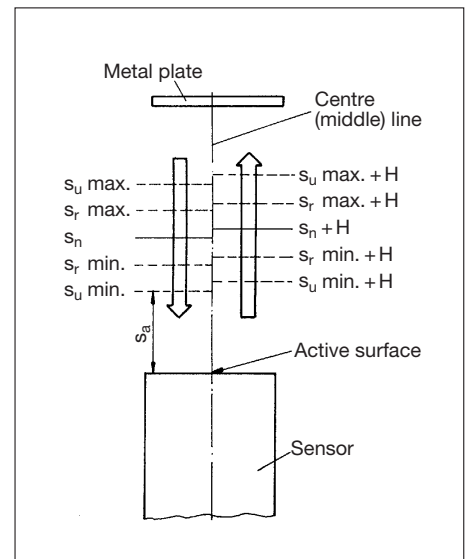
The effective sensing distance is measured within the range of the admissible temperatures and voltages and must be between 90% and 110% of the real sensing distance.

## Working sensing distance: $S_a$

(Secured sensing distance)  
The working sensing distance heeds the effects of temperature, supply voltage and unit-to-unit variations. Within 0–80% of the nominal sensing distance is guaranteed if all permissible operating conditions are fulfilled.  
 $S_a \leq 0.8 S_n$

## Hysteresis: $H$

Hysteresis is the difference between the switch-on point as the object approaches the sensor, and the switch-off point as the object moves away. Hysteresis is stated as a percentage of the nominal sensing distance. Hysteresis is needed to keep proximity sensors from output "chattering" when subjected to vibration, slowly approaching objects, temperature drift or electrical interferences. Hysteresis is typically 10% of the nominal sensing distance.

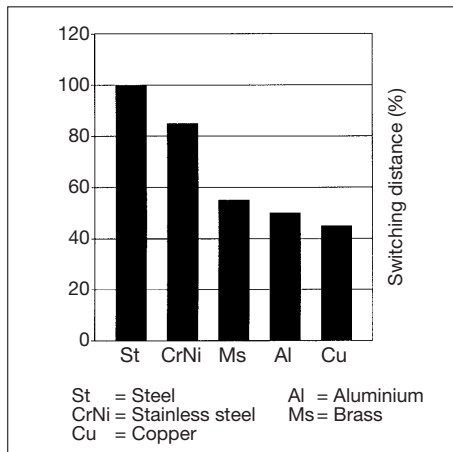


## Repeat accuracy

The ability of a sensor to repeatedly detect an object at the same distance away from the sensing surface. Normally there will be a deviation of <5%.

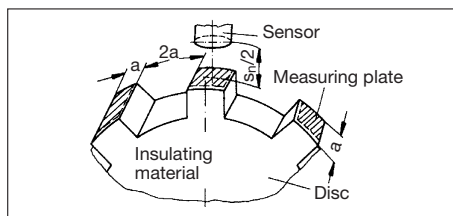
**Reduction factors**

The definition of the sensing distance is based on the measurement of standardised square steel target plates. For other materials with the same dimensions, the sensing distances are reduced as displayed in the following figure:



**Switching frequency**

A rotating, non-conductive disk on which the standard target plates are situated (size of plates as defined above) measures the switching frequency.



The distance between the measurement plates and the sensor is half of the nominal sensing distance. The maximum switching frequency is achieved when the switch-on/off output signal falls below 50 ms.

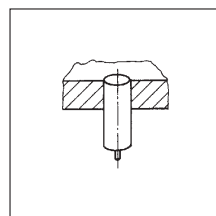
**Temperature range**

The normal temperature range for most sensors is from -25 °C to +70 °C (-13 °F to + 158 °F). Some sensors are available for use in higher temperature applications.

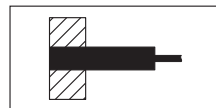
**Installation**

Inductive sensors contain coils which are wound in ferrite cores to point the radiated electromagnetic field in the direction of use. The core is built in to the enclosure in such a way that the field exits from the active surface. A portion of the magnetic field exits laterally. This is sufficient to prevent the sensor from being flush-installed in metal because it would activate the sensor. If a flush installation in metal is desired, a metal ring is placed around the ferrite core to restrict the lateral radiation of the field. This type of sensor is called a shielded/flush mounted sensor and will have a reduced sensing range compared to that of the unshielded/non-flush mounted type.

**Flush installation**

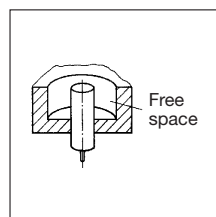


The active surface may be flush with metal surfaces.

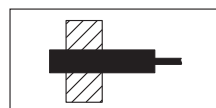


Catalogue symbol for flush installation.

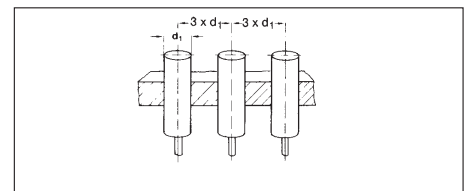
**Non-flush installation**



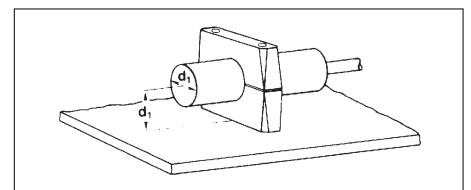
Sensors for non-flush installation must be provided with a free zone, which is three times greater than the diameter of the active surface and 25 mm thick.



Catalogue symbol for non-flush installation.



Minimum distance for the non-flush installation of sensors.



Installation with mounting flange parallel to a steel wall or surface.

**Protection types**

IP 65  
IP 67

**Materials**

The sensors are encapsulated in thermoplastic housings that are reinforced by glass fibre. The power cable has a PVC or PU sheath.

**Weld field immune sensors**

Weld field immune sensors have the ability not to false trigger in the presence of strong electromagnetic fields. These special models are ideal for welding environments as well as other applications where strong magnetic fields are present.

**Standards**

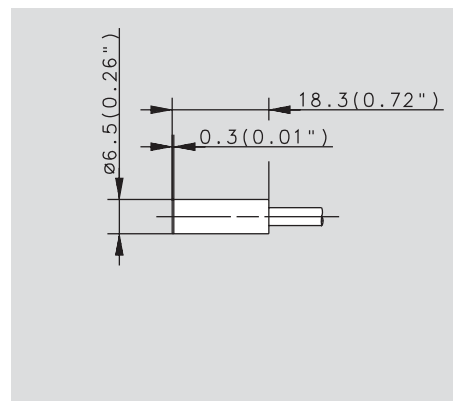
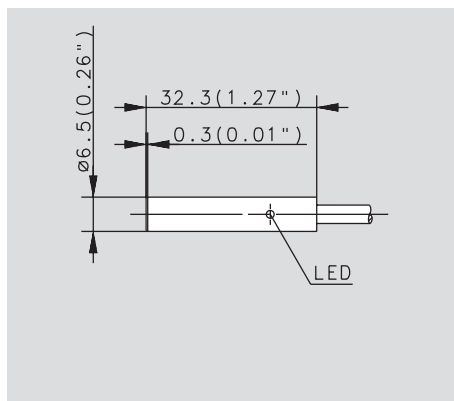
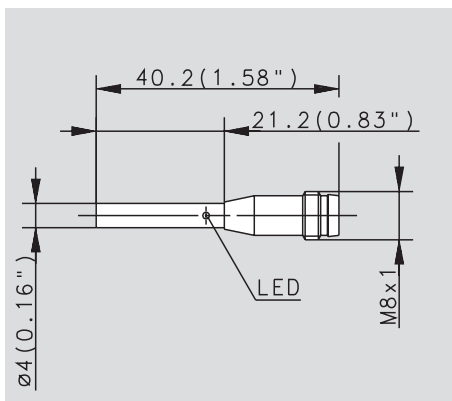
All sensors correspond to the specifications of the following European standards, as devised by the European Committee for the Standardisation of Electrotechnology:

EN 60947-5-2	CE	
IEC 255-5		Level 2
ENV 50140		Level 3
EN 61000-4-2		Level 2 Metal housing
		Level 3 Plastic housing
EN 61000-4-4		Level 2





Ø 4			Ø 6.5			Ø 6.5		
0.8 mm (0.03")			1.5 mm (0.06")			1.5 mm (0.06")		
●/-	●/-	-	●/-	●/-	-	-	●/-	-
NPN	PNP	AC	NPN	PNP	AC	NPN	PNP	AC
KIB-D04NS/ 0.8-KLSM8	KIB-D04PS/ 0.8-KLSM8	-	KIB-D06NS/ 1.5-KL2	KIB-D06PS/ 1.5-KL2	-	-	KIB-D06PS/ 1.5-K2VPU	-
<b>650.2399.015</b>	<b>650.2999.017</b>	-	<b>650.2399.009</b>	<b>650.2999.010</b>	-	-	<b>650.2999.034</b>	-
263/4	263/1	-	263/4	263/1	-	-	263/1	-
-/●	●/-	-	-/●	●/-	-	-	●/-	-
-	-	-	-	KIB-D06PÖ/ 1.5-KL2	-	-	-	-
-	-	-	-	<b>650.2799.011</b>	-	-	-	-
-	-	-	-	263/2	-	-	-	-
-	-	-	-	-/●	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
10-30 V	10-30 V	-	10-30 V	10-30 V	-	-	10-30 V	-
-/200 mA	-/200 mA	-	-/200 mA	-/200 mA	-	-	-/200 mA	-
3000 Hz	3000 Hz	-	1000 Hz	1000 Hz	-	-	1000 Hz	-
●	●	-	●	●	-	-	●	-
●/-	●/-	-	●/-	●/-	-	-	-	-
-	-	-	-	-	-	-	-	-
-25 °C/+70 °C	-25 °C/+70 °C	-	-25 °C/+70 °C	-25 °C/+70 °C	-	-	-25 °C/+70 °C	-
-13 °F/+158 °F	-13 °F/+158 °F	-	-13 °F/+158 °F	-13 °F/+158 °F	-	-	-13 °F/+158 °F	-
IP 67/NEMA 4	IP 67/NEMA 4	-	IP 67/NEMA 4	IP 67/NEMA 4	-	-	IP 67/NEMA 4	-
stainless steel 1.4305	stainless steel 1.4305	-	stainless steel 1.4401	stainless steel 1.4401	-	-	stainless steel 1.4401	-
-	-	-	PVC 3x0.14	PVC 3x0.14	-	-	PUR 3x0.14	-
278/279	278/279	-	-	-	-	-	-	-
266/3	266/3	-	266/5	266/5	-	-	266/5	-



# Inductive sensors

- M 4 x 0.5
- M 5 x 0.5
- M 8 x 1

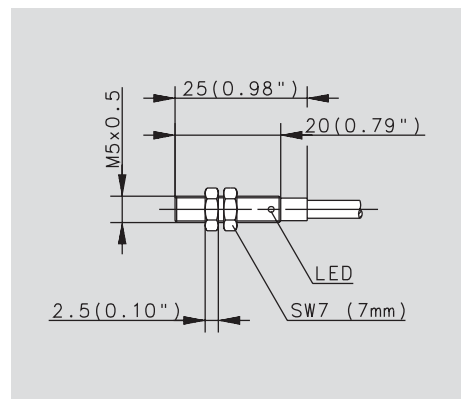
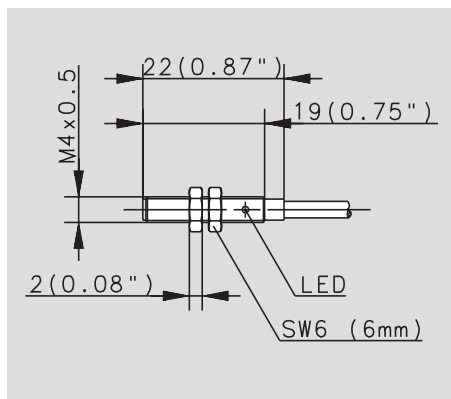


Rated operating distance	
Mounting	flush  /non-flush
Switching functions	
	Model description
Normally-open (NO)	Part number
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
	Model description
Normally-closed (NC)	Part number
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
	Model description
Normally-closed/open (NC/NO) selectable	Part number
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
	Model description
Complementary	Part number
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
Electrical data	
Voltage range	
Output current	min./max.
Switching frequency	max.
Short-circuit protection	
LED: yellow = switched / green = power	
Sensitivity adjustment	
Mechanical data	
Temperature range	min./max.
Protection type	
Housing material	
Termination	cable 2 m/6.5 ft mm <sup>2</sup>
	plug (page)
Accessories	(page/Pos.)

M 4			M 5		
0.6 mm (0.02")			1 mm (0.04")		
NPN	PNP	AC	NPN	PNP	AC
KIB-M04NS/ 0.6-KL2PU	KIB-M04PS/ 0.6-KL2PU	-	KIB-M05NS/ 001-KL2PU	KIB-M05PS/ 001-KL2PU	-
<b>650.2399.018</b>	<b>650.2999.020</b>		<b>650.2399.003</b>	<b>650.2999.003</b>	
263/4	263/1		263/4	263/1	
-/●	●/-		-/●	●/-	
-	KIB-M04PÖ/ 0.6-KL2PU	-	KIB-M05NÖ/ 001-KL2PU	KIB-M05PÖ/ 001-KL2PU	-
	<b>650.2799.008</b>		<b>650.2199.001</b>	<b>650.2799.001</b>	
	263/2		263/5	263/2	
	-/●		-/●	●/-	
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
10-30 V	10-30 V	-	10-30 V	10-30 V	-
-/100 mA	-/100 mA	-	-/200 mA	-/200 mA	-
3000 Hz	3000 Hz	-	3000 Hz	3000 Hz	-
●	●	-	●	●	-
●/-	●/-	-	●/-	●/-	-
-	-	-	-	-	-
-25 °C/+70 °C	-25 °C/+70 °C	-	-25 °C/+70 °C	-25 °C/+70 °C	-
-13 °F/+158 °F	-13 °F/+158 °F	-	-13 °F/+158 °F	-13 °F/+158 °F	-
IP 67/NEMA 4	IP 67/NEMA 4	-	IP 67/NEMA 4	IP 67/NEMA 4	-
CuZn39Pb3	CuZn39Pb3	-	CuZn39Pb3	CuZn39Pb3	-
PUR 3x0.055	PUR 3x0.055	-	PUR 3x0.14	PUR 3x0.14	-
-	-	-	-	-	-
266/3	266/3	-	266/4	266/4	-

## Dimension diagrams

All dimensions in mm (inch)



**M 5****1 mm (0.04")**

-	●/-	-
<b>NPN</b>	<b>PNP</b>	<b>AC</b>

-	KIB-M05PS/ 001-KLSM8	-
-	<b>650.2999.018</b>	-
-	263/1	-

-	●/-	-
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**M 8 x 1****1.5 mm (0.06")**

●/-	●/-	-
<b>NPN</b>	<b>PNP</b>	<b>AC</b>

-	KIB-M08NS/ 1.5-KL2	-
-	<b>650.2301.003</b>	-
-	263/4	-

●/-	●/-	-
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-	KIB-M08NÖ/ 1.5-KL2	-
-	<b>650.2101.001</b>	-
-	263/5	-

●/-	●/-	-
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**M 8 x 1****1.5 mm (0.06")**

●/-	●/-	-
<b>NPN</b>	<b>PNP</b>	<b>AC</b>

-	KIB-M08NS/ 1.5-KLSM8	-
-	<b>650.2342.003</b>	-
-	263/4	-

-	KIB-M08PS/ 1.5-KL2	-
-	<b>650.2901.003</b>	-
-	263/1	-

-	KIB-M08PS/ 1.5-KLSM8	-
-	<b>650.2942.005</b>	-
-	263/1	-

-	KIB-M08PÖ/ 1.5-KLSM8	-
-	<b>650.2742.001</b>	-
-	263/2	-

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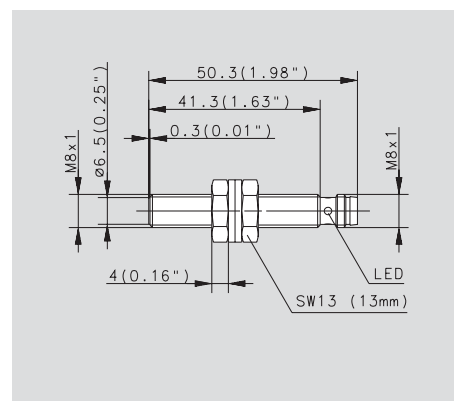
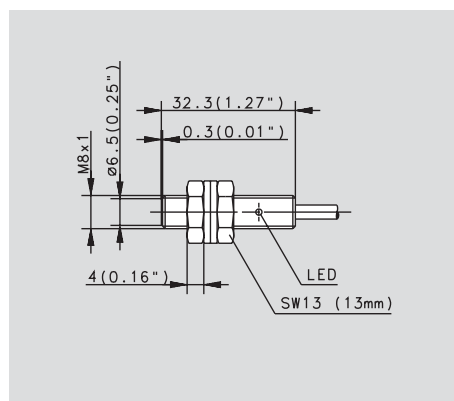
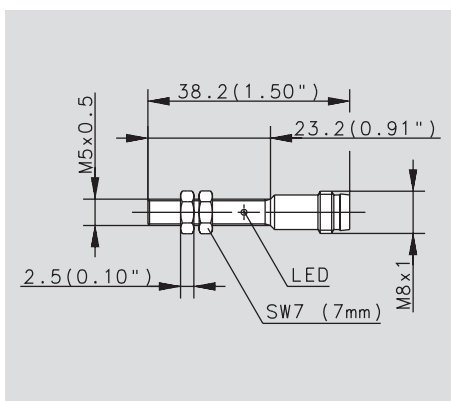
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# Inductive sensors

M 12 x 1



<b>Rated operating distance</b>	
<b>Mounting</b>	flush  /non-flush
<b>Switching functions</b>	
	Model description
Normally-open (NO)	Part number
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
	Model description
Normally-closed (NC)	Part number
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
	Model description
Normally-closed/open (NC/NO) selectable	Part number
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
	Model description
Complementary	Part number
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
<b>Electrical data</b>	
Voltage range	
Output current	min./max.
Switching frequency	max.
Short-circuit protection	
LED: yellow = switched / green = power	
Sensitivity adjustment	
<b>Mechanical data</b>	
Temperature range	min./max.
Protection type	
Housing material	
Termination	cable 2 m/6.5 ft mm <sup>2</sup>
	plug (page)
Accessories	(page/Pos.)

## M 12 x 1

2 mm (0.08")

NPN	PNP	AC
KIB-M12NS/ 002-KL2 <b>650.2303.001</b> 263/4 -/-	KIB-M12PS/ 002-KL2 <b>650.2903.003</b> 263/1 ●/-	KIB-M12AS/ 002-L2 <b>650.3503.001</b> 265/4 ●/-
-	KIB-M12PÖ/ 002-KL2 <b>650.2703.001</b> 263/2 -/-	KIB-M12AÖ/ 002-L2 <b>650.3403.001</b> 265/5 -/-
-	-	-

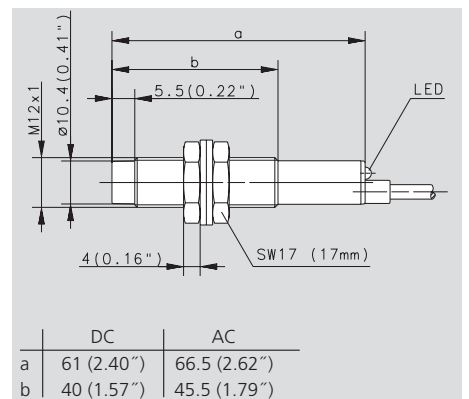
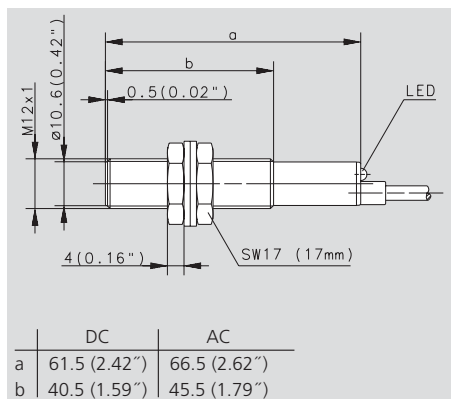
## M 12 x 1

4 mm (0.16")

NPN	PNP	AC
KIN-M12NS/ 004-KL2 <b>650.2304.001</b> 263/4 -/-	KIN-M12PS/ 004-KL2 <b>650.2904.002</b> 263/1 ●/-	KIN-M12AS/ 004-L2 <b>650.3504.001</b> 265/4 -/-
KIN-M12NÖ/ 004-KL2 <b>650.2104.001</b> 263/5 -/-	KIN-M12PÖ/ 004-KL2 <b>650.2704.001</b> 263/2 ●/-	KIN-M12AÖ/ 004-L2 <b>650.3404.001</b> 265/5 -/-
-	-	-

## Dimension diagrams

All dimensions in mm (inch)



**M 12 x 1****2 mm (0.08")**

●/-	●/-	-
NPN	PNP	AC
KIB-M12NS/ 002-KLS12	KIB-M12PS/ 002-KLS12	-
<b>650.2343.003</b>	<b>650.2943.012</b>	
263/4	263/1	
-/●	●/-	
-	KIB-M12PÖ/ 002-KLS12	-
	<b>650.2743.003</b>	
	263/2	
	-/●	
-	-	-

**M 12 x 1****4 mm (0.16")**

-	-/●	-
NPN	PNP	AC
-	KIN-M12PS/ 004-KLS12	-
	<b>650.2944.012</b>	
	263/1	
	●/-	
-	KIN-M12PÖ/ 004-KLS12	-
	<b>650.2744.003</b>	
	263/2	
	-/●	
-	-	-

**M 12 x 1****2 mm (0.08")**

●/-	●/-	-
NPN	PNP	AC
KIB-M12NS/ 002-KL2V	KIB-M12PS/ 002-KL2V	-
<b>650.2903.016</b>	<b>650.2903.016</b>	
263/1	263/1	
-/●	-/●	
KIB-M12NÖ/ 002-KL2V	KIB-M12PÖ/ 002-KL2V	-
<b>650.2103.003</b>	<b>650.2703.005</b>	
263/5	263/2	
-/●	-/●	
-	-	-

10-30 V	10-30 V	-
-/200 mA	-/200 mA	-
800 Hz	800 Hz	-
●	●	-
●/-	●/-	-
-	-	-

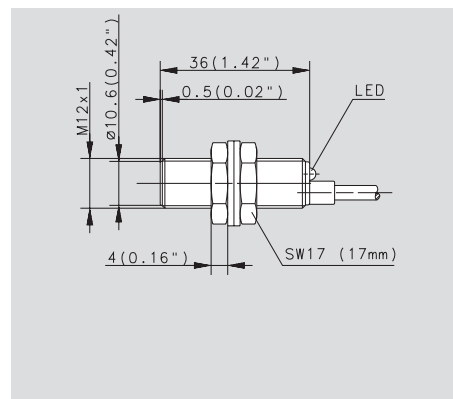
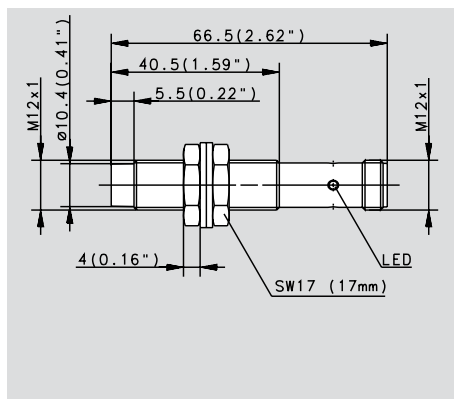
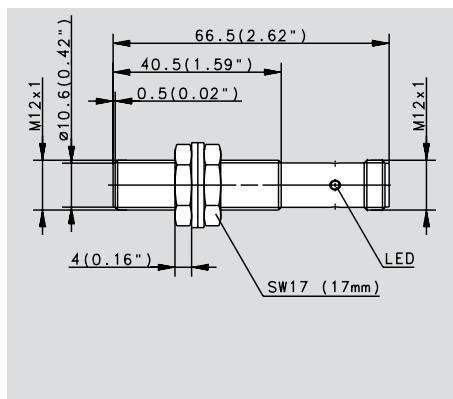
-	10-30 V	-
-	-/200 mA	-
-	400 Hz	-
-	●	-
-	●/-	-
-	-	-

10-30 V	10-30 V	-
-/200 mA	-/200 mA	-
800 Hz	800 Hz	-
●	●	-
●/-	●/-	-
-	-	-

-25 °C/+70 °C	-25 °C/+70 °C	-
-13 °F/+158 °F	-13 °F/+158 °F	-
IP 67/NEMA 4	IP 67/NEMA 4	-
CuZn39Pb3	CuZn39Pb3	-
-	-	-
280/281/282	280/281/282	-
-	-	-

-	-25 °C/+70 °C	-
-	-13 °F/+158 °F	-
-	IP 67/NEMA 4	-
-	CuZn39Pb3	-
-	-	-
-	280/281/282	-
-	-	-

-	-25 °C/+70 °C	-
-	-13 °F/+158 °F	-
-	IP 67/NEMA 4	-
-	CuZn39Pb3	-
-	PVC 3x0.14	-
-	-	-

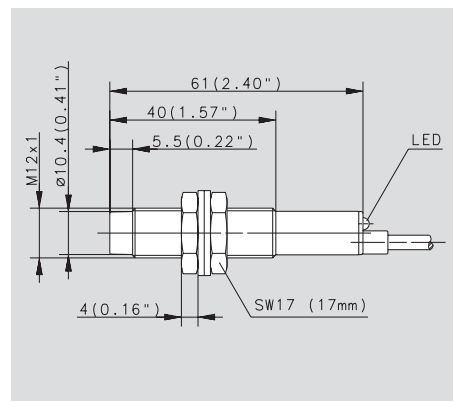
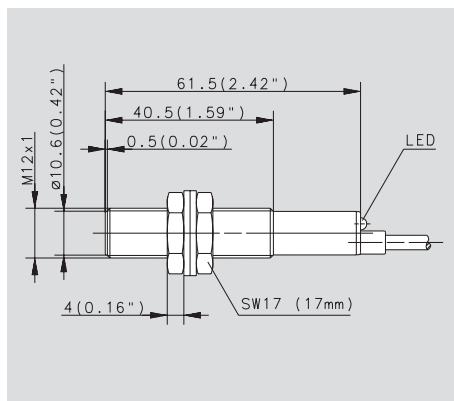
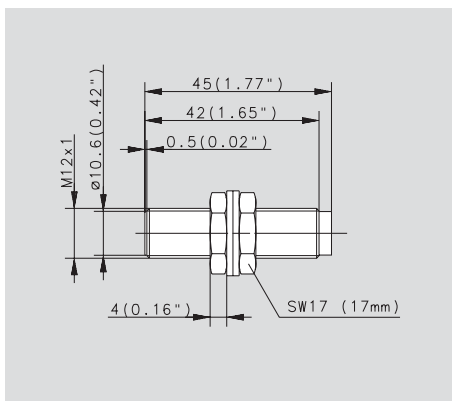








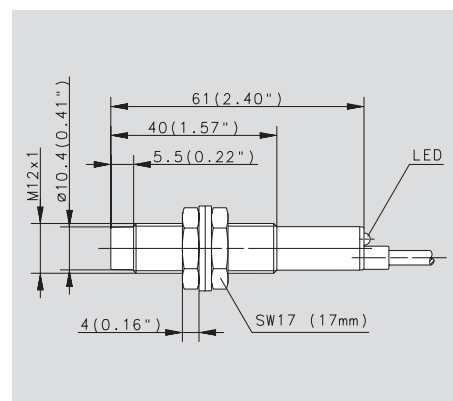
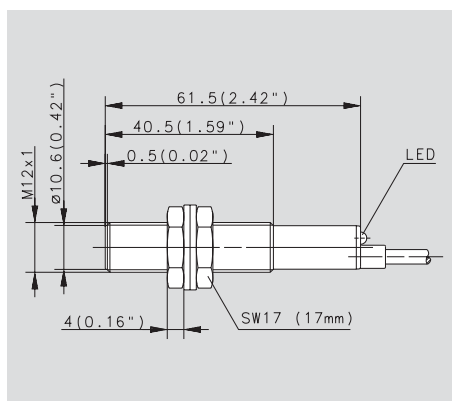
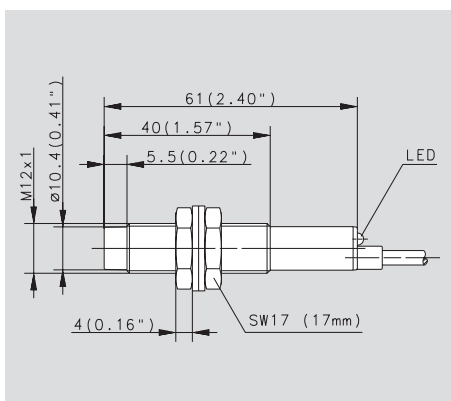
M 12 x 1 2 mm (0.08")			M 12 x 1 4 mm (0.16")			M 12 x 1 6 mm (0.24")		
-	●/-	-	-	●/-	-	-/●	-/●	-
<b>NPN</b>	<b>PNP</b>	<b>AC</b>	<b>NPN</b>	<b>PNP</b>	<b>AC</b>	<b>NPN</b>	<b>PNP</b>	<b>AC</b>
-	KIB-M12PS/ 002-KS12V <b>650.2943.006</b> 263/1	-	-	KIB-M12PS/ 004-KL2E <b>650.2903.014</b> 263/1	-	KIN-M12NS/ 006-KL2E <b>650.2304.012</b> 263/4	KIN-M12PS/ 006-KL2E <b>650.2904.009</b> 263/1	-
-	●/-	-	-	●/-	-	-/●	●/-	-
-	KIB-M12PÖ/ 002-KS12V <b>650.2743.005</b> 263/2	-	-	-	-	-	KIN-M12PÖ/ 006-KL2E <b>650.2704.005</b> 263/2	-
-	-/●	-	-	-	-	-	-/●	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	10-30 V	-	-	10-60 V	-	10-60 V	10-60 V	-
-	-200 mA	-	-	-200 mA	-	-200 mA	-200 mA	-
-	800 Hz	-	-	800 Hz	-	400 Hz	400 Hz	-
-	●	-	-	●	-	●	●	-
-	●/-	-	-	●/-	-	●/-	●/-	-
-	-	-	-	-	-	-	-	-
-	-25 °C/+70 °C	-	-	-25 °C/+70 °C	-	-25 °C/+70 °C	-25 °C/+70 °C	-
-	-13 °F/+158 °F	-	-	-13 °F/+158 °F	-	-13 °F/+158 °F	-13 °F/+158 °F	-
-	IP 67/NEMA 4	-	-	IP 67/NEMA 4	-	IP 67/NEMA 4	IP 67/NEMA 4	-
-	CuZn39Pb3	-	-	CuZn39Pb3	-	CuZn39Pb3	CuZn39Pb3	-
-	-	-	-	PVC 3x0.14	-	PVC 3x0.14	PVC 3x0.14	-
-	280/281/282	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-







M 12 x 1 4 mm (0.16")			M 12 x 1 2 mm (0.08")			M 12 x 1 4 mm (0.16")		
NPN	PNP	AC	NPN	PNP	AC	NPN	PNP	AC
-	KIN-M12PS/ 004-KL2T <b>650.2904.011</b> 263/1 -/●	-	KIB-M12NS/ 002-KL2F <b>650.2303.005</b> 263/4 -/●	KIB-M12PS/ 002-KL2F <b>650.2903.012</b> 263/1 -/●	-	KIN-M12NS/ 004-KL2F <b>650.2304.006</b> 263/4 -/●	KIN-M12PS/ 004-KL2F <b>650.2904.010</b> 263/1 ●/-	-
-	KIN-M12PÖ/ 004-KL5T <b>650.2704.004</b> 263/2 -/●	-	-	-	-	-	-	-
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-	-	-	-	-	-	-	-	-
-	10-30 V	-	10-60 V	10-60 V	-	10-60 V	10-60 V	-
-	-/200 mA	-	-/200 mA	-/200 mA	-	-/200 mA	-/200 mA	-
-	400 Hz	-	4000 Hz	4000 Hz	-	3000 Hz	3000 Hz	-
-	●	-	●	●	-	●	●	-
-	●/-	-	●/-	●/-	-	●/-	●/-	-
-	-	-	-	-	-	-	-	-
-	0 °C/+100 °C	-	-25 °C/+70 °C	-25 °C/+70 °C	-	-25 °C/+70 °C	-25 °C/+70 °C	-
-	-32 °F/+212 °F	-	-13 °F/+158 °F	-13 °F/+158 °F	-	-13 °F/+158 °F	-13 °F/+158 °F	-
-	IP 67/NEMA 4	-	IP 67/NEMA 4	IP 67/NEMA 4	-	IP 67/NEMA 4	IP 67/NEMA 4	-
-	CuZn39Pb3	-	CuZn39Pb3	CuZn39Pb3	-	CuZn39Pb3	CuZn39Pb3	-
-	PVC 3x0.14	-	PVC 3x0.14	PVC 3x0.14	-	PVC 3x0.14	PVC 3x0.14	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-



# Inductive sensors

M 18 x 1



<b>Rated operating distance</b>	
<b>Mounting</b>	flush  /non-flush
<b>Switching functions</b>	
	Model description
Normally-open (NO)	<b>Part number</b> Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
	Model description
Normally-closed (NC)	<b>Part number</b> Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
	Model description
Normally-closed/open (NC/NO) selectable	<b>Part number</b> Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
	Model description
Complementary	<b>Part number</b> Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
<b>Electrical data</b>	
Voltage range	10–60 V
Output current	min./max. –/200 mA
Switching frequency	max. 500 Hz
Short-circuit protection	●
LED: yellow = switched / green = power	●/–
Sensitivity adjustment	–
<b>Mechanical data</b>	
Temperature range	min./max. –25 °C/+70 °C
Protection type	IP 67/NEMA 4
Housing material	CuZn39Pb3
Termination	cable 2 m/6.5 ft mm <sup>2</sup>
	plug (page)
Accessories	(page/Pos.)

## M 18 x 1 5 mm (0.20")

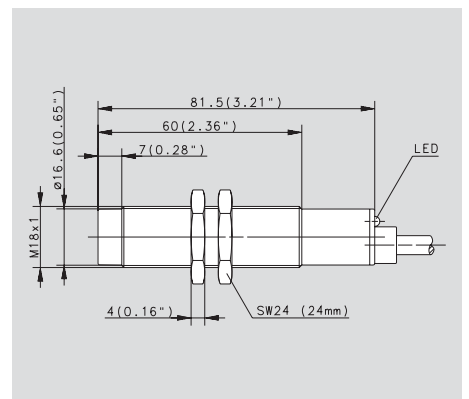
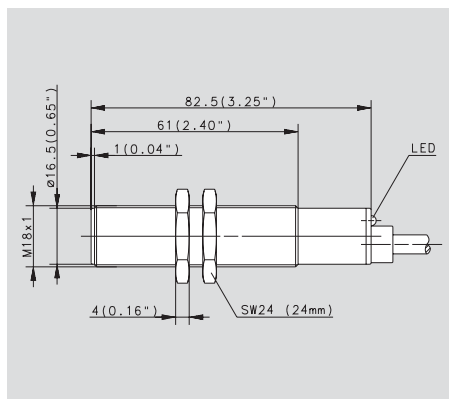
●/–	●/–	●/–
NPN	PNP	AC
KIB-M18NS/ 005-KL2 <b>650.2305.134</b> 263/4	KIB-M18PS/ 005-KL2 <b>650.2905.850</b> 263/1	KIB-M18AS/ 005-L2 <b>650.3505.004</b> 265/4
–	KIB-M18PÖ/ 005-KL3 <b>650.2705.172</b> 263/2	KIB-M18AÖ/ 005-L2 <b>650.3405.001</b> 265/5
–	–	–
–	KIB-M18PU/ 005-KL2 <b>650.2805.001</b> 264/4	–
–	–	–

## M 18 x 1 8 mm (0.32")

–/●	–/●	–/●
NPN	PNP	AC
KIN-M18NS/ 008-KL2 <b>650.2306.194</b> 263/4	KIN-M18PS/ 008-KL2 <b>650.2906.200</b> 263/1	KIN-M18AS/ 008-L2 <b>650.3506.002</b> 265/4
–	KIN-M18NÖ/ 008-KL2 <b>650.2106.191</b> 263/5	KIN-M18PÖ/ 008-KL2 <b>650.2706.001</b> 263/2
–	–	–
–	KIN-M18PU/ 008-KL2 <b>650.2806.001</b> 264/4	–
–	–	–

## Dimension diagrams

All dimensions in mm (inch)





**M 18 x 1**  
5 mm (0.20")

	●/-	-
NPN	PNP	AC
-	KIB-M18PS/ 005-KL2V <b>650.2905.008</b> 263/1	-
-	●/-	-
-	KIB-M18PÖ/ 005-KL2V <b>650.2705.006</b> 263/2	-
-	-/●	-
-	-	-

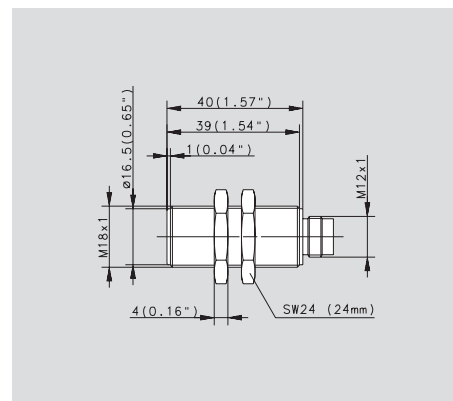
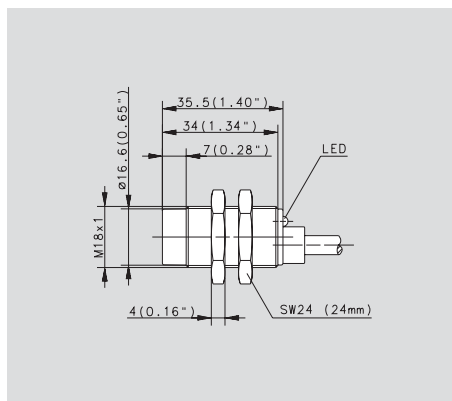
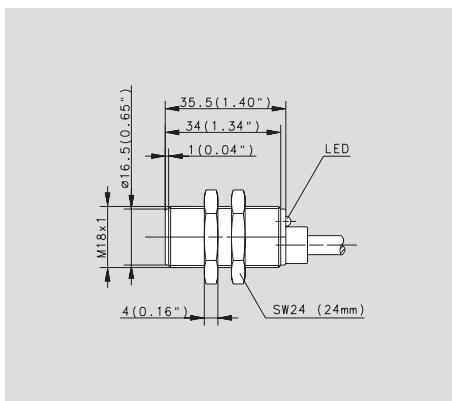
**M 18 x 1**  
8 mm (0.32")

-/●	-/●	-
NPN	PNP	AC
KIN-M18NS/ 008-KL2V <b>650.2306.004</b> 263/4	KIN-M18PS/ 008-KL2V <b>650.2906.006</b> 263/1	-
-	●/-	-
-	KIN-M18PÖ/ 008-KL2V <b>650.2706.002</b> 263/2	-
-	-/●	-
-	-	-

**M 18 x 1**  
5 mm (0.20")

	●/-	-
NPN	PNP	AC
-	KIB-M18PS/ 005-KS12V <b>650.2905.012</b> 263/1	-
-	●/-	-
-	KIB-M18PÖ/ 005-KS12V <b>650.2705.007</b> 263/2	-
-	-/●	-
-	-	-

-	10-60 V	-	10-60 V	10-60 V	-	-	10-60 V	-
-	-200 mA	-	-200 mA	-200 mA	-	-	-200 mA	-
-	500 Hz	-	200 Hz	200 Hz	-	-	500 Hz	-
-	●	-	●	●	-	-	●	-
-	●/-	-	●/-	●/-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-25 °C/+70 °C	-	-25 °C/+70 °C	-25 °C/+70 °C	-	-	-25 °C/+70 °C	-
-	-13 °F/+158 °F	-	-13 °F/+158 °F	-13 °F/+158 °F	-	-	-13 °F/+158 °F	-
-	IP 67/NEMA 4	-	IP 67/NEMA 4	IP 67/NEMA 4	-	-	IP 67/NEMA 4	-
-	CuZn39Pb3	-	CuZn39Pb3	CuZn39Pb3	-	-	CuZn39Pb3	-
-	PVC 3x0.5	-	PVC 3x0.5	PVC 3x0.5	-	-	-	-
-	-	-	-	-	-	-	260/261/262	-
-	266/6	-	266/6	266/6	-	-	266/6	-







**M 30 x 1.5**

**10 mm (0.39")**

●/-      ●/-      ●/-

**NPN**      **PNP**      **AC**

KIB-M30NS/      KIB-M30PS/      KIB-M30AS/

010-KL2      010-KL2      010-L2

**650.2307.135**      **650.2907.068**      **650.3507.378**

263/4      263/1      265/4

-/●      ●/-      ●/-

-      -      KIB-M30AÖ/

-      -      010-L2

-      -      **650.3407.240**

-      -      265/5

-      -      -/●

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**M 30 x 1.5**

**15 mm (0.59")**

-/●      -/●      -/●

**NPN**      **PNP**      **AC**

KIN-M30NS/      KIN-M30PS/      KIN-M30AS/

015-KL2      015-KL2      015-L2.5

**650.2308.001**      **650.2908.002**      **650.3508.246**

263/4      263/1      265/4

-/●      ●/-      -/●

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**M 30 x 1.5**

**10 mm (0.39")**

-      ●/-      -

**NPN**      **PNP**      **AC**

-      KIB-M30PS/      -

-      010-KLS12      -

-      **650.2939.004**      -

-      263/1      -

-      ●/-      -

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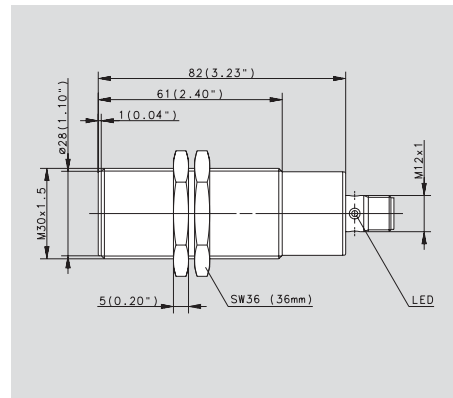
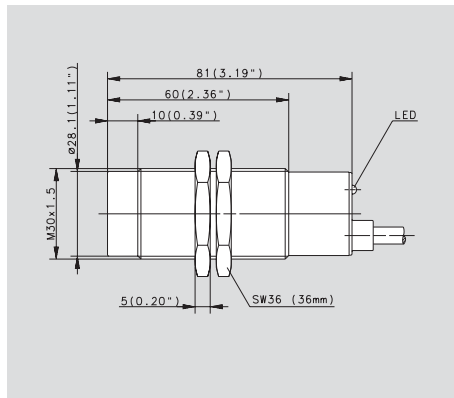
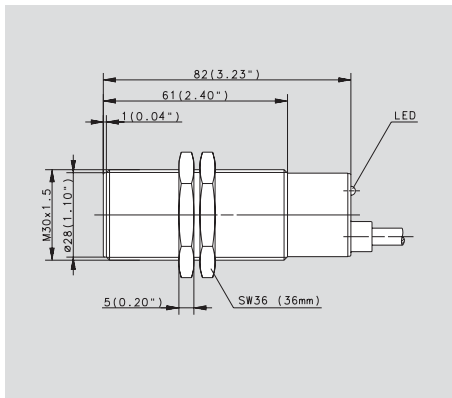
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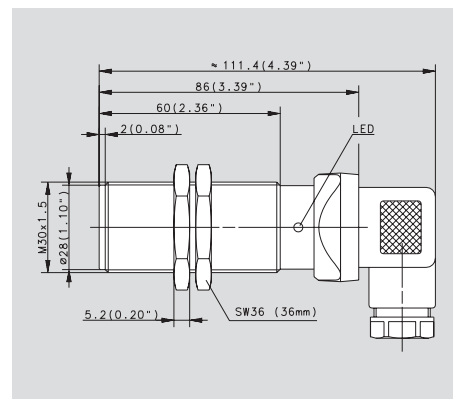
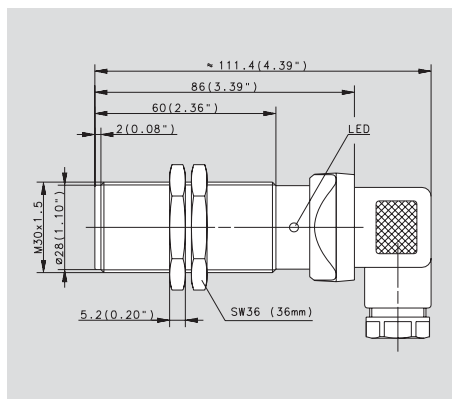
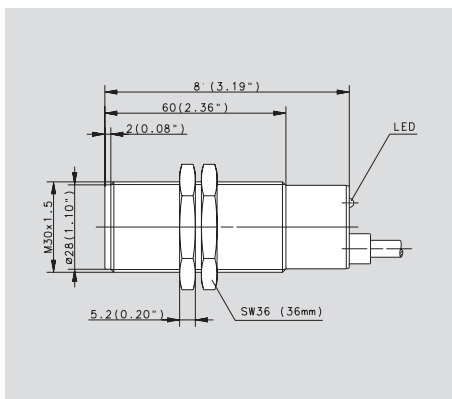
**M 30 x 1.5**  
**15 mm (0.59")**

**M 30 x 1.5**  
**10 mm (0.39")**

**M 30 x 1.5**  
**15 mm (0.59")**

M 30 x 1.5 15 mm (0.59")			M 30 x 1.5 10 mm (0.39")			M 30 x 1.5 15 mm (0.59")		
NPN	PNP	AC	NPN	PNP	AC	NPN	PNP	AC
-	KIN-T30PS/ 015-KL2 <b>650.2923.981</b> 263/1	KIN-T30AS/ 015-L2.5 <sup>1)</sup> <b>650.3523.956</b> 265/4	-	-	-	-	KIN-T30PS/ 015-KLSD <b>650.2935.001</b> <sup>1)</sup>	-
-	-	KIN-T30AÖ/ 015-L2 <b>650.3423.955</b> 265/5	-	-	-	-	-	-
-	-	-	-	KIB-T30PP/ 010-KLSD <b>650.2822.862</b> <sup>1)</sup>	-	-	KIN-T30PP/ 015-KLSD <b>650.2836.860</b> <sup>1)</sup>	KIN-T30AP/ 015-LSD <b>650.3536.868</b> <sup>2)</sup>
-	-	-	-	-	-	-	-	-

-	10-60 V	20-250 V	-	10-60 V	-	-	10-60 V	20-250 V
-	-200 mA	4/400 mA	-	-200 mA	-	-	-200 mA	4/400 mA
-	100 Hz	10 Hz	-	300 Hz	-	-	100 Hz	10 Hz
-	●	-	-	●	-	-	●	-
-	●/-	●/-	-	●/-	-	-	●/-	●/-
-	-	-	-	-	-	-	-	-
-	-25 °C/+70 °C	-25 °C/+70 °C	-	-25 °C/+70 °C	-	-	-25 °C/+70 °C	-25 °C/+70 °C
-	-13 °F/+158 °F	-13 °F/+158 °F	-	-13 °F/+158 °F	-	-	-13 °F/+158 °F	-13 °F/+158 °F
-	IP 67/NEMA 4	IP 67/NEMA 4	-	IP 65/NEMA 12	-	-	IP 65/NEMA 12	IP 65/NEMA 12
-	PA 6	PA 6	-	PA 6	-	-	PA 6	PA 6
-	PVC 3x0.5	PVC 2x0.5	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	266/8	266/8	-	266/8	-	-	266/8	266/8







**8 x 8 x 47**

**1.5 mm (0.06")**

	●/-	-
NPN	PNP	AC
-	KIB-Q08PS/ 1.5-KLSM8 <b>650.2980.002</b> 263/1	-
-	●/-	-
-	KIB-Q08PÖ/ 1.5-KLSM8 <b>650.2780.002</b> 263/2	-
-	-/●	-
-	-	-
-	-	-
-	-	-
-	-	-
-	10-30 V	-
-	-200 mA	-
-	1000 Hz	-
-	●	-
-	●/-	-
-	-	-
-	-25 °C/+70 °C	-
-	-13 °F/+158 °F	-
-	IP 67/NEMA 4	-
-	CuZn39Pb3	-
-	-	-
-	-	-
-	278/279	-

**12 x 12 x 55 extended sensing distance**

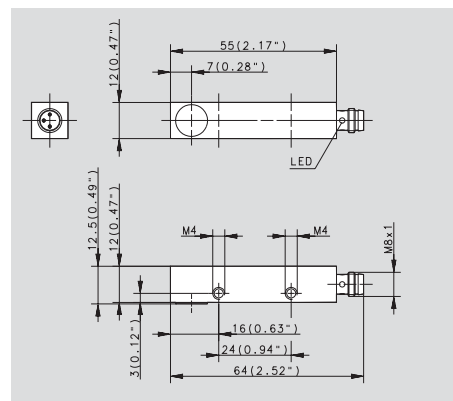
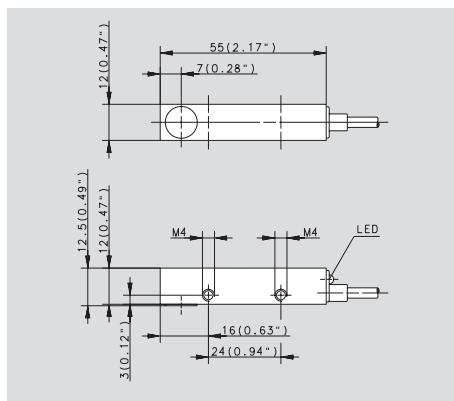
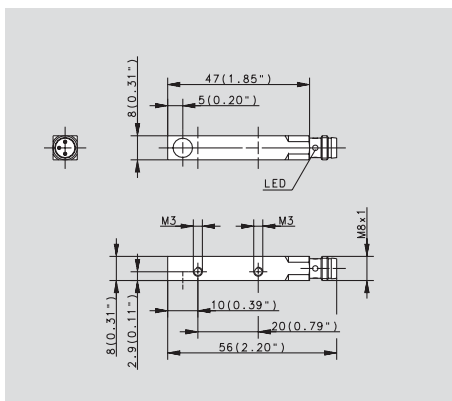
**4 mm (0.16")**

	●/-	-
NPN	PNP	AC
-	KIB-Q12PS/ 004-KL2E <b>650.2999.028</b> 263/1	-
-	-/●	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	10-60 V	-
-	-200 mA	-
-	800 Hz	-
-	●	-
-	●/-	-
-	-	-
-	-25 °C/+70 °C	-
-	-13 °F/+158 °F	-
-	IP 67/NEMA 4	-
-	CuZn39Pb3	-
-	PVC 3x0.14	-
-	-	-
-	-	-
-	278/279	-

**12 x 12 x 55 extended sensing distance**

**4 mm (0.16")**

	●/-	●/-	-
NPN	PNP	AC	
-	KIB-Q12NS/ 004-KLSM8E <b>650.2399.021</b> 263/4	KIB-Q12PS/ 004-KLSM8E <b>650.2999.030</b> 263/1	-
-	-/●	●/-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	10-30 V	10-30 V	-
-	-200 mA	-200 mA	-
-	800 Hz	800 Hz	-
-	●	●	-
-	●/-	●/-	-
-	-	-	-
-	-25 °C/+70 °C	-25 °C/+70 °C	-
-	-13 °F/+158 °F	-13 °F/+158 °F	-
-	IP 67/NEMA 4	IP 67/NEMA 4	-
-	CuZn39Pb3	CuZn39Pb3	-
-	-	-	-
-	278/279	278/279	-
-	-	-	-





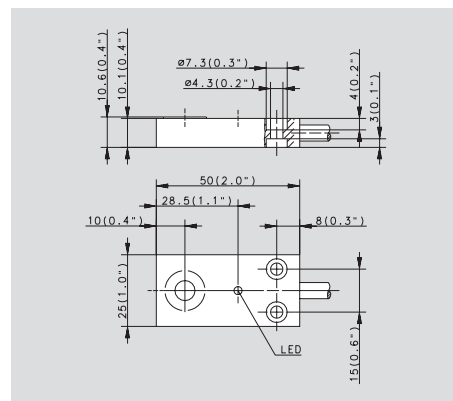
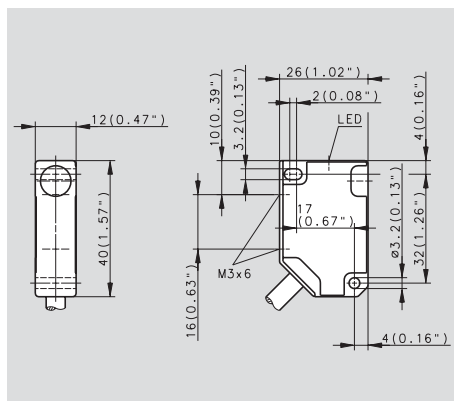
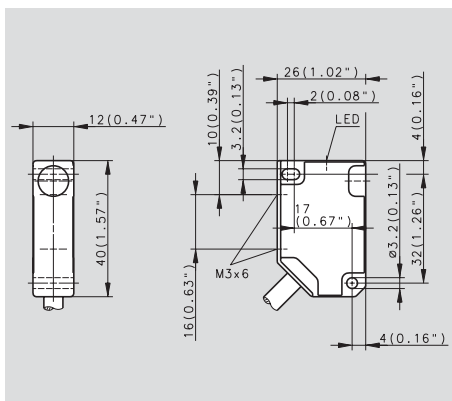


**40 x 26 x 12**  
2 mm (0.08")

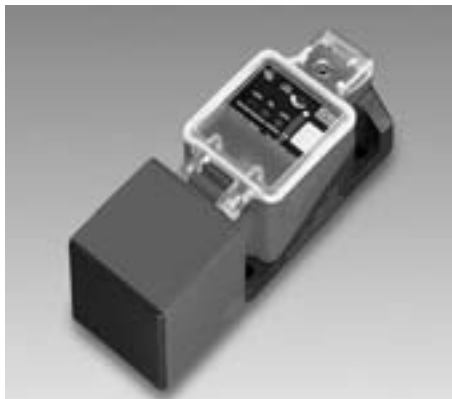
**40 x 26 x 12**  
4 mm (0.16")

**50 x 25 x 10**  
5 mm (0.20")

40 x 26 x 12 2 mm (0.08")			40 x 26 x 12 4 mm (0.16")			50 x 25 x 10 5 mm (0.20")		
NPN	PNP	AC	NPN	PNP	AC	NPN	PNP	AC
-	●/-	●/-	-/●	-/●	-/●	●/-	●/-	-
-	KIB-E40PS/ 002-KL2 <b>650.2984.023</b> 263/1	KIB-E40AS/ 002-L2 <b>650.3584.004</b> 265/4	-	KIN-E40PS/ 004-KL2 <b>650.2984.024</b> 263/1	KIN-E40AS/ 004-L2 <b>650.3584.005</b> 265/4	KIB-E50NS/ 005-KL2 <b>650.2390.001</b> 263/4	KIB-E50PS/ 005-KL2 <b>650.2990.001</b> 263/1	-
-	●/-	●/-	●/-	●/-	●/-	-/●	●/-	-
-	KIB-E40PÖ/ 002-KL2 <b>650.2784.006</b> 263/2	KIB-E40AÖ/ 002-L2 <b>650.3484.003</b> 265/5	-	KIN-E40PÖ/ 004-KL2 <b>650.2784.007</b> 263/2	KIN-E40AÖ/ 004-L2 <b>650.3484.004</b> 265/5	-	-	-
-	-/●	-/●	-/●	-/●	-/●	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	10-36 V	20-250 V AC	10-36 V	10-36 V	20-250 V AC	10-60 V	10-60 V	-
-	-/200 mA	-/300 mA	-/200 mA	-/200 mA	-/300 mA	-/200 mA	-/200 mA	-
-	800 Hz	10 Hz	400 Hz	400 Hz	10 Hz	500 Hz	500 Hz	-
-	●	-	●	●	-	●	●	-
-	●/-	●/-	●/-	●/-	●/-	●/-	●/-	-
-	-	-	-	-	-	-	-	-
-	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-
-	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-
-	IP 67/NEMA 4	IP 67/NEMA 4	IP 67/NEMA 4	IP 67/NEMA 4	IP 67/NEMA 4	IP 67/NEMA 4	IP 67/NEMA 4	-
-	PA 6.6	PA 6.6	PA 6.6	PA 6.6	PA 6.6	PA 6.6	PA 6.6	-
-	PVC 3x0.5	PVC 2x0.5	PVC 3x0.5	PVC 3x0.5	PVC 2x0.5	PVC 3x0.5	PVC 3x0.5	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-







**41.5 x 41.5 x 120 extended sensing distance**

**20 mm (0.78")**

●/-	●/-	-
<b>NPN</b>	<b>PNP</b>	<b>AC</b>
		-
KIB-N44DP/ 020-KLSE <b>650.2054.004</b> 263/7 ●/-		-

**41.5 x 41.5 x 120 extended sensing distance**

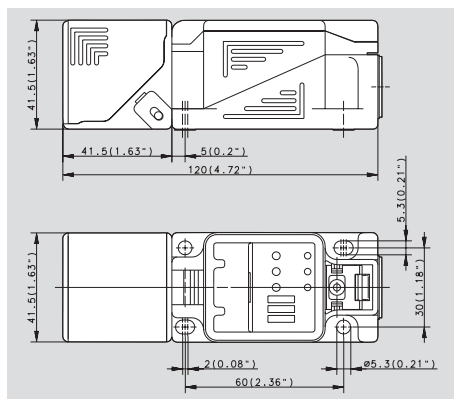
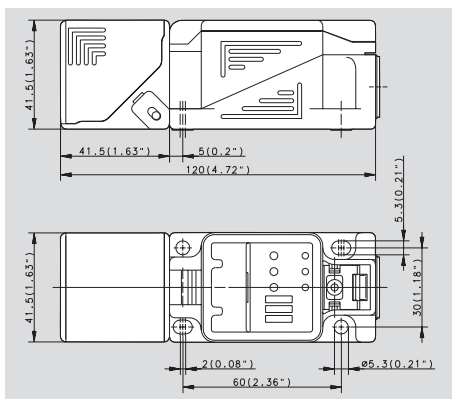
**40 mm (1.57")**

-/●	-/●	-
<b>NPN</b>	<b>PNP</b>	<b>AC</b>
		-
KIN-N44DP/ 040-KLSE <b>650.2054.005</b> 263/7 ●/-		-

-	-	KIB-N44AP/ 020-LSE <b>650.3554.001</b> 265/6 ●/-	-	-	KIN-N44AP/ 040-LSE <b>650.3554.002</b> 265/6 -/●
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-	10-60 V	20-250 V	-	10-60 V	20-250 V
-	-400 mA	-500 mA	-	-400 mA	-500 mA
-	50 Hz	15 Hz	-	50 Hz	15 Hz
-	●	-	-	●	-
-	●/●	●/●	-	●/-	●/●

-	-25 °C/+70 °C	-25 °C/+70 °C	-	-25 °C/+70 °C	-25 °C/+70 °C
-	-13 °F/+158 °F	-13 °F/+158 °F	-	-13 °F/+158 °F	-13 °F/+158 °F
-	IP 65/NEMA 12	IP 65/NEMA 12	-	IP 65/NEMA 12	IP 65/NEMA 12
-	PA 6.6	PA 6.6	-	PA 6.6	PA 6.6







**M 12 x 1****2 mm (0.08")**

●/-	●/-	-
<b>NPN</b>	<b>PNP</b>	<b>AC</b>

KIB-M12NS/ 002-KL2	KIB-M12PS/ 002-KL2	-
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<b>693.2303.001</b>	<b>693.2903.001</b>	
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263/4	263/1	
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●/-	●/-	-
-	-	-

**M 12 x 1****2 mm (0.08")**

●/-	●/-	-
<b>NPN</b>	<b>PNP</b>	<b>AC</b>

KIB-M12NS/ 002-KLS12	KIB-M12PS/ 002-KLS12	-
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<b>693.2343.001</b>	<b>693.2943.001</b>	
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263/4	263/1	
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●/-	●/-	-
-	-	-

**M 12 x 1****4 mm (0.16")**

-/●	-/●	-
<b>NPN</b>	<b>PNP</b>	<b>AC</b>

KIN-M12NS/ 004-KL2	KIN-M12PS/ 004-KL2	-
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<b>693.2304.001</b>	<b>693.2904.001</b>	
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263/4	263/1	
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●/-	●/-	-
-	-	-

10-30 V	10-30 V	-
-/200 mA	-/200 mA	-
800 Hz	800 Hz	-

●	●	-
●/-	●/-	-

-	-	-
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-25 °C/+70 °C	-25 °C/+70 °C	-
-13 °F/+158 °F	-13 °F/+158 °F	-

IP 67/NEMA 4	IP 67/NEMA 4	-
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-	-	-
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PVC 3x0.14	PVC 3x0.14	-
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-	-	-
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-	-	-
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10-30 V	10-30 V	-
-/200 mA	-/200 mA	-
800 Hz	800 Hz	-

●	●	-
●/-	●/-	-

-	-	-
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-25 °C/+70 °C	-25 °C/+70 °C	-
-13 °F/+158 °F	-13 °F/+158 °F	-

IP 67/NEMA 4	IP 67/NEMA 4	-
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280/281/282	280/281/282	-
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10-30 V	10-30 V	-
-/200 mA	-/200 mA	-
400 Hz	400 Hz	-

●	●	-
●/-	●/-	-

-	-	-
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-25 °C/+70 °C	-25 °C/+70 °C	-
-13 °F/+158 °F	-13 °F/+158 °F	-

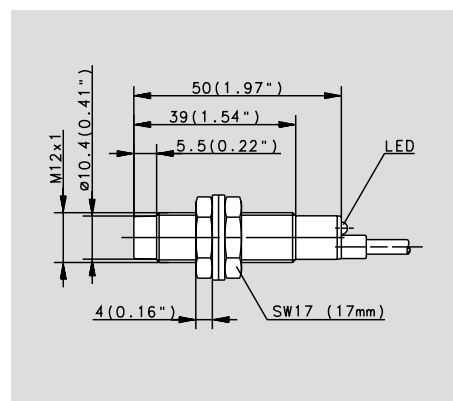
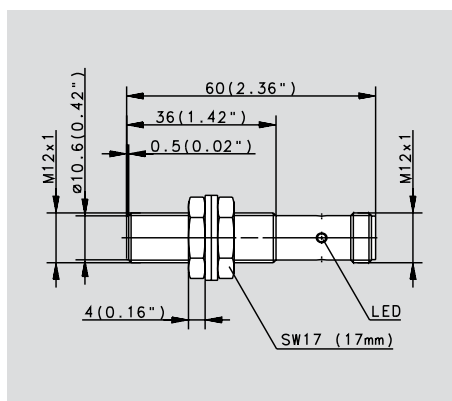
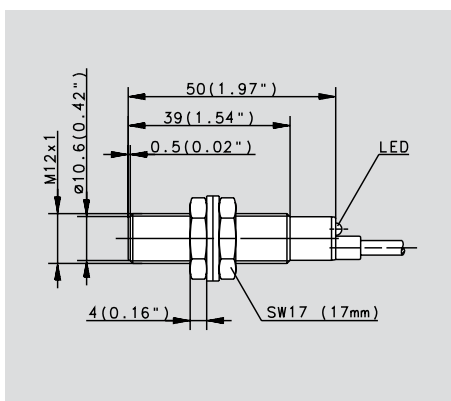
IP 67/NEMA 4	IP 67/NEMA 4	-
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PVC 3x0.14	PVC 3x0.14	-
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-	-	-
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**M 18 x 1****5 mm (0.20")**

●/-	●/-	-
<b>NPN</b>	<b>PNP</b>	<b>AC</b>

KIB-M18NS/ 005-KLS12	KIB-M18PS/ 005-KLS12	-
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<b>693.2305.004</b>	<b>693.2905.004</b>	
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263/4	263/1	
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●/-	●/-	-
-	-	-

**M 18 x 1****8 mm (0.32")**

-/●	-/●	-
<b>NPN</b>	<b>PNP</b>	<b>AC</b>

KIN-M18NS/ 008-KL2	KIN-M18PS/ 008-KL2	-
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<b>693.2306.001</b>	<b>693.2906.001</b>	
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263/4	263/1	
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●/-	●/-	-
-	-	-

**M 18 x 1****8 mm (0.32")**

-/●	-/●	-
<b>NPN</b>	<b>PNP</b>	<b>AC</b>

KIN-M18NS/ 008-KLS12	KIN-M18PS/ 008-KLS12	-
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<b>693.2306.004</b>	<b>693.2906.004</b>	
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263/4	263/1	
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●/-	●/-	-
-	-	-

10-30 V	10-30 V	-
-/200 mA	-/200 mA	-
500 Hz	500 Hz	-

●	●	-
●/-	●/-	-

-	-	-
---	---	---

-25 °C/+70 °C	-25 °C/+70 °C	-
-13 °F/+158 °F	-13 °F/+158 °F	-

IP 67/NEMA 4	IP 67/NEMA 4	-
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-	-	-
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280/281/282	280/281/282	-
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266/6	266/6	-
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10-30 V	10-30 V	-
-/200 mA	-/200 mA	-
200 Hz	200 Hz	-

●	●	-
●/-	●/-	-

-	-	-
---	---	---

-25 °C/+70 °C	-25 °C/+70 °C	-
-13 °F/+158 °F	-13 °F/+158 °F	-

IP 67/NEMA 4	IP 67/NEMA 4	-
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-	-	-
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PVC 3x0.5	PVC 3x0.5	-
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-	-	-
---	---	---

266/6	266/6	-
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10-30 V	10-30 V	-
-/200 mA	-/200 mA	-
200 Hz	200 Hz	-

●	●	-
●/-	●/-	-

-	-	-
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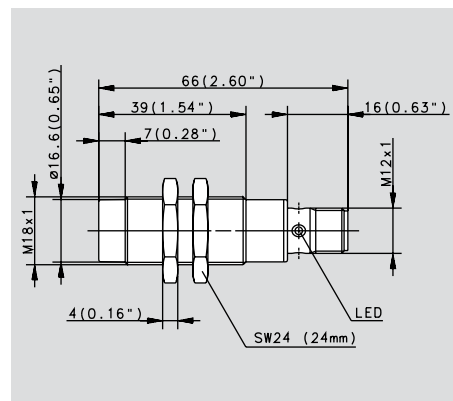
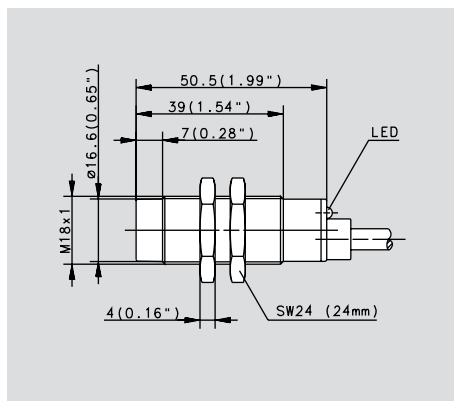
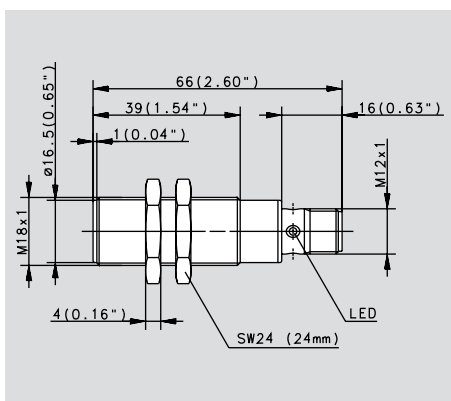
-25 °C/+70 °C	-25 °C/+70 °C	-
-13 °F/+158 °F	-13 °F/+158 °F	-

IP 67/NEMA 4	IP 67/NEMA 4	-
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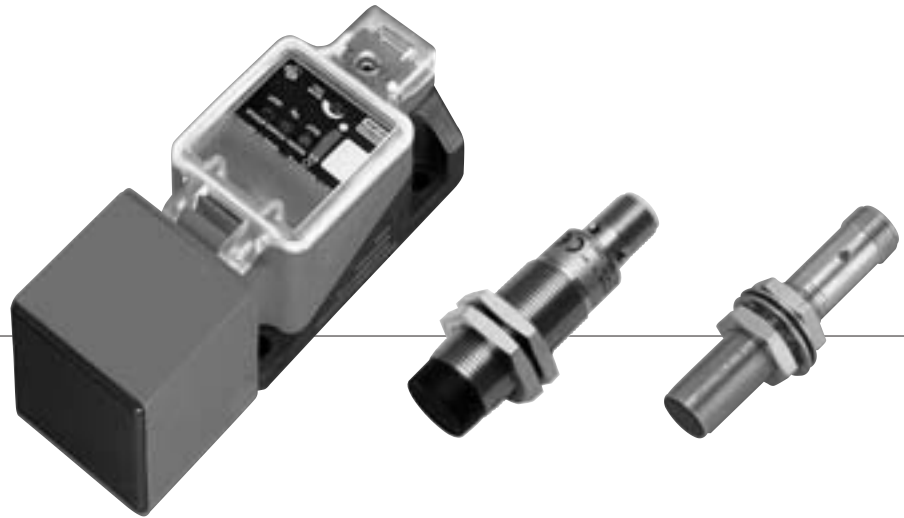
-	-	-
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280/281/282	280/281/282	-
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-	-	-
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## Programmable inductive sensors



### Principle

These sensors work on the conventional inductive principle, nevertheless they can, thanks to their adaptable properties, be universally adapted for many applications.

With this learning capability (the so-called teach-in function), the sensors can be split into two groups:

- Sensors with teach-in-function for distance sensing
- Sensors with teach-in-function for speed monitoring

The following demonstrates two application examples:

A practical application is the sensing range of targets, which due to changing conditions, e.g. operating conditions or wear and tear, would require a constant re-adjustment.

Through a simple voltage pulse or PLC the necessary programmable pulse can be directed to the sensor and the learning process initiated. The programmable pulse can vary within the voltage range of  $U_B$ .

A further application for teach-in sensors is the speed monitoring of rotating shafts (detection by gear wheels) with changing, rotational frequencies. Here a simple voltage pulse or PLC can be used to set the necessary programmable pulse to "learn" the maximum operating frequency. Additional control devices with power supply and complicated evaluating electronics are not necessary.

### Mode of operation

The teach-in-function is achieved by an A/D-converter which permanently stores and compare the values in EEPROM (Electrical Erasable Read Only Memory).

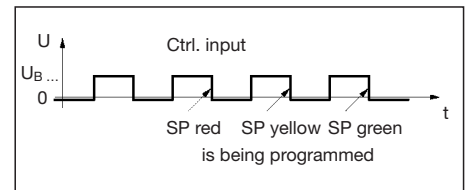
The EEPROM data can be safely stored for at least 40 years with the number of read/write-operations said to be 1.000.000.

By using a micro-controller for signal processing, Bernstein sensors can also be re-programmed to meet specific customer requirements for especially difficult tasks.

### Variations

BERNSTEIN delivers the programmable inductive sensor in different enclosure designs and with a varying range of technical features.

The multi-norm version has three programmable switching outputs. With this type of sensor, four positive impulse signals are expected one after the other on the control line. At the first impulse signal, the sensor switches to the programming mode. After each following impulse signal, the actual distance to the targeted object is assigned to an output (Teach-in sensing distance).



Programming for multi-norm version

The teach-in speed monitor sensors are available in M12 and M18 enclosures in plug and cable versions and PNP-version (special types on request).

### General data

Enclosure material	PA6.6 <sup>1)</sup> / CuZn39Pb3 <sup>2)</sup>
Protection class according to IEC	IP 65 <sup>1)</sup> / IP 67 <sup>2)</sup>
Operating temperature	-25 °C bis +70 °C
Storage temperature	-40 °C bis +80 °C
Sensing distance	programmable, 20..40 mm <sup>1)</sup> / 8..16 mm <sup>2)</sup>

### Teach-in distance sensing sensors

Enclosure material	PA6.6 <sup>1)</sup> / CuZn39Pb3 <sup>2)</sup>
Protection class according to IEC	IP 65 <sup>1)</sup> / IP 67 <sup>2)</sup>
Operating temperature	-25 °C bis +70 °C
Storage temperature	-40 °C bis +80 °C
Sensing distance	programmable, 20..40 mm <sup>1)</sup> / 8..16 mm <sup>2)</sup>

### Teach-in speed monitoring sensors

Enclosure material	CuZn39Pb3
Protection class according to IEC	IP 67
Operating temperature	-25 °C bis +70 °C
Storage temperature	-40 °C bis +80 °C
Sensing distance	2 mm <sup>3)</sup> / 5 mm <sup>4)</sup>

### Electrical data

Switching frequency	3 Hz
Hysteresis	≤ 10% (from programmed sensing distance)
Open-circuit current	< 10 mA <sup>1)</sup> / < 11 mA <sup>2)</sup>
Voltage drop	≤ 1.5 V
Polarisation protection	yes
Overload-/short-circuit withstand capability	yes
Repeat accuracy	≤ 5%

Switching frequency	programmable, 1..5000 Hz
Hysteresis	≤ 15% (from progr. switching frequency)
Open-circuit current	< 11 mA
Voltage drop	≤ 2.5 V
Polarisation protection	yes
Overload-/short-circuit withstand capability	yes
Repeat accuracy	≤ 5%

<sup>1)</sup> European standard enclosure (N44 series Multinorm)

<sup>2)</sup> Metric design (M12 / M18)

<sup>3)</sup> Metric design M12

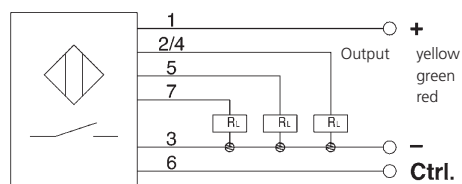
<sup>4)</sup> Metric design M18

## Advantages

- Sensor adjustment is easy
- Calibration in the application
- Sensors can be re-programmed without additional mounting effort
- One sensor can scan a number of switching points
- Programming from control panel possible
- High process safety due to tolerance minimisation
- High repeat accuracy

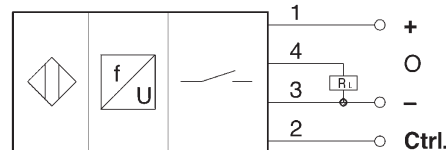
## Teach-in distance sensing sensors

Connection diagram, N44

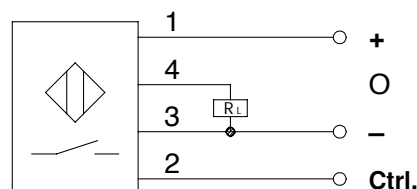


## Teach-in speed monitoring sensors

Connection diagram, M12/M18



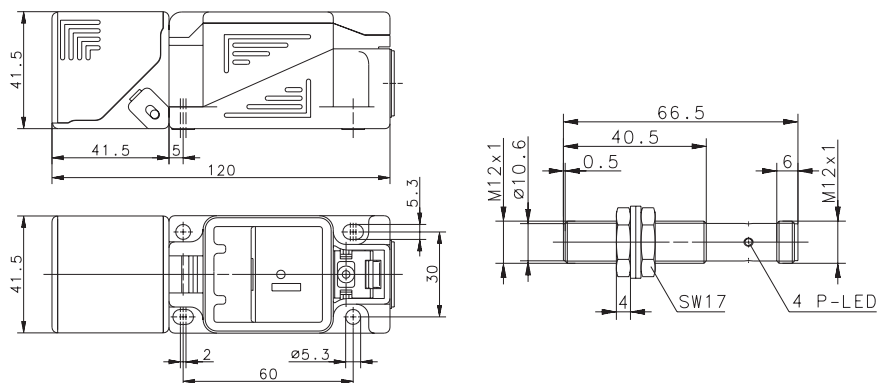
Connection diagram, M18



## Version

Designation	KIN-N44PS/040-KLSE	KIB-M12PS/002-KLS12I	KIB-M12PS/002-KL2I
Part number	<b>650.2954.015<sup>1)</sup></b>	<b>650.2943.014<sup>1)</sup></b>	<b>650.2903.024<sup>2)</sup></b>
Operating voltage	10 – 30 V DC	10 – 36 V DC	10 – 36 V DC
Switching current	≤ 200 mA	≤ 200 mA	≤ 200 mA
Switching distances / prog. switching frequencies	20...40 mm / –	– / 1...5000 Hz	– / 1...5000 Hz

## Dimensions

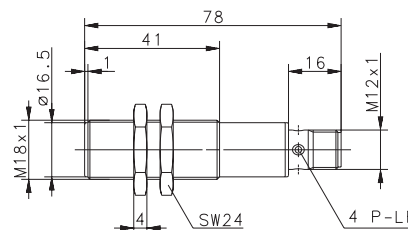


## Version



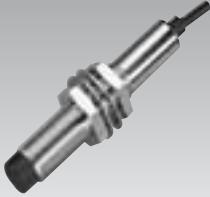

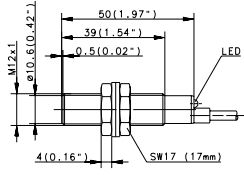
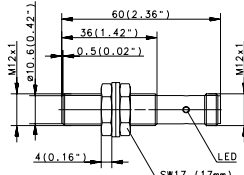
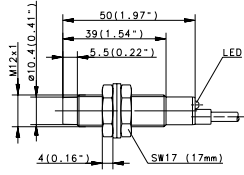
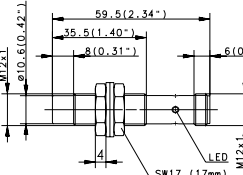
Designation	KIB-M18PS/005-KLS12I	KIB-M18PS/005-KL2I
Part number	<b>650.2940.004<sup>1)</sup></b>	<b>650.2905.021<sup>2)</sup></b>
Operating voltage	10 – 30 V DC	10 – 30 V DC
Switching current	≤ 200 mA	≤ 200 mA
Switching distance/frequency programmable	– / 1...5000 Hz	– / 1...5000 Hz


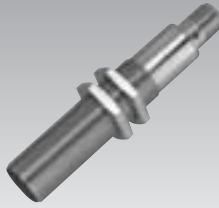


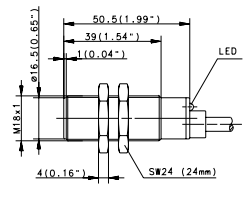
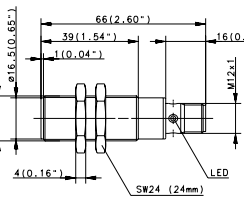
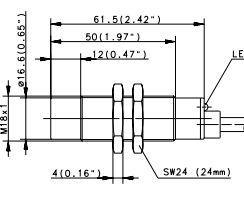
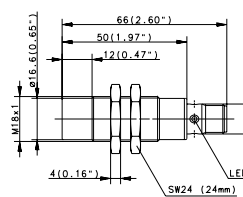
## Dimensions

- <sup>1)</sup> S12 plug version  
for connection coupling 413.9100.299
- <sup>2)</sup> Cable type 2 m



# Inductive sensors with increased sensing distances

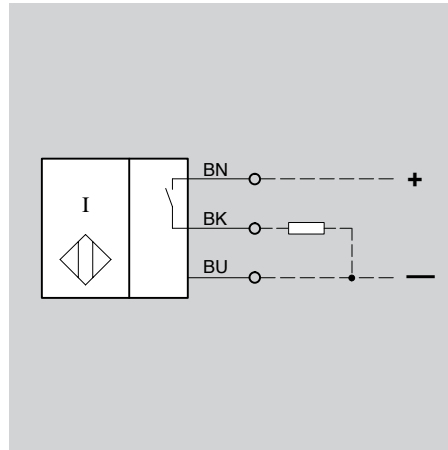
Type M12	4 mm sensing distance		8 mm sensing distance	
				
	flush metal design		non-flush metal design	
	2 m cable	M12 plug	2 m cable	M12 plug
PNP normally-open contact*)	KIB-M12PS/004-KL2E <b>650.2903.025</b>	KIB-M12PS/004-KLS12E <b>650.2943.015</b>	KIN-M12PS/008-KL2E <b>650.2904.021</b>	KIN-M12PS/008-KLS12E <b>650.2944.013</b>
Dimensions				

Type M18	8 mm sensing distance		16 mm sensing distance	
				
	flush metal design		non-flush metal design	
	2 m cable	M12 plug	2 m cable	M12 plug
PNP normally-open contact*)	KIB-M18PS/008-KL2E <b>650.2905.022</b>	KIB-M18PS/008-KLS12E <b>650.2940.005</b>	KIN-M18PS/016-KL2E <b>650.2906.018</b>	KIN-M18PS/016-KLS12E <b>650.2941.004</b>
Dimensions				

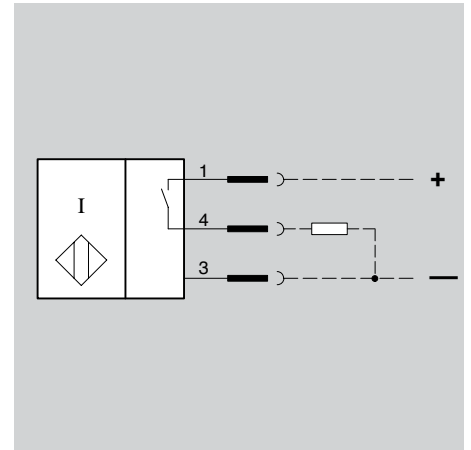
\*) Order only with part number, NPN- and normally-closed version on request

## Wiring diagrams

Type M12/M18, cable version



Type M12/M18, plug version



## Accessories

Cable couplings see page 280 ff.

## General data





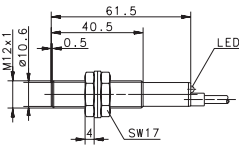
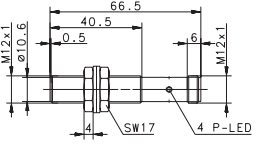
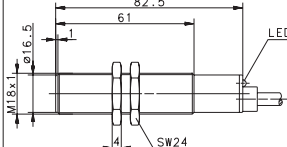
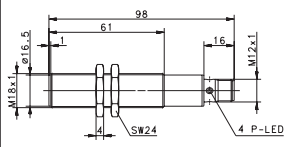
	M12		M18	
	flush	non-flush	flush	non-flush
Operating voltage	10–36 V			
Rated operating voltage	$\leq 200$ mA			
Switching hysteresis	10% from rated switching distance			
Reproducibility	$\leq 5\%$			
Switching frequency	800 Hz	400 Hz	500 Hz	200 Hz
Output	short circuit- and overload proof			
Polarity reversal protection	yes			
Rated switching distance	4 mm	8 mm	8 mm	16 mm
Functions-/operating voltage display	●/–	●/–	●/–	●/–
Ambient temperature	– 25 °C to + 70 °C			
Protection class	IP 67 according to IEC 529, EN 60 529			
Enclosure	nickel-plated brass (CuZn39Pb3)			
Cable PVC	3 x 0.14		3 x 0.5	



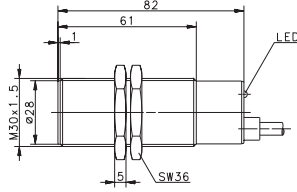
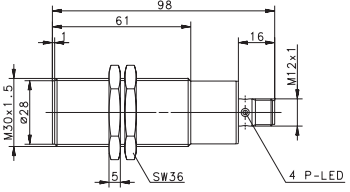


## Inductive sensors

### Temperature range

-40 °C to +100 °C

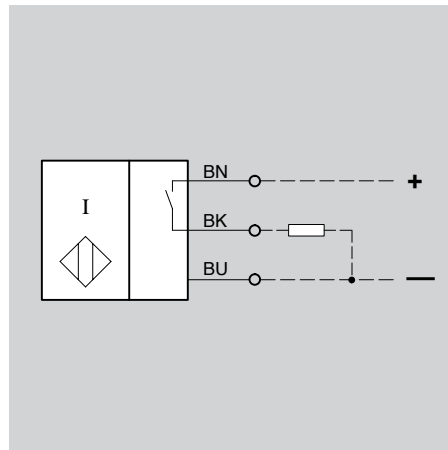
Type M12 M18	2 mm sensing distance M12		5 mm sensing distance M18	
				
PNP normally-open contact*)	flush metal design		flush metal design	
	2 m cable	M12 plug	2 m cable	M12 plug
Model description Part number	KIB-M12PS/002-KL2T <b>650.2903.026</b>	KIB-M12PS/002-KLS12T <b>650.2943.016</b>	KIB-M18PS/005-KL2PUT <b>650.2905.023</b>	KIB-M18PS/005-KLS12T <b>650.2940.006</b>
Dimensions				

Type M30	10 mm sensing distance	
		
PNP normally-open contact*)	flush metal design	
	2 m cable	M12 plug
Model description Part number	KIB-M30PS/010-KL2PUT <b>650.2907.013</b>	KIB-M30PS/010-KLS12T <b>650.2939.006</b>
Dimensions		

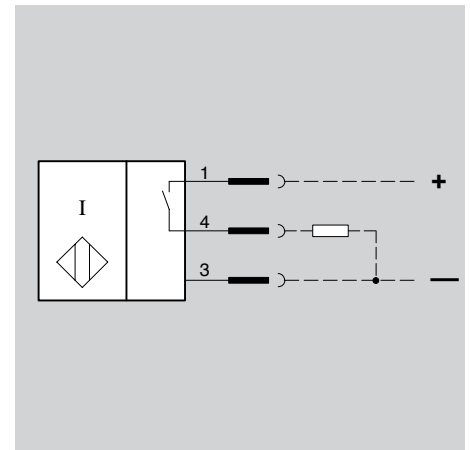
\*) Order only with part number, NPN- and normally-closed version on request

## Wiring diagrams

Type M12/M18/M30, cable version



Type M12/M18/M30, plug version



## Accessories



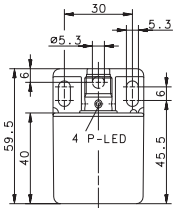
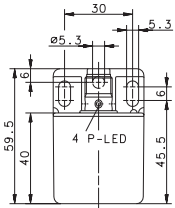
Cable couplings see page 280 ff.


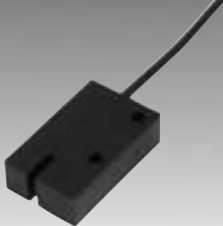
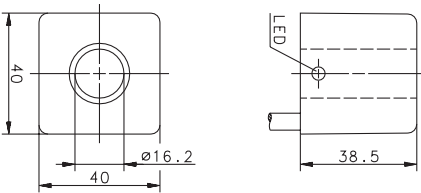
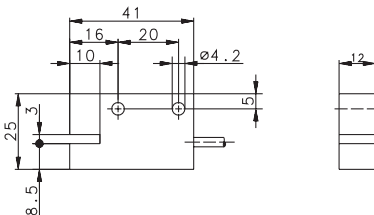
## General data

	M12 flush	M18 flush	M30 flush
Operating voltage	$U_B$	10–30 V	
Rated operating voltage	$I_B$	$\leq 200$ mA	
Switching hysteresis	H	10% from rated switching distance	
Reproducibility	R	$\leq 5\%$	
Switching frequency	F	800 Hz	300 Hz
Output		short circuit- and overload proof	
Polarity reversal protection		yes	
Rated switching distance	$S_n$	2 mm	10 mm
Functions-operating voltage display		●/–	●/–
<b>Ambient temperature</b>		<b>– 40 °C to + 100 °C</b>	
Protection class		IP 67 according to IEC 529, EN 60 529	
Enclosure		nickel-plated brass (CuZn39Pb3)	
Cable PVC	mm <sup>2</sup>	3 x 0.14	3 x 0.5

# Inductive sensors

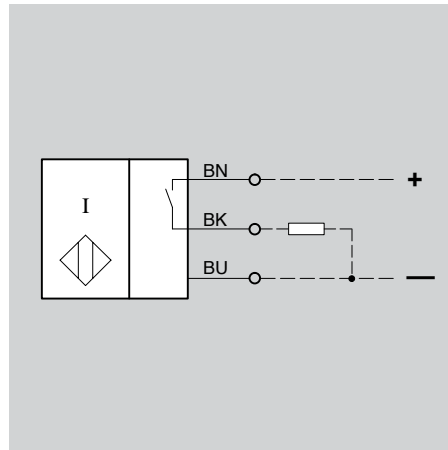
## Special-purpose design

<b>Type N40</b>	<b>15 mm sensing distance</b>		<b>20 mm sensing distance</b>	
				
	Flush design		Non-flush design	
	M12 plug/PNP NO contact	M12 plug/PNP NC contact	M12 plug/PNP NO contact	M12 plug/PNP NO contact
<b>Model description</b> <b>Part number</b>	KIB-N40PS/015-KLS12 <b>650.2988.001</b>	KIB-N40PÖ/015-KLS12 <b>650.2788.001</b>	KIN-N40PS/020-KLS12 <b>650.2982.003</b>	KIN-N40PÖ/020-KLS12 <b>650.2782.001</b>
<b>Dimensions</b>				

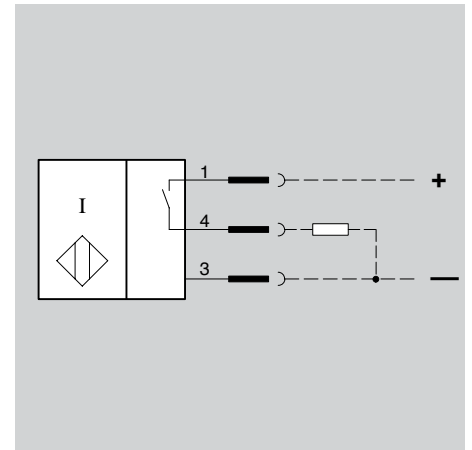
<b>Type N40</b> – Ring sensor  <b>Type S03</b> – Slot sensor	<b>Ring sensor Ø 16 mm</b>		<b>Slot sensor 3 mm slot width</b>	
				
	6 m cable		2 m cable	
	PNP-NO contact	NPN-NO contact	PNP-NO contact	NPN-NO contact
<b>Model description</b> <b>Part number</b>	KIR-N40PS/000-KL6 <b>650.2999.036</b>	KIR-N40NS/000-KL6 <b>660.2399.375</b>	KIN-S03PS/003K2 <b>650.2999.035</b>	–
<b>Dimensions</b>				

## Wiring diagrams

Type N40, cable version  
Type SO3, slot sensor



Type N40, plug version



Sensors

## Accessories

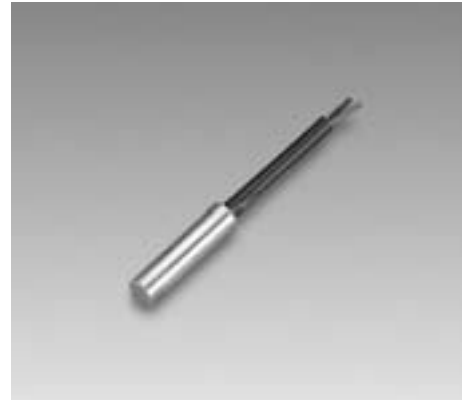
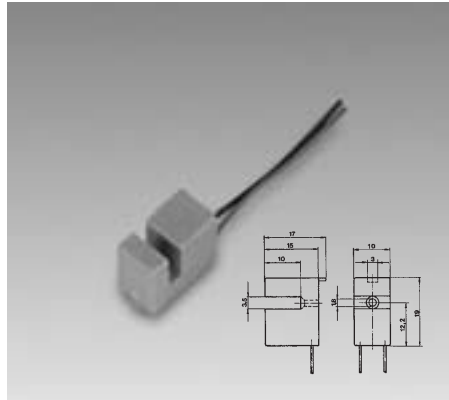
Cable couplings see page 280 ff.

## General data

	N40 flush	N40 non-flush	N40 Ring sensor	N40 Slot sensor
Operating voltage	10–36 V		10–30 V	
Rated operating voltage	≤ 200 mA			
Switching hysteresis	10% from rated switching distance		–	
Reproducibility	≤ 5%			
Switching frequency	100 Hz	50 Hz	4000 Hz	
Output	continuous short-circuit- and overload proof			
Polarity reversal protection	yes			
Rated switching distance	15 mm	20 mm	Immersion approx. 20 mm	Immersion approx. 7 mm
Functions-/operating voltage display	●/–	●/–	●/–	–/–
Ambient temperature	– 25 °C to + 70 °C			
Protection class	IP 67 according to IEC 529, EN 60 529			
Enclosure	PA6		PA6	
Connection	S12 plug		cable 3 x 0.5 mm <sup>2</sup>	cable 3 x 0.14 mm <sup>2</sup>

**NAMUR**  
DIN EN 60947-5-6

**Inductive sensors**



<b>Rated operating distance</b>	
<b>Mounting</b>	flush  /non-flush
<b>Switching functions</b>	
Model description	
<b>Part number</b>	
Wiring diagram	(page/Pos.)
Stock status: Ex stock/Built to order	
<b>Mechanical data</b>	
Housing material	
Cable length 2 m/6.5 ft. mm	
Accessories	(page/Pos.)

<b>19 x 17 x 10</b>	
<b>Slot 3.5 mm (0.13")</b>	
●/-	
<b>NAMUR / B</b>	
KIB-S03EA/ 3.5-0.5	* screw M 1.6 x 12 DIN 963 and nut M 1.6 DIN 964 are included
<b>650.1675.001</b>	
263/8	
●/-	
PA 6	
0.5 m/2 x 0.14 single core	
-	

<b>Ø 6.5; 25 mm length</b>	
<b>1.5 mm (0.06")</b>	
●/-	
<b>NAMUR / A</b>	
KIB-D06EA/ 1.5-2	
<b>650.1699.002</b>	
263/8	
●/-	
stainless steel 1.4305	
PVC 2 x 0.25	
-	



<b>Rated operating distance</b>	
<b>Mounting</b>	flush  /non-flush
<b>Switching functions</b>	
Model description	
<b>Part number</b>	
Wiring diagram	(page/Pos.)
Stock status: Ex stock/Built to order	
<b>Mechanical data</b>	
Housing material	
Cable length 2 m/6.5 ft. mm	
Accessories	(page/Pos.)

<b>M 5; 25 mm length</b>	
<b>1 mm (0.04")</b>	
●/-	
<b>NAMUR / B</b>	
KIB-M05EA/ 001-2	
<b>650.1699.008</b>	
263/8	
●/-	
CuZn39Pb3	
PVC 2 x 0.14	
-	

<b>M 8 x 1; 32 mm length</b>	
<b>1.5 mm (0.06")</b>	
●/-	
<b>NAMUR / A</b>	
KIB-M08EA/ 1.5-2	
<b>650.1601.003</b>	
263/8	
●/-	
stainless steel 1.4305	
PVC 2 x 0.25	
-	

**Electrical and mechanical data for NAMUR inductive sensors**

<b>Electrical data</b>	
Nominal input voltage 8.2 V DC	
Input resistance 1 kΩ	

<b>Mechanical data</b>	
Temperature range min./max.	-25 °C/+70 °C -13 °F/+158 °F
Protection class IP 67/NEMA 4	

<b>Output current</b>		
	Diagram A	Diagram B
damped	≤ 1 mA	≤ 1.1 mA
undamped	≥ 4 mA	≥ 2.2 mA

**M 8 x 1; 32 mm length****2 mm (0.08")**

-/●

**NAMUR / A**KIN-M08EA/  
002-2**650.1601.005**

263/8

-/●

stainless steel 1.4305

PVC 2 x 0.25

-

**M 12 x 1; 30 mm length****2 mm (0.08")**

●/-

**NAMUR / A**KIB-M12EA/  
002-2**650.1624.760**

263/8

●/-

CuZn39Pb3

PVC 2 x 0.25

-

**M 12 x 1; 32 mm length****4 mm (0.16")**

-/●

**NAMUR / A**KIN-M12EA/  
004-2**650.1625.761**

263/8

●/-

CuZn39Pb3

PVC 2 x 0.25

-

**M 18 x 1; 35 mm length****5 mm (0.20")**

●/-

**NAMUR / A**KIB-M18EA/  
005-2**650.1626.762**

263/8

●/-

CuZn39Pb3

PVC 2 x 0.5

-

**M 18 x 1; 35 mm length****8 mm (0.32")**

-/●

**NAMUR / A**KIN-M18EA/  
008-2**650.1627.763**

263/8

-/●

CuZn39Pb3

PVC 2 x 0.5

-

**PEA-T22NR/202-B08S**PEA-T22NR/  
202-B08S**661.2208.012**

Intrinsic safe [EEx ia] II C

PTB-No.: Ex-93.C.4001

2-channel switching amplifier with fault condition monitor for short-circuit and wire breakage

230 V\* ± 10%, 45–60 Hz

8 V; 12.6 V<sub>max.</sub>; R<sub>i</sub> = 1 kΩ

2 x 5 A, 250 V AC, 100 VA normally-closed (NC)

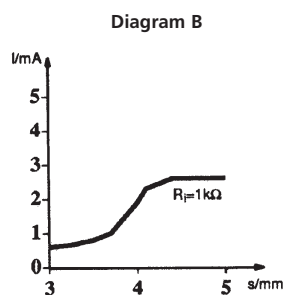
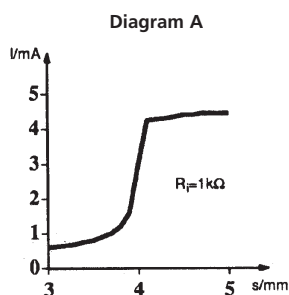
Mounting: TS 35 DIN rail

Temperature range = -25 °C/+50 °C

IP 20/NEMA 1

Input signals NAMUR sensors, variable resistances, mechanical contacts

\* Other voltages on request



# Programmable universal switching device

## PCS-T75UR/205-D



### Main fields of applications

- Rotational speed monitor
- Analogue signal evaluation
- Level and position evaluation
- Switching point evaluation

### Main features

- Programmable Control System (PCS)
- Programming via menu
- Teach-in function
- Universal
- Easy to operate

With state of the art evaluation electronics PCS-T75UR/205D, BERNSTEIN introduces a new **Programmable Control System** into automation technology that offers the user a high degree of flexibility and configuration options.

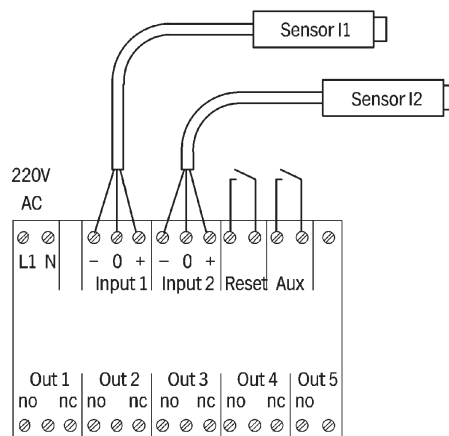
The PCS is controlled via a menu for applications that require rotational speed queries, evaluation of analogue signals, levels or positions, and switching points. The sensor inputs are wired to standard sensors, NAMUR sensors or analogue sensors with current or voltage output from 5/24 V.

In addition to the menu controlled programming function, the PCS can learn pre-defined switching points or rotational speeds (teach-in function). This enables the user to minimise tolerances when setting or programming applications.

5 potential-free relay contacts are available as outputs. If required, the evaluation electronics can be divided in to 2 functional units, which means the user has two separate configurations available.

This innovative feature ensures a high degree of flexibility when configuring and installing. Despite its comprehensive functions of the PCS, the evaluation electronics can be operated without the need for previous experience.

### Wiring diagram



Output Relay:  
 NO = Normally-Open Contact  
 NC = Normally-Closed Contact



### Technical data

#### Electrical data

Supply voltages

Sensor voltages

Relay outputs

(divides in to 2 functions)

Input signals

Auxiliary inputs

Hysteresis

Protection class

85–265 V AC

8.2 V DC (NAMUR)

24 V DC (standard sensor)

5 V DC

5 relay outputs

– 4x CO

– 1x NO

– current: 2 A, voltage: 200 V DC, power: 60 W

NAMUR sensors

PNP/NPN sensors 0...24 V

Analog sensors 0...24 mA, 0...5 V

1x reset (start-up delay)

programmable 2–20 %

IP 20/NEMA 1

#### Mechanical data

Temperature range

Enclosure, see-through cover

Connection

Mounting

–20 °C...+70 °C (0 °C...+60 °C legible display)

PC black, PC

Rigid 0.2...4 mm<sup>2</sup>

Flexible 0.2...2.5 mm<sup>2</sup>

AWG 24-11

Mounts on to mounting rail according to EN 50 022

#### Function and programming

Mode

Programming

Start-up override

Rotational speed monitoring

Programmable

Mean-value generation

Level or position evaluation

Default by entering the values

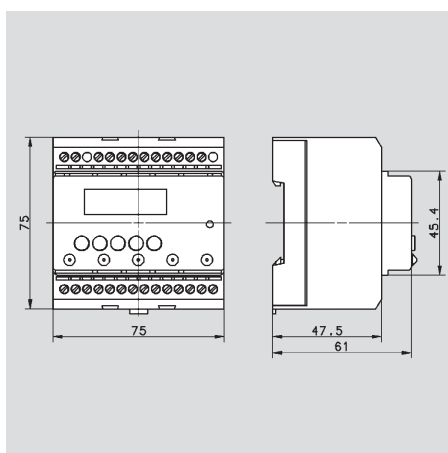
Adaptive programming

Visualisation/operator guidance

Adjustable from 1 to 100 s

Programmable from 2 Hz–10 kHz

### Dimensions





# Capacitive sensors

## Introduction

Capacitive sensors can sense conducting and non-conducting materials in solid or liquid form. They have various uses including level control in tanks, as well as detection of container contents on filling and packaging machinery. Other uses include positioning and counting of materials within transportation and storage systems, for example conveyor belts, and steering mechanisms.

Typical materials which can be sensed:

### Solids:

Wood, ceramic, glass, piles of paper, plastic, stone, rubber, ice, non-ferrous materials and vegetable matter.

### Liquids:

Water, oil, glue and paint.

### Granular:

Plastic granules, seed, feed and salt.

### Powder:

Dyes, soap-powder, sand, cement, fertilizer, sugar, flour and coffee

## Technical specifications

The function of a capacitive sensor is to signal a change of state based on the evaluation of the stimulus from an electrical field. Capacitive sensors detect metallic or non-metallic objects by measuring the change in capacitance, which is dependent upon the dielectric constant of the material being sensed, its mass, size and distance from the active surface of the sensor.

Capacitive sensors are built around an RC-oscillator. Due to the influence of the target and the change in capacitance, the amplification becomes stronger causing the oscillator to oscillate. The exact start of that function can be adjusted by means of a potentiometer, which controls the feedback to the oscillator. The sensing distance of a certain material can therefore be adjusted by the potentiometer. The output signal of the oscillator feeds another amplifier, which in turn feeds the signal to the output stage.

If a conductive target approaches the active face of the switch the target becomes a capacitor. The change in capacitance is

significant resulting in a long sensing distance. If a non-conductive target approaches the switch ( $>1$ ) there is only a small change in the dielectric constant and the rise in capacitance is quite small compared to conductive materials. Correction factors therefore have to be noted when comparing quoted sensing distances.

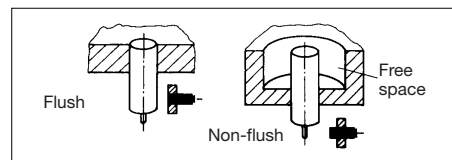
### Correction factors

Steel or other grounded metals	1.00
Surface of water	1.00
Steel 150 x 150 x 1 mm (5.9" x 5.9" x 0.03") not grounded	0.85
Marble 150 x 150 x 12.5 mm (5.9" x 5.9" x 0.49")	0.65
Glass 150 x 150 x 7.5 mm (5.9" x 5.9" x 0.29")	0.55
Pile of paper (500 sheets)	0.55
Pressed wood 150 x 150 x 16 mm (5.9" x 5.9" x 0.62")	0.45
Ceramic tile 150 x 150 x 6 mm (5.9" x 5.9" x 0.23")	0.25
PVC 150 x 150 x 4 mm (5.9" x 5.9" x 0.15")	0.15

The factors given are average values, as the sensing distance is influenced by individual features of the target and the environment in which the sensor is installed. In all applications, it is important to note the influence of humidity around the switch and target. High moisture content, in wood or paper for example, increases sensing distance.

Capacitive switches are available for:

- Flush mounting or shielded
- Non-flush mounting or non-shielded.



Around a non-flush mounting capacitive switch a free zone must be made available so no influencing material can affect the sensor. Because of the sensitivity control

adjustment, non-flush capacitive sensors can be mounted in areas where the "Free Zone" is restricted. These sensors are less sensitive to dust or moisture in the atmosphere than flush-mounting sensors.

Flush-mounting sensors have an in-built shielding electrode, which is connected to earth. As both electrodes are very near to each other, the flush-mounting sensors are especially efficient in sensing different dielectrics. However, this makes them more prone to sensing dust or moisture in the atmosphere.

If capacitive sensors are mounted next or opposite to one another they can also influence each other. Flush mounting switches are much less sensitive in such applications than non-flush mounting. If the required sensing distance between sensors is  $>2$   $<8$  times the housing diameter an application test is necessary. It is not necessary to test applications where the sensing distances between sensors is  $>8$  times the housing diameter.

## Specifications

### Active-face

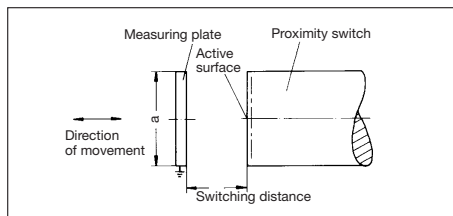
Active-face is the capacitive sensor's housing surface where the electrical field emerges. To ensure correct installation, cylindrical housings are mostly front sensing, while rectangular housings generally have the position marked with a line or a cross.

### Actuation

To actuate means to bring the material in front of the active face of the capacitive sensor so that the output changes.

### Standard targets

The standard target is square, 1 mm thick and made from steel (FE 360).



The front face of the square target is identical to the diameter of the active face. If the sensing distance were three times greater than the diameter of the active face, the target would have to be this size. In order to ensure accurate sensing distances, the target needs to be grounded. The sensing distance of a rectangular capacitive sensor is aligned with a grounded plate the same size as the active face.

### Real sensing distance

Real sensing distance is the distance between the target and the active-face when the sensor switches and gives a change in output, while mounted in a specific application.

### Nominal sensing distance: $s_n$

Nominal sensing distance is the sensing distance shown without taking into account tolerances and influences from temperature or power supply.

### Standardised sensing distance: $s_r$

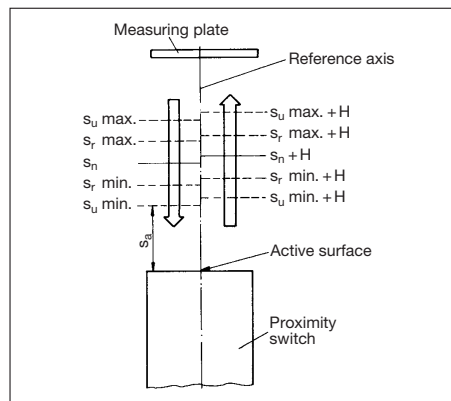
Standardised sensing distance is the distance aligned at  $23\text{ °C} \pm 5\text{ °C}$ . It has to be between 90% and 110% of the nominal sensing distance.

### Effective sensing distance: $s_n$

This includes all tolerances of temperature and voltage supply. It has to be between 80% and 120% of the standardised sensing distance.

### Usable sensing distance

(Working sensing distance). The usable sensing distance should be calculated for applications under the worst circumstances. This is calculated to be between 0-72% of the nominal sensing distance.

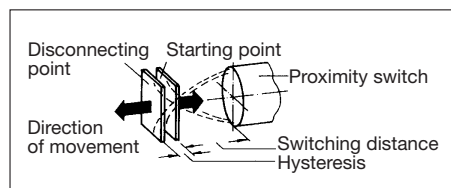


### Repeatability

This is the accuracy between the first and second switching, within 8 hours of each other and with a temperature band of  $18\text{ °C}$  to  $28\text{ °C}$ . The maximum difference of the voltage supply may vary only by 5%. The difference between both measurements may not be more than 10% of the standardised sensing distance.

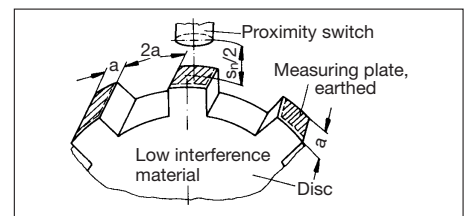
### Hysteresis

This is the difference between the switch-on point when approaching the switch and the switch-off point when leaving the switch. The value is given as a percentage of the standardised sensing distance.



### Switching frequency

The switching frequency is measured according to EN 60947-5-2. The standard targets with the side length "a" are mounted at intervals of 2 times "a" on a disc which does not influence the sensor when the disc starts rotating. If the on-off signal of the sensor is shorter than 50 ms the maximum switching frequency of the sensor is reached. For AC sensors the maximum switching frequency of the sensor is reached when the on-off time equals half one sine wave.



### Temperature range

The temperature range for sensors is measured according to the EN-DIN at  $-25\text{ °C}$  to  $+75\text{ °C}$ . In this range the sensors will work with a tolerance of  $\pm 10\%$ .

### Protection class

IP 65  
IP 67

### Cable

The standard cable has PVC insulation. Silicon cable, Polyurethane cable, special stabilised PVC- or PTFE-cable is available upon request.

### Plug and socket

For electronic products today the plug and socket are just as important as the cable. The Bernstein capacitive proximity switches are available with several plug and socket variations.

### Standards

All sensors are in accordance with EN 60947-5,2.



# The way to the right sensor

## Using the selection matrix

To assist the user in selecting the right capacitive sensor for their application, Bernstein developed the selection matrix below. The colours of the individual fields match those in the product index to allow rapid selection of the most suitable sensor (by part number) starting with the most important criteria, switching distance. By not using detailed technical descriptions the selection is considerably simplified, but our engineers are always available to answer any technical questions.

## Important notes

Capacitive sensors are able to sense conducting and non-conducting materials in solid, liquid, granular or powder form. In operation however, a number of criteria must be taken into account.

### Switching distance

The rated switching distance is shown (according to DIN EN 6947-5-2/97) and adjusted on site. The greatest switching distance is reached with an approaching conducting target of a certain size. With a non-conducting material, knowledge of the specific inductive capacity of the target is important as the switching distance will vary by a factor dependent on material and application (see fig. 1 and 2).

The factors indicated in the table show an expected approximation of the reacting sensitivity, since specific characteristics of the target objects (especially cross section, thickness and moisture content) and the surrounding area (earthing) have a major influence on the sensing distance. Compensation for most applications can be made by adjustment of the built-in potentiometer.

### Free zone

Non-flush mounting capacitive sensors are less sensitive to dust or condensation than flush mounting versions, but a free zone must be established around the sensor, clear of materials that could influence it.

Selection matrix – capacitive sensors

Rated sensing distance	Housing metal/plastic	Mounting	Supply	Output	Switching	Connection
2 mm 4 mm	M12 M M12 K	flush mounted non-flush mounted	10 - 36 V DC	NPN 3L PNP 3L	N.C. N.O.	plug M8 cable 2 m
5 mm 8 mm	M18 M M18 K	flush mounted non-flush mounted	10 - 60 V DC 10 - 60 V DC / 20 - 250 V AC	NPN 3L PNP 3L AC 2L	N.C. N.O.	plug M8 M12 cable 2 m
10 mm 20 mm	M30 M M30 K	flush mounted non-flush mounted	10 - 60 V DC 10 - 60 V DC / 20 - 250 V AC	NPN 3L PNP 3L AC 2L	N.C. N.O.	plug M12 cable 2 m
15 mm 30 mm	M32 M M32 K	flush mounted non-flush mounted	10 - 60 V DC	NPN/PNP prog. 3L NPN/PNP prog. 3L / AC 2L	Complementary prog. N.O./N.C. prog.	plug M12 cable 2 m
15 mm	Ø 20 K	non-flush mounted	10 - 60 V DC / 20 - 250 V AC	NPN 3L PNP 3L AC 2L	N.C. N.O.	plug M12 cable 2 m
20 mm 30 mm	Ø 34 M Ø 34 K	flush mounted non-flush mounted	10 - 36 V DC 10 - 60 V DC / 20 - 250 V AC	PNP 3L NPN 3L / PNP 3L / AC 2L	N.C. N.O.	plug M12 cable 2 m
8 mm	E 50 50 x 25 x 10 mm P	flush mounted	10 - 36 V DC	NPN 3L PNP 3L	N.C. on request N.O.	cable 2 m
10 mm	E 68 68 x 30 x 15 mm P	flush mounted	10 - 36 V DC	PNP 3L PNP 3L	N.C. on request N.O.	cable 2 m
15 mm 30 mm	N 44 40 x 40 x 120 mm P	flush mounted non-flush mounted	10 - 60 V DC	NPN/PNP prog. 3L	N.C./N.O. prog.	Terminal chamber

Flush mounting capacitive sensors have, by design, higher sensitivity to a variety of materials, so care must be taken to ensure the sensing face is kept free of contamination by dust or moisture.

If capacitive sensors are mounted within a distance of 2 - 8 housing diameters of one another, they can influence each other and testing under real conditions is strongly recommended. The aforementioned adjustment capability however, allows a solution to be found for virtually every application.

Glass	3...14
Rubber	2.5...3
Hard paper	3.5...6
Wood	2.5...6.8
Marble	8.4...14
Mineral oil	2.15
Epoxy resin	3.3...3.6
Petroleum	2.2
Plexiglas	3.6
Polyamid	3...8
PVC	3.3...4.1
China	4.2...6.5
Teflon PTFE	2
Air	1
Water	80.8
Paper (dry)	2

Fig. 1 Dielectric Factor

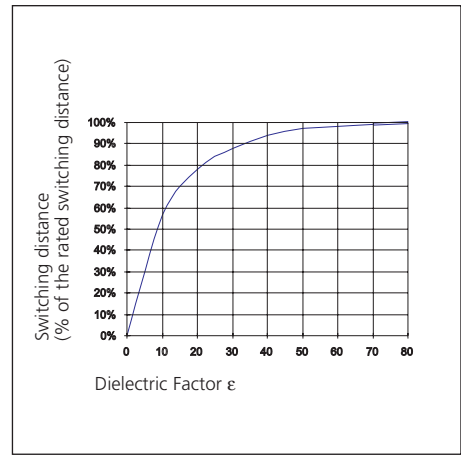


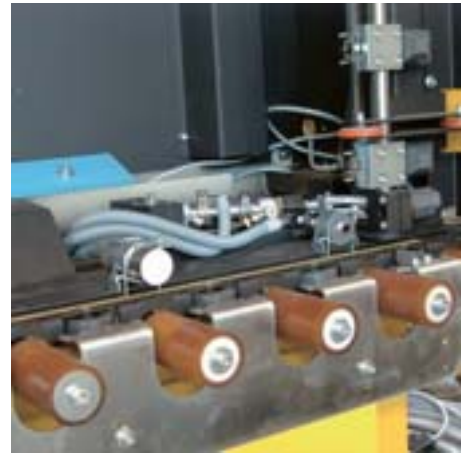
Fig. 2 Variation of the switching distance depending on Dielectric Factor ε

**Applications**

Capacitive proximity sensors are particularly useful for sensing fill levels through non-metallic container walls.





Advantage:





The container wall does not have to be breached and the sensed material will not come in contact with the sensor. A requirement for this application is that the Dielectric Factor of the target material is higher than that of the container. Using the potentiometer the sensitivity of the sensor is reduced until it responds to the target medium but not the container wall. See below for further applications.

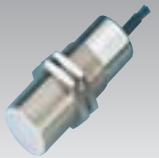
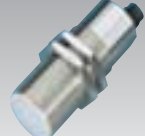








Top: insulating glass-production line fitted with Bernstein capacitive sensors

	Level monitoring through non-metallic containers		Level control in paint and glue containers		Detection at wood processing
	Level control for granulate or feed hoppers		Registration, counting, sorting or control of conveyor belt systems		Tear sensing
	Pallet height sensing e.g. paper		Position sensing in continuous processing		Level control in cardboard packaging

Standard-models		2 mm switching distance				4 mm switching distance			
		M12							
flush mounted metal design				non-flush mounted plastic design					
2 m cable, length = 61.5 mm			Plug M8, length = 61.8 mm		2 m cable, length = 61 mm		Plug M8, length = 61.3 mm		
N.O.	N.C.		N.O.	N.C.	N.O.	N.C.	N.O.	N.C.	
DC	NPN	650.7303.001	650.7103.001	650.7303.004	650.7103.004	650.7319.001	650.7119.001	650.7319.004	650.7119.004
	PNP	650.7903.001	650.7703.001	650.7903.004	650.7703.004	650.7919.001	650.7719.001	650.7919.004	650.7719.004

Standard-models		5 mm switching distance				8 mm switching distance			
		M18							
flush mounted metal design				non-flush mounted plastic design					
2 m cable, length = 81.7 mm			Plug S12, length = 81.7 mm		2 m cable, length = 81 mm		Plug M8 (DC) Plug S12 (AC) length = 81 mm		
N.O.	N.C.		N.O.	N.C.	N.O.	N.C.	N.O.	N.C.	
DC	NPN	650.7305.001	650.7105.001	650.7305.004	650.7105.004	650.7321.723	650.7121.722	650.7321.002	650.7121.002
	PNP	650.7905.001	650.7705.001	650.7905.004	650.7705.004	650.7921.724	650.7721.001	650.7921.002	650.7721.002
AC						650.8521.001	650.8421.001	650.8521.004	650.8421.004

Standard-models		10 mm switching distance				20 mm switching distance			
		M30							
flush mounted metal design				non-flush mounted plastic design					
2 m cable, length = 82 mm			Plug S12, length = 82 mm		2 m cable, length = 81 mm		Plug S12, length = 81 mm		
N.O.	N.C.		N.O.	N.C.	N.O.	N.C.	N.O.	N.C.	
DC	NPN	650.7307.001	650.7107.001	650.7307.004	650.7107.004	650.7323.001	650.7123.001	650.7323.004	650.7123.004
	PNP	650.7907.001	650.7707.001	650.7907.004	650.7707.004	650.7923.727	650.7723.001	650.7923.004	650.7723.004
AC						650.8523.001	650.8423.001	650.8523.004	650.8423.004

Standard-models		15 mm switching distance				30 mm switching distance			
		M32							
flush mounted metal design				non-flush mounted plastic design					
2 m cable, length = 70 mm			Plug S12, length = 70 mm		2 m cable, length = 70 mm		Plug S12, length = 70 mm		
N.O./N.C. prog.	Complementary		N.O./N.C. prog.	Complementary	N.O./N.C. prog.	Complementary	N.O./N.C. prog.	Complementary	
DC	NPN/ PNP progr.	650.7013.011	650.7013.012	650.7013.015	650.7013.016	650.7013.001	650.7013.002	650.7013.004	650.7013.005
		AC Relais Timer					650.8613.001		

Standard-models		15 mm switching distance				20 mm switching distance				30 mm switching distance			
		non-flush mounted plastic design		flush mounted metal design		non flush mounted plastic design							
Ø 20 Ø 34													
		2 m cable, length = 81 mm		Plug M8, length = 81 mm		2 m cable, length = 80.5 mm		Plug S12, length = 80.5 mm		2 m cable, length = 81 mm		Plug S12, length = 81 mm	
		N.O.	N.C.	N.O.	N.C.	N.O.	N.O.	N.O.	N.F.	N.O.	N.F.	N.O.	N.F.
DC	NPN	650.7310.002	650.7110.001	650.7310.004				650.7315.001	650.7115.001	650.7315.004	650.7115.004		
	PNP	650.7910.001	650.7710.001	650.7910.004	650.7710.004	650.7915.005	650.7915.006	650.7915.001	650.7715.154	650.7915.004	650.7715.004	650.7915.004	650.7715.004
AC		650.8510.001	650.8410.001					650.8515.001	650.8415.001	650.8515.005	650.8415.004		

Standard-models		8 mm switching distance		10 mm switching distance		15 mm sw. dist.		30 mm sw. dist.	
		flush mounted metal design		flush mounted plastic design		flush mounted plastic design		non-flush plastic design	
E50 (50 x 25 x 10) E68 (68 x 30 x 15) N44 (40 x 40 x 120)									
		2 m cable		2 m cable		Terminal chamber			
		N.O.		N.O.		N.O./N.C. prog.		N.O./N.C. prog.	
DC	NPN	650.7390.001		650.7356.001		650.7054.001		650.7054.002	
	PNP	650.7990.001		650.7956.001					

**Technical data**

		DC-data									
		M12	M18	M30	M32	Ø 20	Ø 34	E50	E68	N44	
Operating voltage	$U_b$	10 - 36 V	10 - 60 V	10 - 60 V	10 - 60 V	10 - 60 V	10 - 36 V	10 - 36 V	10 - 36 V	10 - 60 V	
Operating current	$I_b$	≤ 200 mA	≤ 200 mA	≤ 400 mA	≤ 400 mA	≤ 400 mA	≤ 400 mA	≤ 200 mA	≤ 200 mA	≤ 400 mA	
Switch hysteresis	H	20% of rated switching distance									
Repeatability	R	≤ 10%									
Switching frequency	F	≈ 25 Hz									
Output		Sustained short circuit and overload protection									
Reverse voltage protection		yes									

		AC-data							
		M18	M30	M32	Ø 20	Ø 34	N44		
Operating voltage	$U_b$	20 - 250 V							
Operating current	$I_b$	≤ 300 mA (M32 version with relay output 8 A)							
Switch hysteresis	H	20% rated switching distance							
Repeatability	R	≤ 10%							
Switching frequency	F	≈ 15 Hz							
Output		(M32 version with adjustable off-delay 3-600 s)							
Reverse voltage protection		yes							

		general technical data									
		M12	M18	M30	M32	Ø 20	Ø 34	E50	E68	N44	
Rated switching distance											
(flush mounted/non-flush mounted)	$s_n$	2/4 mm	5/8 mm	10/20 mm	15/30 mm	-/15 mm	20/30 mm	8/- mm	10/- mm	15/30 mm	
Adjustable switching distance		yes with potentiometer (apart from M12 plug version)									
Function-/operating voltage indication		●/-	●/●	●/●	●/●	●/●	●/●	●/-	●/-	●/●	
Operating temperature		-25°C...+70°C									
Ingress protection		IP 65/67 according to CEI 529/EN 60529									



## Photoelectric sensors

Bernstein photoelectric sensors can be divided into four basic types:

- Through-beam
- Retro-reflective
- Diffuse reflective
- Fibre optic

The specifications of the above mentioned sensors are defined in the standard EN 60947-5-2.

The use of these systems depends primarily on the application and the operating environment. On the following pages you can find a number of application examples which demonstrate the advantages and disadvantages of the individual sensing types.

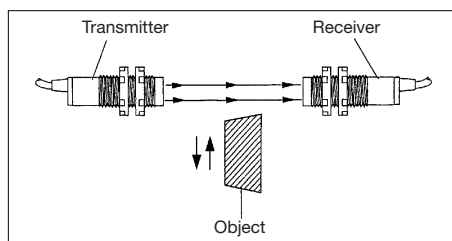
The division of photoelectric sensors into type/model helps make selection easier, the housing style and material distinguish the different type groups. You will find the available sensing options of the individual type groups in the data section of this catalogue.

In general, Bernstein photoelectric sensors operate using pulsating red or infrared light. This technology offers the following benefits:

- High immunity to ambient light
- Maximum sensing range
- Reduced temperature, resulting in longer operational life of transmitter diodes

### Sensing types

#### Through-beam sensors (ES)



Through-beam sensors have the light source and receiver in separate heads. The light emitted by the source is analysed by the receiver. Interruption of the light path (caused by an object) is evaluated and results in switching of the output.

Advantages:

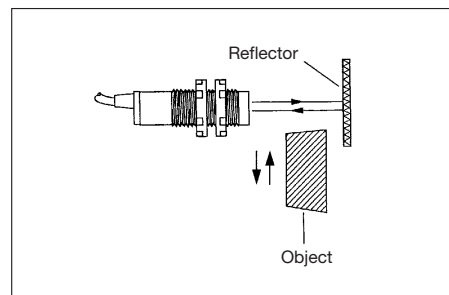
- Long sensing distance; the light beam needs only to travel in one direction from the transmitter to the receiver

- High operational safety, interference reflections rarely trigger the receiver
- Detection of very small objects, possible by the additional use of lenses or filters

Disadvantage:

- High installation cost with two devices having to be mounted, wired and adjusted

#### Retroreflective sensors (RS)



Retroreflective sensors have the light source and the receiver in the same head. The light beam emitted by the source is reflected back to the receiver by a reflector (e.g. triple reflector or reflective foil). Any break in the light path is evaluated by the receiver and in turn results in a change of the output mode.

Advantages:

- Easy installation of sensor head and reflector
- Reflector can be fixed to a moving target, e.g. conveyor belt installations

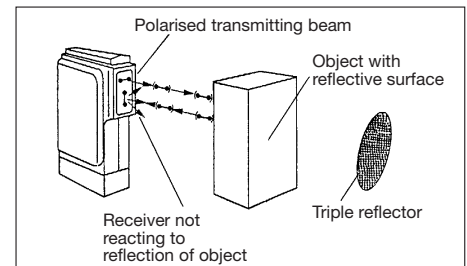
Disadvantages:

- Shorter sensing range than a through-beam system since the light beam has to travel from the light source to the reflector and back to the receiver
- High-gloss objects can function as reflectors and may cause malfunctions

Note:

The sensing ranges specified in the data section of this catalogue refer to use with a triple reflector with a diameter of 83 mm. Changes in the sensing range due to the use of other reflector types are available on request (see page 274).

#### Polarised retroreflective sensors (PS)



This device is a special type of retro-reflective sensor. Special linear or circular polarised filtering elements (foils) are mounted between the reception/transmission elements and the lens of the sensor.

Advantage:

- Reflections of mirroring or transparent objects are reliably ignored

Disadvantage:

- The sensing distance is shorter compared to standard devices without polarisation filters

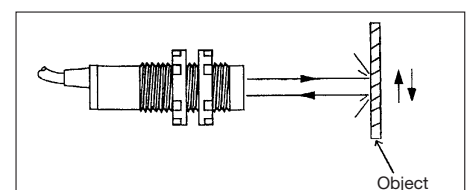
#### Special types with autocollimation

Transmission/reception channels use the same lens

Advantage:

- No dead zone with reflectors in short distance ranges

#### Diffuse reflective sensors (RT)



Diffuse reflective sensors have the light source and receiver in the same head. The light emitted by the source is diffusely reflected by the detected object. A part of this reflection returns to the receiver and changes the switching status of the output when a certain intensity is exceeded. Thus the texture and colour of the object's surface has a great effect on the detection (presence/absence) of objects.

The sensing distances indicated in the data section of this catalogue are defined as follows in accordance with EN 60947-5-2. Sensing distances of up to 400 mm refer to a 100 x 100 mm white paper test card from Kodak. For sensing distances of more than 400 mm, 200 x 200 mm test cards are to be used.

The reflectivity of the object surface to be sensed affects the sensing distance, so that a correction factor or re-emission factor has to be specified. This value may vary from, less than 10% for matt-black plastic to 200% for raw aluminium sheet metal (special values on request). Usually we recommend an application-dependent test of the specific object to take ambient conditions, such as dust and humidity, into consideration for the selection of the optimum sensor.

Advantages:

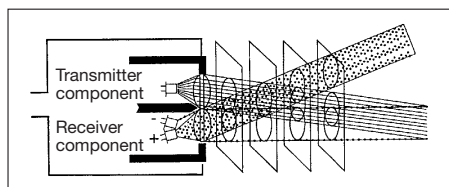
- Easiest installation
- No reflector necessary

Disadvantage:

- Different sensing distances and sensitivity settings are required for different objects (surface, colour)



### Diffuse reflective sensors with background suppression (RH)



This type of sensor is a special type of diffuse reflective sensor. It is based on two receptive elements (segmented receivers). Using the triangulation principle, reflections of objects beyond the target do not reach the active surface of the receiver modules.

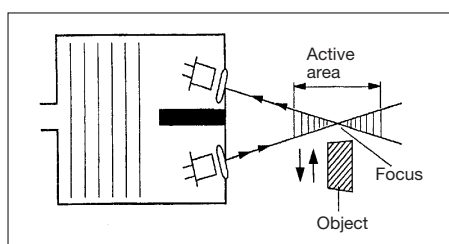
Advantage:

- No background effect on object detection (e.g. a faintly reflecting object may be detected in front of a high-gloss background)

Disadvantages:

- Short sensing distance
- Higher technical expense

### Convergent beam sensors, fixed focus (FF)



The transmission and reception elements of convergent beam sensors are arranged in a defined angle to each other. The light cone of the source and the receiver are joined in a fixed focal point. This results in the active zone for the detection of objects being defined around this focal point.

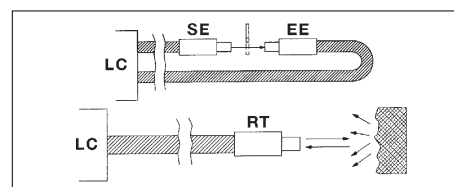
Advantages:

- Background/foreground suppression
- Defined active zone

Disadvantage:

- Short sensing distances (due to limited base width of sensor housing)

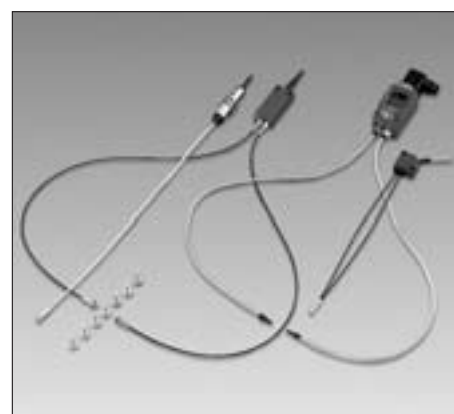
### Fibre optic controls (LC) for the connection of fibre optics



Fibre optic controls with corresponding fibre optics can be used for the through-beam and diffuse reflective principle, fibre optics for sensor applications consist of bundled glass fibres or one or more transparent plastic fibres. The light falling below the limit angle of the total reflection forms the basis of the light transportation principle. In the interior of the fibre, which has a higher refraction index than the sleeve, the light is conducted in a zigzag course from the transmitter to the switching amplifier to the fibre end. The material of the surrounding sleeve can either be plastic or metal, depending on the application type, in addition, a wide selection of fibre ends of different types are available to the operator.

Advantages:

- Use in confined areas
- Not effected by electrical and magnetic fields
- High temperature range
- Detection of very small objects possible









### M 12 x 66.5 mm

Diffuse reflective sensors

60 mm (2.36")

200 mm (7.87")

OM12 RT-DHTP-0060-CL

**655.7928.002**

271/4

●/-

-

-

10-36 V DC

●

200 mA

>100 Hz

●/-/-

-

-

0 °C/+70 °C

+32 °F/+158 °F

IP 67/NEMA 4

3 x 0.14

-

-



### M 12 x 74.5 mm

Diffuse reflective sensors

60 mm (2.36")

OM12 RT-DHTP-0200-CL

**655.7927.001**

271/4

-/●

-

-

10-36 V DC

●

200 mA

>100 Hz

-/-/-

-

-

0 °C/+70 °C

+32 °F/+158 °F

IP 67/NEMA 4

3 x 0.14

280/282; 281/3, 4

-



### M 12 x 76 mm

Diffuse reflective sensors

60 mm (2.36")

OM12 RT-DHTP-0200-CLE

**655.7928.003**

271/4

-/●

-

-

10-36 V DC

●

200 mA

>250 Hz

●/-/-

●

-

0 °C/+70 °C

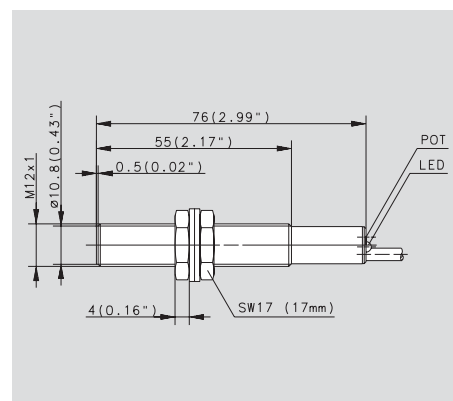
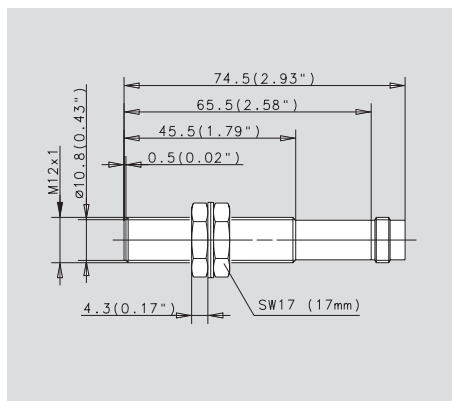
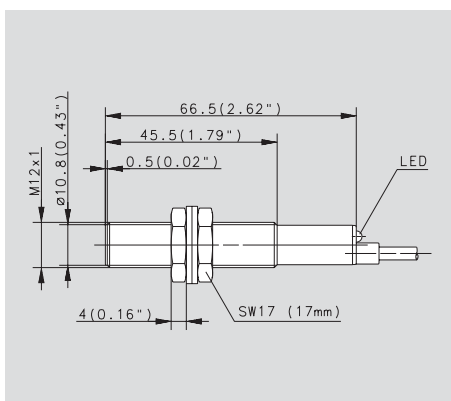
+32 °F/+158 °F

IP 65/NEMA 12

3 x 0.14

-

-



# The new M18 product line of photoelectric sensors

## Using the selection matrix

To assist the user in selecting the right photoelectric sensor for their application, Bernstein developed the selection matrix below.

The colour of the individual fields matches those in the product index to allow rapid selection of the most suitable sensor (by part number) starting with the most important criteria switching distance. By not using detailed technical descriptions the selection is considerably simplified, but our engineers are always available to answer any technical questions.

## Variants and Highlights

The new photoelectric sensors of the M18 product line are available in three different housing materials:

Plastic, nickel-plated brass and stainless steel.

The new product line covers all the most popular function types.

*Diffuse reflective sensors* are available with different sensing distances. One variant has a fixed sensing distance of 100 mm, two further diffuse reflective sensors have an adjustable sensing distance of 300 mm and 500 mm.

An integral part of this product line is also a *convergent beam sensor* with 40 mm fixed sensing distance.

The transmission and reception elements of convergent beam sensors are arranged in a defined angle to each other. This results in an active detection zone being defined around this focal point.

In addition to the *retroreflective sensor* with 3 m fixed range, the product line includes a polarized retroreflective sensor with 2.5 m adjustable range.

The *polarized retroreflective sensor* is an autocollimation type. The advantage of this technology is, that the transmission and reception channel have the same light emitting surface, and therefore no dead detection zone.

Selection matrix photoelectric sensors product line M18

Function type	Sensing range-/distance	Housing material	Output	Connection
Diffuse reflective (R T)	100 mm fixed 300 mm adjustable 500 mm adjustable	Plastic Nickel plated brass Stainless steel	NPN PNP	plug M12 cable 2 m
Convergent beam (Fix-Focus) (FF)	40 mm fixed	Plastic Nickel plated brass Stainless steel	NPN PNP	plug M12 cable 2 m
Retroreflective (R S)	3 m fixed	Plastic Nickel plated brass Stainless steel	NPN PNP	plug M12 cable 2 m
Polarized retroreflective (PS) Transparent sensor (PS)	2.5 m adjustable 0.8 m adjustable	Plastic Nickel plated brass Stainless steel	NPN PNP	plug M12 cable 2 m
Through-beam Transmitter (SE) Set (ES) Through-beam Receiver (EE)	8 m fixed	Plastic Nickel plated brass Stainless steel	NPN PNP	plug M12 cable 2 m







## Overview diffuse reflective/retroreflective sensors M 18





Type OT, Plastic housing								
	PA 12-front cap				glass lens			
	2 m cable, length = 56 mm		plug M12, length = 65 mm		2 m cable, length = 58.5 mm		plug m12, length = 67.5 mm	
Sensing range-/distance	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN
RT 100 mm fixed	655.7819.004	655.7219.004	655.7818.002	655.7218.001				
RT 300 mm adjustable	655.7819.005	655.7219.005	655.7818.003	655.7218.005				
RT 500 mm adjustable	655.7819.006	655.7219.006	655.7818.006	655.7218.006				
FF 40 mm fixed	655.8819.001	655.8219.001	655.8818.002	655.8218.001				
RS 3 m fixed	655.4819.003	655.4219.002	655.4818.001	655.4218.001				
PS 2.5 m adjustable					655.5819.003	655.5219.001	655.5818.001	655.5218.001
PS 0.8 m adjustable					655.5819.004	655.5219.002	655.5818.002	655.5218.002





Type OM, Nickel plated brass housing								
	PA 12-front cap				glass lens			
	2 m cable, length = 56 mm		plug M12, length = 65 mm		2 m cable, length = 58.5 mm		plug M12, length = 67.5 mm	
Sensing range-/distance	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN
RT 100 mm fixed	655.7817.002	655.7217.001	655.7816.001	655.7216.001				
RT 300 mm adjustable	655.7817.003	655.7217.002	655.7816.002	655.7216.003				
RT 500 mm adjustable	655.7817.004	655.7217.003	655.7816.006	655.7216.004				
FF 40 mm fixed	655.8817.001	655.8217.001	655.8816.001	655.8216.001				
RS 3 m fixed	655.4817.001	655.4217.001	655.4816.001	655.4216.001				
PS 2.5 m adjustable					655.5817.001	655.5217.001	655.5816.001	655.5216.001
PS 0.8 m adjustable					655.5817.002	655.5217.002	655.5816.002	655.5216.002

Type ON, Stainless steel housing								
	PA 12-front cap				glass lens			
	2 m cable, length = 56 mm		plug M12, length = 65 mm		2 m cable, length = 58.5 mm		plug m12, length = 67.5 mm	
Sensing range-/distance	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN
RT 100 mm fixed	655.7822.001	655.7222.001	655.7821.001	655.7221.001				
RT 300 mm adjustable	655.7822.002	655.7222.002	655.7821.002	655.7221.002				
RT 500 mm adjustable	655.7822.003	655.7222.003	655.7821.003	655.7221.003				
FF 40 mm fixed	655.8822.001	655.8222.001	655.8821.001	655.8221.001				
RS 3 m fixed	655.4822.001	655.4222.001	655.4821.001	655.4221.001				
PS 2.5 m adjustable					655.5822.001	655.5222.001	655.5821.001	655.5221.001
PS 0.8 m adjustable					655.5822.002	655.5222.002	655.5821.002	655.5221.002

## Overview through-beam sensors M 18

<b>Type OT, Plastic housing</b>								
	Receiver				Set			
Sensing-/distance	2 m cable, length = 56 mm		plug M12, length = 65 mm		2 m cable, length = 56 mm		plug M12, length = 65 mm	
	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN
8 m	<b>655.1819.001</b>	<b>655.1219.002</b>	<b>655.1818.001</b>	<b>655.1218.001</b>	<b>655.1819.101</b>	<b>655.1219.102</b>	<b>655.1818.101</b>	<b>655.1218.101</b>
	Transmitter							
	<b>655.1019.001</b>		<b>655.1018.001</b>					

<b>Type OM, Nickel plated brass housing</b>								
	Receiver				Set			
Sensing range-/distance	2 m cable, length = 56 mm		plug M12, length = 65 mm		2 m cable, length = 56 mm		plug M12, length = 65 mm	
	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN
8 m	<b>655.1817.001</b>	<b>655.1217.001</b>	<b>655.1816.001</b>	<b>655.1216.001</b>	<b>655.1817.101</b>	<b>655.1217.101</b>	<b>655.1816.101</b>	<b>655.1216.101</b>
	Transmitter							
	<b>655.1017.001</b>		<b>655.1016.001</b>					

<b>Type ON, Stainless steel housing</b>								
	Receiver				Set			
Sensing range-/distance	2 m cable, length = 56 mm		plug M12, length = 65 mm		2 m cable, length = 56 mm		plug M12, length = 65 mm	
	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN
8 m	<b>655.1822.001</b>	<b>655.1222.001</b>	<b>655.1821.001</b>	<b>655.1221.001</b>	<b>655.1822.101</b>	<b>655.1222.101</b>	<b>655.1821.101</b>	<b>655.1221.101</b>
	Transmitter							
	<b>655.1022.001</b>		<b>655.1021.001</b>					

### General data

Operating voltage	$U_s$	10–36 V DC	Ambient light resistance	10 kLux
Max. switching current	$I$	200 mA	Operating temperature	-20°C...+70°C
Switch hysteresis	$H$	≤ 15%	Ingress protection	IP67
Repeatability	$R$	≤ 10%	Protection class	II, protective insulation
Switching frequency	$f$	500 Hz	Cable PVC	0.34 mm <sup>2</sup>
Output	Voltage reversal protection, short-circuit protection light-/dark activated programmable		Housing material (Type)	PBT(OT18), Nickel plated brass (OM18), 1.4305 (ON18)

## Photoelectric sensors

### Type OZ20 – stainless steel

The photoelectric range has been further extended by the housing OZ20.


A smooth stainless steel barrel with a 20 mm diameter that has been specially designed for use in hygienic areas. The food industry requires that installations and components are easy to clean. The smooth barrel form offers bacteria no hiding places.

Many different functional types are available.


The sensors are connected via 2 m fixed cable or an M 12 plug.

### Overview design OZ20

#### Design OZ, stainless steel housing Ø 20 mm, 2 m cable

	Function type, detection range	Part number	Designation
	Sensor, 100 mm fixed	655.7800.001	OZ20RT-DPTP-0100-CL
	Sensor, 300 mm adjustable	655.7800.003	OZ20RT-DPTP-0300-CLE
	Sensor, 500 mm adjustable	655.7800.005	OZ20RT-DPTP-0500-CLE
	Fix-focus, 40 mm fixed	655.8800.001	OZ20FF-DPTP-0040-CL
	Retroreflective beam, 3 m fixed	655.4800.001	OZ20RS-DPTP-03.0-CL
	Pole filter beam, 2.5 m adjustable	655.5800.001	OZ20PS-DPTP-02.5-CLE
	Transparent sensor, 0.8 m adjustable	655.5800.003	OZ20PS-DPTP-0800-CLE
	Transmitter, 8 m	655.1000.002	OZ20SE-DOOS-08.0-CC
	Receiver, 8 m	655.1800.001	OZ20EE-DPTP-08.0-CL

#### Design OZ, stainless steel housing Ø 20 mm, plug M12

	Function type, detection range	Part number	Designation
	Sensor, 100 mm fixed	655.7800.002	OZ20RT-DPTP-0100-SL
	Sensor, 300 mm adjustable	655.7800.004	OZ20RT-DPTP-0300-SLE
	Sensor, 500 mm adjustable	655.7800.006	OZ20RT-DPTP-0500-SLE
	Fix-focus, 40 mm fixed	655.8800.002	OZ20FF-DPTP-0040-SL
	Retroreflective beam, 3 m fixed	655.4800.002	OZ20RS-DPTP-03.0-SL
	Pole filter beam, 2.5 m adjustable	655.5800.002	OZ20PS-DPTP-02.5-SLE
	Transparent sensor, 0.8 m adjustable	655.5800.004	OZ20PS-DPTP-0800-SLE
	Transmitter, 8 m	655.1000.001	OZ20SE-DOOS-08.0-SC
	Receiver, 8 m	655.1800.002	OZ20EE-DPTP-08.0-SL

## Photoelectric sensors

### Analog output sensors

Bernstein has extended its M 18 photoelectric range through a diffuse-reflective sensor with an analog output. Suitable for sensing distances between 30 and 200 mm, the required sensing distance can easily be set within this range via a programming wire.

The sensor sets a new amplification, by means of a brief connection to the positive operating voltage (0.1 - 10 s). Parameters such as the steepness of the characteristic curve and direction can be factory programmed.

The following voltage and current signals are available on the output side: 0-10 V, 0-20 mA and 4-20 mA.

The new diffuse-reflective sensor with analog output is available in the following housing variants:

Threaded design in plastic, brass, stainless steel and in smooth stainless steel barrels with a 20 mm diameter.

An M 12 x 1 plug was chosen for the connection.

## Overview of analog output sensors

### Design OT, plastic housing



Output	Part number	Designation
0-20 mA	<b>655.7018.001</b>	OT18RT-DPAP-0200-SE
4-20 mA	<b>655.7018.002</b>	OT18RT-DPAP-0200-SE
0-10 V	<b>655.7018.003</b>	OT18RT-DPAP-0200-SE

### Design OM, metal housing



Output	Part number	Designation
0-20 mA	<b>655.7016.001</b>	OM18RT-DPAP-0200-SE
4-20 mA	<b>655.7016.002</b>	OM18RT-DPAP-0200-SE
0-10 V	<b>655.7016.003</b>	OM18RT-DPAP-0200-SE

### Design ON, stainless steel housing



Output	Part number	Designation
0-20 mA	<b>655.7021.001</b>	ON18RT-DPAP-0200-SE
4-20 mA	<b>655.7021.002</b>	ON18RT-DPAP-0200-SE
0-10 V	<b>655.7021.003</b>	ON18RT-DPAP-0200-SE

### Design OZ, stainless steel housing Ø 20 mm



Output	Part number	Designation
0-20 mA	<b>655.7000.002</b>	OZ20RT-DPAP-0200-SE
4-20 mA	<b>655.7000.003</b>	OZ20RT-DPAP-0200-SE
0-10 V	<b>655.7000.004</b>	OZ20RT-DPAP-0200-SE





# Photoelectric sensors OR05

- OR05 ES Through-beam sensors
- OR05 PS Polarised retroreflective sensors
- OR05 RT Diffuse reflective sensors
- OR05 LC Fibre optic controls



### 30 x 30 x 15 mm

**Through-beam sensors**  
12 m (39.4 ft)

### 30 x 30 x 15 mm

**Polarised retroreflective sensors**  
4 m (13.1 ft)

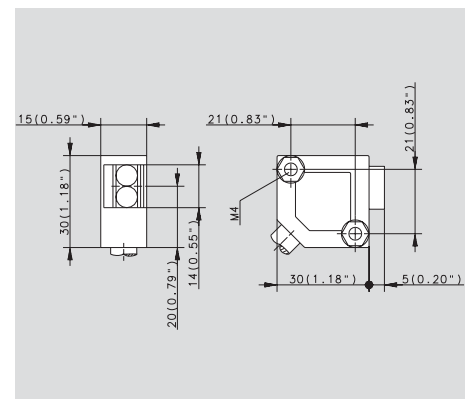
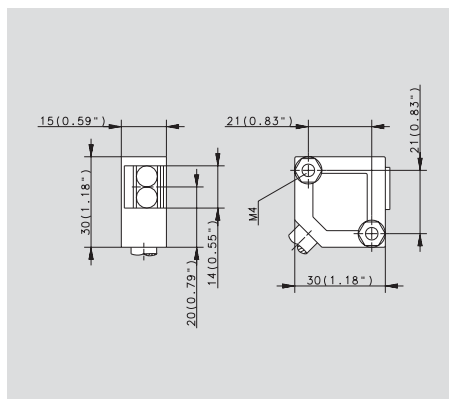
<b>Sensing type</b>	
<b>Sensing distance / range</b>	
Model description	
PNP	
LA	<b>Part number</b>
	Wiring diagram (page/Pos.)
Stock status: Ex stock/Built to order	
Model description	
PNP	
antivalent	<b>Part number</b>
	Wiring diagram (page/Pos.)
Stock status: Ex stock/Built to order	
Model description	
Transmitter	
(Connector)	<b>Part number</b>
	Wiring diagram (page/Pos.)
Stock status: Ex stock/Built to order	
Model description	
Transmitter	
(Cable)	<b>Part number</b>
	Wiring diagram (page/Pos.)
Stock status: Ex stock/Built to order	
Voltage range	
Short-circuit protection	
Output current	max.
Switching frequency	max.
LED for output function/supply voltage/diagnostic	
Adjustable sensitivity	
Timer function	
Diagnostic function	
Temperature range	min./max.
Protection type	
Screw-clamp termination	(page/Pos.)
Cable length (2 m)	Cross section (mm <sup>2</sup> )
Plug	(page/Pos.)
Accessories	(page/Pos.)

-	-	OR05 PS-DHTP-04.0-3LFE <b>655.5975.002</b> 271/6 ●/-
OR05 EE-DATP-12.0-3DE <b>655.1875.003</b> [ 2 ] 271/5 ●/-	OR05 EE-DATP-12.0-SDE <b>655.1875.004</b> [ 1 ] 271/5 ●/-	OR05 PS-DATP-04.0-3DE <b>655.5875.001</b> 271/5 ●/-
-	OR05 SE-DOOS-12.0-SC <b>655.1075.004</b> 271/3 ●/-	-
OR05 SE-DOOS-12.0-3C <b>655.1075.003</b> 271/3 ●/-	-	-
SE: 10-36 V DC	EE: 10-36 V DC	10-36 V DC
-	●	●
-	200 mA	200 mA
-	>1000 Hz	>1000 Hz
-/-/-	●/-/●	●/-/●
-	●	●
-	-	-
●	-	-
-25 °C/+70 °C -13 °F/+158 °F	-25 °C/+70 °C -13 °F/+158 °F	-25 °C/+70 °C -13 °F/+158 °F
IP 67/NEMA 4	IP 67/NEMA 4	IP 67/NEMA 4
-	-	-
3 m/4 x 0.14	-	3 m/4 x 0.14
-	277	-
273/1	273/1	273/1; 274

## Dimensions

All dimensions in mm (inch)

- [ 1 ] Connector
- [ 2 ] Cable



# Photoelectric sensors OR05

- OR05 ES Through-beam sensors
- OR05 PS Polarised retroreflective sensors
- OR05 RT Diffuse reflective sensors
- OR05 LC Fibre optic controls



**30 x 30 x 15 mm**

**30 x 30 x 15 mm**

<b>Sensing type</b>	
<b>Sensing distance / range</b>	
	Model description
PNP	
LA	<b>Part number</b>
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
	Model description
PNP	
avalantent	<b>Part number</b>
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	

<b>Polarised retroreflective sensors</b>	
<b>4 m (13.1 ft)</b>	
	OR05 PS-DHTP-04.0-SLFE
	<b>655.5975.001</b>
	271/6
	●/–
	–

<b>Diffuse reflective sensors</b>	
<b>1.2 m (3.94 ft)</b>	
	OR05 RT-DHTP-01.2-3LFE
	<b>655.7975.004</b>
	271/6
	●/–
	OR05 RT-DATP-01.2-3DE
	<b>655.7875.003</b>
	271/5
	●/–

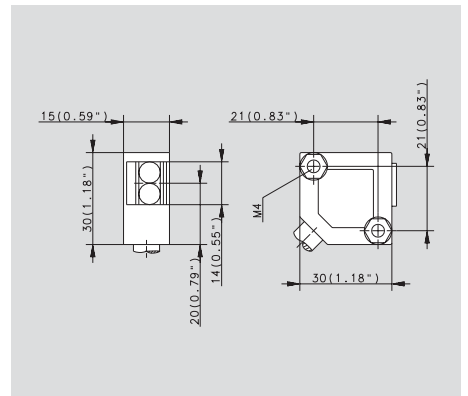
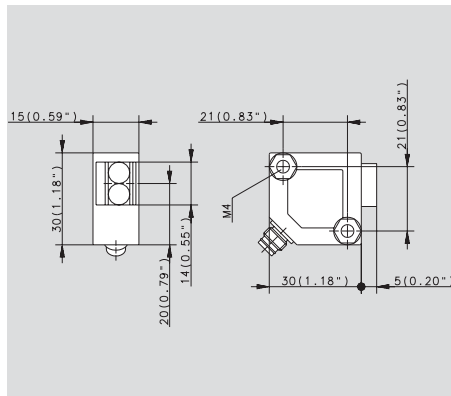
<b>Voltage range</b>	
<b>Short-circuit protection</b>	
Output current	max.
Switching frequency	max.
LED for output function/supply voltage/diagnostic	
Adjustable sensitivity	
Timer function	
Diagnostic function	
Temperature range	min./max.
<b>Protection type</b>	
Screw-clamp termination	(page/Pos.)
Cable length (2 m)	Cross section (mm <sup>2</sup> )
Plug	(page/Pos.)
Accessories (page/Pos.)	

10–36 V DC	
●	
200 mA	
>1000 Hz	
●/–/●	
●	
–	
–	
–25 °C/+70 °C	
–13 °F/+158 °F	
IP 67/NEMA 4	
–	
–	
3 m/4 x 0.14	
277	
273/1, 274	

10–36 V DC	
●	
200 mA	
>1000 Hz	
●/–/●	
●	
–	
–	
–25 °C/+70 °C	
–13 °F/+158 °F	
IP 67/NEMA 4	
–	
–	
3 m/4 x 0.14	
–	
273/1	

## Dimensions

All dimensions in mm (inch)





**30 x 30 x 15 mm**

**Diffuse reflective sensors**  
**1.2 m (3.94 ft)**

OR05 RT-DHTP-  
01.2-SLFE  
**655.7975.003**  
271/6

●/-

-



**30 x 30 x 15 mm**

**Fibre optic controls**  
**depending on fibre type**

OR05 LC-DHTP-  
0000-3LFE  
**655.2975.004**  
271/6

●/-

OR05 LC-DATP-  
0000-3DE  
**655.2875.002**  
271/5  
●/-



**30 x 30 x 15 mm**

**Fibre optic controls**  
**depending on fibre type**

OR05 LC-DHTP-  
0000-SLFE  
**655.2975.003**  
271/6

●/-

-

10-36 V DC

●

200 mA  
>1000 Hz

●/-●

●

-

-

-25 °C/+70 °C  
-13 °F/+158 °F

IP 67/NEMA 4

-

-

277

273/1

10-36 V DC

●

200 mA  
>250 Hz

●/-●

●

-

●

-25 °C/+70 °C  
-13 °F/+158 °F

IP 67/NEMA 4

-

3 m/4 x 0.14

-

275

10-36 V DC

●

200 mA  
>250 Hz

●/-●

●

-

●

-25 °C/+70 °C  
-13 °F/+158 °F

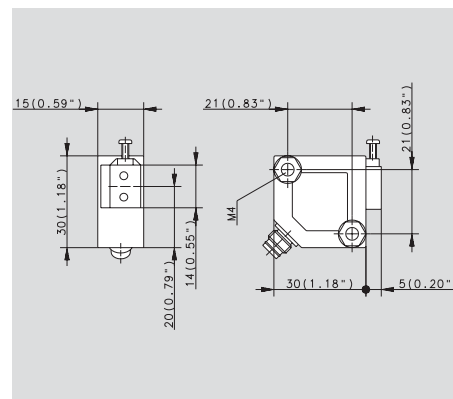
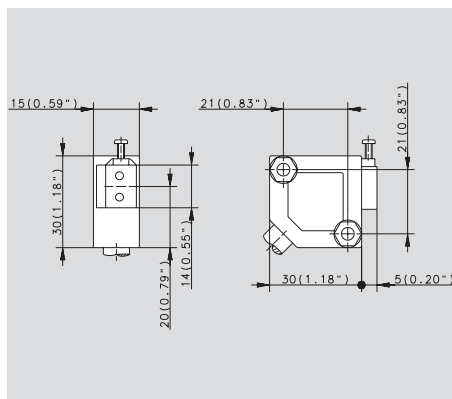
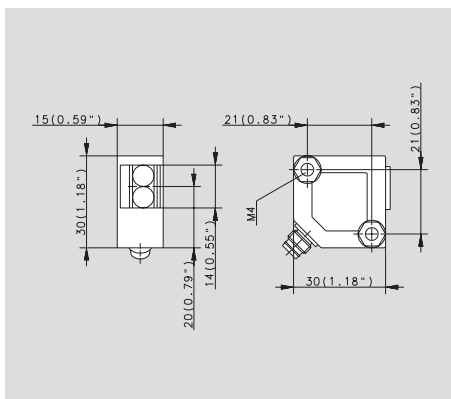
IP 67/NEMA 4

-

-

277

275



# Photoelectric sensors OR10

## OR10 ES Through-beam sensors



### 9 x 10 x 82 mm

#### Through-beam sensors<sup>1)</sup>

6 m (19.7 ft)

#### Light output: lens

-	OR10 EE-DDTP-06.0-S	-	OR10 EE-DDTP-06.0-6
	<b>655.1757.001</b>		<b>655.1757.002</b>
	271/4		271/4
	-/●		-/●

OR10 SE-DOOS

06.0-SC

**655.1057.001**

271/3

●/-

### 9 x 10 x 82 mm

#### Through-beam sensors<sup>1)</sup>

6 m (19.7 ft)

#### Light output: lens

-	OR10 SE-DOOS-06.0-6C	-	OR10 SE-DOOS-06.0-6
	<b>655.1057.002</b>		<b>655.1757.002</b>
	271/3		271/3
	-/●		-/●

OR10 SE-DOOS-

06.0-6C

**655.1057.002**

271/3

-/●

<b>Sensing type</b>	
<b>Sensing distance / range</b>	
	Model description
PNP	
DA	<b>Part number</b>
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
	Model description
Transmitter	
	<b>Part number</b>
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	

SE: 10–36 V DC	EE: 10–36 V DC	SE: 10–36 V DC	EE: 10–36 V DC
-	●	-	●
-	200 mA	-	200 mA
-	>100 Hz	-	>100 Hz
-/-/-	-/-/-	-/-/-	-/-/-
-	-	-	-
-	-	-	-
●	-	●	-
-5 °C/+70 °C	-5 °C/+70 °C	-5 °C/+70 °C	-5 °C/+70 °C
+23 °F/+158 °F	+23 °F/+158 °F	+23 °F/+158 °F	+23 °F/+158 °F
IP 67/NEMA 4	IP 67/NEMA 4	IP 67/NEMA 4	IP 67/NEMA 4
-	-	-	-
-	-	3 x 0.14	3 x 0.14
276/1, 2	276/1, 2	-	-
-	-	-	-

<b>Voltage range</b>	
<b>Short-circuit protection</b>	
Output current	max.
Switching frequency	max.
LED for output function/supply voltage/diagnostic	
Adjustable sensitivity	
Timer function	
Diagnostic function	
Temperature range	min./max.
<b>Protection type</b>	
Screw-clamp termination	(page/Pos.)
Cable length (2 m)	Cross section (mm <sup>2</sup> )
Plug	(page/Pos.)
Accessories	(page/Pos.)

## Dimensions

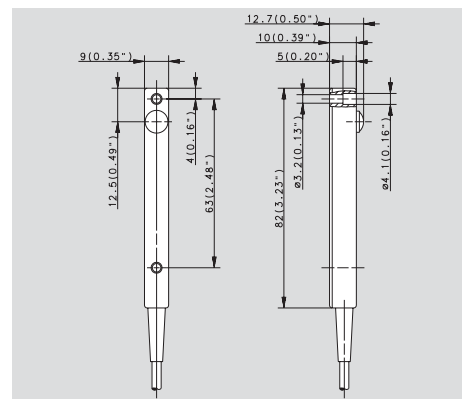
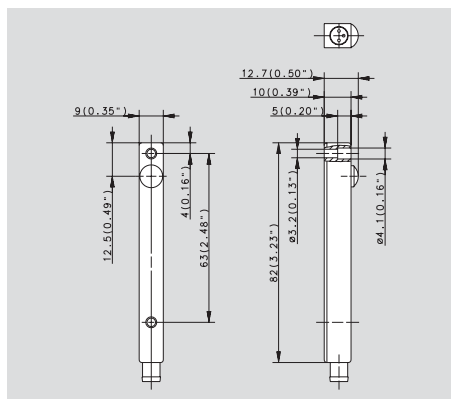
<sup>1)</sup> On request transmitter and receiver in a single packing unit (ES)

Installation accessories on request:

- Adhesive mounting
- Screw mounting
- Single-hole mounting

NPN or LA on request

All dimensions in mm (inch)





**9 x 10 x 82 mm**

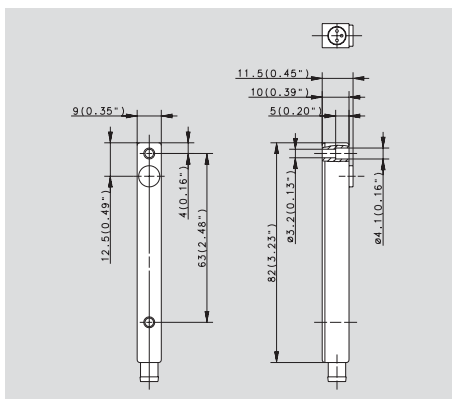
Through-beam sensors<sup>1)</sup>

6 m (19.7 ft)

Light output: plane

-	OR10 EE-DDTP- 06.0-S <b>655.1757.003</b> 271/4 ●/-
OR10 SE-DOOS- 06.0-SC <b>655.1057.003</b> 271/3 ●/-	-

SE: 10-36 V DC	EE: 10-36 V DC
-	●
-	200 mA
-	>100 Hz
-/-/-	-/-/-
-	-
-	-
●	-
-5 °C/+70 °C	-5 °C/+70 °C
+23 °F/+158 °F	+23 °F/+158 °F
IP 67/NEMA 4	IP 67/NEMA 4
-	-
-	-
276/1, 2	276/1, 2
-	-



# Photoelectric sensors OR12

- OR12 ES Through-beam sensors
- OR12 ES Through-beam sensors with reduced interior beam
- OR12 RS Retroreflective sensors
- OR12 RT Diffuse reflective sensors



12 x 12 x 55 mm

12 x 12 x 55 mm

<b>Sensing type</b>	
<b>Sensing distance / range</b>	
Model description	
PNP	
LA	<b>Part number</b>
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
Model description	
PNP	
DA	<b>Part number</b>
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
Model description	
[1] NPN	
LA	<b>Part number</b>
[2] Transmitter	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
Model description	
NPN	
DA	<b>Part number</b>
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
Voltage range	
Short-circuit protection	
Output current	max.
Switching frequency	max.
LED for output function/supply voltage/diagnostic	
Adjustable sensitivity	
Timer function	
Diagnostic function	
Temperature range	min./max.
Protection type	
Screw-clamp termination	(page/Pos.)
Cable length (2 m)	Cross section (mm <sup>2</sup> )
Plug	(page/Pos.)
Accessories	(page/Pos.)

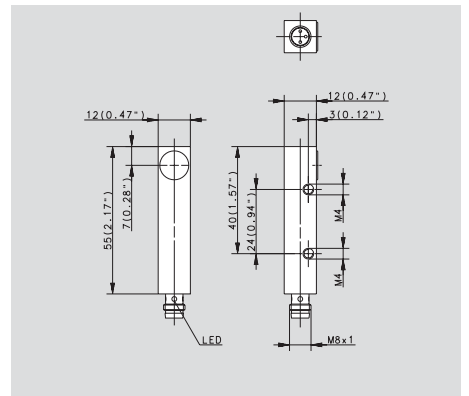
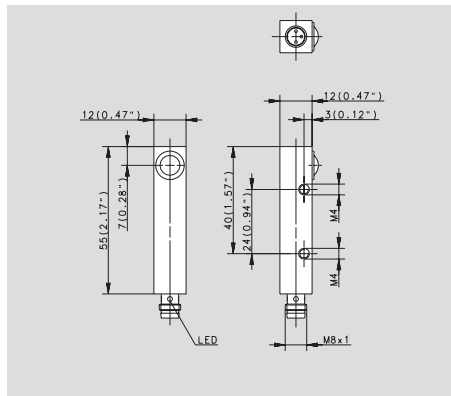
<b>Through-beam sensors</b>		<b>Through-beam sensors</b>	
<b>6 m (19.7 ft)<sup>2</sup></b>		<b>1 m (3.28 ft)</b>	
Model description		Model description	
–	OR12-EE-DHTP-06.0-SL	–	OR12 EE-DHTP-01.0-SL
	<b>655.1955.001</b>		<b>655.1955.002</b>
	271/4		271/4
	●/–		–/●
Model description		Model description	
OR12 EE-DDTP-06.0-SL	OR12-EE-DDTP-06.0-SLE	OR12 EE-DDTP-01.0-SL	OR12 EE-DDTP-01.0-SLE
<b>655.1755.001</b>	<b>655.1755.003</b>	<b>655.1755.002</b>	<b>655.1755.004<sup>3)</sup></b>
271/4	271/4	271/4	271/4
●/–	–/●	●/–	–/●
Model description		Model description	
OR12 SE-DOOS-06.0-SVC	[2] –	OR12 SE-DOOS-01.0-SVC	[2] –
<b>655.1055.002</b>		<b>655.1055.003</b>	
271/3		271/3	
●/–		●/–	
Model description		Model description	
–	OR12-EE-DDTN-06.0-SL	–	OR12 EE-DDTN-01.0-SL
	<b>655.1155.001</b>		<b>655.1155.002</b>
	271/7		271/7
	–/●		–/●
SE: 10–36 V DC	EE: 10–36 V DC	SE: 10–36 V DC	EE: 10–36 V DC
–	●	–	●
–	200 mA	–	200 mA
–	>100 Hz	–	>100 Hz
–/●/–	●/–/–	–/●/–	●/–/–
–	–	–	–
–	–	–	–
●	–	●	–
–5 °C/+70 °C	–5 °C/+70 °C	–5 °C/+70 °C	–5 °C/+70 °C
+23 °F/+158 °F	+23 °F/+158 °F	+23 °F/+158 °F	+23 °F/+158 °F
IP 65/NEMA 12	IP 65/NEMA 12	IP 65/NEMA 12	IP 65/NEMA 12
–	–	–	–
–	–	–	–
276/1, 2; 278	276/1, 2; 278	276/1, 2; 278	276/1, 2; 278
–	273/5	273/5	273/5

## Dimensions

<sup>2)</sup> Range 10 m and 60 m LASER on request

<sup>3)</sup> Adjustable sensitivity

All dimensions in mm (inch)





**12 x 12 x 65 mm**

**Retroreflective sensors**

**4 m (13.1 ft)**

OR12 RS-DHTP-  
04.0-SL

**655.4955.001**

271/4

-/●

OR12 RS-DDTP-  
04.0-SL

**655.4755.001**

271/4

●/-

OR12 RS-DHTN- [1]  
04.0-SL

**655.4355.001**

271/7

-/●

OR12 RS-DDTN-  
04.0-SL

**655.4155.001**

271/7

-/●

10-36 V DC

●

200 mA

>100 Hz

●/-/-

-

-

-

-5 °C/+70 °C

+23 °F/+158 °F

IP 65/NEMA 12

-

-

276/1, 2; 278

273/5, 274



**12 x 12 x 60 mm**

**Diffuse reflective sensors**

**200 mm (7.87")**

OR12 RT-DHTP-  
0200-SLE

**655.7955.001**

271/4

●/-

OR12 RT-DDTP-  
0200-SLE

**655.7755.001**

271/4

-/●

OR12 RT-DHTN- [1]  
0200-SLE

**655.7355.001**

271/7

-/●

OR12 RT-DDTN-  
0200-SLE

**655.7155.001**

271/7

-/●

10-36 V DC

●

200 mA

>100 Hz

●/-/-

●

-

-

-5 °C/+70 °C

+23 °F/+158 °F

IP 65/NEMA 12

-

-

276/1, 2; 278

273/5



**12 x 12 x 65 mm**

**Diffuse reflective sensors**

**1.2 m (3.94 ft)**

OR12 RT-DHTP-  
01.2-SLE

**655.7955.002**

271/4

●/-

OR12 RT-DDTP-  
01.2-SLE

**655.7755.002**

271/4

-/●

OR12 RT-DHTN- [1]  
01.2-SLE

**655.7355.002**

271/7

-/●

OR12 RT-DDTN-  
01.2-SLE

**655.7155.002**

271/7

-/●

10-36 V DC

●

200 mA

>100 Hz

●/-/-

●

-

-

-5 °C/+70 °C

+23 °F/+158 °F

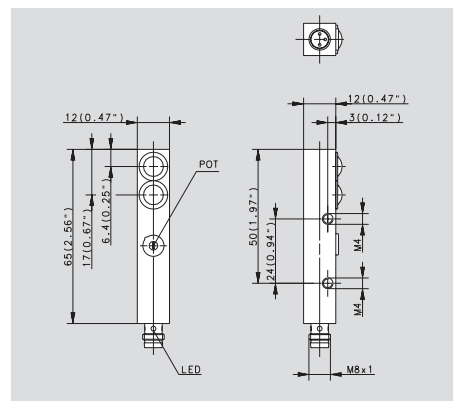
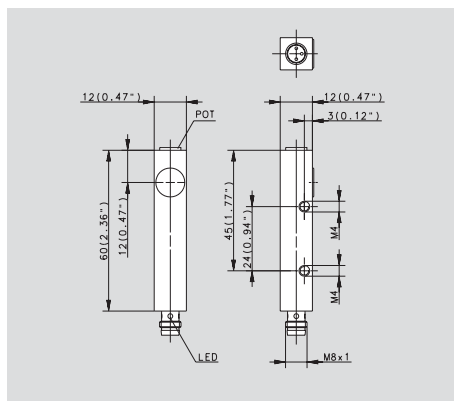
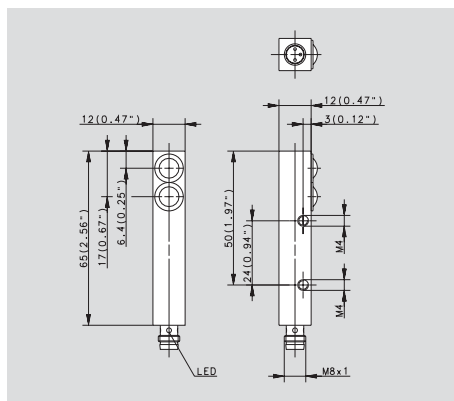
IP 65/NEMA 12

-

-

276/1, 2; 278

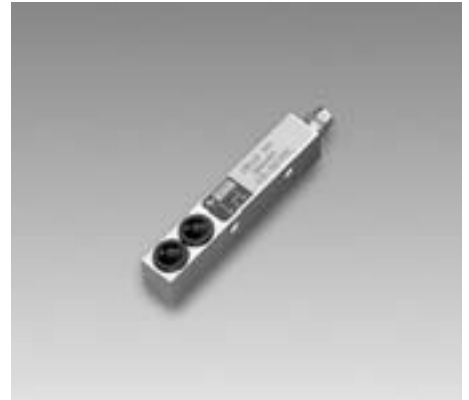
273/5





# Photoelectric sensors OR12

OR12 ES Laser-through-beam sensors  
OR12 FF Convergent beam sensor  
(Fixed-Focus)



**12 x 12 x 55 mm**

**12 x 12 x 65 mm**

<b>Sensing type</b>	
Sensing distance / range	
Model description	
PNP	
DA	<b>Part number</b>
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
Model description	
PNP	
LA	<b>Part number</b>
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
Model description	
Transmitter	
	<b>Part number</b>
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	

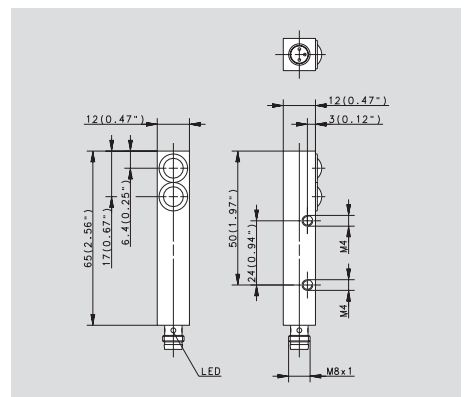
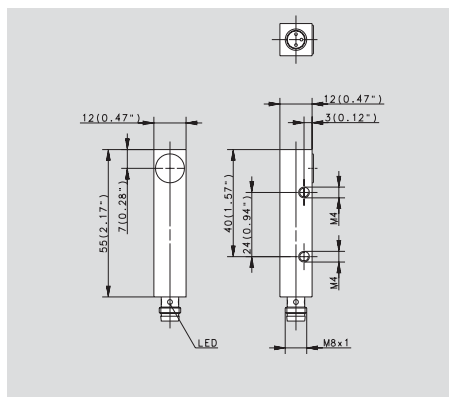
<b>Laser-through-beam sensors</b>		<b>Convergent beam sensor (Fixed-Focus)</b>
60 m (197 ft)		50 mm
Model description		
-	OR12-EE-DDTP-60.0-SL	-
	<b>655.1755.005</b>	
	-	
	-/●	
Model description		OR12 FF-DHTP-0050-SL
		<b>655.8955.001</b>
		271/4
		●/-
Model description		
OR12 SE-DOOS-60.0-SVC		
<b>655.1055.004</b>		
-		
	-/●	

Voltage range		
Short-circuit protection		
Output current	max.	
Switching frequency	max.	
LED for output function/supply voltage/diagnostic		
Adjustable sensitivity		
Timer function		
Diagnostic function		
Temperature range	min./max.	
Protection type		
Screw-clamp termination	(page/Pos.)	
Cable length (2 m)	Cross section	(mm <sup>2</sup> )
Plug	(page/Pos.)	
Accessories	(page/Pos.)	

SE: 10–36 V DC	EE: 10–36 V DC	10–36 V DC
-	●	●
-	55 mA	200 mA
-	>1000 Hz	>100 Hz
-/●/-	●/-/-	●/-/-
-	-	-
-	-	-
●	-	-
-10 °C/+50 °C	-10 °C/+50 °C	-5 °C/+70 °C
+14 °F/+122 °F	+14 °F/+122 °F	-
IP 65/NEMA 12	IP 65/NEMA 12	IP 65/NEMA 12
-	-	-
-	-	-
276/1, 2; 278	276/1, 2; 278	276/1, 2; 278
273/5	273/5	273/5

## Dimensions

All dimensions in mm (inch)





# Photoelectric sensors OR17

## Multinorm

OR17 ES Through-beam sensors  
OR17 RT Diffuse reflective sensors  
OR17 PS Polarised retroreflective sensors



120 x 41.5 x 41.5 mm

120 x 41.5 x 41.5 mm

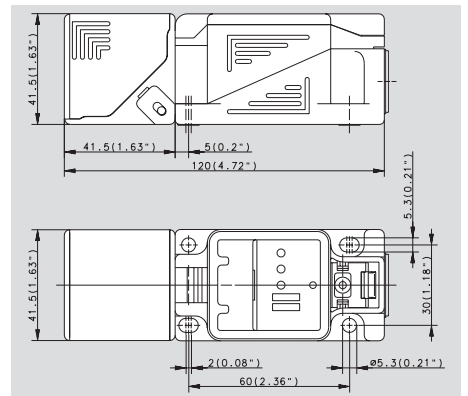
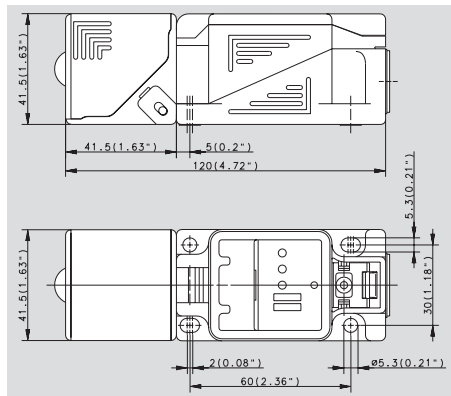
Sensing type	
Sensing distance / range	
Model description	
PNP/NPN <sup>1)</sup>	
Changeover switch	<b>Part number</b>
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
Model description	
PNP selectable	<b>Part number</b>
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
Model description	
NPN selectable	<b>Part number</b>
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
Model description	
Transmitter	<b>Part number</b>
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
Voltage range	
Short-circuit protection	
Output current	max.
Switching frequency	max.
LED for output function/supply voltage/diagnostic	
Adjustable sensitivity	
Timer function	
Diagnostic function	
Temperature range	min./max.
Protection type	
Screw-clamp termination	(page/Pos.)
Cable length (2 m)	Cross section (mm <sup>2</sup> )
Plug	(page/Pos.)
Accessories	(page/Pos.)

Through-beam sensors		Diffuse reflective sensors	
25 m (82.0 ft)		500 mm (19.7")	
-	OR17 EE-DPTU-25.0-AHE	-	OR17 RT-DPTU-0500-AHE <sup>4)</sup>
-	<b>655.1860.001</b>	-	<b>655.7060.001</b>
-	272/9	-	272/9
-	-/●	-	●/-
-	-	-	OR17 RT-DPTP-0500-AGEC
-	-	-	<b>655.7860.001</b>
-	-	-	272/4
-	-	-	●/-
-	-	-	-
OR17 SE-DOOS-25.0-AVC	-	-	-
<b>655.1060.001</b>	-	-	-
272/4	-	-	-
-/●	-	-	-
SE: 10-60 V DC	EE: 10-60 V DC	10-60 V DC	10-60 V DC
-	●	●	●
-	400 mA	400 mA	400 mA/50 mA <sup>2)</sup>
-	>50 Hz	>50 Hz	>50 Hz
-/●/-	●/●/-	●/●/-	●/●/● <sup>3)</sup>
-	●	●	●
-	-	-	-
●	-	-	●
0 °C/+70 °C	0 °C/+70 °C	-5 °C/+70 °C	-5 °C/+70 °C
+32 °F/+158 °F	+32 °F/+158 °F	+23 °F/+158 °F	+23 °F/+158 °F
IP 65/NEMA 12	IP 65/NEMA 12	IP 65/NEMA 12	IP 65/NEMA 12
272/4	272/9	272/9	272/4
-	-	-	-
-	-	-	-
-	-	-	-

## Dimensions

- <sup>1)</sup> Two integrated DIP switches allow to select between light or dark activation (LA/DA) and between NPN or PNP
- <sup>2)</sup> 50 mA output current for activated diagnostic signal
- <sup>3)</sup> Red LED flashes in unsafe operation mode (e.g. maladjustment); diagnosis output (see 2) is static

All dimensions in mm (inch)





**120 x 41.5 x 41.5 mm**

**Diffuse reflective sensors**

**2 m (6.56 ft)**

OR17 RT-DPTU-  
02.0-AHE  
**655.7060.002**  
272/9

●/-

OR17 RT-DPTP-  
02.0-AGEC  
**655.7860.002**  
272/4  
●/-



**120 x 41.5 x 41.5 mm**

**Polarised retroreflective sensors**

**8 m (26.2 ft)**

OR17 PS-DPTU-  
08.0-AHE  
**655.5060.001**  
272/9

●/-

OR17 PS-DPTP-  
08.0-AGEC  
**655.5860.001**  
272/4  
-/●

10-60 V DC

●  
400 mA

>50 Hz

●/●/-

●

-

-

-5 °C/+70 °C

+23 °F/+158 °F

IP 65/NEMA 12

272/9

-

-

-

10-60 V DC

●  
400 mA/50 mA<sup>2</sup>)

>50 Hz

●/●/●<sup>3</sup>)

●

-

●

-5 °C/+70 °C

+23 °F/+158 °F

IP 65/NEMA 12

272/4

-

-

-

10-60 V DC

●  
400 mA

>50 Hz

●/●/-

●

-

-

-5 °C/+70 °C

+23 °F/+158 °F

IP 65/NEMA 12

272/9

-

-

274

10-60 V DC

●  
400 mA/50 mA<sup>2</sup>)

>50 Hz

●/●/●<sup>3</sup>)

●

-

●

-5 °C/+70 °C

+23 °F/+158 °F

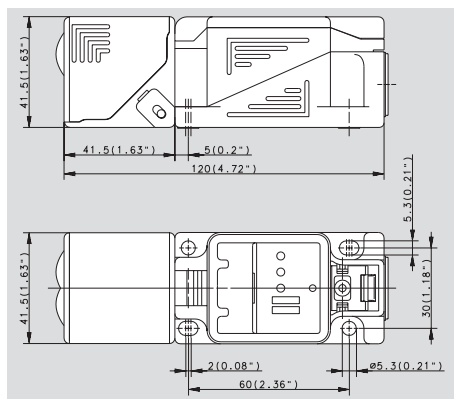
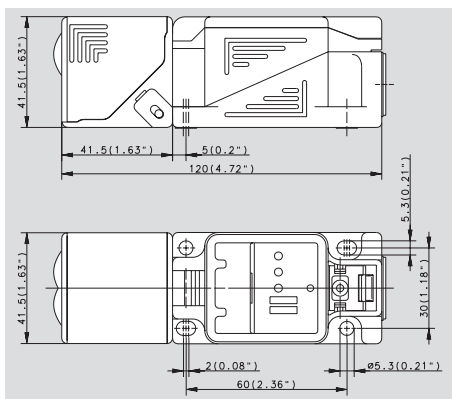
IP 65/NEMA 12

272/4

-

-

274



# Photoelectric sensors OR20

## DC types

- OR20 ES Through-beam sensors
- OR20 RS Retroreflective sensors
- OR20 PS Polarised retroreflective sensors
- OR20 RT Diffuse reflective sensors
- OR20 RH Diffuse reflective sensors with background suppression



**88 x 63 x 24 mm**

**Through-beam sensors**  
20 m (65.6 ft)

**88 x 63 x 24 mm**

**Retroreflective sensors**  
8 m (26.2 ft)

Sensing type	
Sensing distance / range	
Model description	
PNP selectable	<b>Part number</b>
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
Model description	
NPN selectable	<b>Part number</b>
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
Model description	
Transmitter	<b>Part number</b>
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	

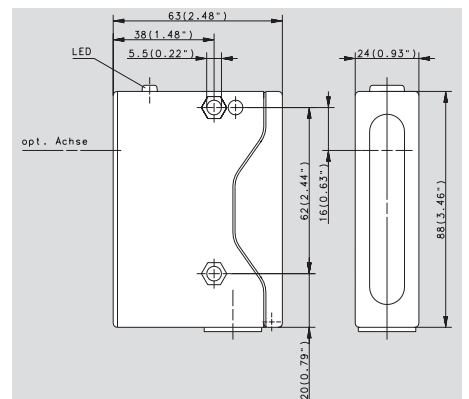
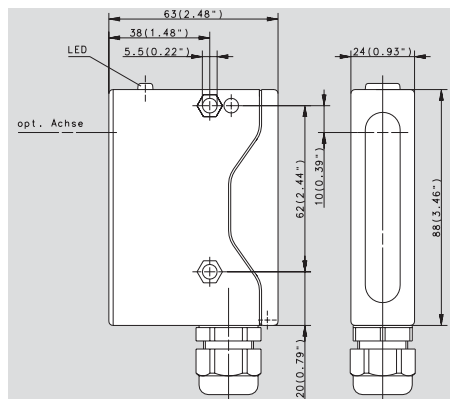
–	OR20 EE-DPTP-20.0-ALET	OR20 RS-DPTP-08.0-ALET
	<b>655.1886.003</b>	<b>655.4886.001</b>
	272/5	272/5
	●/–	●/–
–	–	–
OR20 SE-DOOS-20.0-AV	–	–
	<b>655.1086.003</b>	
	272/1	
	●/–	

Stock status: Ex stock/Built to order		
Voltage range		
Short-circuit protection		
Output current	max.	
Switching frequency	max.	
LED for output function/supply voltage/diagnostic		
Adjustable sensitivity		
Timer function		
Diagnostic function		
Temperature range	min./max.	
Protection type		
Screw-clamp termination	(page/Pos.)	
Cable length (2 m)	Cross section (mm <sup>2</sup> )	
Plug (page/Pos.)		
Accessories (page/Pos.)		

SE: 10–36 V DC	EE: 10–36 V DC	10–36 V DC
–	●	●
–	200 mA	200 mA
–	>100 Hz	>100 Hz
–/●/–	●/–/–	●/–/–
–	●	●
–	●	●
–	–	–
–20 °C/+70 °C	–20 °C/+70 °C	–20 °C/+70 °C
–4 °F/+158 °F	–4 °F/+158 °F	–4 °F/+158 °F
IP 65/NEMA 12	IP 65/NEMA 12	IP 65/NEMA 12
272/1	272/5	272/5
–	–	–
–	–	–
273/2, 3	273/2, 3	273/2, 3; 274

## Dimensions

All dimensions in mm (inch)





**88 x 63 x 24 mm**

**Polarised retroreflective sensors**  
6 m (19.7 ft)

OR20 PS-DPTP-  
06.0-ALET  
**655.5886.001**  
272/5  
●/-

-



**88 x 63 x 24 mm**

**Diffuse reflective sensors**  
600 mm (1.97 ft)    1.5 m (4.92 ft)

OR20 RT-DPTP-  
0600-ALET  
**655.7886.001**  
272/5  
-/●

-



**88 x 63 x 24 mm**

**Background suppression**  
400 mm (1.31 ft)

OR20 RH-DPTP-  
0400-ALET  
**655.8886.002**  
272/5  
-/●

-

10–36 V DC

●  
200 mA  
>100 Hz

●/-/-  
●  
●

-20 °C/+70 °C  
-4 °F/+158 °F

IP 65/NEMA 12  
272/5

-  
273/2, 3; 274

10–36 V DC

●  
200 mA  
>100 Hz

●/-/-  
●  
●

-20 °C/+70 °C  
-4 °F/+158 °F

IP 65/NEMA 12  
272/5

-  
273/2, 3

10–36 V DC

●  
200 mA  
>100 Hz

●/-/-  
●  
●

-20 °C/+70 °C  
-4 °F/+158 °F

IP 65/NEMA 12  
272/5

-  
273/2, 3

10–36 V DC

●  
200 mA  
>100 Hz

●/-/-  
●  
●

-20 °C/+70 °C  
-4 °F/+158 °F

IP 65/NEMA 12  
272/5

-  
273/2, 3

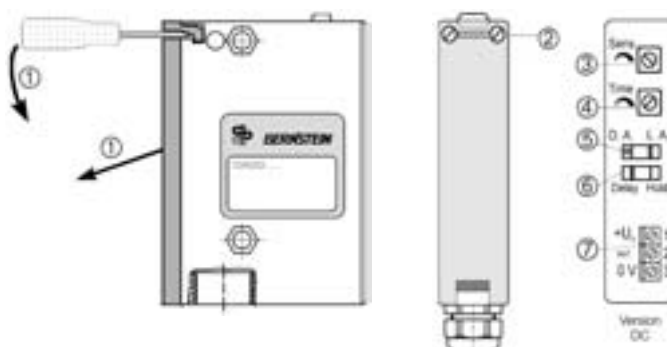
### Notes on operation of OR20 series (DC types)

#### Housing types:

- ① Snap-cover housing (to be opened with screwdriver)
- ② Screw-cap housing (with M 16-cable gland)

#### Operating elements

- ③ Sensitivity potentiometer
- ④ Time potentiometer
- ⑤ Operation-mode micro switch
- ⑥ Delay-type micro switch
- ⑦ Connection terminals



# Photoelectric sensors OR20

## AC/DC types

- OR20 ES Through-beam sensors
- OR20 RS Retroreflective sensors
- OR20 PS Polarised retroreflective sensors
- OR20 RT Diffuse reflective sensors
- OR20 RH Diffuse reflective sensors with background suppression



**88 x 63 x 24 mm**

**Through-beam sensors**  
20 m (66.2 ft)

**88 x 63 x 24 mm**

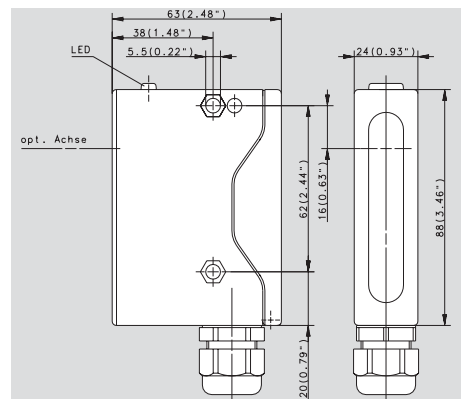
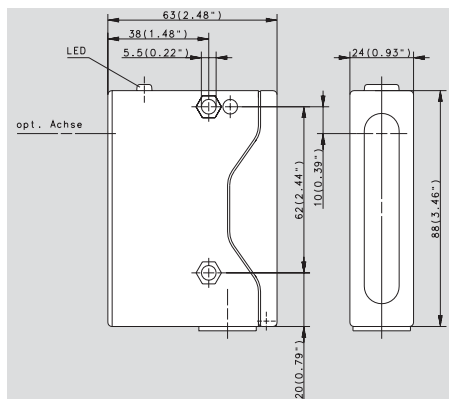
**Retroreflective sensors**  
8 m (26.2 ft)

Sensing type	
Sensing distance / range	
Model description	
<b>Relay output</b>	<b>Part number</b>
– Contacts: change-over (1 x)	Wiring diagram (page/pos.)
– Switching current 3 A	Stor./deliv.: on requ.
– Connection compartment cover with quick snap release	Model description
	<b>Part number</b>
	Wiring diagram (page/pos.)
	Stor./deliv.: on requ.
Model description	
<b>Relay output</b>	<b>Part number</b>
– Contacts: change-over (1 x)	Wiring diagram (page/pos.)
– Switching current 3 A	Stor./deliv.: on requ.
– Connection compartment cover with screws	Model description
– Cable gland	<b>Part number</b>
	Wiring diagram (page/pos.)
	Stor./deliv.: on requ.
Voltage range	
Short-circuit protection	
Output current	max.
Switching frequency	max.
LED for output function/supply voltage/diagnostic	
Adjustable sensitivity	
Timer function	
Diagnostic function	
Temperature range	min./max.
Protection type	
Screw-clamp termination	(page/Pos.)
Cable length (2 m)	Cross section (mm <sup>2</sup> )
Plug	(page/Pos.)
Accessories	(page/Pos.)

OR20 SE-MOOS-20.0-AV	–	–
<b>655.1086.001</b>		
272/1		
●/–		
–	OR20 EE-MAR5-20.0-ALET	OR20 RS-MAR5-08.0-ALET
	<b>655.1686.003</b>	<b>655.4686.001</b>
	272/3	272/3
	●/–	●/–
OR20 SE-MOOS-20.0-AV	–	–
<b>655.1086.002</b>		
272/1		
–/●		
–	OR20 EE-MAR5-20.0-ALET	OR20 RS-MAR5-08.0-ALET
	<b>655.1686.004</b>	<b>655.4686.002</b>
	272/3	272/3
	–/●	–/●
SE: 12–265 V AC/DC	EE: 12–265 V AC/DC	12–265 V AC/DC
–	–	–
–	3 A	3 A
–	>50 Hz	>50 Hz
–/●/–	●/–/–	●/–/–
–	●	●
–	●	●
–	–	–
–20 °C/+70 °C	–20 °C/+70 °C	–20 °C/+70 °C
–4 °F/+158 °F	–4 °F/+158 °F	–4 °F/+158 °F
IP 65/NEMA 12	IP 65/NEMA 12	IP 65/NEMA 12
272/1	272/3	272/3
–	–	–
–	–	–
273/2, 3	273/2, 3	273/2, 3; 274

## Dimensions

All dimensions in mm (inch)





**88 x 63 x 24 mm**

**Polarised retroreflective sensors**

**6 m (19.7 ft)**



**88 x 63 x 24 mm**

**Diffuse reflective sensors**

**600 mm (1.97 ft)**

**1.5 m (4.92 ft)**



**88 x 63 x 24 mm**

**Background suppression**

**400 mm (1.31 ft)**

OR20 PS-MAR5-

06.0-ALET

**655.5686.001**

272/3

●/-

OR20 RT-MAR5-

0600-ALET

**655.7686.001**

272/3

●/-

OR20 RT-MAR5-

01.5-ALET

**655.7686.003**

272/3

●/-

OR20 RH-MAR5-

0400-ALET

**655.8686.002**

272/3

●/-

OR20 PS-MAR5-

06.0-ALET

**655.5686.002**

272/3

●/-

12-265 V AC/DC

-

3 A

>50 Hz

●/-/-

●

●

-

-20 °C/+70 °C

-4 °F/+158 °F

IP 65/NEMA 12

272/3

-

-

273/2, 3; 274

-

12-265 V AC/DC

-

3 A

>50 Hz

●/-/-

●

●

-

-20 °C/+70 °C

-4 °F/+158 °F

IP 65/NEMA 12

272/3

-

-

273/2, 3

OR20 RT-MAR5-

01.5-ALET

**655.7686.004**

272/3

-/●

12-265 V AC/DC

-

3 A

>50 Hz

●/-/-

●

●

-

-20 °C/+70 °C

-4 °F/+158 °F

IP 65/NEMA 12

272/3

-

-

273/2, 3

-

12-265 V AC/DC

-

3 A

>50 Hz

●/-/-

●

●

-

-20 °C/+70 °C

-4 °F/+158 °F

IP 65/NEMA 12

272/3

-

-

273/2, 3

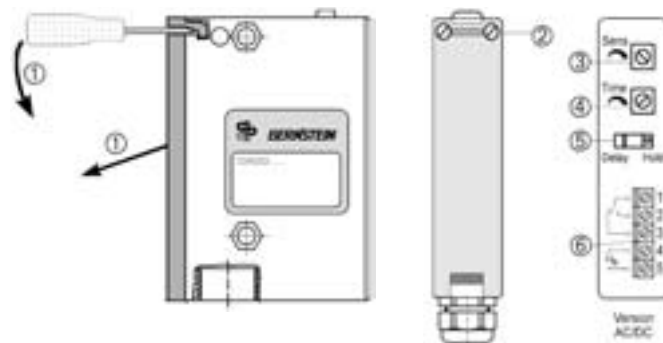
**Notes on operation of OR20 series (AC/DC types)**

**Housing types:**

- ① Snap-cover housing (to be opened with screwdriver)
- ② Screw-cap housing (with M 16-cable gland)

**Operating elements**

- ③ Sensitivity potentiometer
- ④ Time potentiometer
- ⑤ Delay-type micro switch
- ⑥ Connection terminals





# Photoelectric sensors OR90

AC/DC types  
AC types  
DC types

OR90 ES Through-beam sensors  
OR90 RS Retroreflective sensors



**85 x 50 x 23 mm**

**Through-beam sensors**  
12 m (39.4 ft)

**85 x 50 x 23 mm**

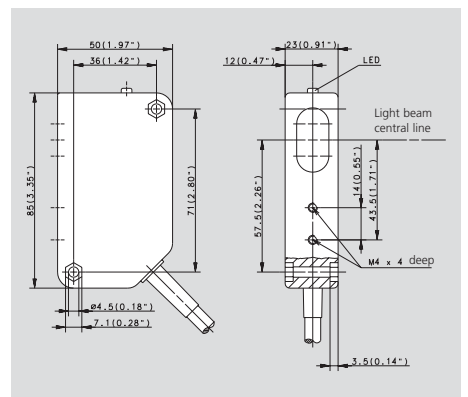
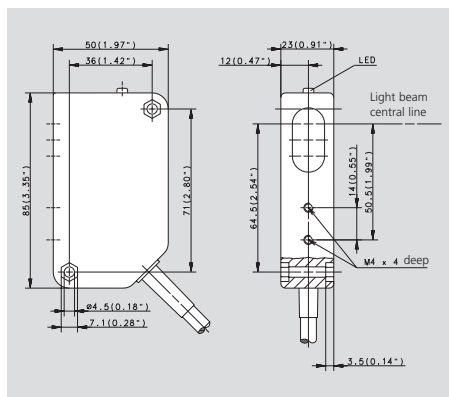
**Retroreflective sensors**  
8 m (26.2 ft)

<b>Sensing type</b>	
<b>Sensing distance / range</b>	
Model description	
<b>Relay output</b>	<b>Part number</b>
– Contacts: changeover (1 x)	– Switching current 3 A
Wiring diagram (page/pos.)	
Stock status: Ex stock/Built to order	
Model description	
Transmitter	<b>Part number</b>
	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
Model description	
PNP	<b>Part number</b>
antivalent	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
Model description	
NPN	<b>Part number</b>
antivalent	Wiring diagram (page/pos.)
Stock status: Ex stock/Built to order	
Voltage range	
Short-circuit protection	
Output current	max.
Switching frequency	max.
LED for output function/supply voltage/diagnostic	
Adjustable sensitivity	
Timer function	
Diagnostic function	
Temperature range	min./max.
Protection type	
Screw-clamp termination	(page/Pos.)
Cable length (2 m)	Cross section (mm <sup>2</sup> )
Plug	(page/Pos.)
Accessories (page/Pos.)	

–	OR90 EE-AAR5-12.0-4L	OR90 RS-MAR5-08.0-CL	–
	<b>655.1696.001</b>	<b>655.4696.001</b>	
	272/8	272/8	
	●/–	●/–	
OR90 SE-AOOS-12.0-4V	–	–	–
<b>655.1096.002</b>			
271/2			
–/●			
–	–	–	OR90 RS-DATP-08.0-CL
			<b>655.4896.001</b>
			271/5
			●/–
–	–	–	OR90 RS-DATN-08.0-CL
			<b>655.4296.001</b>
			271/8
			–/●
SE: 185–242 V AC	EE: 185–242 V AC	12–265 V AC/DC	10–30 V DC
–	–	–	●
–	3 A	3 A	200 mA
–	>50 Hz	>80 Hz	>100 Hz
–/●/–	●/–/–	●/–/–	●/–/–
–	–	–	–
–	–	–	–
–	–	–	–
0 °C/+70 °C	0 °C/+70 °C	–20 °C/+70 °C	–20 °C/+70 °C
+32 °F/+158 °F	+32 °F/+158 °F	–4 °F/+158 °F	–4 °F/+158 °F
IP 65/NEMA 12	IP 65/NEMA 12	IP 65/NEMA 12	IP 65/NEMA 12
–	–	–	–
4 m/2 x 0.5	4 m/5 x 0.5	5 x 0.5	4 x 0.5
–	–	–	–
273/4	273/4	273/4; 274	273/4; 274

## Dimensions

All dimensions in mm (inch)





## Opto-electronic safety devices

### Light barrier OSG 4

#### Apropos safety

Safety at work is an everyday task – ethically as well as economically. Annually, the number of accidents at work resulting in personal injury (and more than three days sick leave) costs the economy tens of millions of Pounds.

This does not have to be the case. Technological advancement and innovative products now offer a higher level of protection than was ever previously available.

Safety light barriers protect machine and plant operators from accidents. Reliable and safe, i.e. safe from manipulation, but also functionally safe. The safety category type 4 demands full internal monitoring: So that even when a piece of equipment malfunctions, the machine receives a stop command and personnel remain protected.

#### Non-contact transmitters

The best safety environment is of no value if it obstructs the personnel. On one hand, it disrupts operating procedures, therefore reducing efficiency; and even worse, operators are tempted to remove the obstruction which means trying to outwit or manipulate the safety device.

Safety light barriers operate contact-free. An encroachment into the protected area initiates the stop signal for the machine or plant. The OSG-4 from BERNSTEIN reacts to an object larger than 14 mm or 29 mm. This represents finger protection or hand protection (just one finger or one hand initiates the stop signal). This means that the safety light barrier initiates the stop signal so effectively that (bearing in mind the machines run-down time) very short distances between the safety light barrier and points of hazard are possible.

#### Transistor-output or relay?

The OSG-4 safety light barriers are available with relay or transistor outputs. The safety relays (positive break contacts) are mounted in a robust, industrial enclosure measuring 54 x 57 mm. These can then directly trigger the power contactors of a machine.

The semi-conductor outputs deliver signals which are reliably recognised by a PLC.



High resolution, therefore finger protection is achieved



Despite small dimensions: relay outputs are possible



Picture left: Safety provisions for a production conveyor at an automobile manufacturer by means of a safety light barrier

**Dialogue modules**

LEDs on the OSG-4 indicate the actual operating function (output active, output passive and waiting for start command).



Alphanumeric display and LEDs for clear communication

An alphanumeric display (four digit) aids in problem solving, e.g. indicates rising levels of contamination, helps the technician when making alignment adjustments (without additional tools such as laser-alignment equipment) and by helping to identify faults.

It also serves as a display for entering a password when making changes to the settings.

**Adjustment buttons**

Two push-buttons (protection class IP 65) allow individual configuration of the safety equipment (e.g. safety mode with or without restart protection, with or without – external – safety control).

Safety-relevant settings can be password protected.



Saves time: PC diagnostics via RS-485 interface

**Diagnostics**

The RS 485 interface enables diagnostics and configuration with the aid of a PC.

**Muting controller**

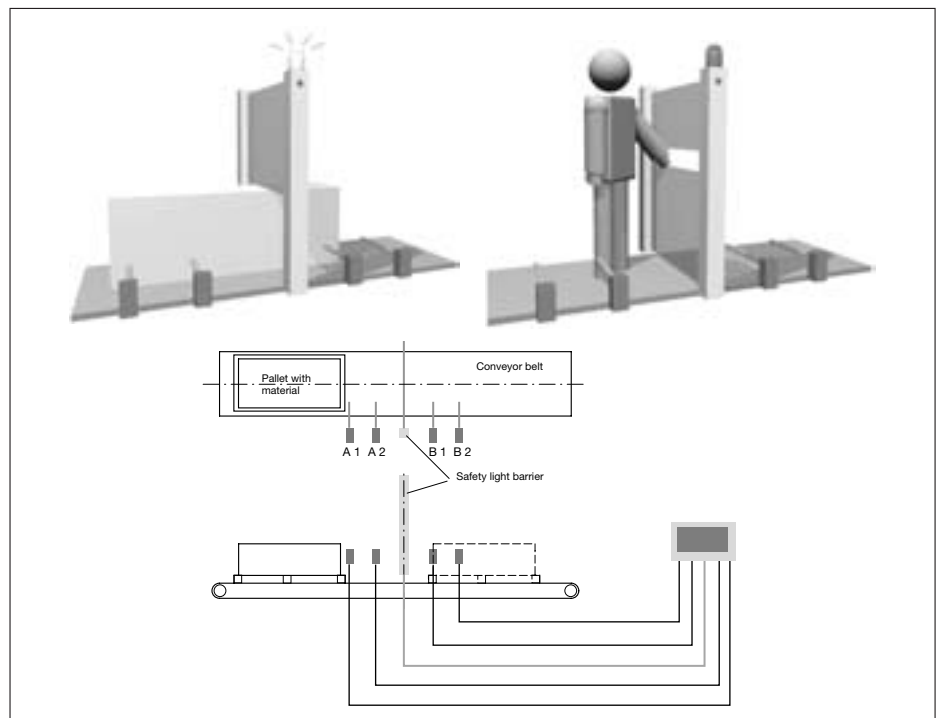
It is not always desirable that safety equipment simply stops plant or machinery without pre-conditions. In many cases, it is often necessary that the machine is continually supplied with material without stopping the production process. Depending on certain circumstances, the material may have to pass through the sensor field of the safety light barrier (protected field).

The task is therefore to distinguish between man and material. This distinction is achieved by the appropriate installation of either optical, inductive or capacitive sensors or mechanical limit switches, and allowing the muting controller to logically interpret their signals.

Extended features thanks to muting controller

Should material be detected by this device, it short-circuits ("mutes") the OSG-4 safety light barrier using a relay controller. The detection of, for example, pallets can be achieved by using mechanical limit switches or sensors from the BERNSTEIN product range.

The safety light barrier is not in operation during the muting process. This reduction to the operators safety must be indicated by a supervised, clearly visible warning light (external short-circuit indication).



Distinction between man and material thanks to logical interpretation of sensor information

# Light barrier OSG 4

## Protection at points of hazard...

...the classical application for a safety light barrier. The operator has to be protected against being able to reach a point of danger with his hands – if there is the possibility of injury.

A mechanical protection device is not always practicable, because it can hinder the production process.

Conventional two-handed operation can prevent the operator from causing injury to himself during hazardous machine-movements. Should he let go of the switches, the machine stops. Accident prevention is guaranteed. However, during machine operation, the operator cannot carry out any additional tasks.

Operation can be greatly simplified, if it is sufficient to take the hands out of the hazard zone in order to press the start button – and the danger point in question is secured by opto-electronic safety equipment.



Short installation distances thanks to high resolution

## Securing hazardous areas...

...that are to be periodically entered – if (contrary to access control) valuable space is to be saved.



Helps save space by securing hazardous areas

## With and without restart protection

The OSG-4 safety light barrier can be used with or without restart protection. A light barrier normally works in "automatic mode", i.e. when just one light beam is interrupted, the output is deactivated. The device goes to "red". Should the protected area be given free, the output is reactivated or the relays are made. The device "goes to green".

The OSG-4 safety light barrier can be set to operate in this way – however, it doesn't have to be. Besides automatic activation, there is also the manual mode. In this case, the device operates with start-up and restart protection.

The machine can only be started (when the hazard area is free) by pressing a push-button (start-up protection). If the safety light barrier halts the machine (because of an encroachment into the hazard area), then it remains in this status until the hazard area is free. The device can only be set to "green" by pressing a push-button (restart protection).

## Availability...

...is an important criterion for industrial production. No company can afford to have its production stopped for no apparent reason. Modern safety light barriers have to be able to cope with disruptive conditions in the working environment. The OSG-4 complies with all EMC regulations, is protected against foreign light sources and can also not be influenced by stroboscope or welding sparks.

This is achieved by "double scanning".

### Safety light barrier, 14 mm, Range 0.35...6 m

Type	Protected field height	Part number
Relay-output	mm	
OSG 4-14 ES-06-0254-DRA	254	<b>654.1323.001</b>
OSG 4-14 ES-06-0374-DRA	374	<b>654.1323.002</b>
OSG 4-14 ES-06-0494-DRA	494	<b>654.1323.003</b>
OSG 4-14 ES-06-0614-DRA	614	<b>654.1323.004</b>
OSG 4-14 ES-06-0734-DRA	734	<b>654.1323.005</b>
OSG 4-14 ES-06-0854-DRA	854	<b>654.1323.006</b>
OSG 4-14 ES-06-0974-DRA	974	<b>654.1323.007</b>
OSG 4-14 ES-06-1094-DRA	1094	<b>654.1323.008</b>
OSG 4-14 ES-06-1214-DRA	1214	<b>654.1323.009</b>
OSG 4-14 ES-06-1334-DRA	1334	<b>654.1323.010</b>
OSG 4-14 ES-06-1454-DRA	1454	<b>654.1323.011</b>
Transistor-output		
OSG 4-14 ES-06-0254-DPA	254	<b>654.1321.001</b>
OSG 4-14 ES-06-0374-DPA	374	<b>654.1321.002</b>
OSG 4-14 ES-06-0494-DPA	494	<b>654.1321.003</b>
OSG 4-14 ES-06-0614-DPA	614	<b>654.1321.004</b>
OSG 4-14 ES-06-0734-DPA	734	<b>654.1321.005</b>
OSG 4-14 ES-06-0854-DPA	854	<b>654.1321.006</b>
OSG 4-14 ES-06-0974-DPA	974	<b>654.1321.007</b>
OSG 4-14 ES-06-1094-DPA	1094	<b>654.1321.008</b>
OSG 4-14 ES-06-1214-DPA	1214	<b>654.1321.009</b>
OSG 4-14 ES-06-1334-DPA	1334	<b>654.1321.010</b>
OSG 4-14 ES-06-1454-DPA	1454	<b>654.1321.011</b>

### Safety light barrier, 29 mm, Range 0.5...9 m

Type	Protected field height	Part number
Relay-output	mm	
OSG 4-29 ES-09-0509-DRA	509	<b>654.2323.001</b>
OSG 4-29 ES-09-0749-DRA	749	<b>654.2323.002</b>
OSG 4-29 ES-09-0989-DRA	989	<b>654.2323.003</b>
OSG 4-29 ES-09-1229-DRA	1229	<b>654.2323.004</b>
OSG 4-29 ES-09-1469-DRA	1469	<b>654.2323.005</b>
OSG 4-29 ES-09-1709-DRA	1709	<b>654.2323.006</b>
OSG 4-29 ES-09-1949-DRA	1949	<b>654.2323.007</b>
Transistor-output		
OSG 4-29 ES-09-0509-DPA	509	<b>654.2321.001</b>
OSG 4-29 ES-09-0749-DPA	749	<b>654.2321.002</b>
OSG 4-29 ES-09-0989-DPA	989	<b>654.2321.003</b>
OSG 4-29 ES-09-1229-DPA	1229	<b>654.2321.004</b>
OSG 4-29 ES-09-1469-DPA	1469	<b>654.2321.005</b>
OSG 4-29 ES-09-1709-DPA	1709	<b>654.2321.006</b>
OSG 4-29 ES-09-1949-DPA	1949	<b>654.2321.007</b>

## Muting controller

Type	Voltage	Part number
Muting controller	24 V DC	<b>656.2322.001</b>
	24 V AC	<b>656.2322.002</b>
	230 V AC	<b>656.2322.003</b>
	115 V AC	<b>656.2322.004</b>

### Easy mounting

Attachment brackets are supplied with the safety light barrier. These allow four possible 90° angles of rotation. Fine adjustment of ± 5° possible within these settings.

A coding screw inserted into the attachment bracket ensures that the device's alignment is maintained even when a new device is fitted. Re-adjustment is not necessary.

An additional method of mounting is provided by the T-slot in the enclosure which can be used to fit sliding nuts.



The attachment bracket provides universal mounting options. Patent: the mechanical alignment tool for quick replacement of devices

### Apropos maintenance

All devices from BERNSTEIN are of course designed to industrial standards and undergo strict quality controls during manufacturing. This does not protect the devices from harsh, everyday industrial conditions. Therefore, the front cover can be replaced without having to undo screws, each individual optical module can be replaced with ease and the plug-in terminal blocks in the connection compartment make device replacement straight forward.



Pluggable terminal blocks enable devices to be replaced in just seconds

### Protection control, test input, alarm-output

The receiver unit has an input terminal which can monitor, when required, the correct operation of both positively-breaking power contactors, e.g. if the contacts weld shut. This function also checks the relay's response time.

Although the OSG-4 is a self-checking device, a complete systems check can be initiated through a test-signal from the sender unit.

Alarm outputs signal to remote monitoring points when the light barrier's light reserve is too low due to contamination and cleaning is necessary.



For maintenance purposes, the optical modules are easy to dismount

### Technical data

	OSG 4-14.....DPA	OSG 4-14.....DRA	OSG 4-29.....DPA	OSG 4-29.....DRA
Resolution	14 mm	14 mm	29 mm	29 mm
Protected field, height (dep. on type)	254 ... 1454 mm	254 ... 1454 mm	509 ... 1949 mm	509 ... 1949 mm
Protected field, width	0,35 ... 6 m	0,35 ... 6 m	0,5 ... 9 m	0,5 ... 9 m
Outputs	transistor	relay	transistor	relay
Output power	1 A / 24 V DC	2 ... 4 A / 24 ... 250 V AC	1 A / 24 V DC	2 ... 4 A / 24 ... 250 V AC
Response time (dep. on type)	15–53 ms	28–66 ms	15–38 ms	28–51 ms
Galvanic isolation	—	●	—	●
Output status indicator	●	1 NC	●	1 NC
Operation	Start and restart protection			
Supply voltage	24 V DC			
Contamination signal output	●			
Protection class	Type 4 (self checking)			
Protection type	IP 65			
Test input	●			
Communication connection	RS 485			
Connection	pluggable terminal block			
Cable input	Pg 13.5			

## Light barriers

### OSS 2 and OSS 4



Opto-electronic protective equipment from BERNSTEIN safely and reliably protects the operator against workplace injuries that occur in dangerous installations and systems.

An EC-type examination certificate was issued for the light barriers by the Experts Committees for Iron and Metal III, the Workers Compensation Board (Berufsgenossenschaft), the Examination and Certification Body (Prüf- und Zertifizierungsstelle).

Examination basis: Council Directive 98/37/EC, EN 61496-1 issued 02.1998 and IEC 61496-2 issued 44/208/FDIS 11.1997

The main fields of use for the light barriers OSS2 and OSS4 are:

- Protective equipment for operating personnel on machines and installations
- Protection of the working area of a robot, entire production lines or of loading and handling systems, storage and feeding systems, paletting and depalleting, pallet and packaging installations ...
- Protection of entrances
- Building a safety area
- Additional protection with light barriers
- Prevention of collisions

The light barriers are divided into two categories: commensurate with the risk analysis of a machine or installation, light barriers type 2 from the OSS2 range or light barriers type 4 from the OSS4 range may be required.

OSS2	OSS4
Light barrier type 2 consisting of a control device OSS2, a transmitter OSS2-01SE and a receiver OSS2-01EE	Light barrier type 4, consisting of a transmitter and a receiver, placed together in one delivery unit OSS4-01ES
<b>Functions</b>	
Two independent safety relays with positively driven contacts Both contacts are open if the IR beam is interrupted.	
<b>Two different means of restarting after the IR beam is again intact</b>	
Possibility of programming wiring on the control device	Possibility of selecting a variety of devices upon ordering
<b>Automatic restart</b>	
The outputs are closed once the IR beam is again intact.	
<b>Restart protection</b>	
The contacts remain closed after first being turned on as well as whenever the IR beam is intact. This function is also named 'manual release'. The release is realised through an external start button.	

# Light barrier OSS2

## Type 2 according to EN 61496-1

EC-type examination certificate  
EN 61496-1/IEC 61496-2  
BG Iron and Metal III  
No. 01 021



Technical Data	
Supply voltage	24 VDC, 24 VAC, 115 VAC, 230 VAC
Output	Two safety relays with positively driven contacts, contact rating (resistive load) max 2A, 250 VAC
Temperature range	Operating temperature -10 °C ... +50 °C Storage temperature -25 °C ... +85 °C
Response time	≤ 40 ms
Sensing distance	max. 20 m
Protection class	Control device IP 20 Transmitter and receiver: plug connection IP 65, cable connection IP 67
Dimensions	Control device 75 x 100 x 110 mm Transmitter and receiver 80 x 89 x 25.4 mm

Designation		Part number
Transmitter	Cable connection area	
Transmitter	plug M12	OSS2-01SE-20-0000-PA 654.6101.001
		OSS2-01SE-20-0000-PS 654.6101.002
Receiver	Cable connection area	
Receiver	plug M12	OSS2-01EE-20-0000-PA 654.6201.001
		OSS2-01EE-20-0000-PS 654.6201.002
Control devices	Control device OSS2 24 VAC	656.2322.006
	Control device OSS2 115 VAC	656.2322.008
	Control device OSS2 230 VAC	656.2322.007
	Control device OSS2 24 VDC	656.2322.005

Sensors



# Light barrier OSS4

## Type 4 according to EN 61496-1

EC type examination certificate  
EN 61496-1/IEC 61496-2  
BG Iron and Metal III  
No. 01019 and 01020



### Technical data

Supply voltage	24 VDC, 24 VAC, 110 VAC, 230 VAC
Output	Two safety relays with positively driven contacts, contact rating (resistive load) max 2A, 250 VAC
Temperature range	Operating temperature -20 °C ... +50 °C Storage temperature -25 °C ... +85 °C
Response time	15 ms
Sensing distance	max. 40 m
Protection class	Transmitter and receiver IP 65
Dimensions	Transmitter 78 x 104 x 211 mm Receiver 78 x 104 x 219 mm

### Light barrier with automatic restart

Supply voltage	Designation	Part number
24 V AC	OSS4-01ES-40-AUTO-ARS	654.6313.001
48 V AC	OSS4-01ES-40-AUTO-ARS	654.6313.002
110 V AC	OSS4-01ES-40-AUTO-ARS	654.6313.003
230 V AC	OSS4-01ES-40-AUTO-ARS	654.6313.004
24 V DC	OSS4-01ES-40-AUTO-DRS	654.6323.001

### Light barrier with restart protection/manual release

Supply voltage	Designation	Part number
24 V AC	OSS4-01ES-40-MANU-ARS	654.6313.005
48 V AC	OSS4-01ES-40-MANU-ARS	654.6313.006
110 V AC	OSS4-01ES-40-MANU-ARS	654.6313.007
230 V AC	OSS4-01ES-40-MANU-ARS	654.6313.008
24 V DC	OSS4-01ES-40-MANU-DRS	654.6323.002



# Safety magnetic controller

## General table



Designation	
<b>Part number</b>	
Operating data	AC 230 V
	AC 24 V
	DC 24 V
Division into safety category	Safety category I
	Safety category II
	Safety category III
	Safety category IV
Approval	
BIA-risk evaluated	
BE-risk-evaluated	
Max. connectable Sensor units	
	1 Sensor (switch)
	2 Sensor (switch)
	6 Sensor (switch)

MÜZ-102/24	MÜZ-102/24-UM	MÜZ-102/D24-FL	MÜZ-202/D24-FL	MÜZ-202/D24-UM
<b>639.2701.006</b>	<b>639.2701.010</b>	<b>639.2701.306</b>	<b>639.2702.307</b>	<b>639.2702.301</b>
-	-	-	-	-
●	●	-	-	-
-	-	●	●	●
#	#	#	#	#
#	#	#	#	#
#	#	●	●	●
●	●	-	-	-
● BIA	● BIA	● TÜV	● TÜV	-
-	-	-	-	●
-	-	-	-	-
●	●	●	#	#
-	-	-	●	●
-	-	-	-	-

### Suitable sensor units

Magnet TK-42-CD  
Switch MAK-4237



Magnet TK-42-CD  
Switch MAK-4236



Magnet TK-52-CD  
Switch MAK-5236



Magnet TK-43-CD  
Switch MAK-5336



●	●	-	-	-
-	-	●	●	●
-	-	●	●	●
-	-	●	●	●
-	-	●	●	●

●: normal category for the risk level  
#: possible application (possibly over-qualified)



MÜZ-602/D24-UM  
639.2706.302

MÜZ-202/024  
639.2702.008

MÜZ-202/230  
639.2702.007

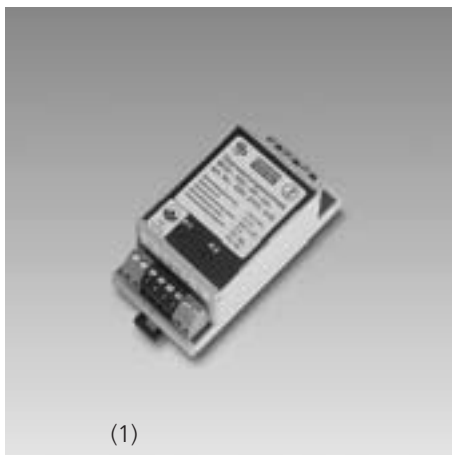
MÜZ-602/024  
639.2706.005

MÜZ-602/230  
639.2706.001

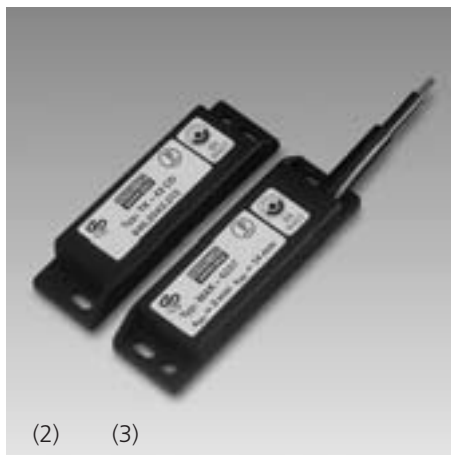
-	-	●	-	●
-	●	-	●	-
●	●	-	●	-
#	●	●	●	●
#	-	-	-	-
●	-	-	-	-
-	-	-	-	-
-	-	-	-	-
●	-	-	-	-
-	●	●	●	●
#	#	#	#	#
#	●	●	#	#
●	-	-	●	●
-	-	-	-	-

●	●	●	●	●
●	●	●	●	●
●	●	●	●	●





(1)



(2) (3)

MÜZ-102/24-UM  
639.2701.010

TK-42-CD  
640.2042.015

MAK-4237-3  
649.0742.008

1

-

-

●

-

●

-

0.1 A

AC 250 V

8 A

1500 VA

-/●

●/-

0 °C/+55 °C

32 °F/+131 °F

IP 20

E

PA 6.6

TS 35 (DIN 50022)

max. 2.5 mm<sup>2</sup>/-

212/2

-

-

BIA/SUVA

●/-

TK-42-CD

640.2042.015

-

-

-

-

-

-

-

-

-

-

-

-

-

-20 °C/+70 °C

-4 °F/+158 °F

IP 67

-

PA 6.6

M 4

-

-

-

-

BIA/SUVA

●/-

MAK-4237-3

649.0742.008

-

-

●

-

-

-

-

-

DC 30 V

-

250 mW

-

-

-20 °C/+70 °C

-4 °F/+158 °F

IP 67

-

PA 6.6

M 4

-/4 x 0.25 mm<sup>2</sup>

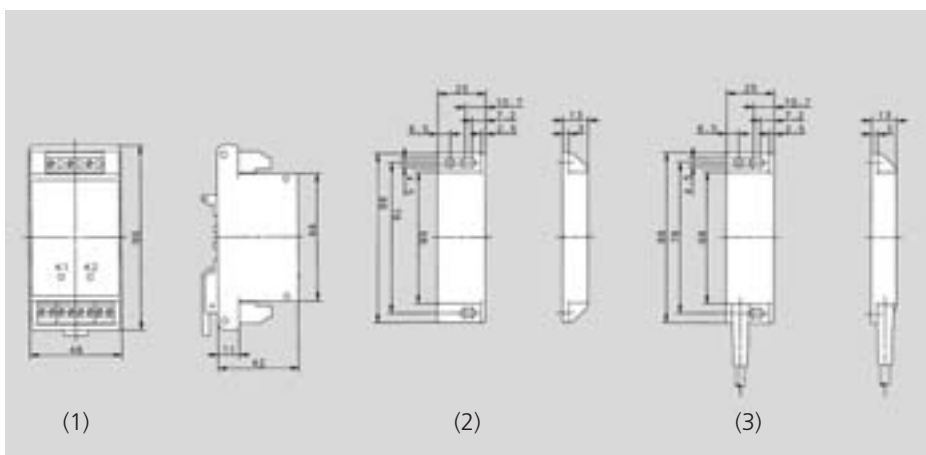
-

3 mm

14 mm

BIA/SUVA

●/-



(1)

(2)

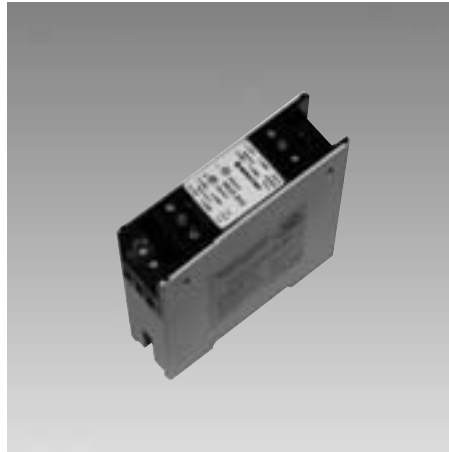
(3)

## Safety magnetic controller

TÜV certificated

System type 3  
according to EN 954-1  
in safety category 3

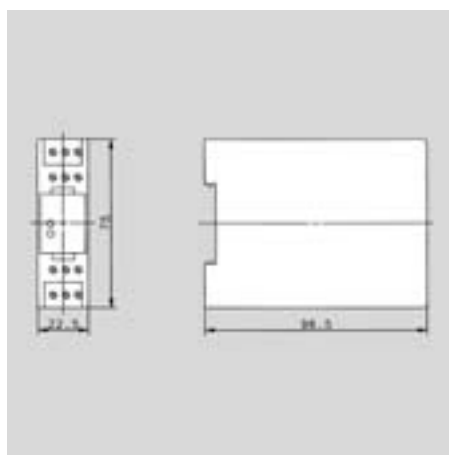
Single fault tolerance S to IEC 60947-5-3



Designation	MÜZ-102/D24-FL-DA	MÜZ-202/D24-FL
<b>Part number</b>	<b>639.2701.306</b>	<b>639.2702.307</b>
Max. connectable sensor units	1	2
safety output, N.O.	●	●
Feedback circuit	●	–
Data output, N.C.	●	–
<b>Operating voltage</b>		
AC 230 V	–*	–*
AC 24 V	–	–
DC 24 V	●	●
Input current	60 mA	60 mA
<b>Switching capacity, safety contact</b>		
Switching voltage	max. AC 250 V	max. AC 250 V
Switching current	max. 8 A	max. 8 A
Switching capacity	max. 1700 VA	max. 1700 VA
LED: Status of hazard/switching status	●/–	●/–
LED: supply voltage/on	●	–
Relay: forced disconnection/standard	●/–	●/–
<b>Ambient conditions</b>		
Temperature range	min./max. 0 °C/+55 °C 32 °F/+131 °F	min./max. 0 °C/+55 °C 32 °F/+131 °F
Protection class (according to IEC 529, EN 60529)	IP 20	IP 20
Housing material	PC	PC
Attachment option (DIN 50022)	TS 35	TS 35
Connetion type: terminal block	max. 2.5 mm <sup>2</sup> 212/7	max. 2.5 mm <sup>2</sup> 212/8
<b>Applicable sensor units see page 203</b>		
Delivery: ex-stock/built to order	●/–	●/–

All dimensions in mm

\* By using separate power supply (housing with same width: 22.5 mm); available on request.



## Coded magnetic switches

<b>3 m PVC cable</b>	
Designation	
<b>Part number</b>	
Delivery: ex-stock/built to order	
<b>Ambient conditions</b>	
Temperature range	min./max.
Protection type (according to IEC 529, EN 60529)	
Housing material	
Sensing distance	S on min. S off max.
<b>Operating magnet</b>	
Designation	
<b>Part number</b>	
<b>To be used MÜZ</b>	
<b>Part number</b>	

All dimensions in mm

Other versions available on request.





# Safety magnetic controller

BIA risk-evaluated

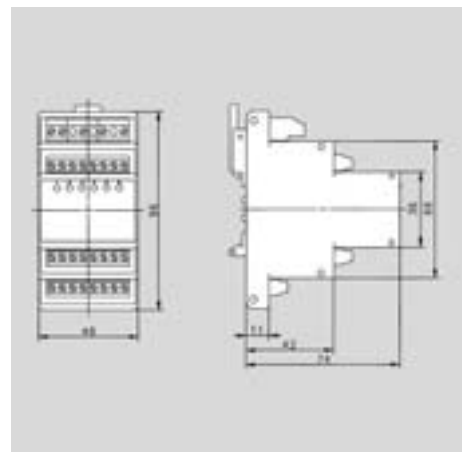
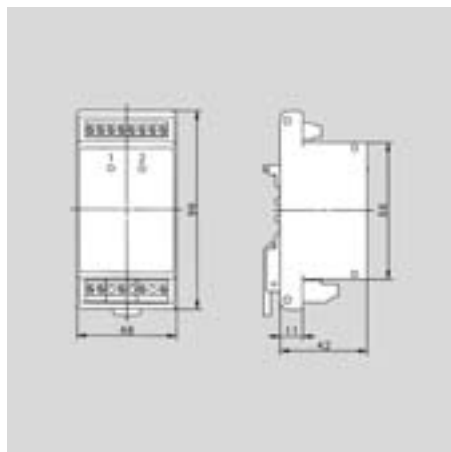
System type 3  
according to EN 954-1  
in safety category 3



Designation	MÜZ-202/D24-UM	MÜZ-602/D24-UM
<b>Part number</b>	<b>639.2702.301</b>	<b>639.2706.302</b>
Max. connectable sensor units	2	6
Normally-open contact	–	–
Combined normally-open/normally-closed contact	–	–
Changeover contact	●	●
<b>Operating voltage</b>		
AC 230 V	–	–
AC 24 V	–	–
DC 24 V	●	●
Input current	0.1 A	0.1 A
<b>Switching capacity, safety contact</b>		
Switching voltage	max. AC 250 V	max. AC 250 V
Switching current	max. 8 A	max. 8 A
switching capacity	max. 1700 VA	max. 1700 VA
LED: Status of hazard/switching status	●/–	●/–
Relay: forced disconnection/standard	●/–	●/–
<b>Ambient conditions</b>		
Temperature range	min./max. 0 °C/+55 °C 32 °F/+131 °F	min./max. 0 °C/+55 °C 32 °F/+131 °F
Protection class (according to DIN 40050)	IP 20	IP 20
Housing material	PA 6.6	PA 6.6
Attachment option (DIN 50022)	TS 35	TS 35
Connection type: terminal block	max. 2.5 mm <sup>2</sup> 212/3	max. 2.5 mm <sup>2</sup> 212/4
<b>Applicable sensor units</b>		
Switch	MAK-xx36	MAK-xx36
Magnet	TK-xx-CD	TK-xx-CD
see page	210–211	210–211
<b>Approvals</b>		
BIA risk-evaluated in safety category	III	III
Delivery: ex-stock/built to order	●/–	●/–

All dimensions in mm

Other versions available on request.



# Safety magnetic controller

Bernstein risk-evaluated

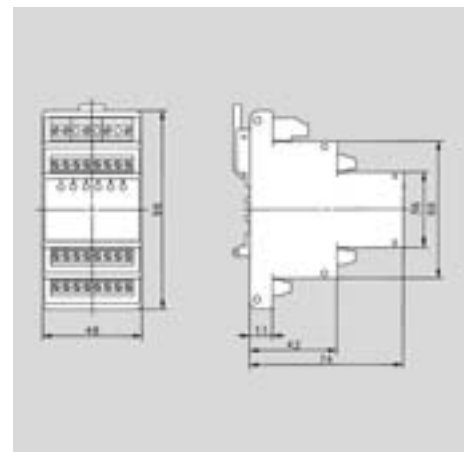
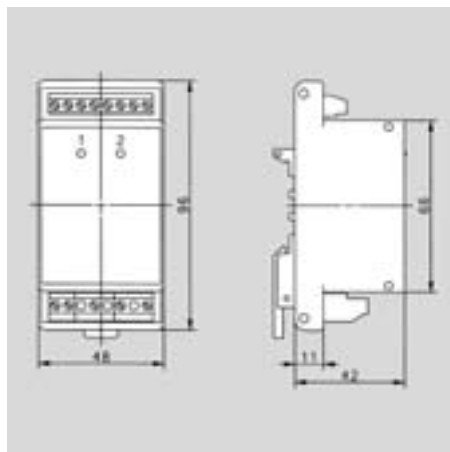
System type 1  
according to EN 954-1  
in safety category 1



Designation	MÜZ-202/024	MÜZ-202/230	MÜZ-602/024	MÜZ-602/230
<b>Part number</b>	<b>639.2702.008</b>	<b>639.2702.007</b>	<b>639.2706.005</b>	<b>639.2706.001</b>
Max. connectable sensor units	2	2	6	6
Normally-open contact	-	-	-	-
Combined normally-open/normally-closed contact	-	-	-	-
Changeover contact	●	●	●	●
<b>Operating voltage</b>				
AC 230 V	-	●	-	●
AC 24 V	● AC/DC universal	-	● AC/DC universal	-
DC 24 V	●	-	●	-
Input current	0.1 A	0.1 A	0.1 A	0.1 A
<b>Switching capacity, safety contact</b>				
Switching voltage	max. AC 250 V/DC 30 V	max. AC 250 V/DC 30 V	max. AC 250 V/DC 30 V	max. AC 250 V/DC 30 V
Switching current	max. 15 A	max. 15 A	max. 15 A	max. 15 A
Switching capacity	max. 2000 VA/150 W	max. 2000 VA/150 W	max. 2000 VA/150 W	max. 2000 VA/150 W
LED: Status of hazard/switching status	●/-	●/-	●/-	●/-
Relay: forced disconnection/standard	-/●	-/●	-/●	-/●
<b>Ambient conditions</b>				
Temperature range	min./max. -25 °C/+55 °C -13 °F/+131 °F	min./max. -25 °C/+55 °C -13 °F/+131 °F	min./max. -25 °C/+55 °C -13 °F/+131 °F	min./max. -25 °C/+55 °C -13 °F/+131 °F
Protection class (according to DIN 40050)	IP 20	IP 20	IP 20	IP 20
Housing material	PA 6.6	PA 6.6	PA 6.6	PA 6.6
Attachment option (DIN 50022)	TS 35	TS 35	TS 35	TS 35
Connection type: terminal bloc	max. 2.5 mm <sup>2</sup> 212/5	max. 2.5 mm <sup>2</sup> 212/6	max. 2.5 mm <sup>2</sup> 212/9	max. 2.5 mm <sup>2</sup> 212/10
<b>Applicable sensor units</b>				
	Switch	MAK-xx36	MAK-xx36	MAK-xx36
	Magnet	TK-xx-CD	TK-xx-CD	TK-xx-CD
see page		210-211	210-211	210-211
<b>Approvals</b>				
BE- risk-evaluated in safety category	I	I	I	I
Delivery: ex-stock/built to order	●/-	●/-	●/-	●/-

All dimensions in mm

Other versions available on request.



Sensors

## Coded switches

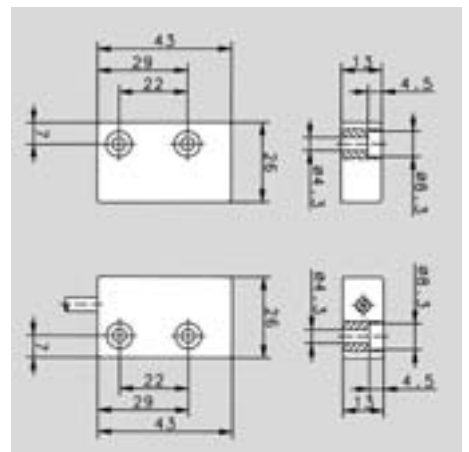
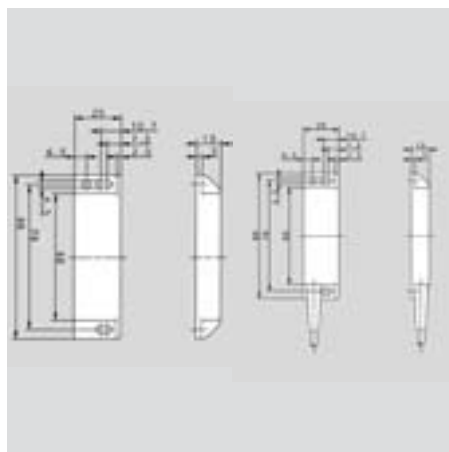


<b>3 m PVC cable</b>		
Designation		
<b>Part number</b>		
Delivery: ex-stock/built to order		
<b>6 m PVC cable</b>		
Designation		
<b>Part number</b>		
Delivery: ex-stock/built to order		
<b>9 m PVC cable</b>		
Designation		
<b>Part number</b>		
Delivery: ex-stock/built to order		
<b>Plug RD 6.5 mm/4 poles</b>		
Designation		
<b>Part number</b>		
Delivery: ex-stock/built to order		
<b>Switching capacity</b>		
Operating voltage		max.
Switching capacity		max.
<b>Ambient conditions</b>		
Temperatur range		min./max.
Protection class (according to IEC 529, EN 60529)		
Housing material		
<b>Sensing distance</b>	S on	min.
	S off	max.
<b>Operating magnet</b>		
Designation		
<b>Part number</b>		
To be used MÜZ		
see page		

MAK-4236-3		MAK-5236-3
<b>649.0642.301</b>		<b>649.0652.306</b>
●/-		-/●
MAK-4236-6		MAK-5236-6
<b>649.0642.302</b>		<b>649.0652.307</b>
●/-		-/●
MAK-4236-9		MAK-5236-9
<b>649.0642.303</b>		<b>649.0652.308</b>
●/-		-/●
MAK-4236-STK		MAK-5236-STK
<b>649.0642.305</b>		<b>649.0652.309</b>
●/-		-/●
DC 30 V		DC 30 V
250 mW		250 mW
-5 °C/+70 °C		-5 °C/+70 °C
+23 °F/+158 °C		+23 °F/+158 °C
IP 67		IP 67
PA 6.6		PA 6.6
5 mm	8 mm	3 mm
14 mm	16 mm	14 mm
TK-42-CD	TK-42-CD-SN8	TK-52-CD/2
<b>640.2042.301</b>	<b>640.2042.306</b>	<b>640.2052.307</b>
208-209	208-209	208-209

All dimensions in mm

Other versions available on request.  
SW: wrench size



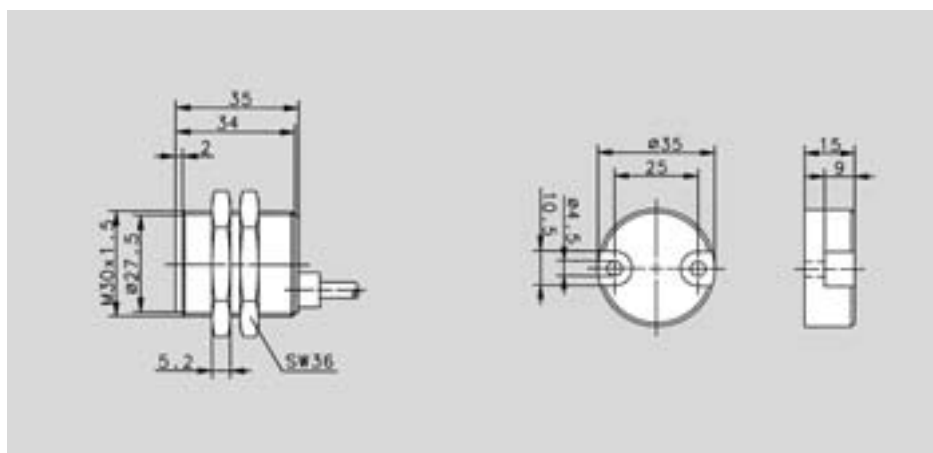
# Coded switches



<b>3 m PVC cable</b>			
Designation			MAK-5336-3
<b>Part number</b>			<b>649.0653.310</b>
Delivery: ex-stock/built to order			●/-
<b>6 m PVC cable</b>			
Designation			MAK-5336-6
<b>Part number</b>			<b>649.0653.311</b>
Delivery: ex-stock/built to order			●/-
<b>9 m PVC cable</b>			
Designation			MAK-5336-9
<b>Part number</b>			<b>649.0653.312</b>
Delivery: ex-stock/built to order			●/-
<b>Plug M 12/4 poles</b>			
Designation			MAK-5336-STK
<b>Part number</b>			<b>649.0653.313</b>
Delivery: ex-stock/built to order			●/-
<b>Switching capacity</b>			
Operating voltage	max.		DC 30 V
Switching capacity	max.		250 mW
<b>Ambient conditions</b>			
Temperatur range	min./max.		-5 °C/+70 °C +23 °F/+158 °C
Protection class (according to IEC 529, EN 60529)			IP 67
Housing material			PA 6.6
<b>Sensing distance</b>	S on	min.	3 mm
	S off	max.	10 mm
<b>Operating magnet</b>			
Designation			TK-43-CD
<b>Part number</b>			<b>640.2043.023</b>
To be used MÜZ			
see page			208-209

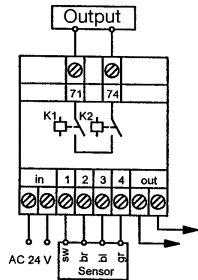
All dimensions in mm

Other versions available on request.

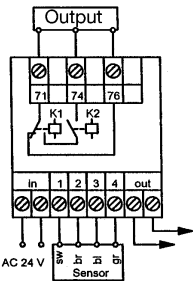


# Magnetic switch Monitoring relays

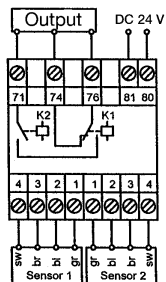
## Wiring diagrams



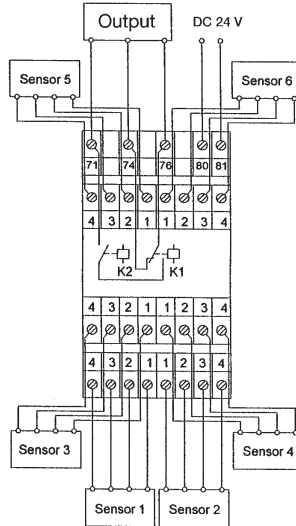
① MÜZ-102



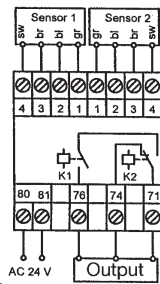
② MÜZ-102/Um



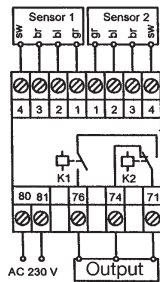
③ MÜZ-202/Um



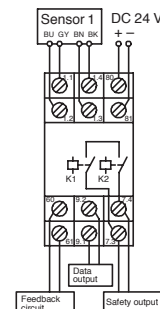
④ MÜZ-602/Um



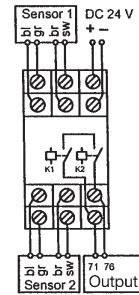
⑤ MÜZ-202



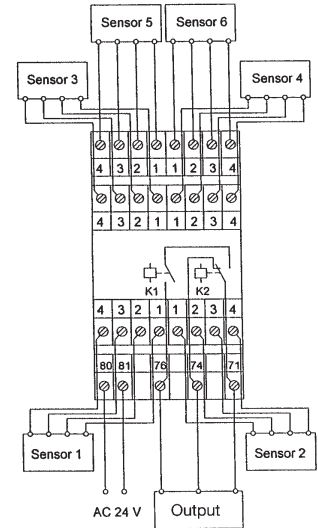
⑥ MÜZ-202



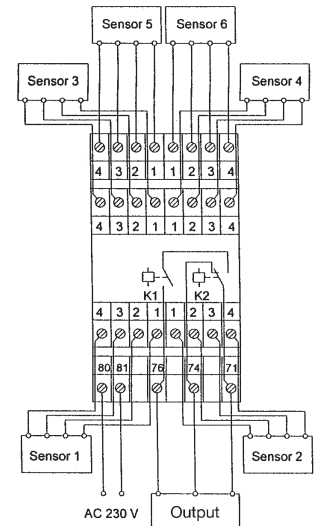
⑦ MÜZ-102/FI



⑧ MÜZ-202/FI



⑨ MÜZ-602



⑩ MÜZ-602



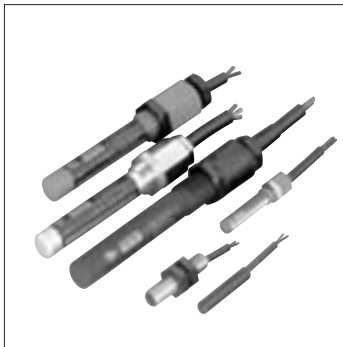
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- Selection aid rectangular housing	Page 221	

Overview

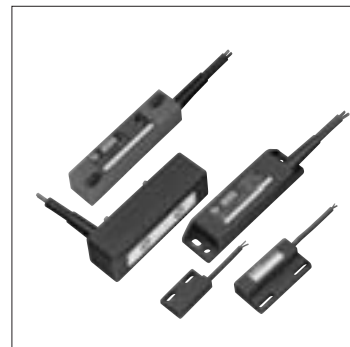
### Electromechanical magnetic switches

Cylindrical and metric housings



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Rectangular housings



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Overview

### Electronic magnetic switches

Cylindrical and metric housings



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Rectangular housings



Page 229

## Magnets

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Accessories

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# Magnetic switches – General features

## Electromechanical and electronic models

BERNSTEIN has extended its range of electromechanical magnetic switches with electronic versions which operate according to the Hall and magnetoresistive principle.

Electromechanical and electronic magnetic switches have special properties which ensure optimal use in their respective environments.

The electronic versions are characterised by their improved mechanical characteristics (high resistance to vibration, shock or impact) and are absolutely wear-free.

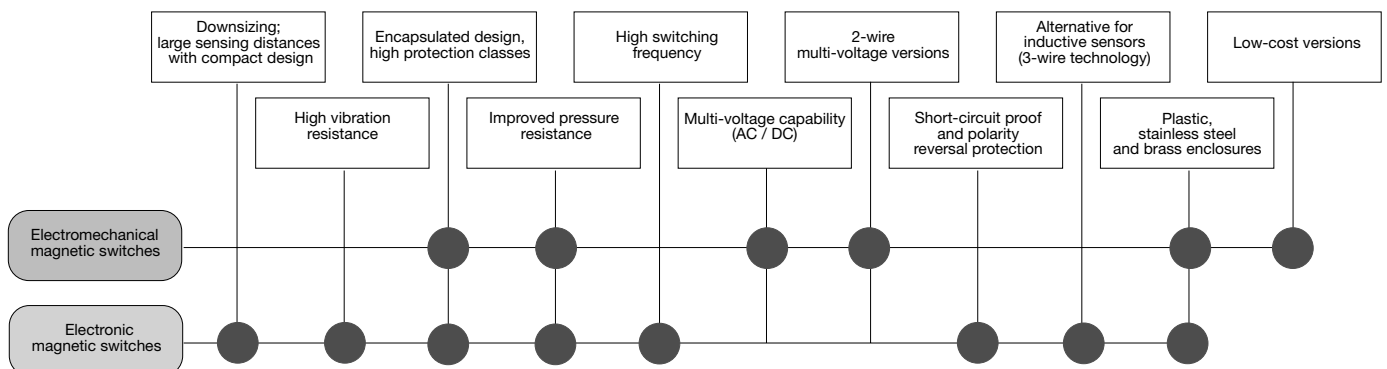
The traditional electromechanical magnetic switches have a very high operational reliability thanks to the use of only one single "active" component (reed contact). The multi-voltage capability and low procurement costs allow these switches to be used in a wide range of applications.

The matrix below highlights the main features for each principle of function and helps you to decide on which magnetic switch to use for your application.



### Technical features and fields of use

More detailed information about the technical features and fields of use for the two principles of function is available in the following chapters.





# Electromechanical magnetic switches

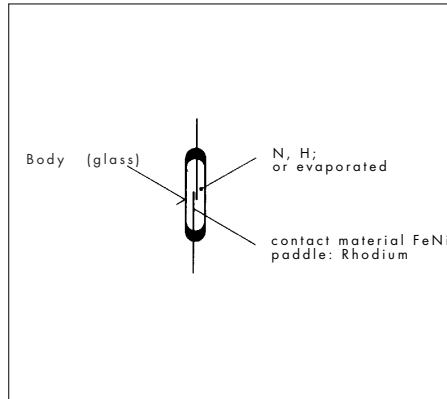
## Bernstein magnetic switches – the advantages

- reliability even under extreme ambient conditions. They are unaffected by dirt, humidity, gases, dust, etc. and operate completely free from wear and tear
- IP 67 protection
- repeatable switching point precision of approx. 0.1 mm
- may be operated from several directions
- can be mounted in any position
- electromechanical magnetic switches normally contain only a single component, thus ensuring high reliability
- easy to mount
- long electrical life (> 10<sup>8</sup> switching cycle lifetime if contacts are suitably protected)
- special types available for extreme temperature ranges (- 40° C to + 150° C)
- AC/DC switching

## Design, function and effect of an electromechanical magnetic switch

The basic elements of this type of switch are the components which change their behaviour when approaching a magnet. The contact paddles invert their polarity (north and south pole) under the influence of a magnetic field. The approach can be made by either permanent magnets or electromagnets; the sensitivity of the switch and the field strength of the magnet determine the sensing distance. Correspondingly the approach or moving away of the magnet controls the opening and closing of the reed contacts. Normally-closed, normally-open and changeover contacts are available in our range of products.

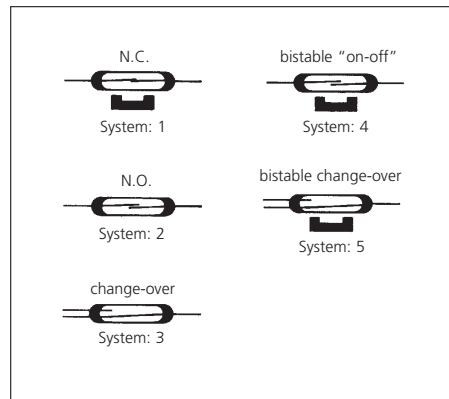
The magnetic switches and their auxiliary components (resistors, diodes, triacs, output stages etc.) are cast in high-quality isolating material or casting compound to increase their resistance to vibration and to guarantee the protection class up to IP 67. For use under extreme ambient conditions such as wider temperature ranges, metal versions (non-corrosive steel, aluminium and brass) as well as standard plastic versions are available.



Construction of a reed contact

### Biasing

Bias magnets energise or hold the bistable or normally-closed contact closed, until a stronger magnet with opposite polarity neutralises the biasing.



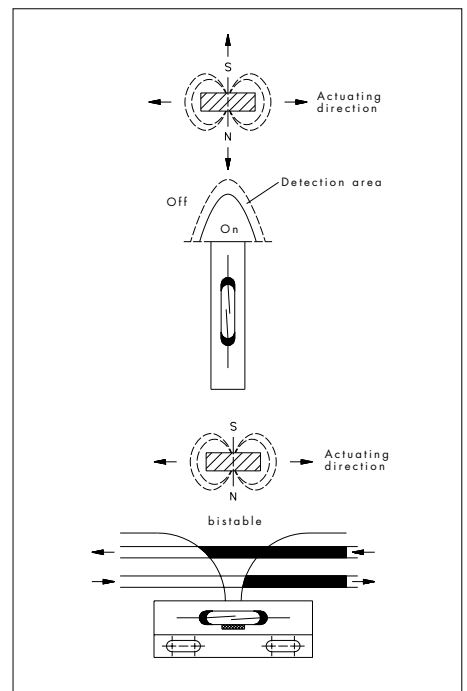
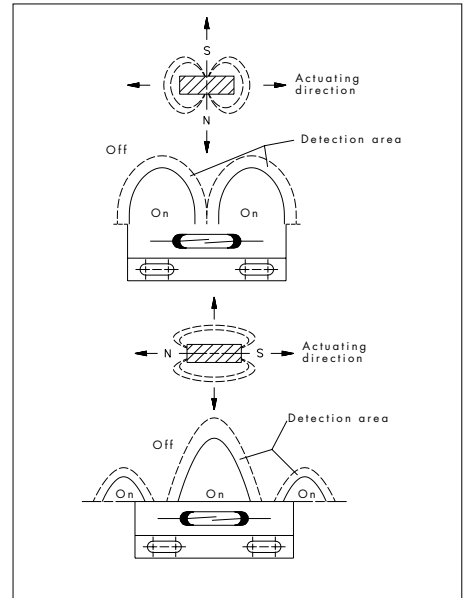
Types of reed contacts

### Actuation and switching behavior

Switching behavior is principally determined by the movement and polarity of the magnet. The following drawings show typical characteristics. Body material and external dimensions are specified in the product overview. The magnetic switches with reed-contact output are identified by an „A“ in the second position of the type code (MA...).

### Switching frequency

Up to 200 Hz, depending on the size of load to be switched (i. e. considerably faster than relays, contactors, etc.).



### Switching distances

Refer to tables of this catalogue to identify which switching magnet may be used and therefore which minimum switching distance will be realised.

## Temperature ranges

The standard version may be used in environments from  $-5^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ . Special types are also available offering an extended operating temperature range of  $-40^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$ .

## Electrical life

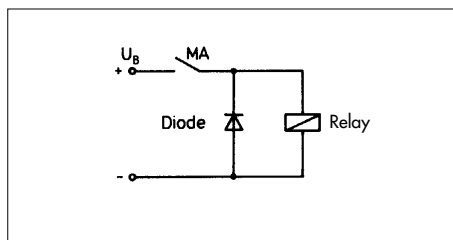
To maintain the long operational life of the electrical contacts, it is important to ensure the maximum supply voltage and maximum switching current are not exceeded. The following graphs show the load values for different contacts.

## Guidelines for reed contact protection

The values for current, performance and voltage specified in the catalogue are valid only for resistive loads. Very often however, these loads will be used in conjunction with inductive or capacitive components when it is advisable to protect the reed contacts against voltage and current spikes. Whilst it is not possible to recommend a safe contact protection that applies to all load ranges (each individual case will require its own evaluation) we would like to present a general introduction to how reed contacts may be connected to different loads for improved operation.

### 1. Inductive loads

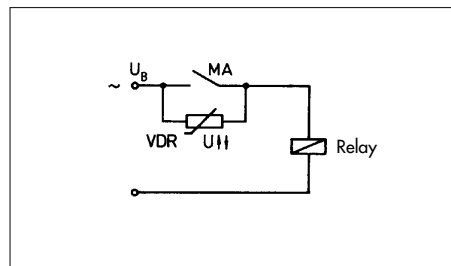
In DC voltage applications, contact protection is realised relatively easily with the help of a reverse polarity diode connected in parallel to the load. The diode polarity is selected so that it will block the normal operating voltage applied but will short-circuit any reverse voltage resulting from the switch being opened. (Note: these reverse voltage peaks can significantly exceed the normal operating voltage.)



Suppression of reverse voltage peaks with a reverse polarity diode

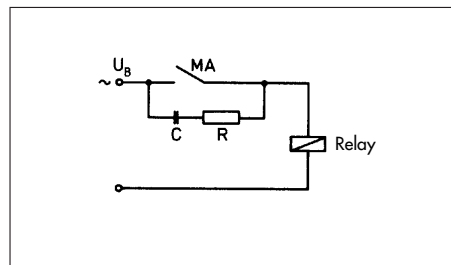
In AC voltage applications, two solutions may be applied.

1) Voltage peaks induced by switching off inductive loads are suppressed by connecting a Voltage Dependent Resistor (VDR) in parallel to the reed contact.



Suppression of reverse voltage peaks with a VDR

2) A Resistive/Capacitive (RC) element is connected in parallel to the contact, thus being in series with the load (vice versa is also possible).

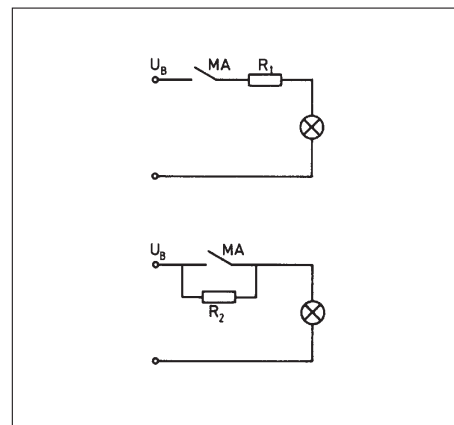
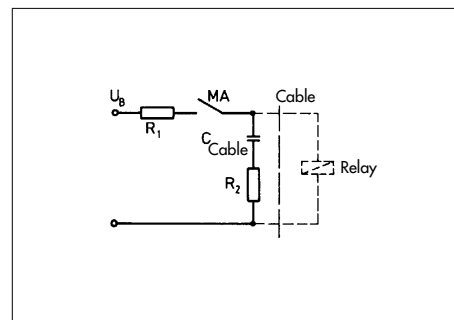


Suppression of reverse voltage peaks with RC network

### 2. Capacitive loads

In contrast to inductive loads, increased making currents can occur in connection with capacitive loads and lamp loads. If charged capacitors are switched (including inherent cable capacities), a sudden discharge occurs that can damage and even weld contacts closed. The intensity of this discharge depends on the capacity and length of the cable leading to the switch but may be decreased by inserting a series resistor. The size of the resistor is determined by the characteristics of the corresponding switching circuit.

It should however be as large as possible to reduce the discharge current to a permissible value to ensure reliable contact protection. These considerations are also valid for charging capacitors.



Contact protection with resistors








## Using the selection matrix








To assist the user in selecting the right sensor for their application, Bernstein developed the following selection matrix. The individual fields match those in the product index to allow rapid selection of the most suitable sensor starting with the model description. By not using detailed technical descriptions the selection is considerably simplified. The corresponding output diagrams are shown on page 223.






# Selection guide electromechanical magnetic switches in threaded and smooth barrels

Model	Switching capacity $S/I_{max.}$	Switching voltage $U_{max.}$	Switching distance $S_{an}$	Output	Housing material	Connection
MA-30 ø 6 x 28 mm	10 VA/0.5 A	250 V	19 mm	N.O.	plastic PA 6.6	cable
	5 VA/0.25 A	100 V	19 mm	change over		
MA-46 ø 6.5 x 40 mm	20 VA/0.5 A	250 V	18 mm	N.O.	plastic PA 6	cable
	20 VA/1 A	150 V	on request	change over		
MA-06 ø 12 x 86 mm	100 VA/3 A	250 V	7 mm	N.O.	aluminium	cable
	60 VA/1 A		10 mm	change over		
	250 VA/5 A		18 mm	bistable		
MA-16 ø 12 x 86 mm	100 VA/3 A	250 V	7 mm	N.O.	stainless steel	cable
	60 VA/1 A		12 mm	change over		
MA-26 ø 12 x 92 mm	100 VA/3 A	250 V	7 mm	N.O.	plastic PA 6	cable
	60 VA/1 A		12 mm	change over		
MA-36 ø 13 x 108 mm	250 VA/5 A	250 V	13 mm	bistable	plastic PA 6.6	cable
MA-04 ø 15.5 x 145 mm	80 VA/1 A	250 V	6 mm	change over	plastic PC	plug
MA-08 M 8 x 1 x 32 mm (Cable) M 8 x 1 x 40 mm (Plug)	10 VA/3 A	250 V	18 mm	N.O.	stainless steel	cable
	20 VA/1 A	100 V	13 mm	change over		
		30 V		plug		
MA-18 M 12 x 1 x 60 mm	10 VA/0.5 A	250 V	18 mm	N.O.	brass, nickel-plated	cable
	60 VA/1 A		12 mm	change over		
MA-28 M 12 x 1 x 60 mm	60 VA/1 A	250 V	15 mm	N.O.	plastic PA	cable
MA-23 M 12 x 1 x 80 mm	100 VA/3 A	250 V	6 mm	N.O.	brass, nickel-plated	cable
MA-33 M 12 x 1 x 80 mm	100 VA/3 A	250 V	7 mm	N.O.	plastic PA 6	cable
	60 VA/1 A		10 mm	change over		
	250 VA/5 A		22 mm	bistable		
MA-17 Pg 9 x 60 mm	30 VA/0.5 A	250 V	12 mm	change over	plastic PA 6	cable
MA-43 Pg 9 x 80 mm	60 VA/1 A	250 V	17 mm	change over	brass, nickel-plated	cable




# Overview electromechanical magnetic switches in smooth barrels




Smooth barrels	MA-30, Ø 6 x 28 mm PA 6.6		MA-46, Ø 6.5 x 39 mm PA 6		MA-06, Ø 12 x 86 mm Al		
							
Switching distance ( $S_{an}$ )	19 mm	19 mm	18 mm	on request	7 mm	10 mm	18 mm
Referring magnet (page)	T-62N/S (228)	T-62N/S (228)	T-62N/S (228)		T-62N/S (228)	T-62N/S (228)	T-62N/S (228)
Switching capacity (diagr.-no.)	10 VA (4)	5 VA (2)	20 VA (7)	20 VA (6)	100 VA (11)	60 VA (9)	250 VA (12)
Max. switching voltage	250 V	100 V	250 V	150 V	250 V	250 V	250 V
Switching function	N.O.	change over	N.O.	change over	N.O.	change over	bistable
Special features	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Designation	MAK-3012-B-1	MAK-3013-X-1	MAK-4612-A-2	MAK-4613-3	MAA-0612-F-1	MAA-0613-L-1	MAA-0614-P-1
Part number	<b>631.1230.571</b>	<b>631.0330.572</b>	<b>631.0246.500</b>	<b>641.0346.336</b>	<b>631.4206.246</b>	<b>631.6306.248</b>	<b>631.0406.554</b>



Smooth barrels	MA-06, Ø 12 x 86 mm Al		MA-16, Ø 12 x 86 mm Stainless steel 1.4305		MA-16, Ø 12 x 86 mm Stainless steel 1.4305		
							
Switching distance ( $S_{an}$ )	16 mm	10 mm	7 mm	12 mm	7 mm		
Referring magnet (page)	T-62N/S (228)	T-62N/S (228)	T-62N/S (228)	T-62N/S (228)	T-62N/S (228)		
Switching capacity (diagr.-no.)	60 VA (9)	60 VA (9)	100 VA (11)	60 VA (9)	100 VA (11)		
Max. switching voltage	250 V	250 V	250 V	250 V	250 V		
Switching function	N.O.	change over	N.O.	change over	N.O.		
Special features	Temp. range -40°C...+150°C	Temp. range -40°C...+150°C	Standard	Standard	Temp. range -40°C...+150°C		
Designation	MAA-0612-NT-4	MAA-0613-LT-1	MAN-1612-F-3	MAN-1613-L-1	MAN-1612-FT-8		
Part number	<b>641.0206.399</b>	<b>631.6306.004</b>	<b>631.4216.476</b>	<b>631.6316.259</b>	<b>631.4216.585</b>		

Smooth barrels	MA-26, Ø 12 x 92 mm PA 6		MA-36, Ø 13 x 108 mm PA 6.6		MA-04, Ø 15.5 x 145 mm PC		
							
Switching distance ( $S_{an}$ )	7 mm	12 mm	13 mm		6 mm		
Referring magnet (page)	T-62N/S (228)	T-62N/S (228)	T-62N/S (228)		T-62N/S (228)		
Switching capacity (diagr.-no.)	100 VA (11)	60 VA (9)	250 VA (12)		80 VA (10)		
Max. switching voltage	250 V	250 V	250 V		250 V		
Switching function	N.O.	change over	bistable		change over		
Special features	Standard	Standard	Standard		plug Amphenol		
Designation	MAK-2612-F-1	MAK-2613-L-1	MAK-3614-P-2		MAK-0413-M-S		
Part number	<b>631.4226.423</b>	<b>631.6326.426</b>	<b>631.0436.553</b>		<b>631.7304.313</b>		

# Overview electromechanical magnetic switches in threaded barrels

Threaded barrels	MA-08, M8 x 1 x 32 mm Stainless steel 1.4305		MA-08, M8 x 1 x 39 mm Stainless steel 1.4305		MA-18, M12 x 1 x 60 mm CuZn39Pb3	
						
Switching distance ( $S_{an}$ )	18 mm	13 mm	13 mm		18 mm	12 mm
Referring magnet (page)	T-62N/S (228)	T-62N/S (228)	T-62N/S (228)		T-62N/S (228)	T-62N/S (228)
Switching capacity (diagr.-no.)	10 VA (4)	10 VA (3)	20 VA (5)		10 VA (4)	60 VA (9)
Max switching voltage	250 V	100 V	30 V		250 V	250 V
Switching function	N.O.	change over	change over		N.O.	change over
Special features	Standard	Standard	plug Ø 6.5		Standard	Standard
Designation	MAN-0812-B-1	MAN-0813-Y-1	MAN-0813-STK		MAM-1812-B-1	MAM-1813-L-1
Part number	<b>631.1208.596</b>	<b>631.0308.597</b>	<b>631.0308.595</b>		<b>631.1218.294</b>	<b>631.6318.002</b>








Threaded barrels	MA-28, M12 x 1 x 60 mm PA		MA-23, M12 x 1 x 80 mm CuZn39Pb3		MA-33, M12 x 1 x 80 mm PA 6		
							
Switching distance ( $S_{an}$ )	15 mm		7 mm		7 mm	10 mm	22 mm
Referring magnet (page)	T-62N/S (228)		T-62N/S (228)		T-62N/S (228)	T-62N/S (228)	T-62N/S (228)
Switching capacity (diagr.-no.)	60 VA (9)		100 VA (11)		100 VA (11)	60 VA (9)	250 VA (12)
Max switching voltage	250 V		250 V		250 V	250 V	250 V
Switching function	N.O.		N.O.		N.O.	change over	bistable
Special features	Standard		Standard		Standard	Standard	Standard
Designation	MAK-2812-L-3		MAM-2312-F-1		MAK-3312-F-2	MAK-3313-L-1	MAK-3314-P-2
Part number	<b>641.6228.260</b>		<b>631.4223.268</b>		<b>631.4233.002</b>	<b>631.6333.005</b>	<b>641.0433.350</b>

Threaded barrels	MA-17, Pg 9 x 60 mm PA 6		MA-43, Pg 9 x 80 mm CuZn39Pb3	
				
Switching distance ( $S_{an}$ )	12 mm		17 mm	
Referring magnet (page)	T-62N/S (228)		T-62N/S (228)	
Switching capacity (diagr.-no.)	30 VA (8)		60 VA (9)	
Max switching voltage	250 V		250 V	
Switching function	N.O.		change over	
Special features	Standard		Standard	
Designation	MAK-1713-K-1		MAM-4313-L-2	
Part number	<b>631.5317.001</b>		<b>631.6343.544</b>	

# Selection guide electromechanical magnetic switches in rectangular housings

Model	Switching capacity $S/I_{max.}$	Switching voltage $U_{max.}$	Switching distance $S_{an}$	Output	Housing material	Connection
MA-11 28.6 x 6.4 x 18 mm	10 VA/0.5 A	250 V	10 mm	N.O.	plastic PA 6.6	cable
	3 VA/0.25 A	130 V	8 mm	change over		
	10 VA/0.5 A	250 V	on request	bistable		
MA-01 45 x 9 x 13 mm	10 VA/0.5 A	250 V	10 mm	N.O.	plastic PA 6.6	cable
MA-45 45 x 9 x 25.5 mm	10 VA/0.5 A	250 V	10 mm	N.O.	plastic PA 6.6	cable
	60 VA/1 A		5 mm	change over		
MA-13 68 x 30 x 15 mm	10 VA/0.5 A	250 V	18 mm	N.O.	plastic PC	cable
	60 VA/1 A		12 mm	change over		
MA-02 80 x 15 x 20 mm	100 VA/3 A	250 V	21 mm	N.O.	plastic PA 6	cable
	30 VA/0.5 A		18 mm	change over		
	250 VA/5 A		on request	bistable		
MA-12 80 x 15 x 20 mm	100 VA/3 A	250 V	21 mm	N.O.	plastic PA 6.6	cable
	60 VA/1 A		24 mm	change over		
			25 mm	bistable		
MA-44 80 x 15 x 30 mm	100 VA/3 A	250 V	19 mm	N.O.	plastic PA 6.6	plug
	80 VA/1 A		22 mm	change over		
	250 VA/5 A		20 mm	bistable		
MA-32 85 x 24 x 26 mm	250 VA/5 A	250 V	16 mm	bistable	plastic PBT	cable plug
MA-42 88 x 13 x 25 mm	100 VA/3 A	250 V	25 mm	N.O.	plastic PA 6.6	cable
	80 VA/1 A		28 mm	change over		
	250 VA/5 A		5 mm	bistable		
MA-03 105 x 25.5 x 58 mm	100 VA/3 A	250 V	10 mm	N.O.	aluminium die casting	screw termination
	80 VA/1 A		10 mm	change over		
	250 VA/5 A		15 mm	bistable		

# Overview electromechanical magnetic switches in rectangular housings

Rectangular housings	MA-11, 28.6 x 6.4 x 18 mm PA 6.6			MA-01, 45 x 9 x 13 mm PA 6.6			MA-45, 45 x 9 x 25.5 mm PA 6.6	
								
Switching distance ( $S_{an}$ )	10 mm	8 mm	on request	10 mm			10 mm	5 mm
Referring magnet (page)	TK-11-11 (229) TK-11-11 (229)			TK-11-01 (229)			TK-45 (229)	TK-45 (229)
Switching capacity (diagr.-no.)	10 VA (4)	3 VA (1)	10 VA (4)	10 VA (4)			10 VA (4)	60 VA (9)
Max. switching voltage	250 V	130 V	250 V	250 V			250 V	250 V
Switching function	N.O.	change over	bistable	N.O.			N.O.	change over
Special features	Standard	Standard	Standard	Standard			Standard	Standard
Designation	MAK-1112-B-1	MAK-1113-1.5	MAK-1114-B-5	MAK-0112-B-1			MAK-4512-B-1	MAK-4513-L-1
Part number	631.1211.541	641.0311.368	631.1411.603	631.1201.288			631.1245.539	631.6345.540
Rectangular housings	MA-13, 68 x 30 x 15 mm PC			MA-02, 80 x 15 x 20 mm PA 6.6			MA-02, 80 x 15 x 20 mm GDAISi 12	
								
Switching distance ( $S_{an}$ )	8 mm			21 mm	18 mm	auf Anfrage	10 mm	30 mm
Referring magnet (page)	T-62N/S (228)			TK-21-02 (229) TK-21-02 (229)			T-62N/S (228)	T-62N/S (228)
Switching capacity (diagr.-no.)	60 VA (9)			100 VA (11)	30 VA (8)	250 VA (12)	100 VA (11)	60 VA (9)
Max. switching voltage	250 V			250 V	250 V	250 V	250 V	250 V
Switching function	N.O.			N.O.	change over	bistable	N.O.	change over
Special features	Standard			Standard	Standard	Standard	Temp. range	Temp. range
							-40°C...+150°C	-40°C...+150°C
Designation	MAK-1313-L-1			MAK-0212-F-1	MAK-0213-K-1	MAK-0214-P-3	MAA-0212-FT-5	MAA-0213-LT-1
Part number	631.6313.004			631.4202.204	631.5302.309	641.9402.397	631.4202.522	631.6302.389
Rectangular housings	MA-12, 80 x 15 x 20 mm PA 6.6			MA-44, 80 x 15 x 30 mm PA 6.6			MA-32, 85 x 24 x 26 mm PBT	
								
Switching distance ( $S_{an}$ )	21 mm	24 mm	25 mm	19 mm	22 mm	20 mm	16 mm	
Referring magnet (page)	TK-21-12 (229)	TK-21-12 (229)	T-62N/S (228)	TK-44 (229)	TK-44 (229)	T-62N/S (228)	T-62N/S (228)	
Switching capacity (diagr.-no.)	100 VA (11)	60 VA (9)	60 VA (9)	100 VA (11)	80 VA (10)	250 VA (12)	250 VA (12)	
Max. switching voltage	250 V	250 V	250 V	250 V	250 V	250 V	250 V	
Switching function	N.O.	change over	bistable	N.O.	change over	bistable	bistable	
Special features	Standard	Standard	Standard	Standard	Standard	Standard	Standard	
Designation	MAK-1212-F-1	MAK-1213-L-1	MAK-1214-L-2	MAK-4412-F-1	MAK-4413-M-1	MAK-4414-P-2	MAK-3214-P-1	
Part number	631.4212.217	631.6312.220	641.0412.143	631.4244.536	631.7344.538	631.0444.562	631.0432.598	

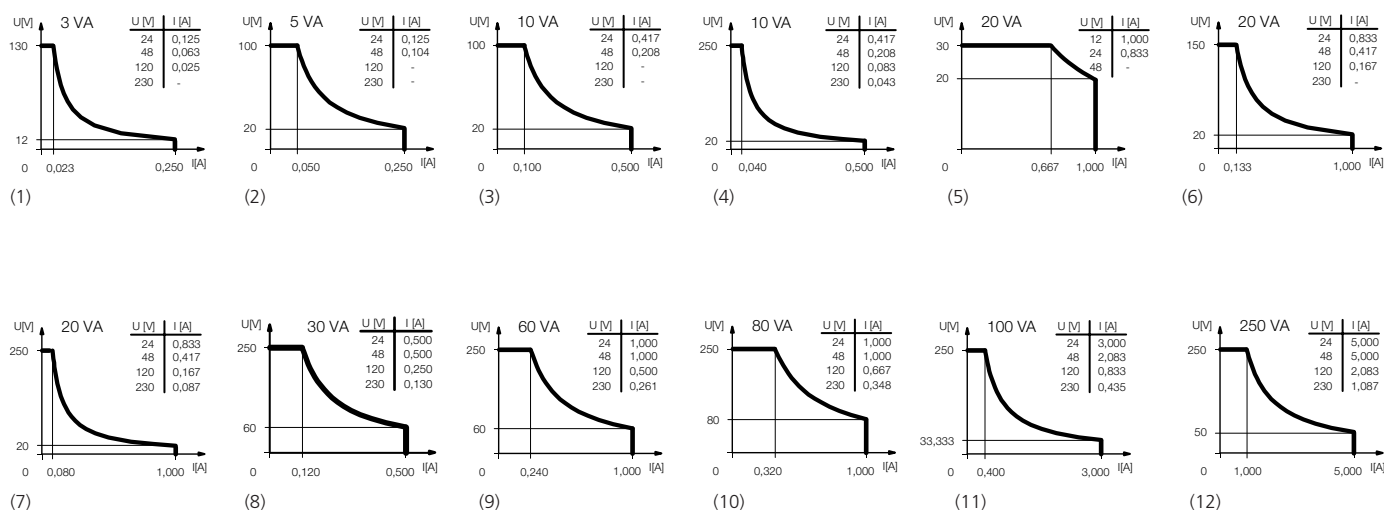
# Overview electromechanical magnetic switches in rectangular housings

Rectangular housings	MA-32, 85 x 24 x 26 mm PBT	MA-42, 88 x 13 x 25 mm PA 6.6			MA-03, 100 x 29.5 x 58 mm GK-AlSi 12		
Switching distance ( $S_{an}$ )	16 mm	25 mm	22 mm	5 mm	10 mm	10 mm	15 mm
Referring magnet (page)	T-62N/S (228)	TK-42 (229)	TK-42 (229)	T-62N/S (228)	TA-31 (230)	TA-31 (230)	T-62N/S (228)
Switching capacity (diagr.-no.)	250 VA (12)	100 VA (11)	80 VA (10)	250 VA (12)	100 VA (11)	80 VA (10)	250 VA (12)
Max. switching voltage	250 V	250 V	250 V	250 V	250 V	250 V	250 V
Switching function	bistable	N.O.	change over	bistable	N.O.	change over	bistable
Special features	plug flat plug 4.8	Standard	Standard	Standard	Standard	Standard	Standard
Designation	MAK-3214-P-STK 4.8	MAK-4212-F-1	MAK-4213-M-1	MAK-4214-P-2	MAA-0312-F	MAA-0313-M	MAA-0314-P
Part number	631.0432.590	631.4242.533	631.7342.535	631.0442.564	631.4203.232	631.7303.312	631.9403.532

## Technical data standard versions electromechanical magnetic switches

Switching current	see output diagram
Temperature range	-5 °C...+70 °C
Protection class (IEC 529, EN 60 529)	IP 67
Repeatable accuracy	≈ ± 0.1 mm
Mech. operational life	> 3 x 10 <sup>8</sup> switching cycles

## Output diagrams electromechanical magnetic switches





## Contact types

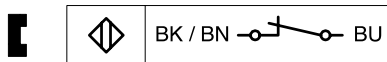
### Electrical loading capacity of reed contacts

Contact type	Performance	Voltage	Current
<b>R</b>	3 VA	28 V	0.25 A
<b>X</b>	5 VA	100 V	0.25 A
<b>B</b>	10 VA	250 V	0.5 A
<b>Y</b>	10 VA	100 V	0.5 A
<b>A</b>	20 VA	250 V	0.5 A
<b>K</b>	30 VA	250 V	0.5 A
<b>H</b>	60 VA	250 V	1.0 A
<b>L</b>	60 VA	250 V	1.0 A
<b>M</b>	80 VA	250 V	1.0 A
<b>F</b>	100 VA	250 V	3.0 A
<b>G</b>	250 VA*	250 V	5.0 A*
<b>P</b>	250 VA*	250 V	5.0 A*

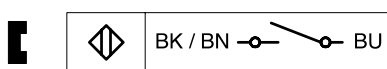
\* max. making current of 2.5 A for duration of 2 ms;  
100 WVA in permanent operation

### Wiring diagrams electromechanical magnet switches

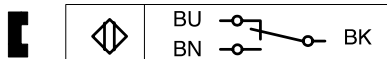
Normally closed



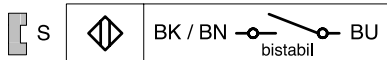
Normally open



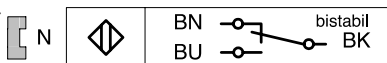
Change over



Bistable ON-OFF

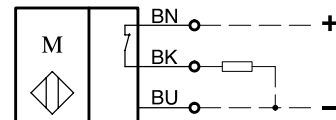


Bistable Change over

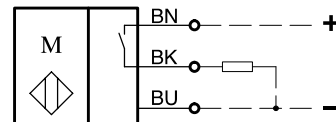


### Wiring diagrams electronic magnet switches

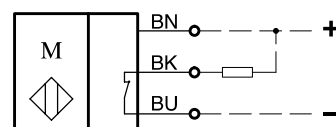
Normally closed, PNP



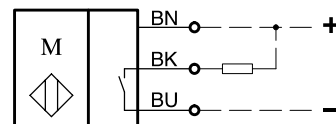
Normally open, PNP/ PNP, bistabil



Normally closed, NPN



Normally open, NPN





# Electronic magnetic switches

## Electronic magnetic switches

The electronic magnetic switches from Bernstein are based on two different physical operating principles: the Hall effect and magneto-resistive (MR) effect. The sensors are characterised by their high sensing range and the absolute non-sensitivity to mechanical influences.

### MR sensor technology

The prime elements of MR sensors are magnetic field dependent, ferromagnetic thin-film resistors. The base material of such a unit is made from silicon to which the ferromagnetic film is applied using electron gun vaporisation.

### Fields of use for MR sensors

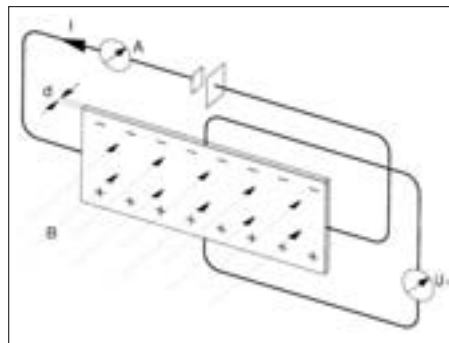
The main application areas for MR sensors are in the detection of current, angles, speed of rotation, position and magnetic fields. Detecting very low magnetic fields is possible with such sensors. An output voltage proportional to the magnetic field can be electrically conditioned. The ability to set the sensitivity or hysteresis allows these sensors to be used in a wide range of applications.



### Hall element technology

The Hall effect is defined as the generation of a voltage difference on the opposing sides of a thin gold wafer through which a current is flowing. This effect also occurs in some semiconductors when certain geometrical conditions are fulfilled. The thickness of the wafer must be very small in relation to the length and width.

Signal Hall elements are used in all types of controllers as contact-free signal sensors. Since the signal voltage is independent of the speed of motion, and in contrast to inductive systems, targets with a very low speed, almost stopped, can be detected.



Schematic description of the Hall effect

### Fields of use for Hall sensors

Since, when the sensor is suitably installed, only the polarity of the Hall voltage or the zero crossing is evaluated, InSb is used as the sensitive material for these Hall elements as its high sensitivity to temperature is not a problem for this application. Having designed the Hall elements for various application areas, they can be used for:

- measuring induction
- measuring tangential and axial components of magnetic induction
- measurements at low temperatures
- contact-free signal generation
- replacing inductive sensors (large sensing distance)

## Selection guide electronic magnetic switches in smooth and threaded barrels and rectangular housings




Designation	Switching current $I_{max}$	Operating voltage $U_b$	Switching distance $S_n^*$	Activity: N = North Pole S = South Pole O = Omnipolar	Output- and switching function: N.O. N.C. bi = bistable	Housing material	Connection
MA-70 ø 6.5 x 25 mm	200 mA	10...30 V	45 mm	O	PNP N.O.	stainless steel 1.4401	cable
MA-61 M 10 x 1 x 40 mm	200 mA	10...30 V	17 mm	N N	PNP N.O. PNP N.C.	plastic PPE, red brass, nickel-plated	cable
MA-62 M 12 x 1 x 46 mm	400 mA	10...30 V	17 mm 35 mm	N N N/S***	PNP N.O. PNP N.C. PNP bi	plastic PA 6, red brass, nickel-plated	cable**
MA-63 M 18 x 1 x 35 mm	400 mA	10...30 V	17 mm 35 mm	N N N/S***	PNP N.O., NPN N.O. PNP N.C., NPN N.C. PNP bi	plastic PA 6, red brass, nickel-plated	cable**
MA-80 8 x 8 x 40 mm	200 mA	10...30 V	45 mm	O	PNP N.O.	brass, nickel-plated	cable
MA-55 12 x 12 x 55 mm	400 mA	10...30 V	17 mm 35 mm	N N N/S***	PNP N.O. PNP N.C. PNP bi	brass, nickel-plated	cable**
MA-52 26 x 13 x 43 mm	200 mA	10...30 V	60 mm	O O	PNP N.O. PNP N.O. PNP N.C. PNP N.C.	plastic PA 12, black	cable**



\* Switching distance referring to magnet T-62N/S  
for magnet T-67N/S approx. 10 % lower switching distance  
for magnet T-69N/S approx. 30 % higher switching distance



\*\* Plug on request

\*\*\* Activity:  
south-pole – switches on  
north-pole – switches off



## Overview electronic magnetic switches in smooth and threaded barrels

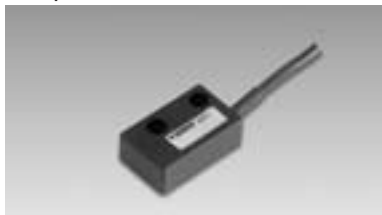
Smooth and threaded barrels		MA-70, Ø 6.5 x 25 mm Stainless steel 1.4401		MA-61, M 10 x 1 x 40 mm PPE, red		MA-61, M 10 x 1 x 40 mm CuZn39Pb3, nickel-plated	
							
Switching distance ( $S_{an}$ )		45 mm		17 mm		17 mm	
Mag. sensitivity		0.5 mT		10 mT		10 mT	
Referring magnet (page)		T-62N/S (228)		T-62N/S (228)		T-62N/S (228)	
Switching function		N.O.		N.C.		N.C.	
PNP	Designation	MEN-70OP2-01.2-2/K		MEK-61NP1-10.2-2/KL		MEK-61NP2-10.2-2/KL	
	<b>Part number</b>	<b>637.3270.067</b>		<b>637.1161.040</b>		<b>637.1261.041</b>	
	Designation	MEM-61NP1-10.2-2/KL		MEM-61NP2-10.2-2/KL			
	<b>Part number</b>					<b>637.1161.043</b>	
	<b>Part number</b>					<b>637.1261.042</b>	

Smooth and threaded barrels		MA-62, M 12 x 1 x 46 mm PA 6, red		MA-62, M 12 x 1 x 46 mm CuZn39Pb3, nickel-plated	
					
Switching distance ( $S_{an}$ )		17 mm		17 mm	
Mag. sensitivity		10 mT		10 mT	
Referring magnet (page)		T-62N/S (228)		T-62N/S (228)	
Switching function		N.C.		N.O.	
PNP	Designation	MEK-62NP1-10.4-2/KL		MEK-62NP2-10.4-2/KL	
	<b>Part number</b>	<b>637.1162.047</b>		<b>637.1262.048</b>	
	Designation	MEK-62SP4-03.4-2/KL		MEM-62NP1-10.4-2/KL	
	<b>Part number</b>	<b>637.3462.049</b>		<b>637.1162.044</b>	
	Designation	MEM-62NP2-10.4-2/KL		MEM-62SP4-03.4-2/KL	
	<b>Part number</b>			<b>637.1262.045</b>	
	<b>Part number</b>			<b>637.3462.046</b>	

Smooth and threaded barrels		MA-63, M 18 x 1 x 35 mm PA 6, red		MA-63, M 18 x 1 x 35 mm CuZn39Pb3, nickel-plated	
					
Switching distance ( $S_{an}$ )		17 mm		17 mm	
Mag. sensitivity		10 mT		10 mT	
Referring magnet (page)		T-62N/S (228)		T-62N/S (228)	
Switching function		N.C.		N.O.	
PNP	Designation	MEK-63NP1-10.4-2/KL		MEK-63NP2-10.4-2/KL	
	<b>Part number</b>	<b>637.1163.053</b>		<b>637.1263.054</b>	
	Designation	MEK-63SP4-03.4-2/KL		MEM-63NP1-10.4-2/KL	
	<b>Part number</b>	<b>637.3463.055</b>		<b>637.1163.050</b>	
	Designation	MEM-63NP2-10.4-2/KL		MEM-63SP4-10.4-2/KL	
	<b>Part number</b>			<b>637.1263.051</b>	
	<b>Part number</b>			<b>637.3463.052</b>	
NPN	Designation	MEK-63NN1-10.4-2/KL		MEM-63NN1-10.4-2/KL	
	<b>Part number</b>	<b>637.1563.069</b>		<b>637.1563.071</b>	
	Designation	MEK-63NN2-10.4-2/KL		MEM-63NN2-10.4-2/KL	
	<b>Part number</b>	<b>637.1663.070</b>		<b>637.1663.072</b>	

## Overview electronic magnetic switches in rectangular housings

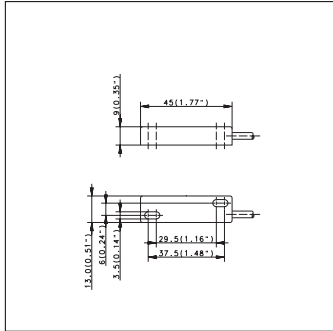
Rectangular housings		MA-80, 8 x 8 x 40 mm CuZn39Pb3, nickel-plated		MA-55, 12 x 12 x 55 mm CuZn39Pb3, nickelé		
						
Switching distance ( $S_{an}$ )		45 mm		17 mm	17 mm	35 mm
Mag. sensivity		0.5 mT		10 mT	10 mT	2.5 mT
Referring magnet (page)		T-62N/S (228)		T-62N/S (228)	T-62N/S (228)	T-62N/S (228)
Switching function		N.O.		N.C.	N.O.	bistable
PNP	Designation	MEM-80OP2-01.2-2/K		MEM-55NP1-10.4-2/KL	MEM-55NP2-10.4-2/KL	MEM-55SP4-03.4-2/KL
	<b>Part number</b>	<b>637.3280.057</b>		<b>637.1155.058</b>	<b>637.1255.059</b>	<b>637.3455.060</b>

Rectangular housings		MA-52, 43 x 26 x 13 mm PA 12, noir	
			
Switching distance ( $S_{an}$ )		60 mm	60 mm
Mag. sensivity		0.1 mT	0.1 mT
Referring magnet (page)		T-62N/S (228)	T-62N/S (228)
Switching function		N.C.	N.O.
PNP	Designation	MEK-52OP1-00.4-2/KL	MEK-52OP2-00.4-2/KL
	<b>Part number</b>	<b>637.3152.075</b>	<b>637.3252.068</b>
NPN	Designation	MEK-52ON1-00.4-2/KL	MEK-52ON2-00.4-2/KL
	<b>Part number</b>	<b>637.3552.073</b>	<b>637.3652.074</b>

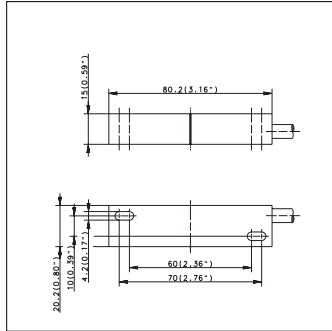
## Technical data standard versions electronic magnetic switches

		MA-70	MA-61	MA-62	MA-63	MA-80	MA-55	MA-52
Operating voltage	$U_B$	10 V...30 V	10 V...30 V	10 V...30 V	10 V...30 V	10 V...30 V	10 V...30 V	10 V...30 V
Rated operating current	$I_B$	≤ 200mA	≤ 200mA	≤ 400mA	≤ 400mA	≤ 200mA	≤ 200mA	≤ 200mA
Switching frequency		≥ 5000 Hz						
Output		short-circuit and overload protection						
Reverse polarity protection		yes						
LED for output function		•	•	•	•	•	•	•
Temperature range		-20 °C/+70 °C						
Protection class		IP 65/IP 67						
Cable (2 m)		•	•	•	•	•	•	•
Plug on request				•	•	•	•	•

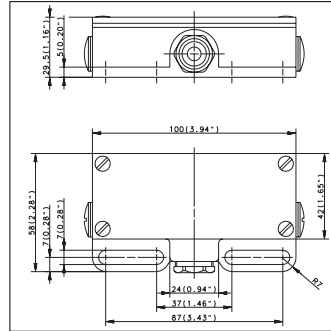
# Dimension diagrams magnetic switches



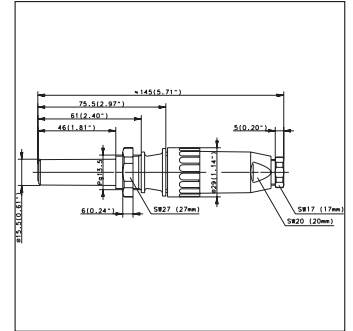
MA-01 Page 222



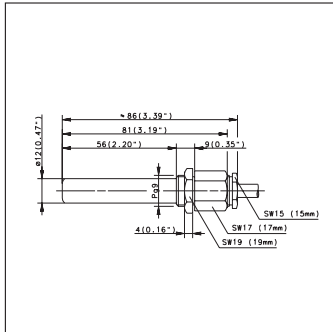
MA-02 Page 222



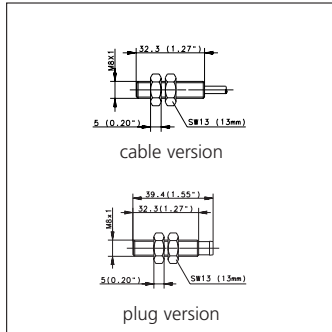
MA-03 Page 223



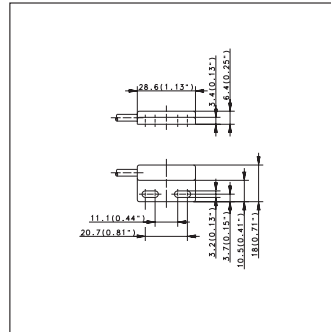
MA-04 Page 219



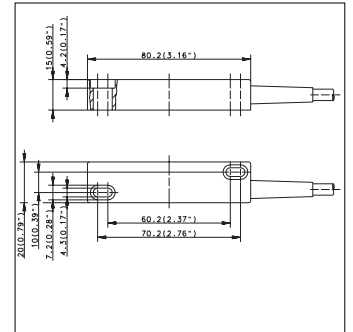
MA-06 Page 219



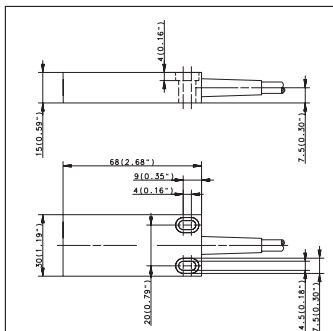
MA-08 Page 220



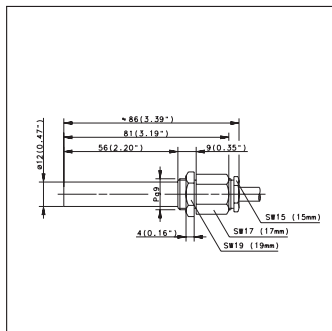
MA-11 Page 222



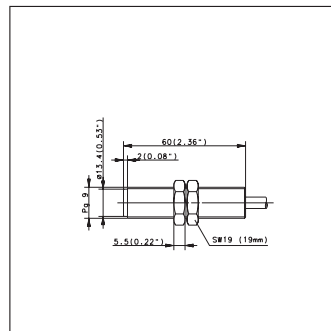
MA-12 Page 222



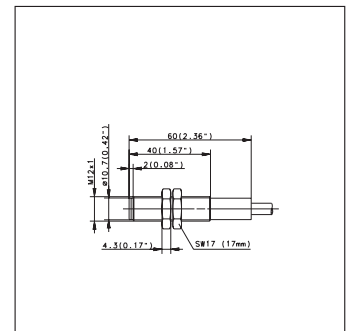
MA-13 Page 222



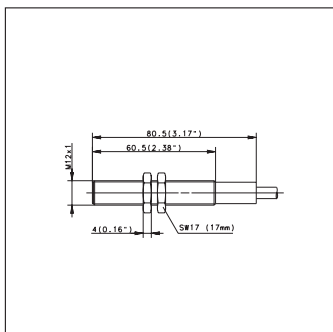
MA-16 Page 219



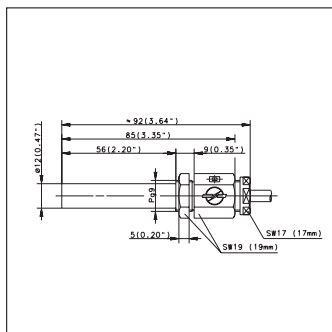
MA-17 Page 220



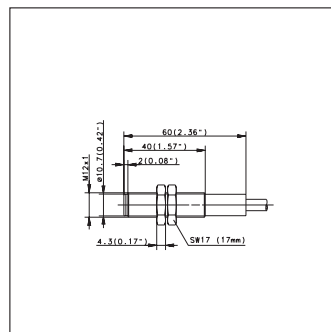
MA-18 Page 220



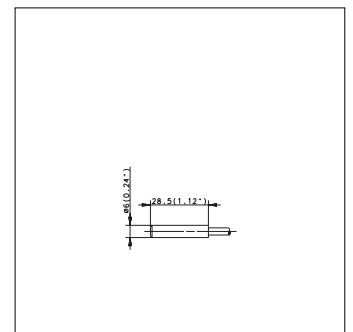
MA-23 Page 220



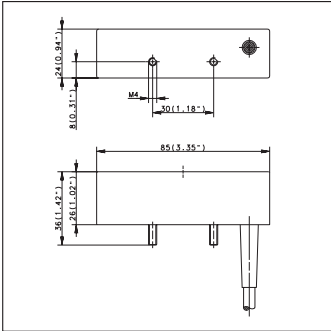
MA-26 Page 219



MA-28 Page 220

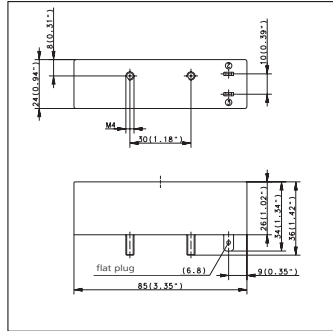


MA-30 Page 219



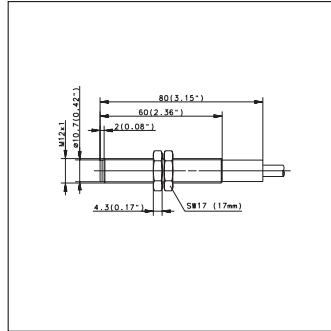
MA-32 (cable)

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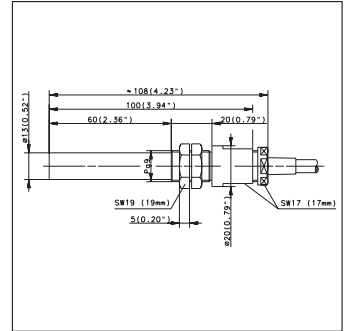
MA-32 (plug)

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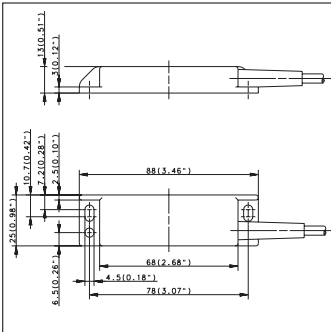
MA-33

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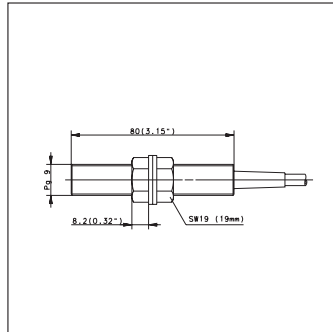
MA-36

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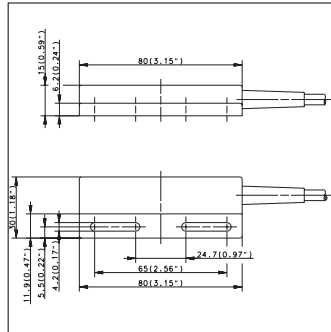
MA-42

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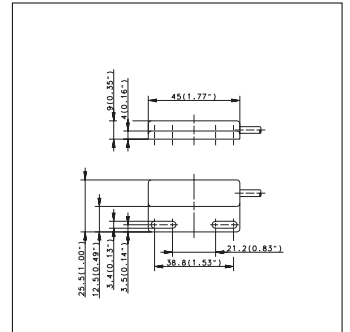
MA-43

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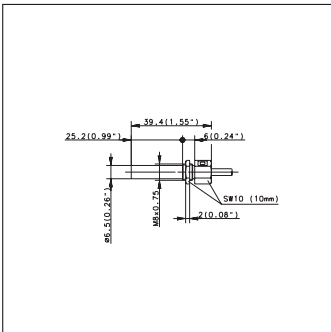
MA-44

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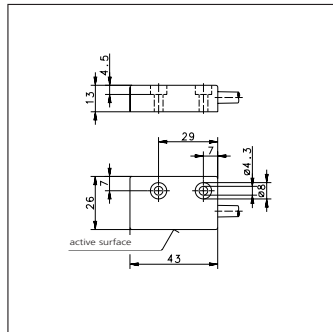
MA-45

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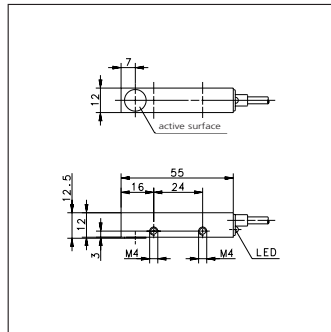
MA-46

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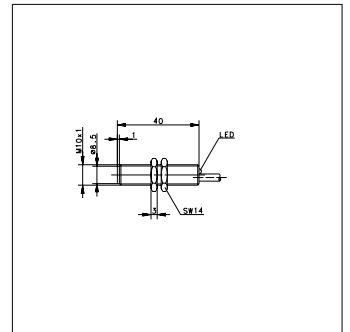
MA-52

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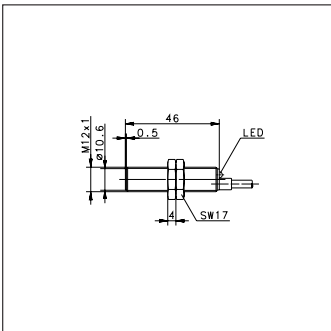
MA-55

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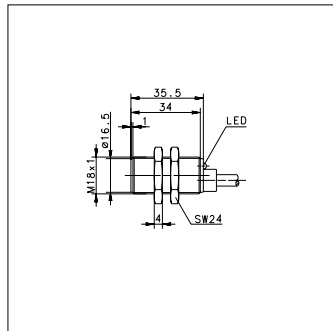
MA-61

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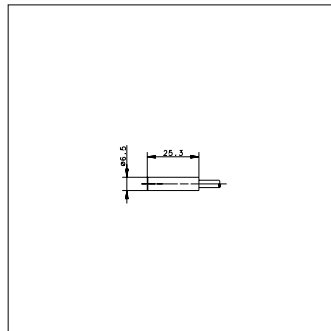
MA-62

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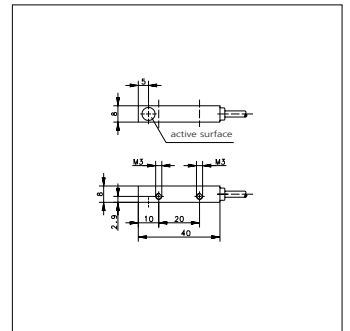
MA-63

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MA-70

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MA-80

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# Designation code

## Electromechanical magnetic switches

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
<b>M</b>	<b>A</b>	<b>K</b>	<b>-</b>	<b>0</b>	<b>8</b>	<b>1</b>	<b>2</b>	<b>-</b>	<b>D</b>	<b>-</b>	<b>1</b>	<b>-</b>	<b>S</b>	<b>O</b>	<b>K</b>	
Product group			Design		Contact specifications				Cable length		Special features					

### Product group

- 1** M = Magnetic switch, general
- 2** Output type
  - A = reed contact
  - I = TRIAC
  - M = mechanical usage
  - Q = mercury contact
  - R = relay
- 3** Housing material
  - A = aluminium
  - N = stainless steel
  - M = brass, nickel-plated
  - K = plastic
  - O = other materials

### Design

- 4** Dash
- 5/6** Designation description
  - 01 = 45 x 9 x 13 mm
  - 02 = 80 x 15 x 20 mm
  - 03 = 100 x 29.5 x 58 mm
  - 04 = RD 15.5 x 145 mm
  - 06 = RD 12 x 86 mm
  - 08 = M 8 x 1 x 32 mm
  - 11 = 28.6 x 6.4 x 18 mm
  - 12 = 80 x 15 x 20 mm
  - 13 = 68 x 30 x 15 mm
  - 16 = RD 12 x 86 mm
  - 17 = Pg 9 x 60 mm
  - 18 = M 12 x 1 x 60 mm
  - 23 = M 12 x 1 x 80 mm
  - 26 = RD 12 x 92 mm
  - 28 = M 12 x 1 x 60 mm
  - 30 = RD 6 x 28 mm
  - 31 = Pg 9 x 100 mm
  - 32 = 85 x 24 x 26 mm
  - 33 = M 12 x 1 x 80 mm
  - 36 = RD 13 x 108 mm
  - 42 = 88 x 13 x 25 mm
  - 43 = Pg 9 x 80 mm
  - 44 = 80 x 15 x 30 mm
  - 45 = 45 x 9 x 25.5 mm
  - 46 = RD 6.5 x 40 mm

### Contact specifications

- 7** Number of contacts
  - e. g. 1 = 1 reed contact
  - 2 = 2 reed contacts
  - etc.
- 8** Contact function
  - 1 = N.C.
  - 2 = N.O.
  - 3 = change over
  - 4 = bistable (on-off)
  - 5 = bistable (change over)
  - 6 = N.C., N.O.;  
separate contacts
  - 7 = coded, BG
  - 8 = not used at present
  - 9 = not used at present
  - 0 = other outputs
- 9** Dash
- 10** Performance of reed contacts
  - A = 250 VDC; 0.5 A; 20 VA
  - B = 250 VDC; 0.5 A; 10 VA
  - C = 250 VDC; 0.5 A; 30 VA
  - D = 250 VDC; 0.5 A; 30 VA
  - E = 250 VDC; 1.5 A; 30 VA
  - F = 250 VDC; 3 A; 100 VA
  - G = 250 VDC; 5 A; 250 VA
  - H = 250 VDC; 1 A; 60 VA
  - K = 250 VDC; 0.5 A; 30 VA
  - L = 250 VDC; 1 A; 60 VA
  - M = 250 VDC; 1 A; 80 VA
  - N = 250 VDC; 1 A; 60 VA
  - O = 120 VDC; 0.5 A; 10 VA
  - P = 250 VDC; 5 A; 250 VA
  - R = 28 VDC; 0.25 A; 3 VA
  - W = 250 VDC; 1.0 A; 60 VA
  - X = 100 VDC; 0.25 A; 5 VA
  - Y = 100 VDC; 0.5 A; 10 VA

### TRIAC usage:

- K = 24 - 250 VDC; 1.5 A
  - a. 300 VA
  - b. 330 VA

### 11 Dash

- 12** Cable length in metres
  - e. g. 1 = 1 m cable
  - 2 = 2 m cable
  - etc.

### 13 Dash

### 14-17 Special features

- EX = explosion-protected
- T = temperature resistance from  
- 40 °C to + 150 °C
- SI = with fine-wire fuse
- VDR = with VDR
- WID = with resistor
- LED = with LED
- Diode = with diode
- SPK = spiral cable
- SK = special cable
- SOK = plug type without head  
(without device connector)
- SMK = plug type with head  
(without device connector)
- Pg 11 = Pg11 screw thread version
- SSW = downtime connector with relay
- RZ = time delay with relay
- RE = relay
- 220V = 220V version
- 24 V = 24V version

# Designation code

## Electronic magnetic switches

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
<b>M</b>	<b>E</b>	<b>K</b>	<b>-</b>	<b>0</b>	<b>2</b>	<b>N</b>	<b>P</b>	<b>2</b>	<b>-</b>	<b>1</b>	<b>0</b>	<b>.</b>	<b>4</b>	<b>-</b>	<b>5</b>	<b>/</b>	<b>L</b>
Product group				Design		Polarity	Output	Function		Magnetic sensitivity			Output current		Options		

### Product group

- 1** M = Magnetic switch, general
- 2** E = electronic type
- 3** Housing material
  - A = aluminium
  - N = stainless steel
  - M = brass, nickel-plated
  - K = plastic
- 4** Dash

### Design

- 5/6** Designation description
  - 52 = 43 x 26 x 13 mm
  - 55 = 12 x 12 x 55 mm
  - 61 = M 10 x 1 x 40 mm
  - 62 = M 12 x 1 x 46 mm
  - 63 = M 18 x 1 x 35 mm
  - 70 = RD 6.5 x 25 mm
  - 80 = 8 x 8 x 40 mm

### Polarity

- 7** N = north pole
- S = south pole
- O = omnipolar (north and south pole)

Bistable types:  
The polarity describes the pole, which switches on the device.

### Output

- 8** P = PNP
- N = NPN
- R = Relay
- G = complementary

### Function

- 9** 1 = N.C.
- 2 = N.O.
- 3 = not used at present
- 4 = bistable
- 5 = not used at present
- 6 = not used at present
- 7 = not used at present
- 8 = not used at present
- 9 = not used at present
- 0 = other

**10** Dash

### Magnetic sensitivity

**11/12** Average value in mT:  
e. g. 10 = 10 mT  
05 = 5 mT  
(the lower the value, the higher the sensitivity)

**13** Dot

### Output current

- 14** 4 = 400 mA
- 2 = 200 mA
- 0 = other

**15** Dash

### Options

- 16** Cable length in metres
- S = plug
- 17** Dash
- 18** L = LED
- K = short circuit proof
- X = customer specific features
- A = 10 - 30 VDC

# Magnets

## 1. Hard Ferrite Magnets

Barium and strontium hard ferrites are economical, reliable components that are also used in automation, control and measurement applications. If operated in higher temperature ranges, the specified switching distance will decrease by a factor of 0.2% per 1°C.

### Chemical characteristics:

Ferrite magnets are oxide ceramics. They are made from approx. 80% iron oxide and 20% barium- or strontium oxide. The magnets are resistant to a large number of chemicals including solvents, dyes and weak acids. If strong organic and inorganic acids (e.g. hydrochloric, sulphuric and hydrofluoric acid) are used, their resistance is basically determined by the temperature, concentration and reaction time of the medium. In general, the resistance should first be determined using longterm tests.

### Mechanical characteristics:

Due to their ceramic character, ferrites are brittle and are sensitive to shock and bending loads.



## 2. Rare-earth magnets

Permanent magnets that are made from samarium cobalt and neodymium iron boron are high-performance and high-quality components that are especially used in drive and control engineering.

If used in higher temperature ranges, the specified switching distance has to be decreased by a factor of 0.02% per 1°C.

### Chemical characteristics:

All rare-earth magnets are metallic materials and show the corresponding characteristics associated with these materials (e.g. the polished shine immediately after being processed). The magnets will oxidise in moist surroundings and acidic environments may decompose them. Conversely, the magnets are extremely resistant to alkaline environments. In water with a pH-value of 7, rare-earth magnets will show only slight surface oxidation but otherwise are resistant.

### Mechanical characteristics:

Minor chips may occur if rare-earth magnets are submitted to impact stress. They respond very sensitively to vibrations and may become demagnetised.

## 3. Plastic magnets

Plastic-bound permanent magnets have an interesting cost-performance ratio and can be produced in a large variety of shapes. Sprayed magnets are typical composite materials. The magnetic powder is embedded in thermoplastics (polyamides), allowing the most diverse shapes to be created.

### Chemical characteristics:

Surface corrosion can rarely be found on plastic-bound magnets. For this reason, they can be used in most application fields without additional coating.

### Mechanical characteristics:

Plastic magnets can be submitted at any time to bending and vibrations without breaking or chipping.

### **Application in explosion-hazardous surroundings**

Magnets must not be handled in explosion-hazardous surroundings since they can cause sparks. Grit and chips from rare earth magnets are self-igniting and burn off with very high temperatures. They should therefore only be machined using a lot of water and never in dry conditions since even dried grinding dust can ignite.

### **Strong magnetic fields**

Strong magnetic fields can interfere or even damage electronic or mechanical equipment. This includes cardiac pacemakers. Appropriate safety clearances are specified in the corresponding manuals or may be requested from the manufacturers.

### Radioactive radiation

Permanent magnets must not be submitted to long term radioactive radiation or they may lose their magnetisation.

### General stability

Rare earth magnets must be stored in dry conditions in order to avoid oxidation. They are not suitable for all environments since they are also partially soluble.

### Effects on persons

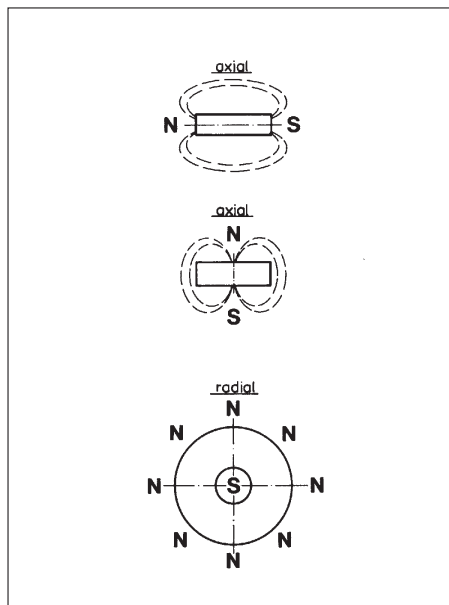
There are no known side-effects caused by touching magnet materials.

### Magnet shapes

Rectangular, circular and cylindrical magnets are the most common shapes of permanent magnets. In addition to these standard shapes, permanent magnets may be manufactured in many other shapes. The shape is in most cases designated during the pressing of the magnet, since any later shaping can only be performed using complex diamond tools. Holes and openings can only be inserted in line with the pressing direction.

### Magnetisation direction

Magnetisation in alignment with the formed magnetic crystals is preferred since this allows the highest magnetic values to be achieved.



The preferred direction is achieved by submitting the magnetic powder to a strong external magnetic field (coil) during the pressing process. As magnets have no preferred direction the magnetisation direction and type can be selected freely.

### Instructions for mounting a magnetic switch-system on ferromagnetic materials

If magnetic limit switches and their corresponding magnets are mounted on magnetisable material (Fe, etc.), the nominal distance may be reduced. To ensure error-free operation, a minimum gap of 15 mm between the magnetic switch and any material which can be magnetised should be maintained as a guide value. The same applies to magnets.

### Applications

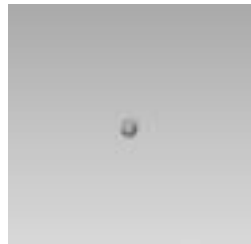
- counting
- position indication in lifts
- end-stop switches in pneumatic and hydraulic installations
- indication on claps, sliders and valves
- conveyors in high-bay shelving
- position detection in textile, packaging and meat-cutting machines
- run-time and down-time monitoring of machines
- control of machine tools
- level control of liquids (see page 240 ff. for more details)

# Accessories

## Magnets without encapsulation

### Magnets without encapsulation

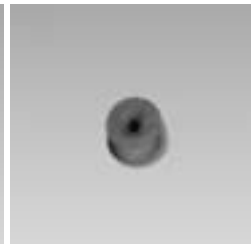
T-75



T-61N/S



T-67N/S

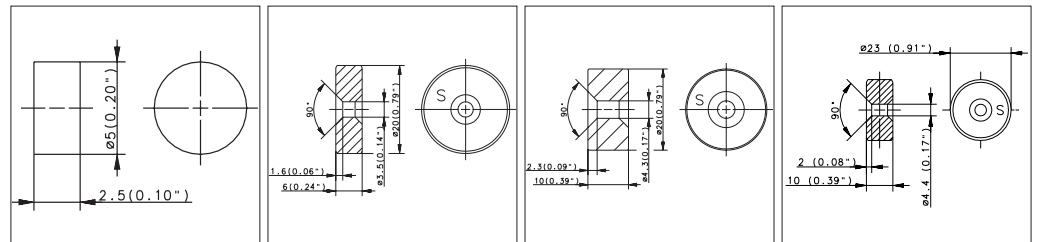


T-62N/S



Magnet material	Rare-earth	Bariumferrite	Bariumferrite	Bariumferrite
Temperature range (in relation to magnetic switch application)	-40 °C...+150 °C -40 °F...+302 °F	-40 °C...+150 °C -40 °F...+302 °F	-40 °C...+150 °C -40 °F...+302 °F	-40 °C...+150 °C -40 °F...+302 °F
Temperature coefficient	0.2 %/K	0.2 %/K	0.2 %/K	0.2 %/K
Housing material	-	-	-	-
<b>Part number</b>	<b>630.1175.057</b>	<b>630.1261.035</b>	<b>630.1167.054</b>	<b>630.1262.039</b>

All dimensions in mm (inch)

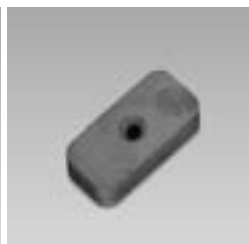


### Magnets without encapsulation

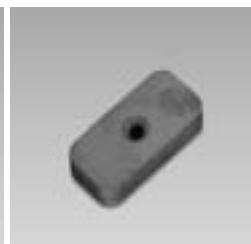
T-69N/S



T-68N

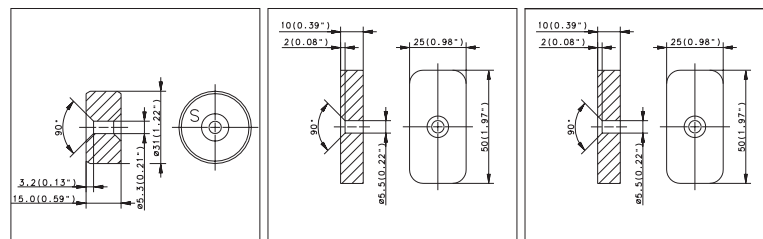


T-68S



Magnet material	Bariumferrite	Bariumferrite	Bariumferrite
Temperature range (in relation to magnetic switch application)	-40 °C...+150 °C -40 °F...+302 °F	-40 °C...+150 °C -40 °F...+302 °F	-40 °C...+150 °C -40 °F...+302 °F
Temperature coefficient	0.2 %/K	0.2 %/K	0.2 %/K
Housing material	-	-	-
<b>Part number</b>	<b>630.1269.031</b>	<b>630.1268.028</b>	<b>630.1368.033</b>

All dimensions in mm (inch)



90° chamfering  
on north pole side

90° chamfering  
on south pole side

# Accessories

## Magnets in plastic housings

### Magnets in plastic housings

TK-11-11



TK-11-01



TK-21-02

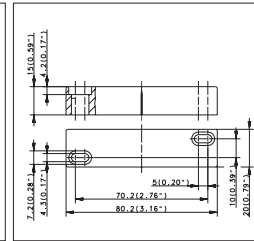
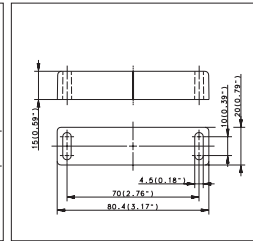
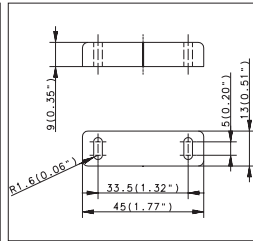
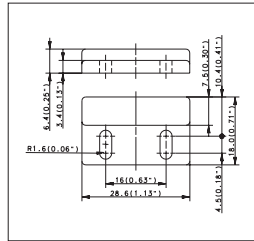


TK-21-12



Magnet material	AlNiCo-500	AlNiCo-500	AlNiCo-500	AlNiCo-500
Temperature range (in relation to magnetic switch application)	-20 °C...+80 °C -4 °F...+176 °F	-20 °C...+80 °C -4 °F...+176 °F	-20 °C...+80 °C -4 °F...+176 °F	-20 °C...+80 °C -4 °F...+176 °F
Temperature coefficient	0.2 %/K	0.2 %/K	0.2 %/K	0.2 %/K
Housing material	PA 6.6	PA 6.6	PA 6.6	PA 6.6
Part number	630.2111.047	630.3111.001	630.3121.002	630.2121.030

All dimensions in mm (inch)



### Magnets in plastic housings

TK-45



TK-42



TK-44

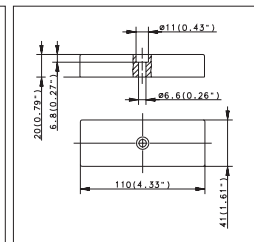
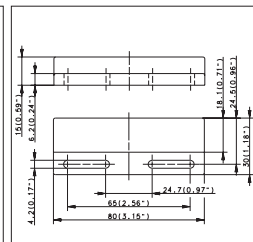
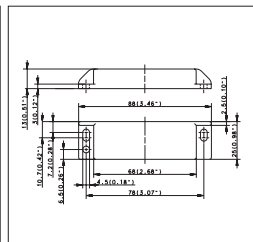
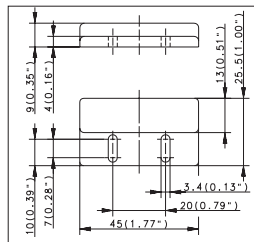


TK-50



Magnet material	AlNiCo-500	AlNiCo-500	AlNiCo-500	Bariumferrit
Temperature range (in relation to magnetic switch application)	-20 °C...+80 °C -4 °F...+176 °F	-20 °C...+80 °C -4 °F...+176 °F	-20 °C...+80 °C -4 °F...+176 °F	-20 °C...+80 °C -4 °F...+176 °F
Temperature coefficient	0.2 %/K	0.2 %/K	0.2 %/K	0.2 %/K
Housing material	PA 6.6	PA 6.6	PA 6.6	PA 6.6
Part number	630.2145.048	630.2142.049	630.2144.050	630.2100.053

All dimensions in mm (inch)



# Accessories

## Magnets in metal housings

### Mounting brackets

#### Magnets in metal housings

TA-21-02



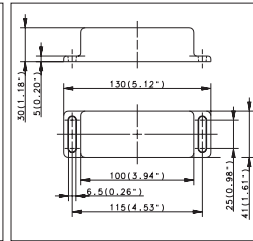
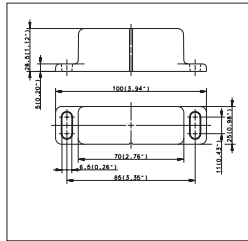
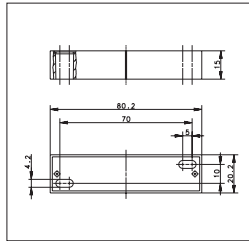
TA-31



TA-33

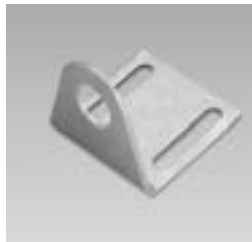


Magnet material	AlNiCo-500	AlNiCo-500	Bariumferrit
Temperature range (in relation to magnetic switch application)	-40 °C...+150 °C -40 °F...+302 °F	-20 °C...+80 °C -4 °F...+176 °F	-20 °C...+80 °C -4 °F...+176 °F
Temperature coefficient	0.2 %/K	0.2 %/K	0.2 %/K
Housing material	Al	Al	Al
<b>Part number</b>	<b>630.5121.064</b>	<b>630.3131.005</b>	<b>630.3133.034</b>
Dimension diagrams			



#### Mounting brackets

BWN-M06NI/40 x 47



BWN-M06NI/MAGNET



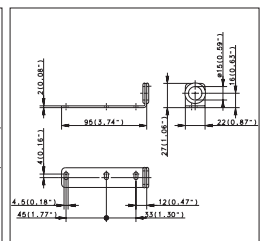
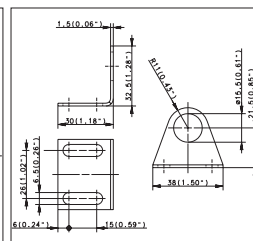
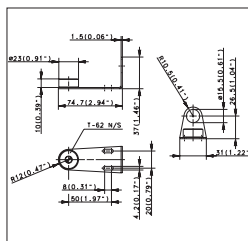
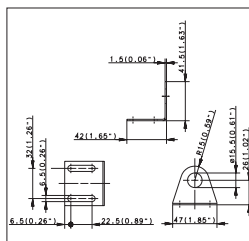
BWN-M06NI/27 x 38



BWN-M36NI



Material	Niro 1.4301	Niro 1.4301	Niro 1.4301	Niro 1.4301
for models	MA-06, MA-16, MA-26, MA-15	MA-06, MA-16, MA-26, MA-15	MA-06, MA-16, MA-26, MA-15	MA-06, MA-16, MA-26, MA-15
<b>Part number</b>	<b>410.2802.001</b>	<b>490.4702.036</b>	<b>410.2802.002</b>	<b>490.4700.035</b>
Dimension diagrams				



# Accessories

## Miniature snap-in connectors

### Miniature snap-in connectors

#### Terminal code

- 1 = brown
- 2 = black
- 3 = blue



GDK-R06US/S00-2.5PU



GDK-R06US/S00-5PU



WDK-R06US/S00-2.5PU



WDK-R06US/S00-5PU




Material of cable sleeve	PUR	PUR	PUR	PUR
Material of coupling	PA 12	PA 12	PA 12	PA 12
Material of body	POM	POM	POM	POM
Operating voltage	60 VAC/75 VDC	60 VAC/75 VDC	60 VAC/75 VDC	60 VAC/75 VDC
Current-carrying capacity	3A	3A	3A	3A
Temperature range	-25 °C...+90 °C -13 °F...+194 °F	-25 °C...+90 °C -13 °F...+194 °F	-25 °C...+90 °C -13 °F...+194 °F	-25 °C...+90 °C -13 °F...+194 °F
Cable length	2.5 m	5 m	2.5 m	5 m
Cable structure	3 x 0.25 mm <sup>2</sup>	3 x 0.25 mm <sup>2</sup>	3 x 0.25 mm <sup>2</sup>	3 x 0.25 mm <sup>2</sup>
Protection class after installation	IP67/NEMA 4	IP67/NEMA 4	IP67/NEMA 4	IP67/NEMA 4
<b>Part number</b>	<b>413.9100.219</b>	<b>413.9100.220</b>	<b>413.9100.221</b>	<b>413.9100.222</b>
Dimension diagrams				



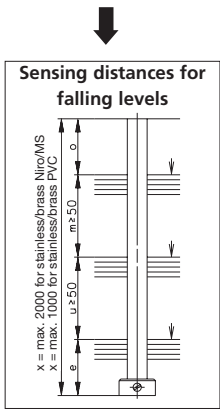
# Standard float switches

## Type code

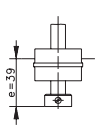
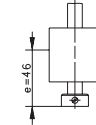
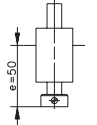
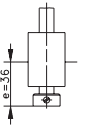
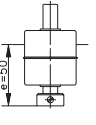
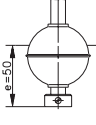
Ordering example  
s. page 246

Position	1	2	3	4
Version	Magnetic float switch	Output type reed contact	Combination switching tube/float	
Typ	M	A		-

### Min./max. dimensions



### Combination switching tube/float

		POM Ø40 x 27	PVC Ø42 x 44	PP Ø30 x 44	NBR Ø30 x 44	1.4571 Ø45 x 47	1.4571 Ø52
Material connecting head	Material switching tube						
		$e=39$	$e=16$	$e=50$	$e=36$	$e=50$	$e=50$



1.4571	1.4571	A	V	T	R	N	E
MS 59	MS 63	M	L	C	S	P	F
PVC	PVC	K	D	I	U	—	—



1.4571	1.4571	A	V	T	R	N	E
MS 58 / gal. Zn25C	MS 63	M	L	C	S	P	F
PVC	PVC	K	D	I	U	—	—



PC	1.4571	A	V	T	R	N	E
PC	MS 63	M	L	C	S	P	F
PC	PVC	K	D	I	U	—	—

5	6	7	8	9	10	11	12	13
General design	Number of switching points	Switching function		Switching capacity	Connecting head	Standard programme		Special features (see page 247)
7	□	□		□	□	S		□


		Number of switching points	Switching function	Switching capacity	Connecting head	
1.4571 Ø62	1.4571 Ø84	1 switching point 2 switching points 3 switching points	1 normally-closed contact 2 normally-open contact 3 changeover contact 4 mixed version (CO, NC, NO)	max. 0.5 A - 30VA - 250 V max. 1A - 60VA - 250 V	straight type type in illustration in 1.4571 material. Slight variations may occur for PVC and MS (brass) versions.	bent type type in illustration in 1.4571 material. Slight variations may occur for PVC and MS (brass) versions.
					ID letter connecting head	ID letter connecting head

B	G	1/2/3	1/2/3/4	K	L	A		
O	H	1/2/3	1/2/3/4	K	L	A		
—	—	1/2/3	1/2/3/4	K	L	A		
B	G	1/2/3	1/2/3/4	K	L	V		
O	H	1/2/3	1/2/3/4	K	L	V		
—	—	1/2/3	1/2/3/4	K	L	V		
B	G	1/2/—	1/2/3/4	K	L	T		
O	H	1/2/—	1/2/3/4	K	L	T		
—	—	1/2/—	1/2/3/4	K	L	T		

# Standard float switches

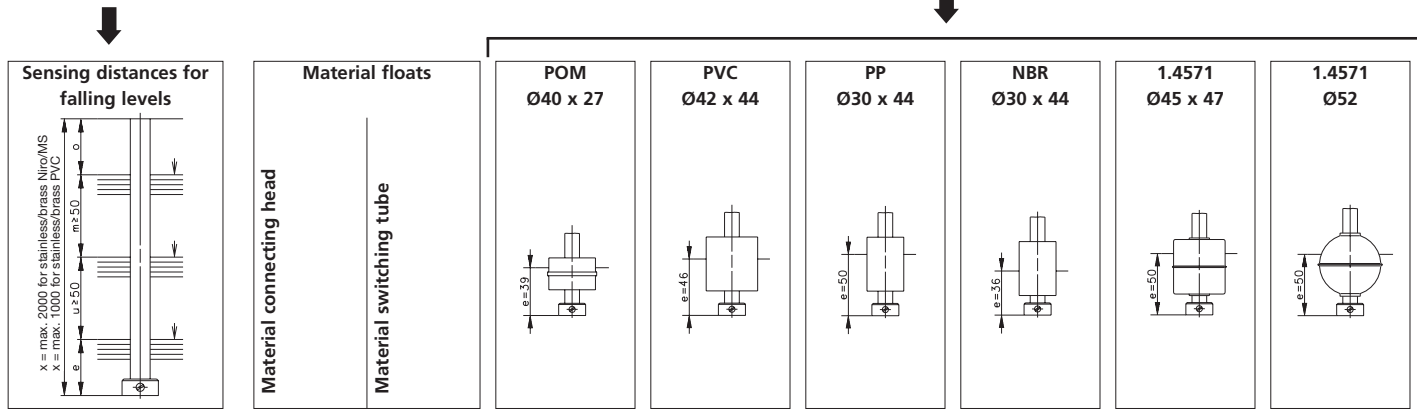
## Type code

Ordering examples  
s. page 246

Position	1	2	3	4
Version	Magnetic float switch	Output type reed contact	Combination switching tube/float	
Type	M	A		-

### Min./max. dimensions

### Combination switching tube/float - float 242



PC	1.4571	A	V	T	R	N	E
PC	MS 63	M	L	C	S	P	F
PC	PVC	K	D	I	U	—	—

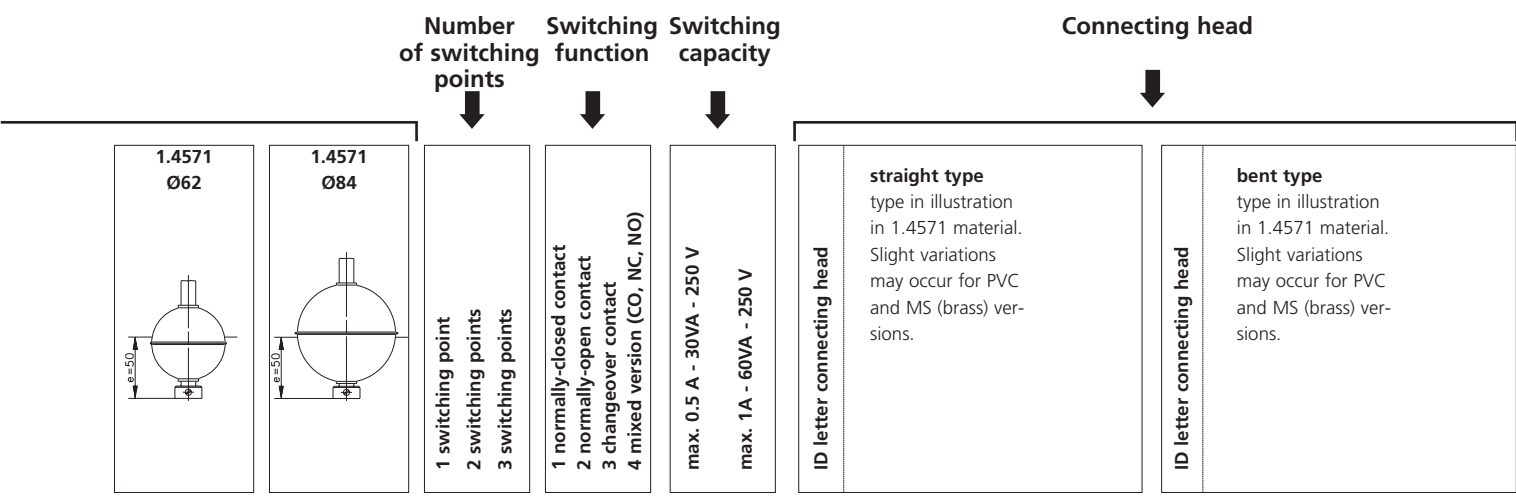


G-AI Si 12	1.4571	A	V	T	R	N	E
G-AI Si 12	MS 63	M	L	C	S	P	F
G-AI Si 12	PVC	K	D	I	U	—	—

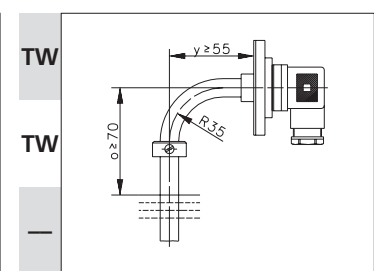
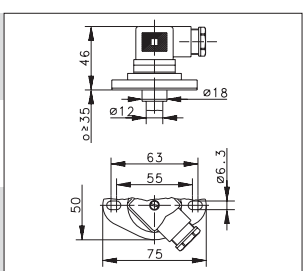


G-AI Si 12	1.4571	A	V	T	R	N	E
G-AI Si 12	MS 63	M	L	C	S	P	F
G-AI Si 12	PVC	K	D	I	U	—	—

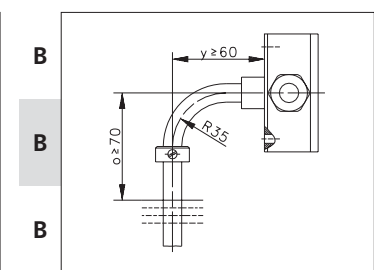
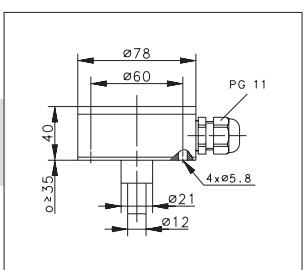
5	6	7	8	9	10	11	12	13
General design	Number of switching points	Switching function		Switching capacity	Connecting head	Standard programme		Special features (see page 247)
7	□	□		□	□	S		□



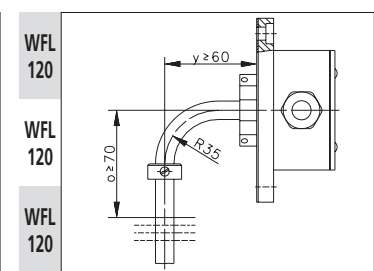
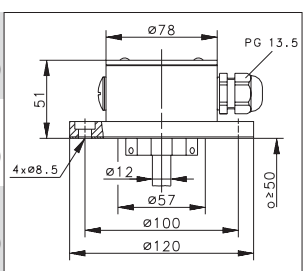
B	G	1/2	1/2/3/4	K	L	TO
O	H	1/2	1/2/3/4	K	L	TO
—	—	1/2	1/2/3/4	K	L	TO



B	G	1/2/3	1/2/3/4	K	L	S
O	H	1/2/3	1/2/3/4	K	L	S
—	—	1/2/3	1/2/3/4	K	L	S




B	G	1/2/3	1/2/3/4	K	L	FL 120
O	H	1/2/3	1/2/3/4	K	L	FL 120
—	—	1/2/3	1/2/3/4	K	L	FL 120



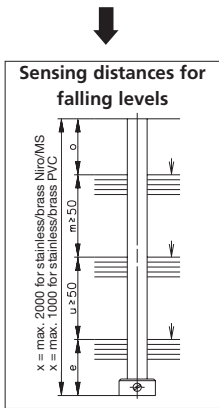
# Standard float switches

## Type code

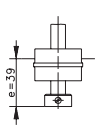
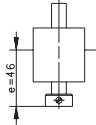
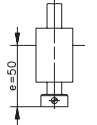
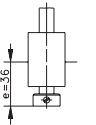
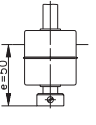
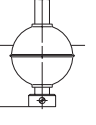
Ordering examples  
s. page 246

Position	1	2	3	4
Version	Magnetic float switch	Output type reed contact	Combination switching tube/float	
Type	M	A		-

Min./max. dimensions



Combination switching tube/float

		POM Ø40 x 27	PVC Ø42 x 44	PP Ø30 x 44	NBR Ø30 x 44	1.4571 Ø45 x 47	1.4571 Ø52
Material connecting head	Material switching tube						
		$e=39$	$e=16$	$e=50$	$e=36$	$e=50$	$e=50$



1.4571 / G-Al Si 12	1.4571	A	V	T	R	N	E
—	MS 63	—	—	—	—	—	—
PVC / G-Al Si 12	PVC	K	D	I	U	—	—

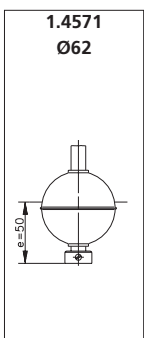
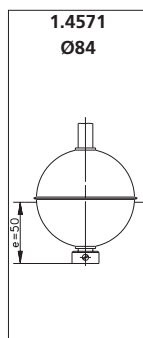


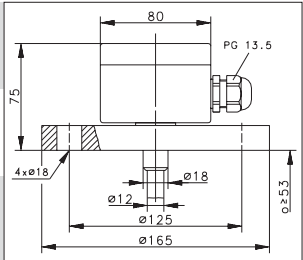
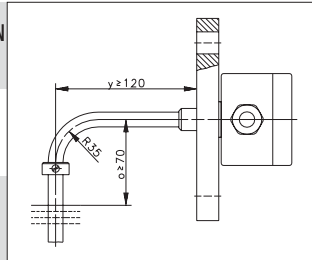
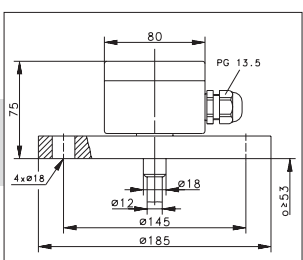
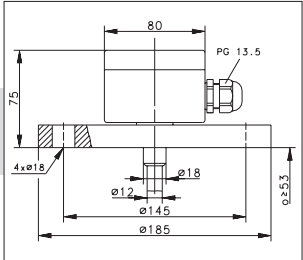
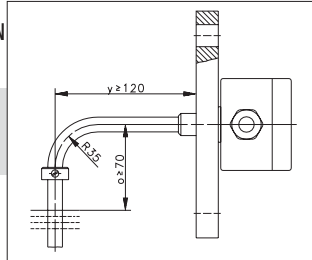
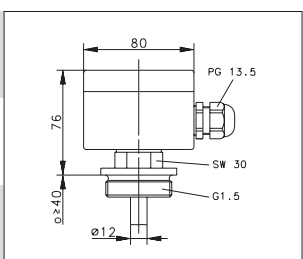
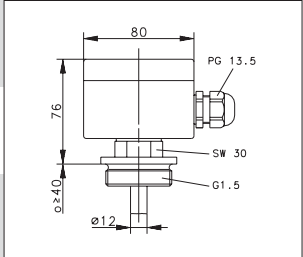

1.4571 / G-Al Si 12	1.4571	A	V	T	R	N	E
—	MS 63	—	—	—	—	—	—
PVC / G-Al Si 12	PVC	K	D	I	U	—	—



1.4571 / G-Al Si 12	1.4571	A	V	T	R	N	E
—	MS 63	—	—	—	—	—	—
PVC / Polyester	PVC	K	D	I	U	—	—

5	6	7	8	9	10	11	12	13
General design	Number of switching points	Switching function		Switching capacity	Connecting head	Standard programme		Special features (see page 247)
7	□	□		□	□	S		□

		Number of switching points	Switching function	Switching capacity	Connecting head	
1.4571 Ø62	1.4571 Ø84	↓	↓	↓	↓	
		1 switching point 2 switching points 3 switching points	1 normally-closed contact 2 normally-open contact 3 changeover contact 4 mixed version (CO, NC, NO)	max. 0.5 A - 30VA - 250 V max. 1A - 60VA - 250 V	straight type type in illustration in 1.4571 material. Slight variations may occur for PVC and MS (brass) versions.	bent type type in illustration in 1.4571 material. Slight variations may occur for PVC and MS (brass) versions.
					ID letter connecting head	ID letter connecting head

B	G	1/2/3	1/2/3/4	K	L	DN 50		WDN 50	
—	—	—	—	—	—	—		—	
—	—	1/2/3	1/2/3/4	K	L	DN 50		—	
B	G	1/2/3	1/2/3/4	K	L	DN 65		WDN 65	
—	—	—	—	—	—	—		—	
—	—	1/2/3	1/2/3/4	K	L	DN 65		—	
B	G	1/2/3	1/2/3/4	K	L	R 1.5		—	
—	—	—	—	—	—	—		—	
—	—	1/2/3	1/2/3/4	K	L	R 1.5		—	

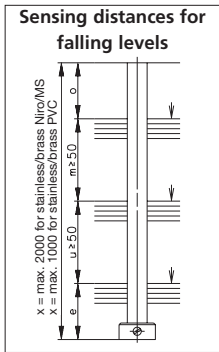
# Standard float switches

Type code

Position	1	2	3	4
Version	Magnetic float switch	Output type reed contact	Combination switching tube/float	
Type	M	A	Ⓚ	-

Min./max. dimensions

Combination switching tube/float



Material connecting head	Material switching tube	POM Ø40 x 27	PVC Ø42 x 44	PP Ø30 x 44	NBR Ø30 x 44	1.4571 Ø45 x 47	1.4571 Ø52



1.4571 / G-Al Si 12	1.4571	A	V	T	R	N	E
—	MS 63	—	—	—	—	—	—
PVC / Polyester	PVC	Ⓚ	D	I	U	—	—

Ordering examples Ⓚ MAK-721 KR2S

with specification o=\_\_\_\_\_ ; u=\_\_\_\_\_ (see order form page 261)

5	6	7	8	9	10	11	12	13
General design	Number of switching points	Switching function		Switching capacity	Connecting head	Standard programme		Special features (s. below)
7	②	①		Ⓚ	Ⓜ	S		

		Number of switching points	Switching function	Switching capacity		Connecting head
		↓	↓	↓		↓
1.4571 Ø62	1.4571 Ø84	1 switching point 2 switching points 3 switching points	1 normally-closed contact 2 normally-open contact 3 changeover contact 4 mixed version (CO, NC, NO)	max. 0.5 A - 30VA - 250 V max. 1A - 60VA - 250 V	ID letter connecting head	straight type type in illustration in 1.4571 material. Slight variations may occur for PVC and MS (brass) versions.
					ID letter connecting head	bent type type in illustration in 1.4571 material. Slight variations may occur for PVC and MS (brass) versions.

B	G	1 / ② / 3	① / 2 / 3 / 4	Ⓚ	L	Ⓜ	
—	—	—	—	—	—	—	
—	—	1/2/3	1/2/3/4	K	L	R2	

### Special features

- Temperature monitoring  
PT 100 (P1) / PT 1000 (P10)
- Bi-metal switch


We can produce tailor-made designs for specific applications to suit individual customer requirements.



# Mini-level float switches

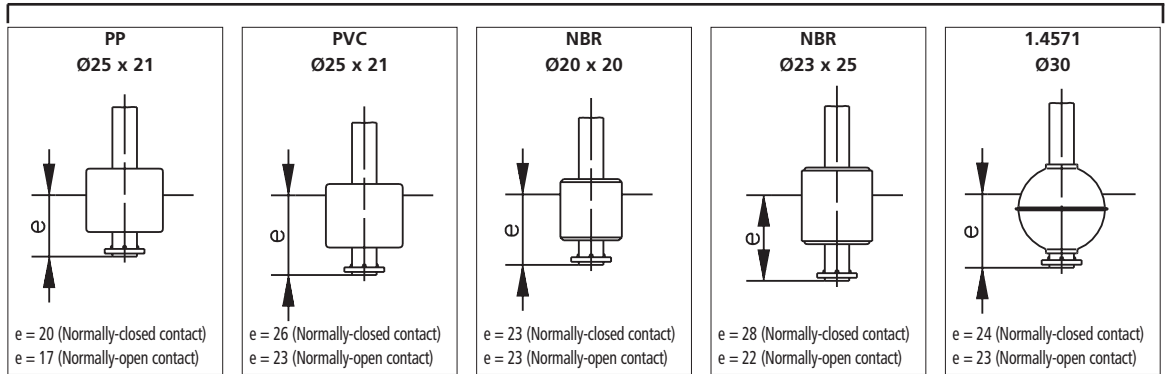
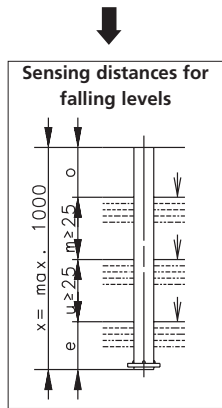
## Type code

Ordering examples  
s. page 246

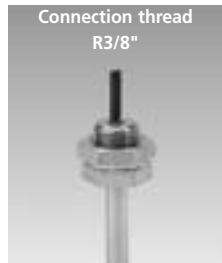
Position	1	2	3
Version	Mini float switch	Float	
Type	MS		-

Min./max. dimensions

Float



K1	K2	K3	K4	N1
K1	K2	K3	K4	N1
K1	—	K3	K4	—
—	K2	K3	K4	—



K1	K2	K3	K4	N1
K1	K2	K3	K4	N1
K1	—	K3	K4	—
—	K2	K3	K4	—

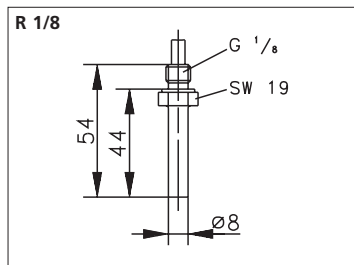


K1	K2	K3	K4	N1
K1	K2	K3	K4	N1
K1	—	K3	K4	—
—	K2	K3	K4	—

4	5	6	7	8	9	10
Enclosure material		Terminal housing		Switching function		Characteristics (see page 247)
□	-	□	-	□		□

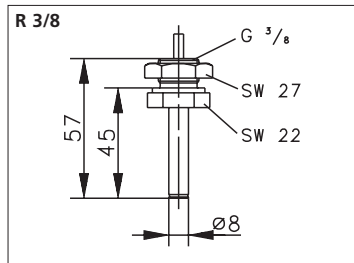
Enclosure material	Terminal housing	Switching function	max. total length	max. number of switching points	Cable length in m
↓	↓	↓			
<p>Ni = 1.4571</p> <p>MS = MS 63</p> <p>PP = polypropylene</p> <p>PVC = polyvinyl chloride version</p>	<p>Version</p>	<p>see page 6</p> <p>S = Normally-open contact (250 V-0.5 A-10 VA)</p> <p>O = Normally-closed contact (250 V-0.5 A-10 VA)</p> <p>U = Changeover contact (100 V-0.3 A-3 VA)</p>	X = max. total length	max. number of switching points	Cable length in m

Ni
MS
PP
PVC



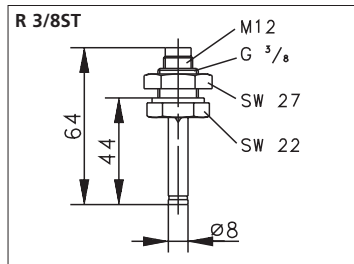
S	O	U	1000	3	1
S	O	U	1000	3	1
S	O	U	40.5	1	1
S	O	U	500	3	1

Ni
MS
PP
PVC



S	O	U	1000	3	1
S	O	U	1000	3	1
S	O	U	40.5	1	1
S	O	U	500	3	1

Ni
MS
PP
PVC




S	O	U	1000	3	—
S	O	U	1000	3	—
S	O	U	40.5	1	—
S	O	U	500	3	—

# Mini-level float switches

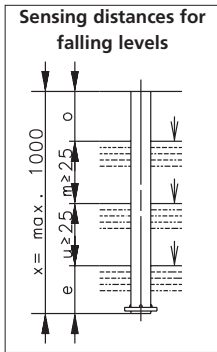
## Type code

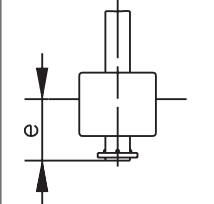
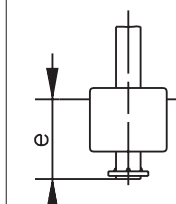
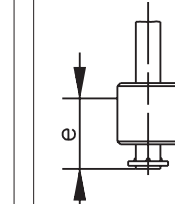
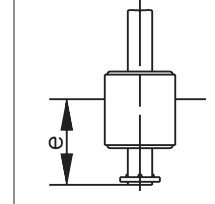
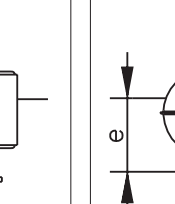
Ordering examples  
s. page 246

Position	1	2	3
Version	Mini level float switch	Float	
Type	MS		-

Min./max. dimensions

Float



PP Ø25 x 21	PVC Ø25 x 21	NBR Ø20 x 20	NBR Ø23 x 25	1.4571 Ø30
				
$e = 20$ (Normally-closed contact) $e = 17$ (Normally-open contact)	$e = 26$ (Normally-closed contact) $e = 23$ (Normally-open contact)	$e = 23$ (Normally-closed contact) $e = 23$ (Normally-open contact)	$e = 28$ (Normally-closed contact) $e = 22$ (Normally-open contact)	$e = 24$ (Normally-closed contact) $e = 23$ (Normally-open contact)

Connection thread  
Pg7



K1	K2	K3	K4	N1
K1	K2	K3	K4	N1
K1	—	K3	K4	—
—	K2	K3	K4	—

MSKS-PA-FL36-OS



—	—	—	—	—
---	---	---	---	---

MSKS-PA-FL36ST-OS

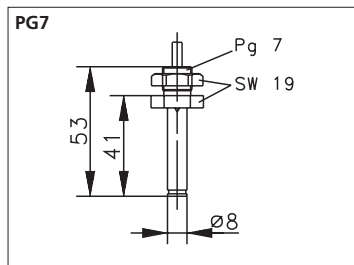


—	—	—	—	—
---	---	---	---	---

4	5	6	7	8	9	10
Enclosure material		Terminal housing		Switching function		Characteristics (see page 247)
□	-	□	-	□		□

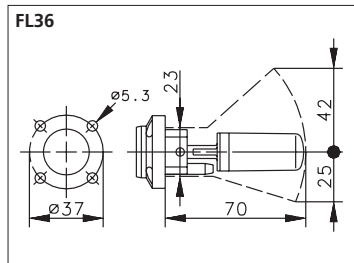
Enclosure material	Terminal housing	Switching function	X = max. total length	max. number of switching points	Cable length in m
↓	↓	↓			
<p>Ni = 1.4571</p> <p>MS = MS 63</p> <p>PP = polypropylene</p> <p>PVC = polyvinyl chloride Version</p>	<p>Version</p>	<p>see page 6</p> <p>S = Normally-open contact (250 V-0.5 A-10 VA)</p> <p>O = Normally-closed contact (250 V-0.5 A-10 VA)</p> <p>U = Changeover contact (100 V-0.3 A-3 VA)</p>			

Ni
MS
PP
PVC



S	O	U	1000	3	1
S	O	U	1000	3	1
S	O	U	40.5	1	1
S	O	U	500	3	1

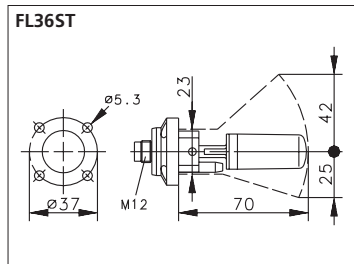
<p><b>PA12</b> (Enclosure &amp; float)</p>
--



S	O	—	(with 1 m cable)		
---	---	---	------------------	--	--

for lateral mounting
----------------------



<p><b>PA12</b> (Enclosure &amp; float)</p>
--



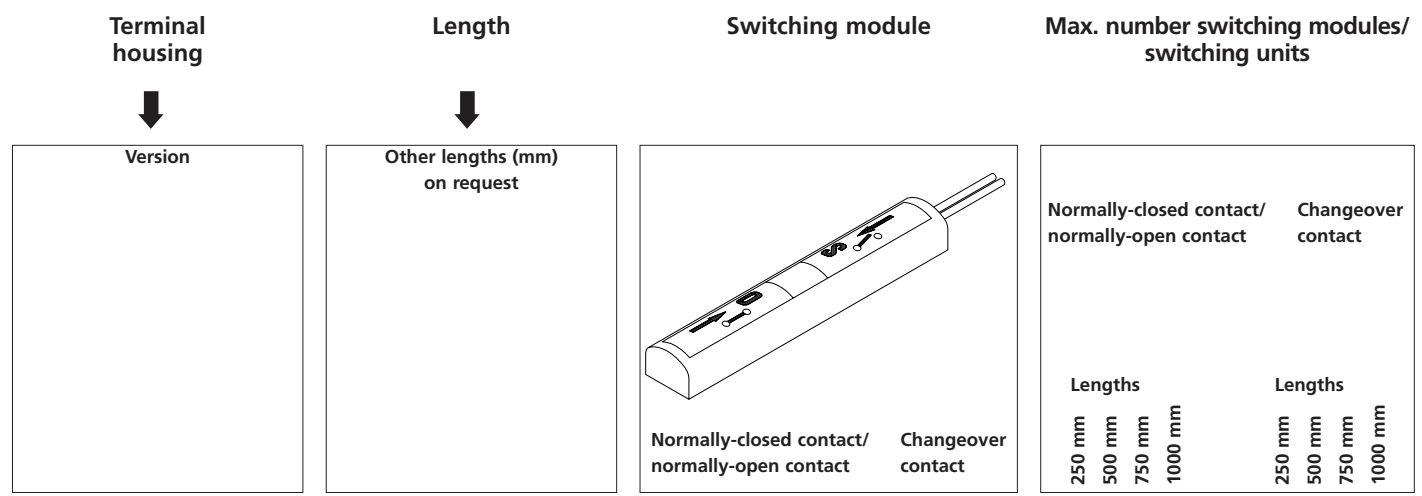
S	O	—	(with plug)		
---	---	---	-------------	--	--

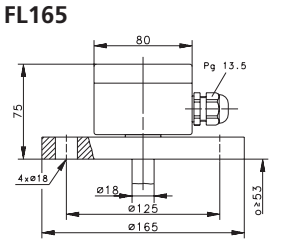
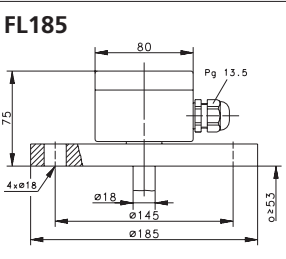
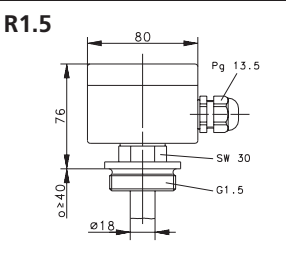
for lateral mounting
----------------------





5	6	7	8
Adjustable	Connecting head		Length
VST		/	

**Note!**  
Switching devices without switching modules!  
Order separately, please!

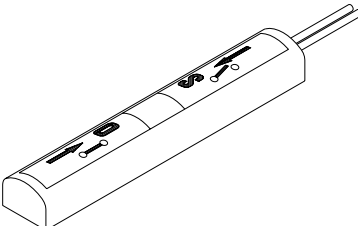


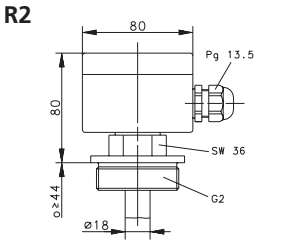
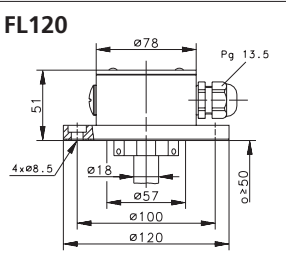
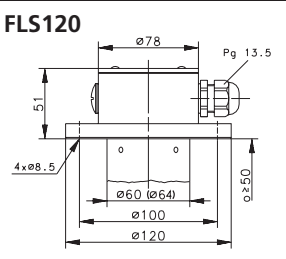
Terminal housing	Length	Switching module	Max. number switching modules/ switching units		
<b>FL165</b> 	250 / 500 / 750 / 1000	491.0007.069	491.6007.075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	491.0007.069	491.6007.075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	491.0007.069	491.6007.075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
<b>FL185</b> 	250 / 500 / 750 / 1000	491.0007.069	491.6007.075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	491.0007.069	491.6007.075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	491.0007.069	491.6007.075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
<b>R1.5</b> 	250 / 500 / 750 / 1000	491.0007.069	491.6007.075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	491.0007.069	491.6007.075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	491.0007.069	491.6007.075	2 / 3 / 4 / 4	2 / 3 / 3 / 3



5	6	7	8
Adjustable	Connecting head		Length
<b>VST</b>		/	

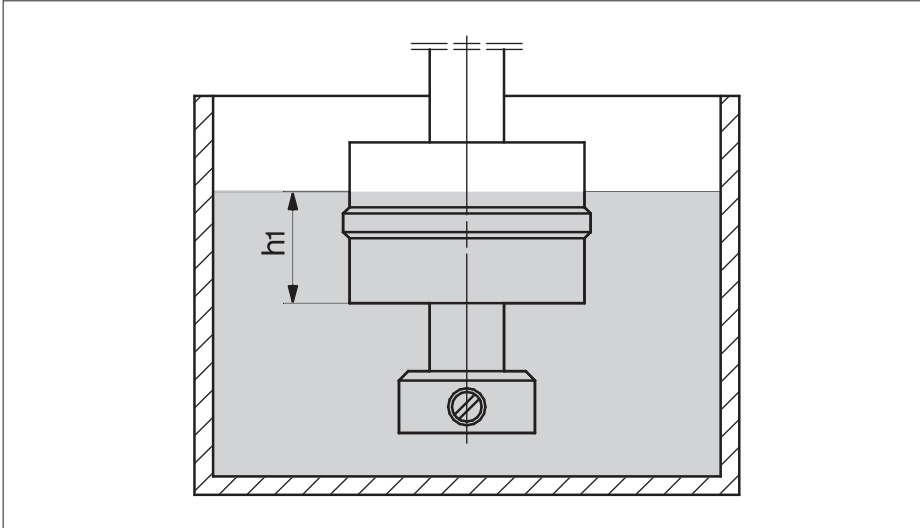
**Note!**  
Switching devices without switching modules!  
Order separately, please!

Terminal housing	Length	Switching module	Max. number switching modules/ switching units	
↓	↓			
Version	Other lengths (mm) on request		Normally-closed contact/ normally-open contact	Changeover contact
			Lengths	Lengths
		Normally-closed contact/ normally-open contact    Changeover contact	250 mm 500 mm 750 mm 1000 mm	250 mm 500 mm 750 mm 1000 mm

Version	Other lengths (mm) on request	Normally-closed contact/ normally-open contact	Changeover contact
<b>R2</b> 	250 / 500 / 750 / 1000	491.0007.069	491.6007.075
	250 / 500 / 750 / 1000	491.0007.069	491.6007.075
	250 / 500 / 750 / 1000	491.0007.069	491.6007.075
<b>FL120</b> 	250 / 500 / 750 / 1000	491.0007.069	491.6007.075
	250 / 500 / 750 / 1000	491.0007.069	491.6007.075
	250 / 500 / 750 / 1000	491.0007.069	491.6007.075
<b>FLS120</b> 	250 / 500 / 750 / 1000	491.0007.069	491.6007.075
	250 / 500 / 750 / 1000	491.0007.069	491.6007.075
	250 / 500 / 750 / 1000	491.0007.069	491.6007.075



# Float standard programme



<b>ID letter:</b>	<b>A/M/K</b>	
Dimension (mm):	Ø40 x 27	
Material:	POM	
<b>Depth of immersion</b>	<b>Weighing</b>	
<b>h1(mm)</b>	<b>y (g/cm³)</b>	
18	1	
20	0.9	
22.5	0.8	
26	0.7	
<b>Part No.:</b>	<b>494.5206.009</b>	


<b>ID letter:</b>	<b>T/C/I</b>	
Dimension (mm):	Ø30 x 44	
Material:	PP	
<b>Depth of immersion</b>	<b>Weighing</b>	
<b>h1(mm)</b>	<b>y (g/cm³)</b>	
27.5	1	
30.5	0.9	
34.5	0.8	
39.5	0.7	
<b>Part No.:</b>	<b>494.5203.019</b>	

<b>ID letter:</b>	<b>R/S/U</b>	
Dimension (mm):	Ø30 x 44	
Material:	NBR	
<b>Depth of immersion</b>	<b>Weighing</b>	
<b>h1(mm)</b>	<b>y (g/cm³)</b>	
19.5	1	
22	0.9	
24.5	0.8	
28	0.7	
<b>Part No.:</b>	<b>494.5203.031</b>	

<b>ID letter:</b>	<b>V/L/D</b>	
Dimension (mm):	Ø42 x 44	
Material:	PVC	
<b>Depth of immersion</b>	<b>Weighing</b>	
<b>h1(mm)</b>	<b>y (g/cm³)</b>	
25	1	
27.5	0.9	
30.5	0.8	
35	0.7	
<b>Part No.:</b>	<b>494.5215.029</b>	

<b>ID letter:</b>	<b>N/P</b>	
Dimension (mm):	Ø44 x 45	
Material:	1.4571	
<b>Depth of immersion</b>	<b>Weighing</b>	
<b>h1(mm)</b>	<b>y (g/cm³)</b>	
32	1	
35	0.9	
39	0.8	
45	0.7	
<b>Part No.:</b>	<b>494.2104.002</b>	

<b>ID letter:</b>	<b>E/F</b>	
Dimension (mm):	Ø52	
Material:	1.4571	
<b>Depth of immersion</b>	<b>Weighing</b>	
<b>h1(mm)</b>	<b>y (g/cm³)</b>	
32	1	
34	0.9	
37	0.8	
43	0.7	
<b>Part No.:</b>	<b>494.2105.003</b>	

<b>ID letter:</b>	<b>B/O</b>	
Dimension (mm):	Ø62	
Material:	1.4571	
<b>Depth of immersion</b>	<b>Weighing</b>	
<b>h1(mm)</b>	<b>y (g/cm³)</b>	
33	1	
35	0.9	
38	0.8	
42	0.7	
<b>Part No.:</b>	<b>494.2102.001</b>	

<b>ID letter:</b>	<b>G/H</b>	
Dimension (mm):	Ø84	
Material:	1.4571	
<b>Depth of immersion</b>	<b>Weighing</b>	
<b>h1(mm)</b>	<b>y (g/cm³)</b>	
33	1	
35	0.9	
38	0.8	
42	0.7	
<b>Part No.:</b>	<b>494.2101.004</b>	

## Adjustable floats

<b>ID letter:</b>	<b>V/L/D</b>	
Dimension (mm):	Ø52 x 55	
Material:	PVC	
<b>Depth of immersion</b>	<b>Weighing</b>	
<b>h1(mm)</b>	<b>y (g/cm³)</b>	
29	1	
32	0.9	
36	0.8	
42	0.7	
<b>Part No.:</b>	<b>494.5216.032</b>	




<b>ID letter:</b>	<b>N/P</b>	
Dimension (mm):	Ø52 x 55	
Material:	1.4571	
<b>Depth of immersion</b>	<b>Weighing</b>	
<b>h1(mm)</b>	<b>y (g/cm³)</b>	
33	1	
36	0.9	
40.5	0.8	
46	0.7	
<b>Part No.:</b>	<b>494.2299.023</b>	



## Miniature floats

<b>ID letter:</b>	<b>K1</b>	
Dimension (mm):	Ø25 x 21	
Material:	PP	
<b>Depth of immersion</b>	<b>Weighing</b>	
<b>h1(mm)</b>	<b>y (g/cm³)</b>	
12	1	
13	0.9	
14.5	0.8	
16.5	0.7	
<b>Part No.:</b>	<b>494.5207.021</b>	



<b>ID letter:</b>	<b>K2</b>	
Dimension (mm):	Ø25 x 21	
Material:	PVC	
<b>Depth of immersion</b>	<b>Weighing</b>	
<b>h1(mm)</b>	<b>y (g/cm³)</b>	
15	1	
16	0.9	
18.5	0.8	
-	0.7	
<b>Part No.:</b>	<b>494.5207.022</b>	



<b>ID letter:</b>	<b>K4</b>	
Dimension (mm):	Ø23 x 25	
Material:	NBR	
<b>Depth of immersion</b>	<b>Weighing</b>	
<b>h1(mm)</b>	<b>y (g/cm³)</b>	
16	1	
17.5	0.9	
19.5	0.8	
22	0.7	
<b>Art.-Nr.:</b>	<b>494.5211.024</b>	



<b>ID letter:</b>	<b>K3</b>	
Dimension (mm):	Ø20 x 20	
Material:	NBR	
<b>Depth of immersion</b>	<b>Weighing</b>	
<b>h1(mm)</b>	<b>y (g/cm³)</b>	
15	1	
17	0.9	
-	0.8	
-	0.7	
<b>Part No.:</b>	<b>494.5210.020</b>	



<b>ID letter:</b>	<b>N1</b>	
Dimension (mm):	Ø30	
Material:	1.4571	
<b>Depth of immersion</b>	<b>Weighing</b>	
<b>h1(mm)</b>	<b>y (g/cm³)</b>	
18	1	
19	0.9	
21	0.8	
24	0.7	
<b>Art.-Nr.:</b>	<b>494.2109.018</b>	



## Technical data

### Standard magnetic float switches



#### Electrical data

	<b>Changeover contact/normally-closed contact/normally-open contact</b>	<b>Changeover contact/normally-closed contact/normally-open contact</b>
Switching function	<b>K</b>	<b>L</b>
Contact ID letter		
Rated voltage (max.)	250 V AC/DC	250 V AC/DC
Rated current (max.)	0.5 A	1 A
Switching capacity (max.)	30 VA	60 VA

#### Mechanical data

Container connection options	Flange enclosures RD 120 mm	Flange enclosures RD 120 mm
	Flange enclosures RD 77 mm	Flange enclosures RD 77 mm
	Flange enclosures RD 165 mm	Flange enclosures RD 165 mm
	Flange enclosures RD 185 mm	Flange enclosures RD 185 mm
	Cable gland PG 9	Cable gland Pg 9
	Cable gland R3/8"	Cable gland R3/8"
	Cable gland R1/5" with plug connection DIN 43650	Cable gland R1/5" with plug connection DIN 43650
	Oval flange 75 x 50 mm with plug-in connec. DIN43650	Oval flange 75 x 50 mm with plug-in connec. DIN43650

Materials switching tube	Stainless steel 1.4571	Stainless steel 1.4571
	MS 63	MS 63
	PVC	PVC

Float variants	A / M / K Cylinder floats RD 40 x 27 mm (POM)	A / M / K Cylinder floats RD 40 x 27 mm (POM)
	T / C / I Cylinder floats RD 30 x 44 mm (PP)	T / C / I Cylinder floats RD 30 x 44 mm (PP)
	V / D Cylinder floats RD 42 x 44 mm (NBR)	V / D Cylinder floats RD 42 x 44 mm (NBR)
	R / SCylinder floats RD 30 x 44 mm (NBR)	R / SCylinder floats RD 30 x 44 mm (NBR)
	N / P Cylinder floats RD 44 x 45 mm (stainless steel)	N / P Cylinder floats RD 44 x 45 mm (stainless steel)
	E / F Ball floats RD 52 mm (stainless steel)	E / F Ball floats RD 52 mm (stainless steel)
	B / O Ball floats RD 62 mm (stainless steel)	B / O Ball floats RD 62 mm (stainless steel)
	G / H Ball floats RD 84 mm (stainless steel)	G / H Ball floats RD 84 mm (stainless steel)

#### Ambient conditions

Protection type (DIN 40050)	IP 65 (up to IP 68, on request)	IP 65 (up to IP 68, on request)
Temperature range	-5°C to 60°C (from -30°C to 150°C, on request)	-5°C to 60°C (from -30°C to 150°C, on request)
Pressure	5 bar (up to 25 bar, on request)	5 bar (up to 25 bar, on request)

## Technical data

### Miniature magnetic float switches



#### Electrical data

	<b>Normally-closed contact</b> / normally-open contact	<b>Changeover contact</b> /normally-closed contact/normally-open contact
Switching function	<b>B</b>	<b>X</b>
Contact ID letter		
Rated voltage (max.)	250 V AC/DC	100 V AC/DC
Rated current (max.)	0.5 A	0.3 A
Switching capacity (max.)	10 VA	3 VA

#### Mechanical data

Container connection options		
	Cable gland Pg 7	Cable gland Pg 7
	Cable gland R1/8"	Cable gland R1/8"
	Cable gland R3/8"	Cable gland R3/8"
	Cable gland R3/8" with plug	Cable gland R3/8" with plug

Materials switching tube		
	Stainless steel 1.4571	Stainless steel 1.4571
	PP	PP
	PVC	PVC
	MS 63	MS 63

Float variants				
	K1 / Cylinder floats	RD 25 x 20 mm (PP)	K1 / Cylinder floats	RD 25 x 20 mm (PP)
	K2 / Cylinder floats	RD 25 x 20 mm (PVC)	K2 / Cylinder floats	RD 25 x 20 mm (PVC)
	K3 / Cylinder floats	RD 20 x 20 mm (NBR)	K3 / Cylinder floats	RD 20 x 20 mm (NBR)
	K4 / Cylinder floats	RD 23 x 25 mm (NBR)	K4 / Cylinder floats	RD 23 x 25 mm (NBR)
	N1 / Ball floats	RD 30 mm (stainless steel)	N1 / Ball floats	RD 30 mm (stainless steel)

#### Ambient conditions

Protection type (DIN 40050)		
Temperature range	IP 65 (up to IP 68, on request) -5°C to 60°C (from -30°C to 150°C, on request)	IP 65 (up to IP 68, on request) -5°C to 60°C (from -30°C to 150°C, on request)
Pressure	5 bar (up to 15 bar, on request)	5 bar (up to 15 bar, on request)

## Technical data

### Adjustable magnetic float switches



#### Electrical data

	<b>P</b>	<b>L</b>
Contact ID letter	REEDK. KPL. F. MA	REEDK. KPL. F. MA
Switching module type		
<b>Part No.</b>	<b>491.0007.069</b>	<b>491.6007.075</b>
Switching function	Normally-open contact / normally-closed contact (bi)	Changeover contact (bi)
Rated voltage (max.)	250 V AC/DC	250 V AC/DC
Rated current (max.)	5 A	1 A
Switching capacity (max.)	250 VA	60 VA

#### Mechanical data

Container connection options	Flange DN 50 (PVC / stainless steel)	Flange DN 50 (PVC / stainless steel)
	Flange DN 65 (PVC / stainless steel)	Flange DN 65 (PVC / stainless steel)
	Cable gland R1.5" (PVC / stainless steel)	Cable gland R1.5" (PVC / stainless steel)
	Cable gland R2" (PVC / stainless steel)	Cable gland R2" (PVC / stainless steel)
	Flange encl. RD 120 mm (with gush protect. possible)	Flange encl. RD 120 mm (with gush protect. possible)

Materials switching tube	Stainless steel 1.4571	Stainless steel 1.4571
	MS 63	MS 63
	PVC	PVC

Float variants	N / PCylinder floats RD 52 x 55 mm (stainless steel)	N / PCylinder floats RD 52 x 55 mm (stainless steel)
	V / D / L Cylinder floats RD 52 x 55 mm (PVC)	V / D / L Cylinder floats RD 52 x 55 mm (PVC)

#### Ambient conditions

Protection class (DIN 40050)	IP 65 (up to IP 68, on request)	IP 65 (up to IP 68, on request)
Temperature range	-5°C to 60°C (from -30°C to 150°C, on request)	-5°C to 60°C (from -30°C to 150°C, on request)
Pressure	5 bar (up to 15 bar, on request)	5 bar (up to 15 bar, on request)

FAX

**Order form and questionnaire  
for magnetic float switches**

Standard tube diameter 12 mm

Page \_\_\_\_\_ from \_\_\_\_\_  
Date: \_\_\_\_\_

**Address:**

**Sender:**

**Bernstein AG**  
Tieloser Weg 6  
D-32457 Porta Westfalica

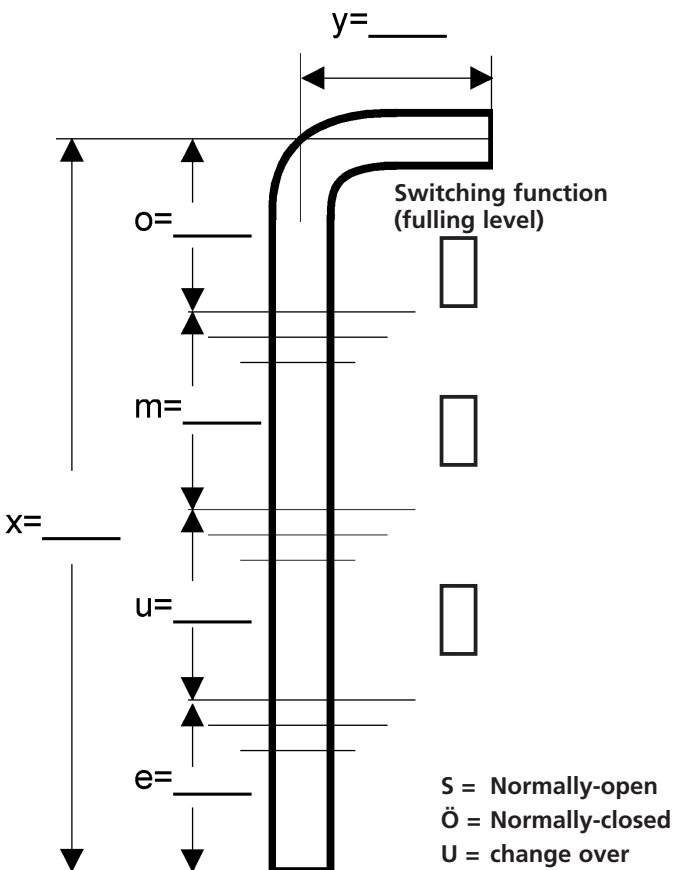
Phone: +49-(0)5 71/7 93-0

**Fax: +49-(0)5 71/7 93-5 55**

Company: \_\_\_\_\_  
Customer No.: \_\_\_\_\_  
Contact: \_\_\_\_\_  
Department: \_\_\_\_\_  
Street: \_\_\_\_\_  
Town: \_\_\_\_\_  
Phone: \_\_\_\_\_  
Fax: \_\_\_\_\_

Sensors

Type \_\_\_\_\_  Enquiry \_\_\_\_\_ pieces  
Position 1 2 3 4 5 6 7 8 9 10 11 12 13  Order \_\_\_\_\_ pieces



**Operational environment:**

Pressure: \_\_\_\_\_ bar      Temperature: \_\_\_\_\_ °C

Container dimens.: \_\_\_\_\_ mm      Medium: \_\_\_\_\_

Cable length: \_\_\_\_\_ m      Separate contact type

Mounting options:       from above  
                                  from below  
                                  lateral

**Other comments:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# Type matrix of inductive sensors

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
<b>K</b>	<b>I</b>	<b>N</b>	<b>-</b>	<b>T</b>	<b>1</b>	<b>2</b>	<b>N</b>	<b>S</b>	<b>/</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>-</b>	<b>K</b>	<b>L</b>	<b>2</b>		
Product group				Housing design			Output		Sensing distance				Options					

**1** K = Non-contact proximity switch

**2** I = Inductive

**3** B = flush installation  
N = non-flush installation  
R = Ring sensor

**4** Always a dash

**5** M = metric threaded barrel (metal)

T = metric threaded barrel (plastic)

D = smooth barrel (metal)

R = smooth barrel (plastic)

Q = rectangular housing (metal)

P = PG threaded barrel (metal)

E = rectangular housing (plastic)

S = Slot sensor (plastic)

N = standard fixing (in accordance with DIN 50025/50037)

**6/7** two-digit number

– Smooth barrel types = diameter in mm

– Threaded barrel types = standard designation

– Rectangular devices = continuing design numbers

Design Examples:

– S03 = Slot type sensor

– Q08 = 8 x 8 x 49 mm, side sensing

– M32 = M32 x 1.5 mm, threaded barrel

– D08 = 8 mm diameter (metal)

– R22 = 22 mm diameter (plastic)

– E68 = 68 x 30 x 15 mm

– N44 = 41.5 x 41.5 x 120 mm (Euro standard housing)

**8** P = PNP

N = NPN

A = AC 2-wire

E = NAMUR

Z = DC 2-wire

Q = AC triac

T = Thyristor (AC 3-wire)

G = Push/pull

D = Dual output NPN/PNP switching device

**9** S = Normally open contact

O = Normally closed contact

P = Programmable

A = Analogue

U = Complementary

**10** Slash

**11/12/13** Sensing distance

Examples: 1.5 = 1.5 mm

002 = 2 mm

040 = 40 mm

**14** Always a dash

**15** K = Short-circuit protected

**16** L = LED

**17...** Cable length  
Examples: 2 = 2 m  
6 = 6 m

E = Extended sensing distance

V = Short body design

P = Potentiometer

PU = Polyurethane cable

S = Screw termination (terminal compartment)

SD = Plug connection, according to DIN with screw termination

SM = Mini socket snap fit

S8 = M8 quick disconnect screw connector

SM8 = M8 quick disconnect snap or screw connector

S12 = M12 quick disconnect screw type

N = Stainless steel housing

F = High switching frequency

T = High temperature resistance

I = teach in

# Wiring diagrams electrical outputs DC

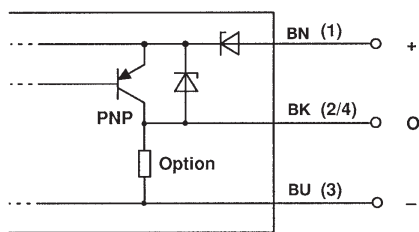
Definition of cable colours

- BN = brown
- BU = blue
- BK = black (Output)

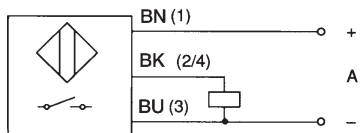
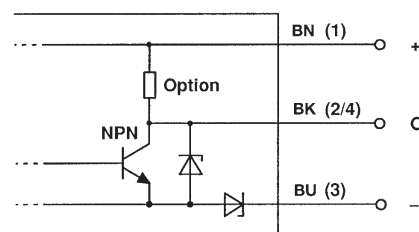
Association of the cable colours to the connection pins of the cable couplings see page 276 ff.

This association is not valid for all plugs and couplings

**PNP output**  
(Principle wiring diagram)

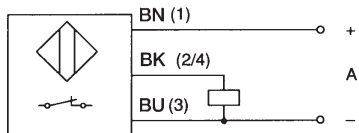


**NPN output**  
(Principle wiring diagram)



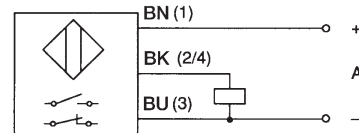
**1) PNP normally open**

PNP transistor switches the output high.



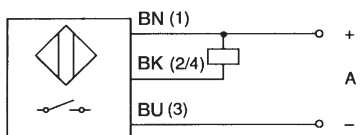
**2) PNP normally closed**

PNP transistor disconnects the positive supply to output.



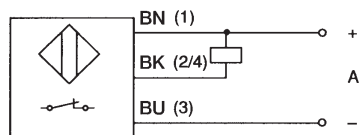
**3) PNP programmable**

With the built-in switch the position PNP N/O 1) or PNP N/C 2) can be chosen.



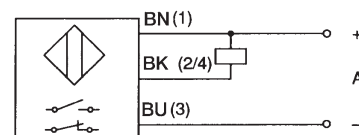
**4) NPN normally open**

NPN Transistor switches the output low.



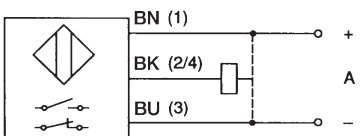
**5) NPN normally closed**

NPN transistor disconnects the negative supply to output.



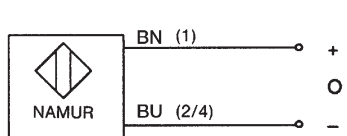
**6) NPN programmable**

With the built-in switch the function NPN N/O 4) or NPN N/C 5) can be chosen.



**7) PNP/NPN programmable**

With two built-in switches PNP or NPN and between NO or NC function can be chosen.



**8) NAMUR**

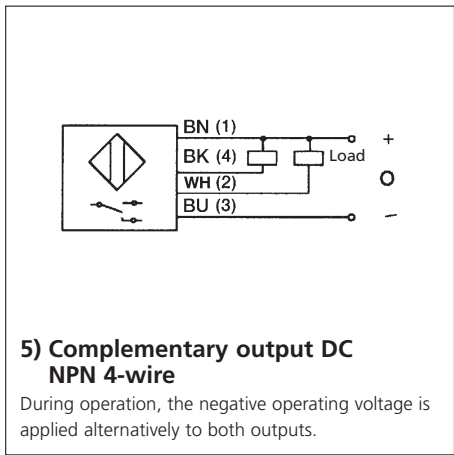
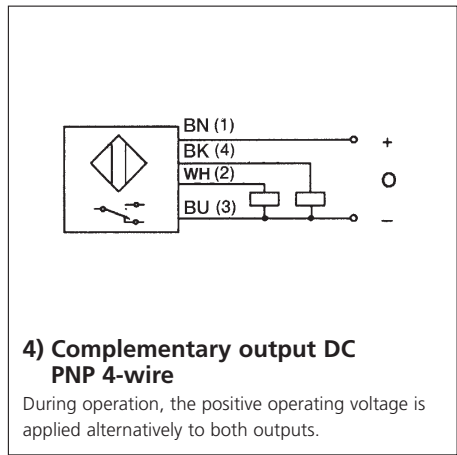
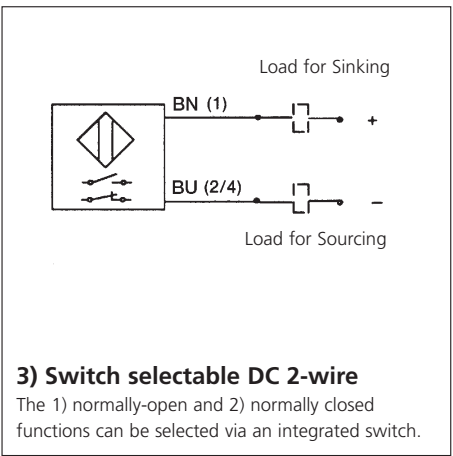
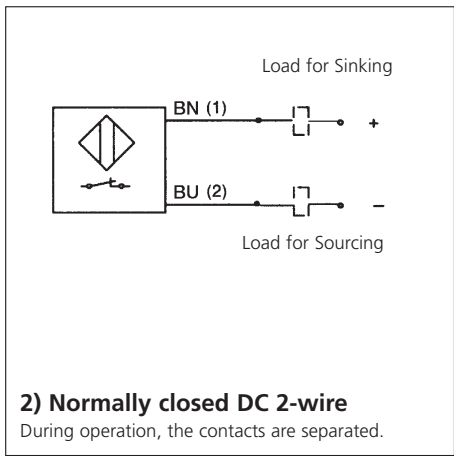
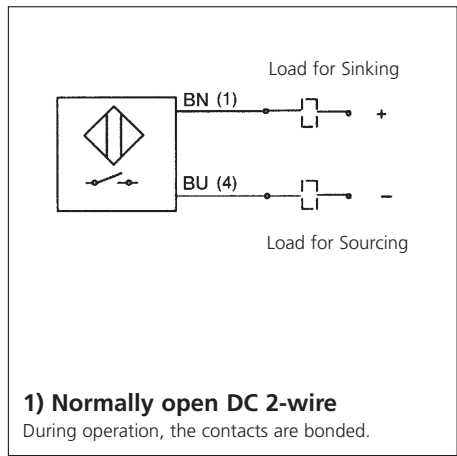
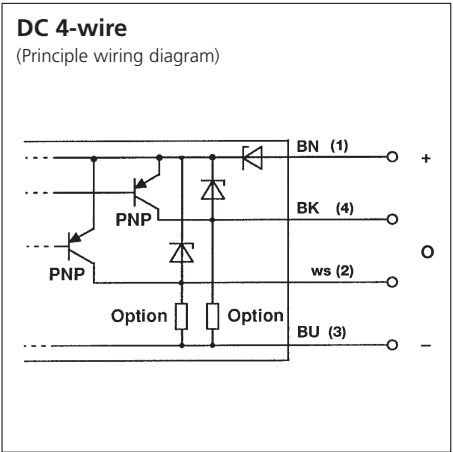
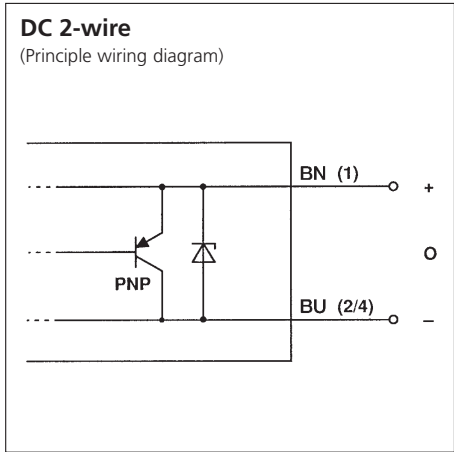
Current change according to DIN EN 60947-5-6.



# Wiring diagrams of DC output types

Key to colour coding of cable

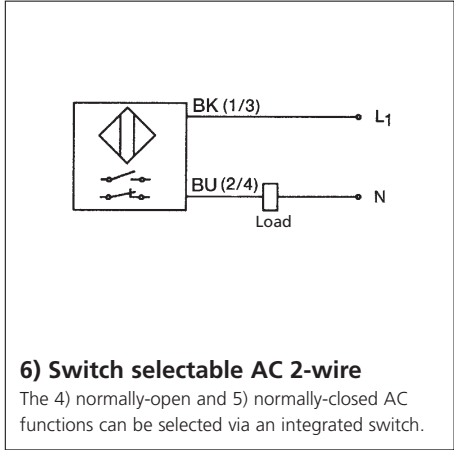
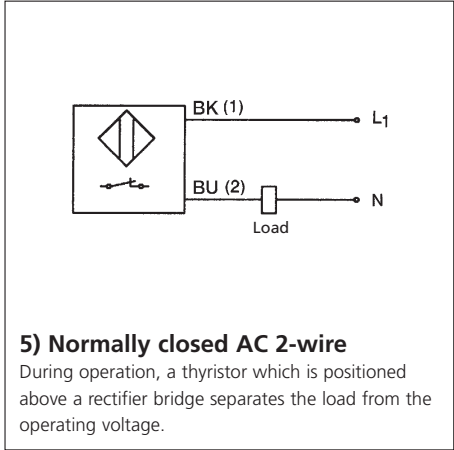
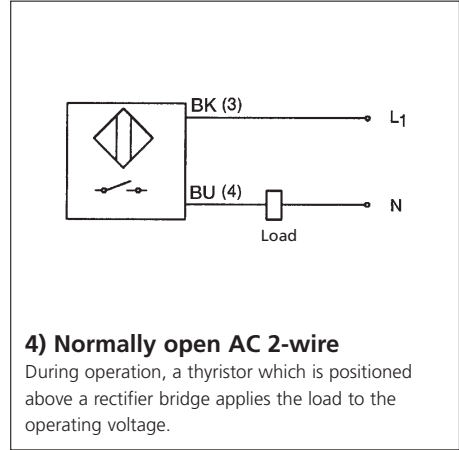
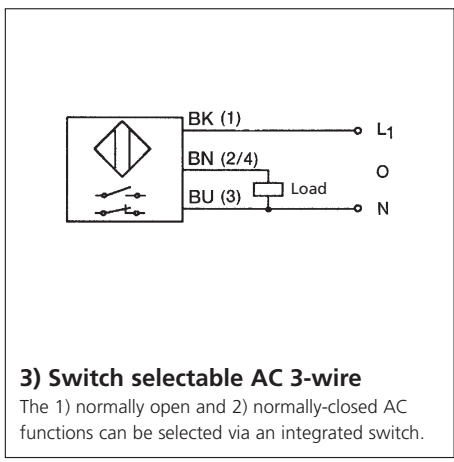
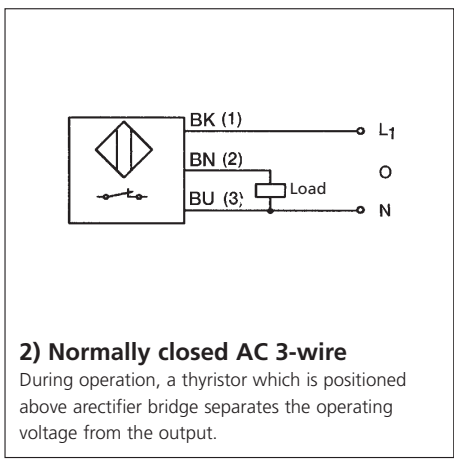
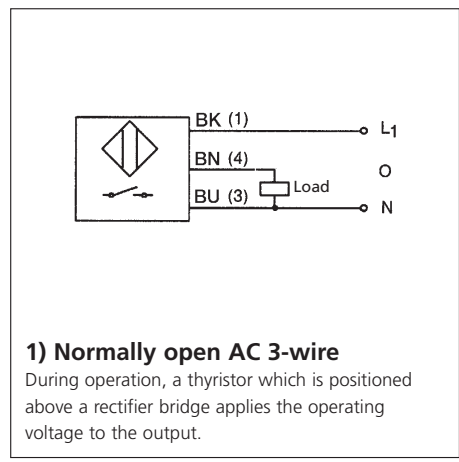
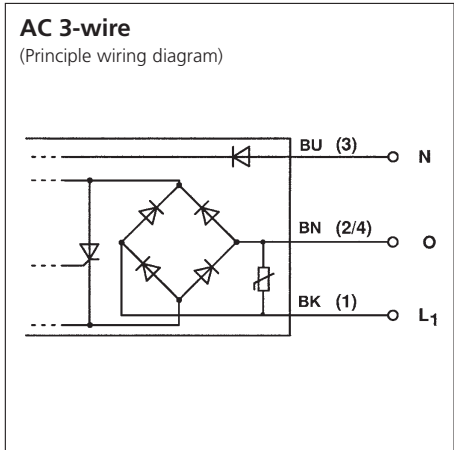
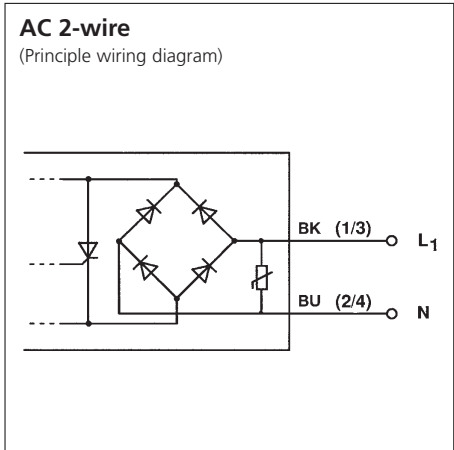
- BN = brown
- BU = blue
- BK = black (switching output)
- WH = white (switching output)



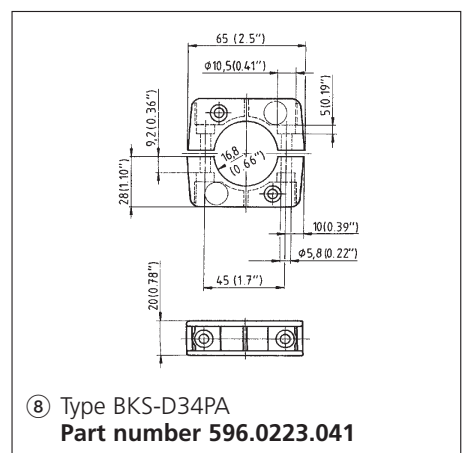
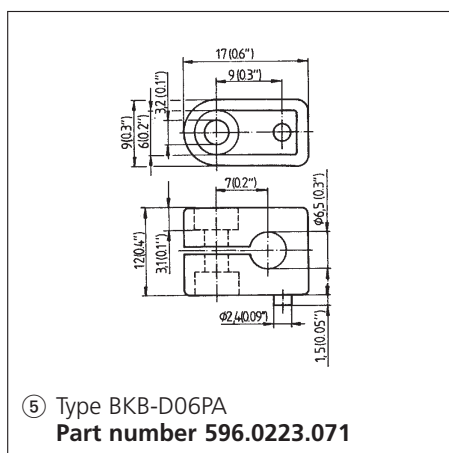
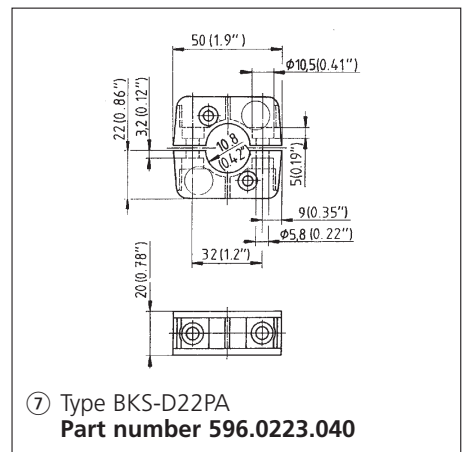
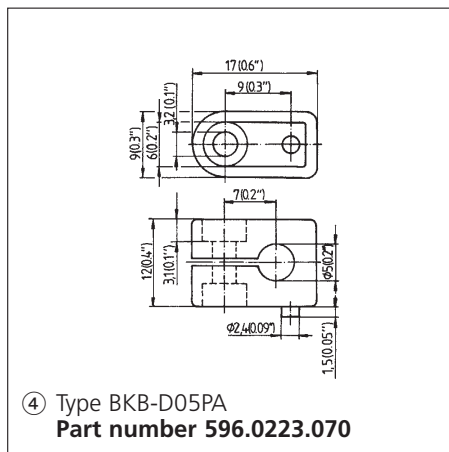
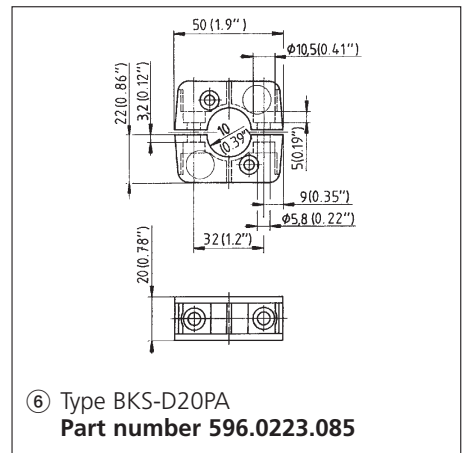
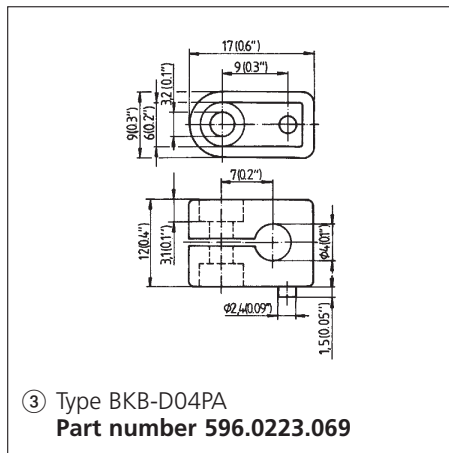
# Wiring diagrams of AC output types

Key to colour coding of cable

- BN = brown
- BU = blue
- BK = black



# Mounting brackets



# Type matrix of capacitive sensors

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
<b>K</b>	<b>C</b>	<b>N</b>	<b>-</b>	<b>T</b>	<b>1</b>	<b>2</b>	<b>N</b>	<b>S</b>	<b>/</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>-</b>	<b>K</b>	<b>L</b>	<b>P</b>
Product group			Housing design			Output			Sensing distance			Options				

**1** K = Non-contact proximity switch

**2** C = Capacitive

**3** B = Flush installation  
N = Non-flush installation

**4** Dash

**5** M = Metric threaded barrel (metal housings)  
T = Metric threaded barrel (plastic housings)  
D = Cylindrical housings (metal)  
R = Cylindrical housings (plastic)  
Q = Rectangular housings (metal)  
E = Rectangular housings (plastic)  
N = Standard attachment according to DIN 50025/50037)

**6/7** Two-digit number  
12 = M 12 x 1 mm threaded barrel  
18 = M 18 x 1 mm threaded barrel  
30 = M 30 x 1.5 mm threaded barrel  
32 = M 32 x 1.5 mm threaded barrel  
20 = 20 mm diameter  
22 = 22 mm diameter  
34 = 34 mm diameter  
44 = 40 x 40 x 120 mm  
68 = 68 x 30 x 15 mm

**8** P = PNP  
N = NPN  
A = AC 2-wire  
R = Relay  
G = Push/pull  
D = Dual output switching device

**9** S = Normally-open contact  
Ö = Normally-closed contact  
P = Programmable switch  
A = Analogue  
U = Complementary

**10** Slash

**11/12/13** Sensing distance

Examples: 1.5 = 1.5 mm  
002 = 2 mm  
040 = 40 mm

**14** Slash

**15** K = Short-circuit proof

**16** L = LED

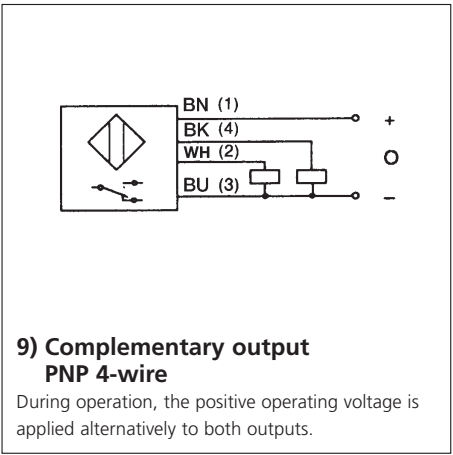
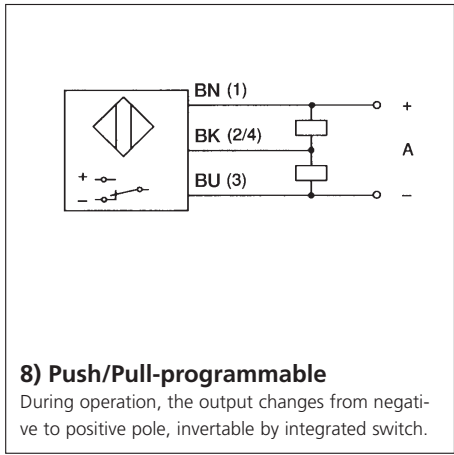
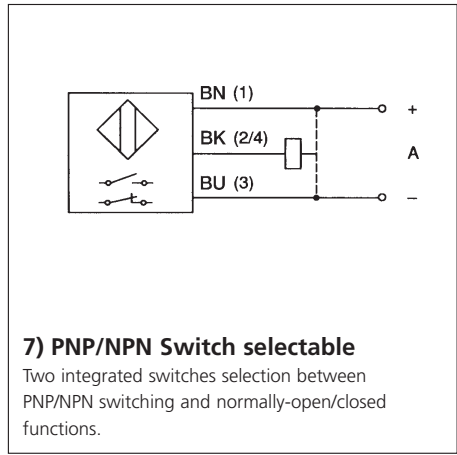
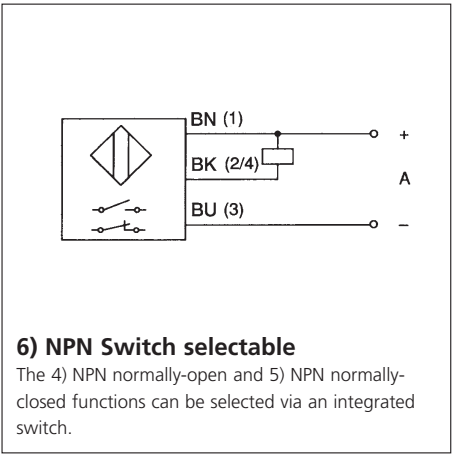
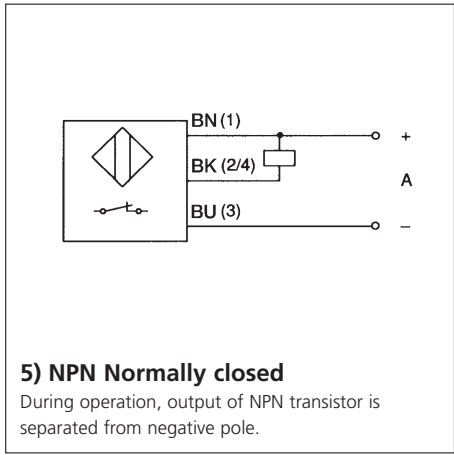
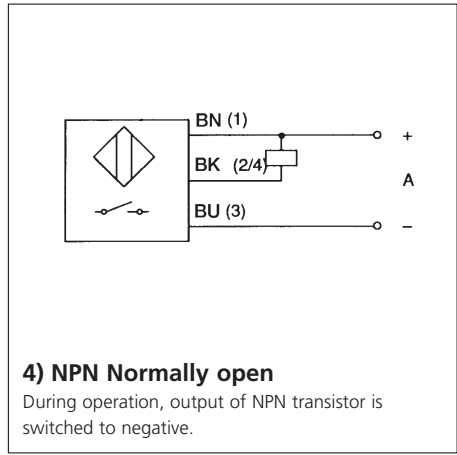
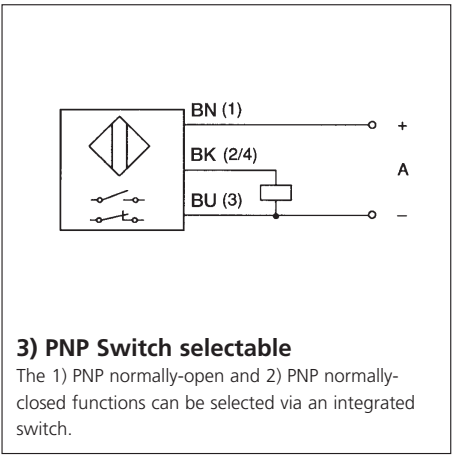
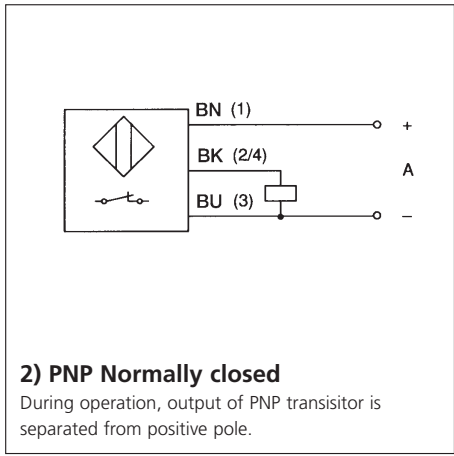
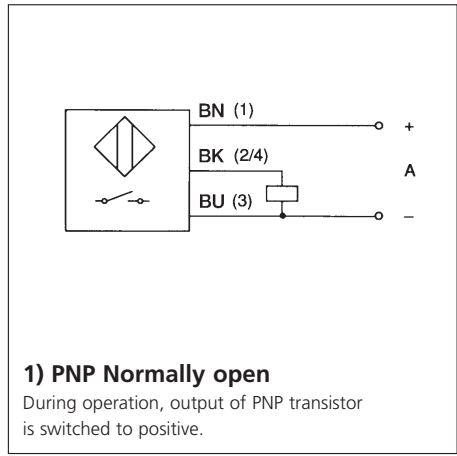
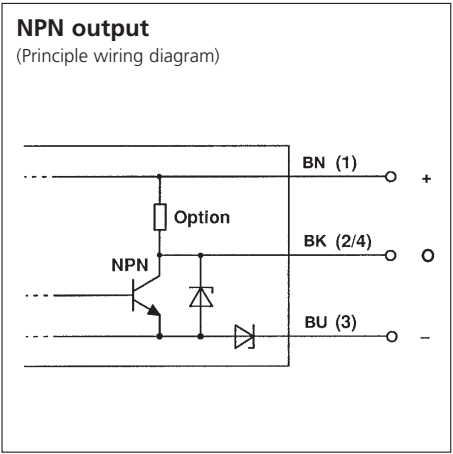
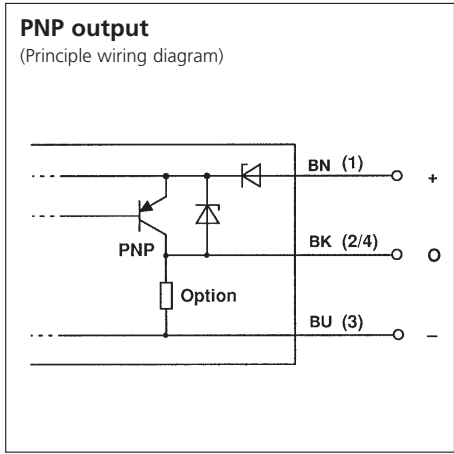
**17...** Cable length  
Examples: 2 = 2 m  
6 = 6 m

E = Extendible sensing distance  
V = Short body design  
P = Potentiometer  
PU = Polyurethane cable  
S = Detachable connection (terminal compartment)  
SD = Plug connectors, according to DIN with fitted cable socket  
SM = Mini socket snap fit  
S8 = M 8 quick disconnect screw type  
SM8 = M 8 quick disconnect universal snap and screw  
S12 = M 12 quick disconnect screw type  
N = Stainless steel housing  
F = High switching frequency  
T = High temperature resistance

# Wiring diagrams of DC output types

Key to colour coding of cable

- BN = brown
- BU = blue
- BK = black



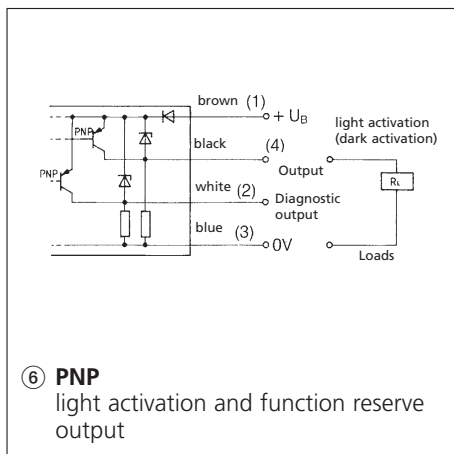
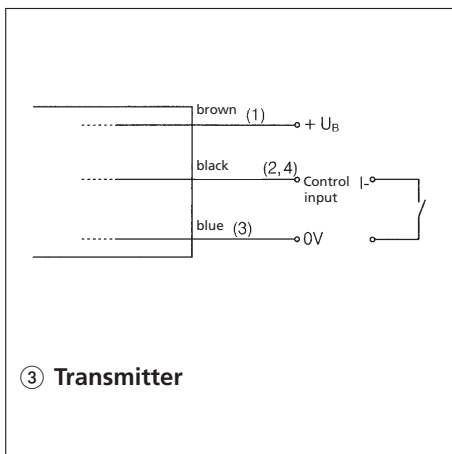
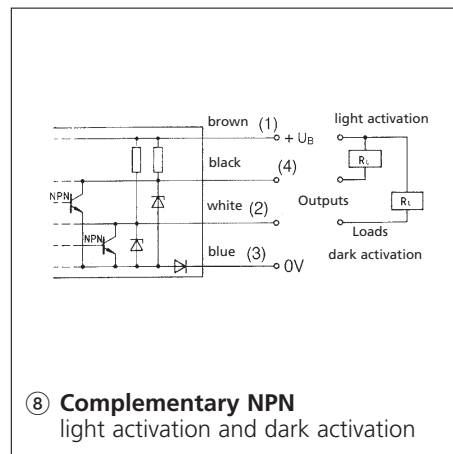
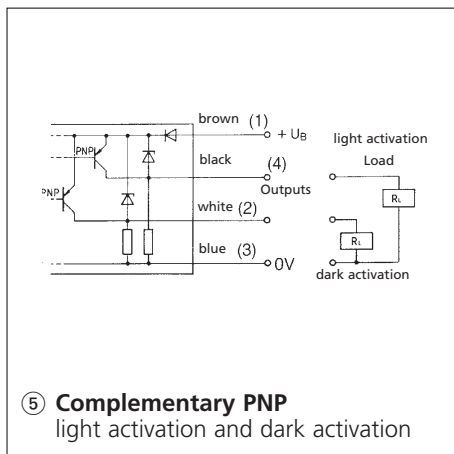
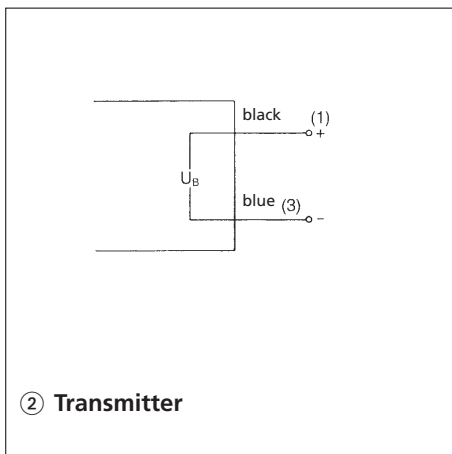
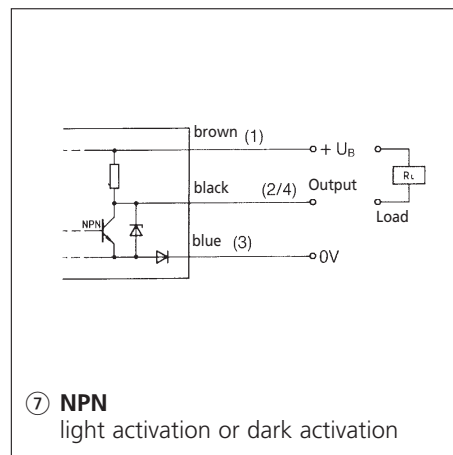
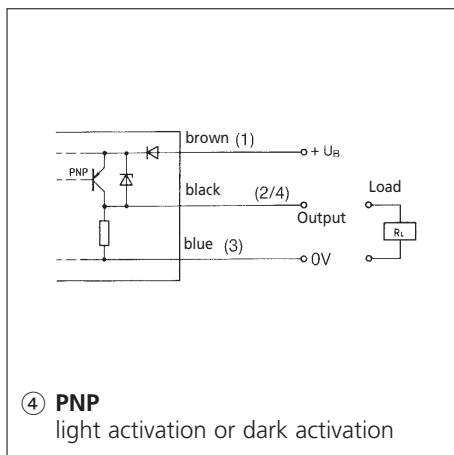
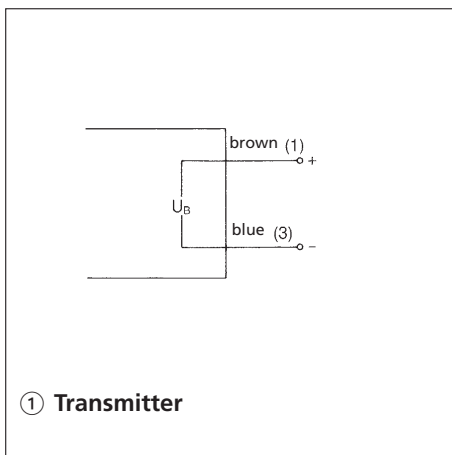


# Photoelectric identification codes

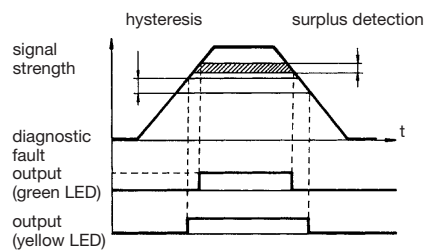
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
<b>O</b>	<b>M</b>	<b>1</b>	<b>2</b>	<b>R</b>	<b>T</b>	<b>-</b>	<b>D</b>	<b>H</b>	<b>T</b>	<b>P</b>	<b>-</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>C</b>	<b>L</b>

- 1** O = Photoelectric sensor
- 2** M = Metric metal housing  
T = Metric thermoplastic housing  
R = Rectangular design  
P = Pg..thread..size  
Z = Cylindrical design
- 3/4** Specification of housing dimensions  
e. g. 12 = M 12  
18 = M 18  
20 = 20 series  
90 = 90 series
- 5/6** ES = Through-beam sensor (Complete set)  
EE = Through beam, receiver only  
SE = Through beam, transmitter only  
LC = Fibre optic control (sensor with fibre optics connection)  
RH = Diffuse reflective sensors with background suppression)  
RS = Retroreflective sensor  
RT = Diffuse reflective sensor  
FF = Convergent beam sensor, fixed focus  
PR = Print registration sensor  
PS = Polarised retro sensor
- 7** Dash
- 8** Voltage type  
A = AC  
D = DC  
M = Multivoltage  
P = Programmable voltage (AC or DC)
- 9** Output function  
A = Complementary LA/DA (light activated / dark activated)  
D = Dark activated (DA)  
H = Light activated (LA)  
O = No output (through-beam transmitter)  
P = Selectable LA/DA (light activated / dark activated)  
X = Customer-specified output
- 10** Output type  
A = Analogue output  
N = NAMUR  
O = No output  
Q = Triac  
R = Relay  
S = Others  
T = Transistor  
Y = Thyristor
- 11** N = NPN transistor output (switched to negative)  
P = PNP transistor output (switched to positive)  
G = Push/pull  
S = Through-beam light source  
U = Switch selectable PNP/NPN  
2 = 2-wire output  
3 = 3-wire output  
4 = 4-wire output
- 12** Dash
- 13-16** Sensing distance  
Sensing distance specifications are always indicated by 4 digits  
– mm: without decimal point  
– m: with decimal point  
e. g. 06.0 = 6 m  
e. g. 15.0 = 15 m  
e. g. 0500 = 500 mm
- 17** Dash
- 18** Connection type  
A = Screw termination  
B = Plug with screw terminals  
C = Cable (standard C = 2 m or length in m)  
S = Plug-in connector
- 19...** Options  
C = Control/diagnostic input  
D = LED for output indication  
E = Adjustable sensitivity  
F = Diagnostic circuit with output and LED for indicator  
G = LED for output mode, supply voltage and beam control indication  
H = LED for supply voltage and output mode indication  
L = LED for output indicator  
T = Adjustable timer circuit  
V = LED for operating voltage indication  
X = Customer-specific options  
Z = Fixed timer

# Wiring diagrams

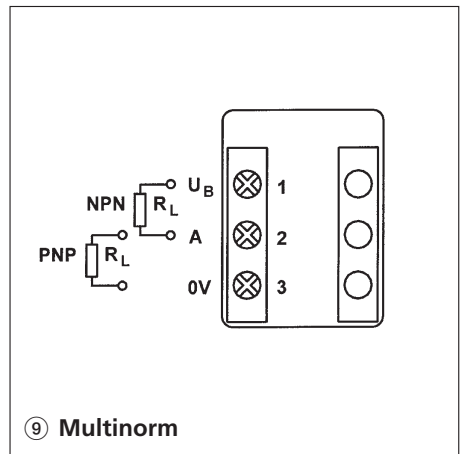
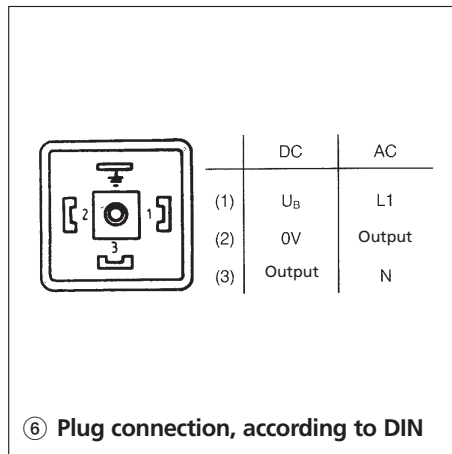
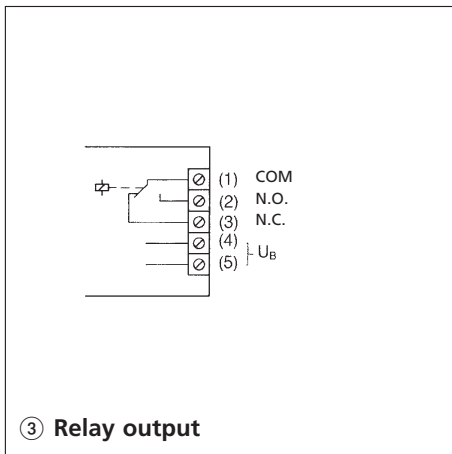
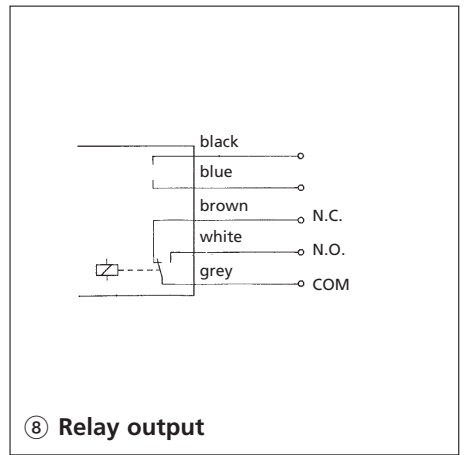
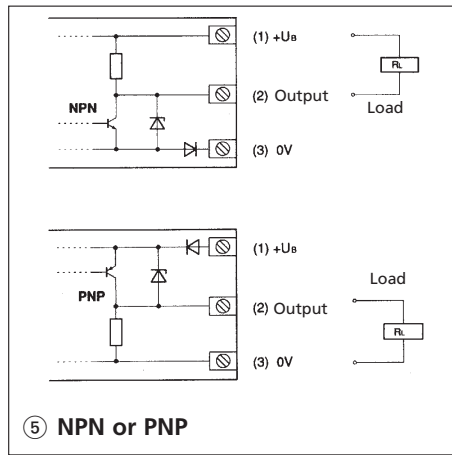
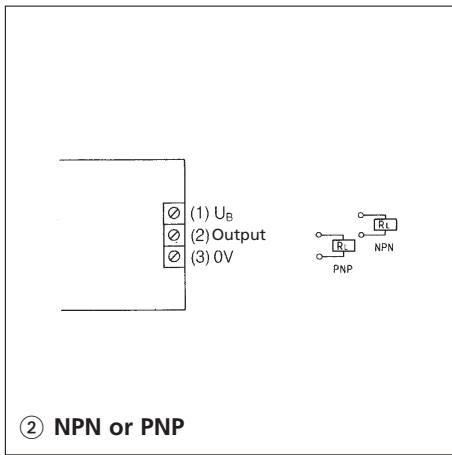
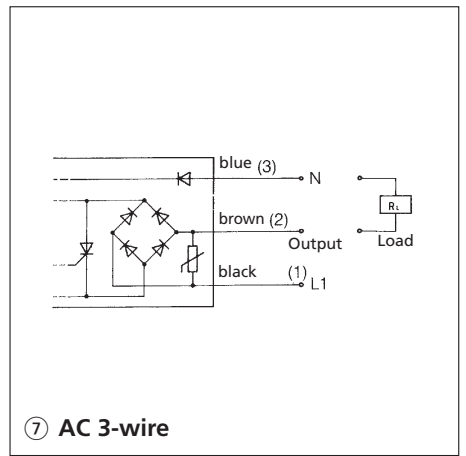
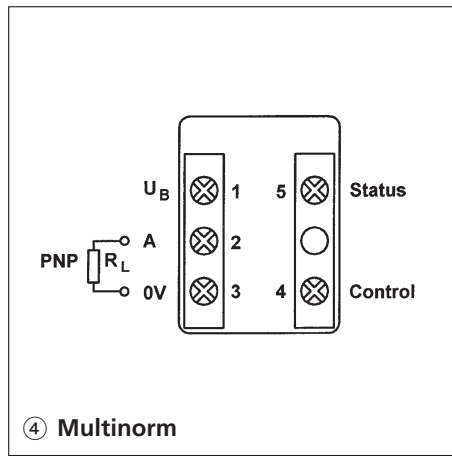
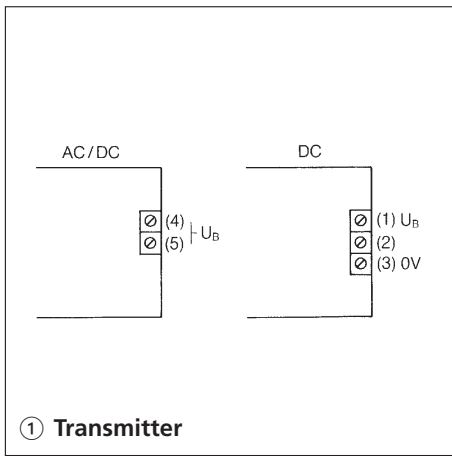


## Surplus detection



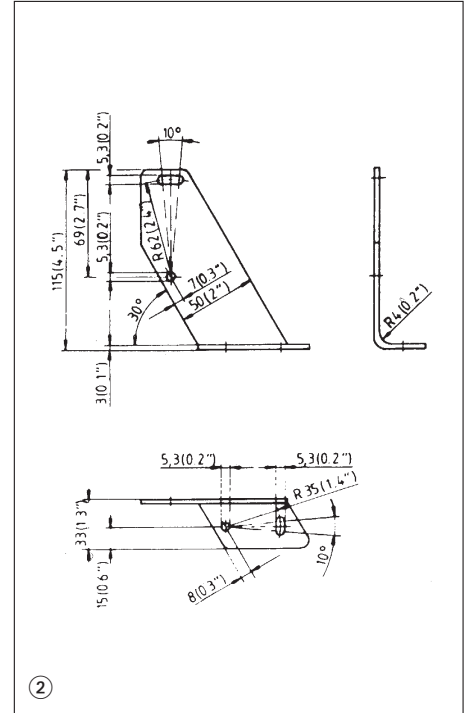
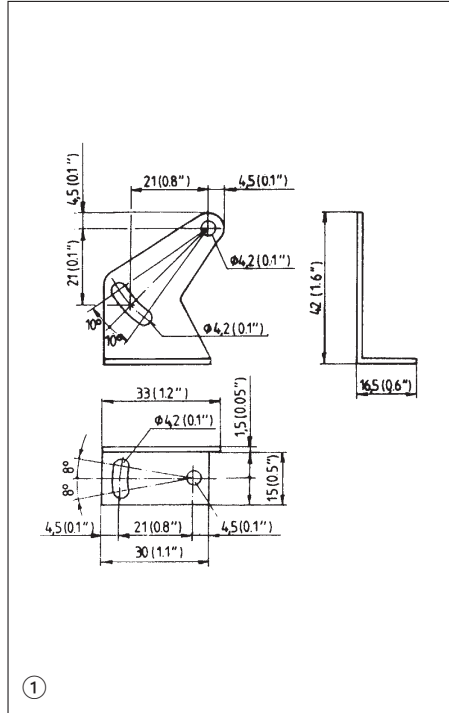


# Wiring diagrams

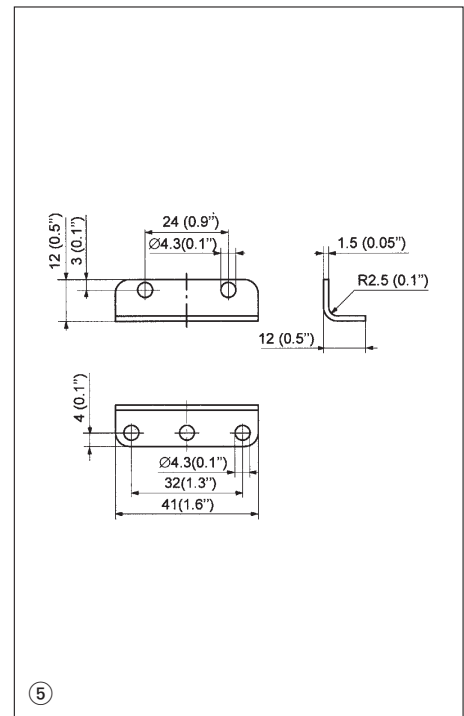
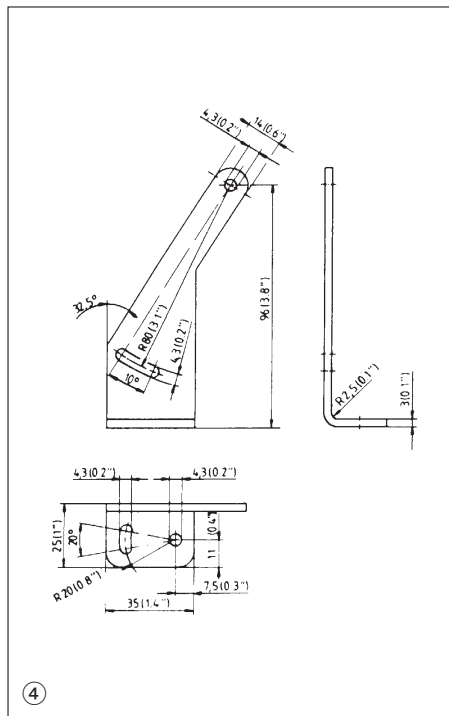
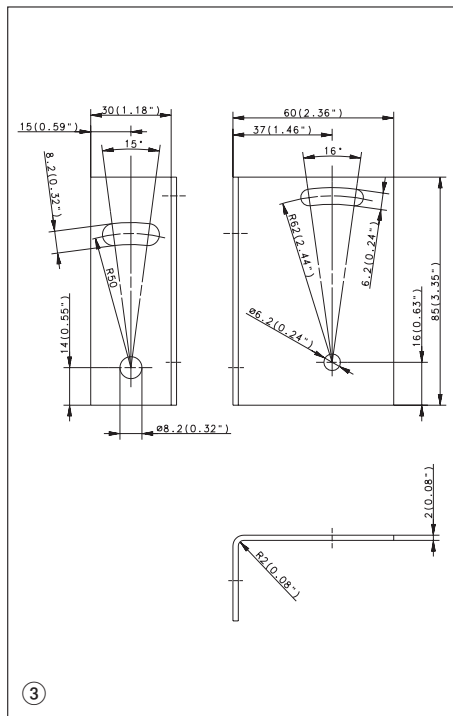


# Fixing material

Other mounting brackets on request



Model description	BWN-L05ST KPL	BWN-L20NI KPL
Part number	657.1300.003	657.1200.002
Stock status: Ex stock/Built to order	-/●	●/-



Model description	BWN-L20NI KPL	BWN-L90NI KPL	BWN-L12AL KPL
Part number	657.1200.007	657.1100.001	657.1500.006
Stock status: Ex stock/Built to order	●/-	●/-	●/-

# Reflectors

A device called triple reflector is the best solution for the reflection in light barriers. Reflective foils play only a secondary role. Triple reflectors are pyramid-shaped small triple mirrors that are combined to make a single reflecting surface. These three reflecting surface are arranged in pyramid shape and in an angle of 90° to each other. They reflect the arriving light beam three times on a single mirroring surface and permit to return it into its original direction (180° reversion). Vibrations, minor movements and variations of up to 30° in relation to the optical axis of the triple reflector do not break the light beam.

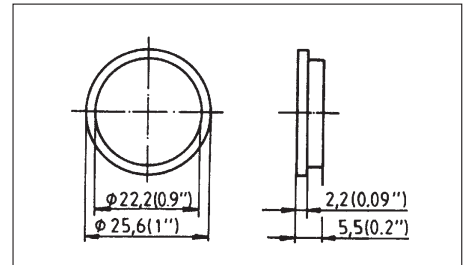
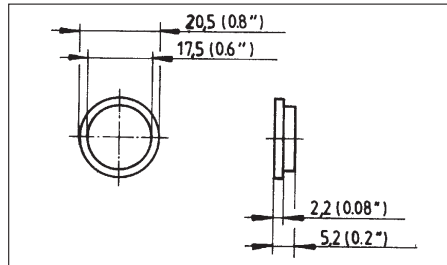
Reflective foils may also be horizontally swung or tilted. However, compared to triple reflectors, their degree of reflection is much decreased as their operation principle is based on small mirrors in connection with micro glass beads. An advantage of reflective foil is its high degree of mounting flexibility. Its reflective performance may be increased by using foil with triple structure, however it does not come near the reflection degree of triple reflectors. In principle a plane mirror should not be used, except when the light beam's angle of incidence corresponds with a high precision to the angle of reflection. Only then a reflection of the light beam can be assured.

The sensing distance specifications of retro-reflective sensors refer to reflectors from the RTS-083 KK or RTS-060 KK series. Basically, the reflector diameter should be selected with regard to the sensing distance and the size of the object to be detected. The ideal case is when the object is larger than the reflector, which is then "shadowed" completely.

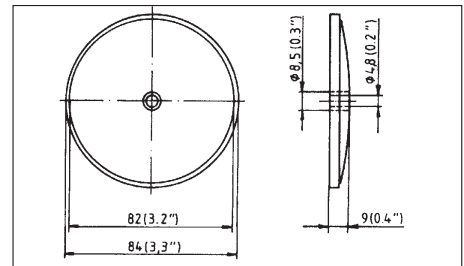
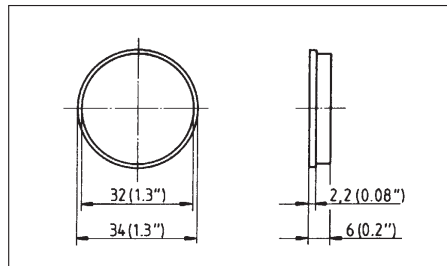
Example: OR20RS

Reflector	Sensing distance
RTS-D17 KK	3.2 m
RTS-D22 KK	3.5 m
RTS-D32 KK	4.0 m
RTS-D83 KK	8.0 m
RTS-60 KK	8.0 m
RFS-100 KK	6.0 m
RTS-120 KK	3.5 m
RTS-500 KK	7.0 m

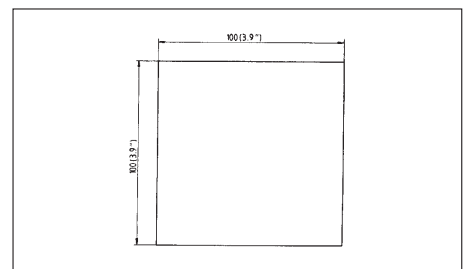
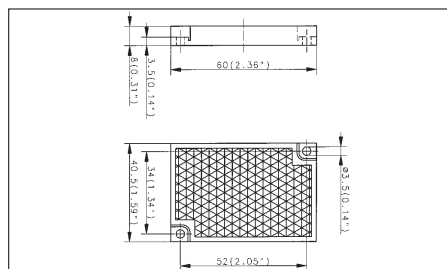
Contact our technical marketing service to obtain information on the sensing distances of other convergent-beam light barriers.



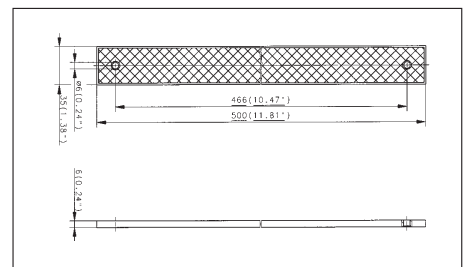
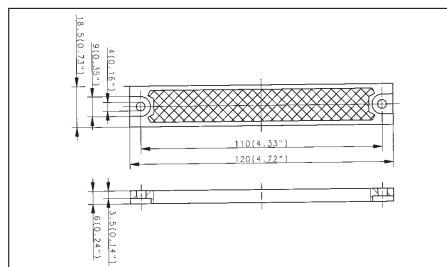
Model description	RTS-D17 KK	RTS-D22 KK
<b>Part number</b>	<b>657.2108.008</b>	<b>657.2109.009</b>
Diameter	17.5 mm (0.69")	22 mm (0.86")
Stock status: Ex stock/Built to order	●/–	●/–



Model description	RTS-D32 KK	RTS-D83 KK
<b>Part number</b>	<b>657.2110.010</b>	<b>657.2107.003</b>
Diameter	32 mm (1 1/4")	83 mm (3 1/4")
Stock status: Ex stock/Built to order	●/–	●/–



Model description	RTS-60 KK	RFS-100 KK
<b>Part number</b>	<b>657.2100.007</b>	<b>657.2300.001</b>
Dimensions	60x41 mm (2.36"x1.61")	100x100 mm (3.9"x3.9") foil with self adhesive backing
Stock status: Ex stock/Built to order	●/–	●/–



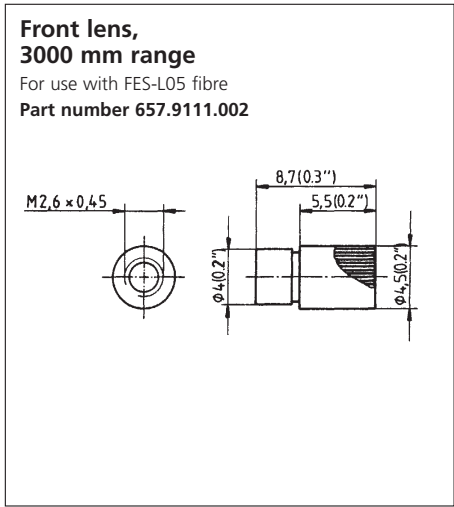
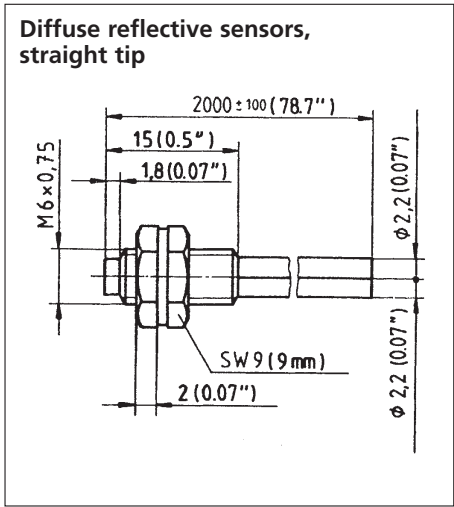
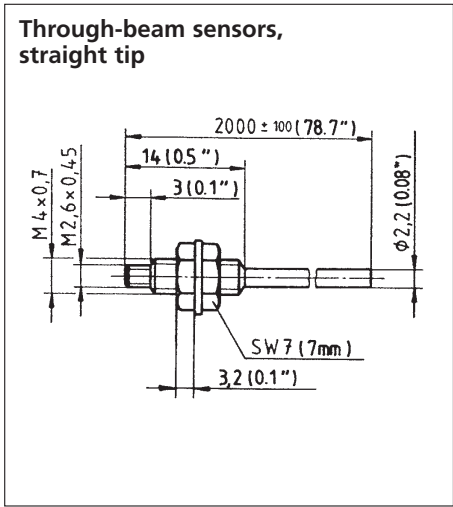
Model description	RTS-120 KK	RTS-500 KK
<b>Part number</b>	<b>657.2100.006</b>	<b>657.2100.002</b>
Dimensions	120x18 mm (4.72"x0.71")	500x35 mm (19.7"x1.38") plastic
Stock status: Ex stock/Built to order	●/–	●/–

# Fibre optics for OR05 series

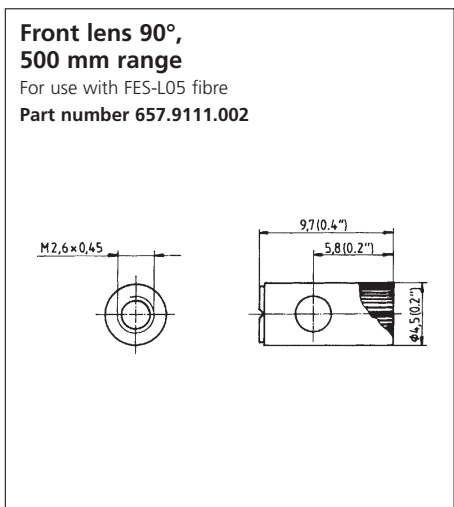
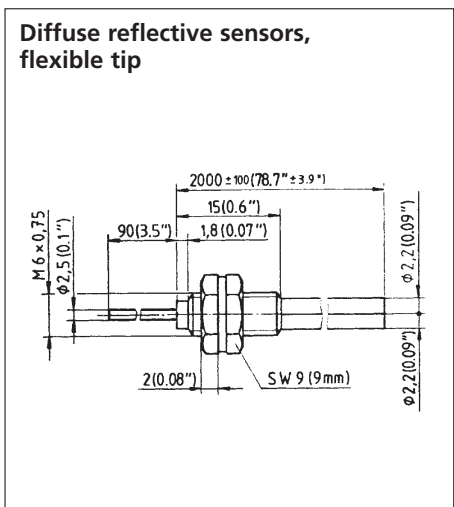
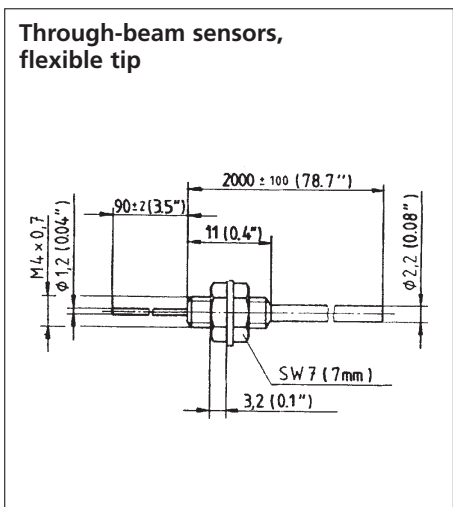
-40 °C/+ 75 °C  
-40 °F/+167 °F

with plastic sleeve

All plastic fibre deliveries include a cutting tool.



Sensing distance/range	200 mm (7.87")	120 mm (4.72")	
2 single fibres, type can be cut	Ø 2.2 mm (0.09")	Ø 2.2 mm (0.09")	
Model description	FES-L05KK/2.0-V	FRS-L05KK/2.0-V	VLS-L05GM/000-M2.6
Part number	657.9111.002	657.9711.001	657.0022.011 (1 unit)
Stock status: Ex stock/Built to order	●/-	●/-	-/●



Sensing distance/range	120 mm (4.72")	120 mm (4.72")	
2 single fibres, type can be cut	Ø 2.2 mm (0.09")	Ø 2.2 mm (0.09")	
Model description	FES-L05KK/2.0-BV	FRS-L05KK/2.0-BV	VLS-L05GM/000-M2.6W
Part number	657.9111.001	657.9711.002	657.0022.008 (1 unit)
Stock status: Ex stock/Built to order	-/●	●/-	-/●

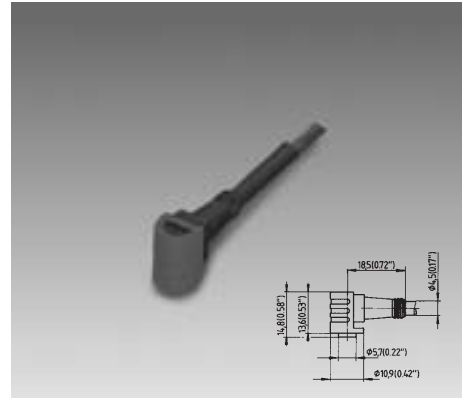
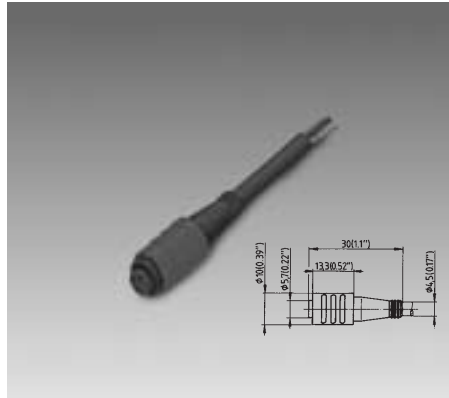
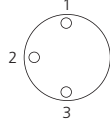
## Miniature snap-in plugs Ø 6.5

with moulded cable

All dimensions in mm (inches)

### Terminal code

1 = brown  
2 = black  
3 = blue



		3-wire	3-wire
Cable length	Model description ①	GDK-R06US/S00-2.5PU	② WDK-R06US/S00-2.5PU
2.5 m/8.2 ft	<b>Part number</b>	<b>413.9100.219</b>	<b>413.9100.221</b>
Cable length	Model description ①	GDK-R06US/S00-5PU	② WDK-R06US/S00-5PU
5 m/16.4 ft	<b>Part number</b>	<b>413.9100.220</b>	<b>413.9100.222</b>
Material of cable sleeve		PUR	PUR
Material body/Contact carrier		PUR	PUR
Material of pull protection		POM	POM
Operating voltage	max.	60 V AC/75 V DC	60 V AC/75 V DC
Current carrying capacity	max.	4 A	4 A
Temperature range	min./max.	-40 °C/+80 °C -40 °F/+176 °F	-40 °C/+80 °C -40 °F/+176 °F
Function indication		-	-
Operating voltage indication		-	-
Cable structure	mm <sup>2</sup>	3 x 0.25	3 x 0.25
Protection type after installation		IP 67/NEMA 4	IP 67/NEMA 4

## Miniature snap-in plugs Ø 6.5

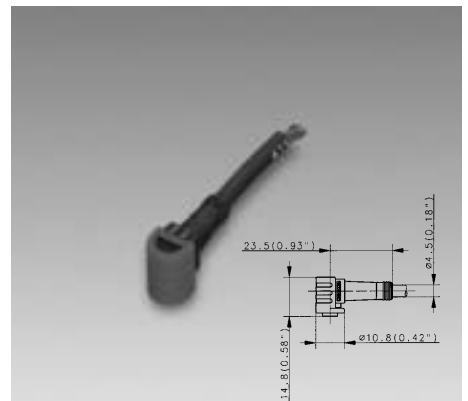
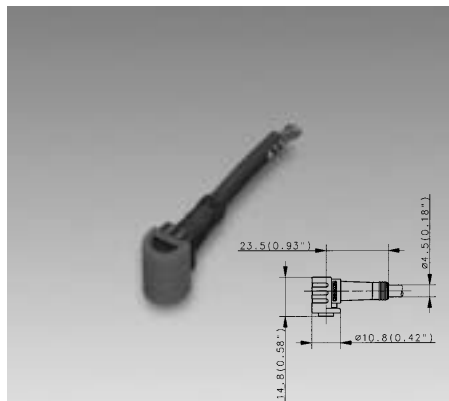
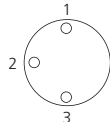
with moulded cable

### Double LED

All dimensions in mm (inch)

### Terminal code

1 = brown  
2 = black  
3 = blue



		PNP 3-wire	NPN 3-wire
Cable length	Model description ③	WDK-R06PS/SL2-2.5PU	④ WDK-R06NS/SL2-2.5PU
2.5 m/8.2 ft	<b>Part number</b>	<b>413.9100.223</b>	<b>413.9100.225</b>
Cable length	Model description ③	WDK-R06PS/SL2-5PU	④ WDK-R06NS/SL2-5PU
5 m/16.4 ft	<b>Part number</b>	<b>413.9100.224</b>	<b>413.9100.226</b>
Material of cable sleeve		PUR	PUR
Material body/Contact carrier		PUR	PUR
Material of pull protection		POM	POM
Operating voltage	max.	36 V DC	36 V DC
Current carrying capacity	max.	4 A	4 A
Temperature range	min./max.	-40 °C/+80 °C -40 °F/+176 °F	-40 °C/+80 °C -40 °F/+176 °F
Function indication		●	●
Operating voltage indication		●	●
Cable structure	mm <sup>2</sup>	3 x 0.25	3 x 0.25
Protection type after installation		IP 67/NEMA 4	IP 67/NEMA 4

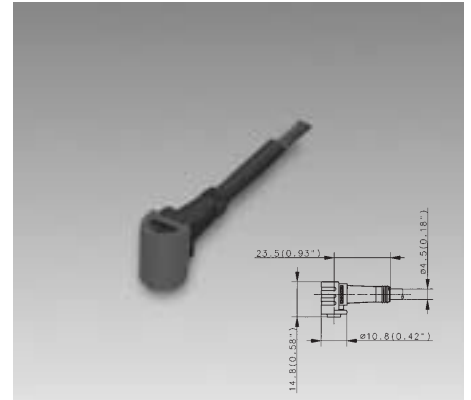
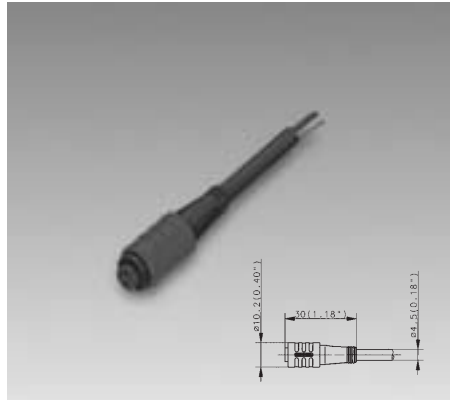
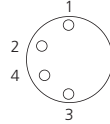
# Miniature snap-in plugs Ø 6.5

with moulded cable

All dimensions in mm (inch)

### Terminal code

- 1 = brown
- 2 = white
- 3 = blue
- 4 = black



		4-wire	4-wire
Cable length	Model description	③ GDK-R06UA/S00-2.5PU	④ WDK-R06UA/S00-2.5PU
2.5 m/8.2 ft	<b>Part number</b>	<b>413.9100.228</b>	<b>413.9100.230</b>
Cable length	Model description	③ GDK-R06UA/S00-5PU	④ WDK-R06UA/S00-5PU
5 m/16.4 ft	<b>Part number</b>	<b>413.9100.229</b>	<b>413.9100.231</b>
Material of cable sleeve		PUR	PUR
Material body/Contact carrier		PUR	PUR
Material of pull protection		POM	POM
Operating voltage	max.	60 V AC/75 V DC	60 V AC/75 V DC
Current carrying capacity	max.	2 A	2 A
Temperature range	min./max.	-25 °C/+90 °C -13 °F/+194 °F	-25 °C/+90 °C -13 °F/+194 °F
Function indication		-	-
Operating voltage indication		-	-
Cable structure	mm <sup>2</sup>	4 x 0.14	4 x 0.14
Protection type after installation		IP 67/NEMA 4	IP 67/NEMA 4

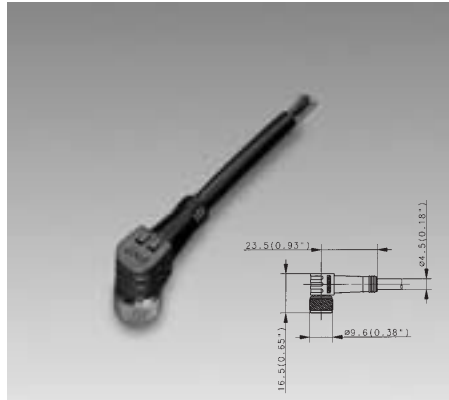
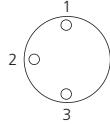
# Plug M 8 x 1 with lock nut

with moulded cable

All dimensions in mm (inches)

## Terminal code

- 1 = brown
- 2 = black
- 3 = blue



## 3-wire

Cable length 2.5 m/8.2 ft	Model description ②	WDK-M08US/S00-2.5PU
	<b>Part number</b>	<b>413.9100.278</b>
Cable length 5 m/16.4 ft	Model description ②	WDK-M08US/S00-5PU
	<b>Part number</b>	<b>413.9100.279</b>
Material of cable sleeve		PVC
Material body/Contact carrier		PVC
Material of pull protection		CuZn39Pb3
Operating voltage	max.	60 V AC/75 V DC
Current carrying capacity	max.	4 A
Temperature range	min./max.	-40 °C/+80 °C -40 °F/+176 °F
Function indication		-
Operating voltage indication		-
Cable structure	mm <sup>2</sup>	3 x 0.25
Protection type after installation		IP 67/NEMA 4

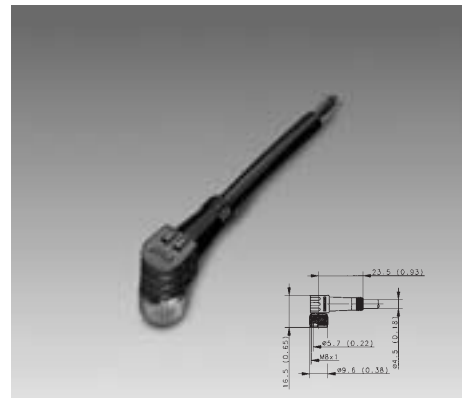
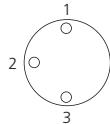
# Plug M 8 x 1 with lock nut

with moulded cable

All dimensions in mm (inches)

## Terminal code

- 1 = brown
- 2 = black
- 3 = blue



## 3-wire

Cable length 2.5 m/8.2 ft	Model description ①	GDK-M08US/S00-2.5PU	②	WDK-M08US/S00-2.5PU
	<b>Part number</b>	<b>413.9100.261</b>		<b>413.9100.264</b>
Cable length 5 m/16.4 ft	Model description ①	GDK-M08US/S00-5PU	②	WDK-M08US/S00-5PU
	<b>Part number</b>	<b>413.9100.263</b>		<b>413.9100.265</b>
Material of cable sleeve		PUR		PUR
Material body/Contact carrier		PUR		PUR
Material of pull protection		CuZn39Pb3		CuZn39Pb3
Operating voltage	max.	60 V AC/75 V DC		60 V AC/75 V DC
Current carrying capacity	max.	4 A		4 A
Temperature range	min./max.	-40 °C/+80 °C -40 °F/+176 °F		-40 °C/+80 °C -40 °F/+176 °F
Function indication		-		-
Operating voltage indication		-		-
Cable structure	mm <sup>2</sup>	3 x 0.25		3 x 0.25
Protection type after installation		IP 67/NEMA 4		IP 67/NEMA 4

# Plug M 8 x 1 with lock nut

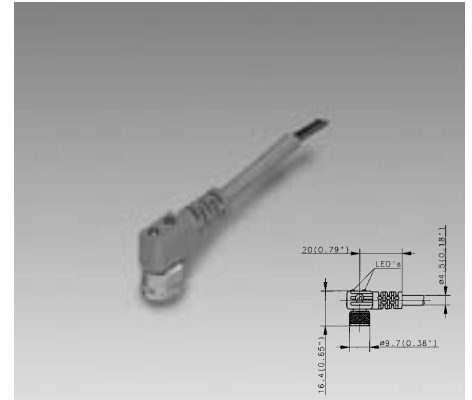
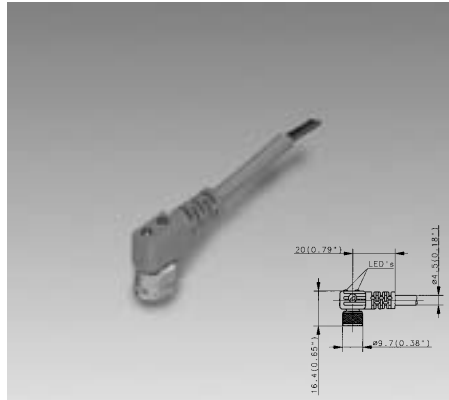
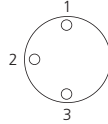
with moulded cable

Double LED

All dimensions in mm (inches)

### Terminal code

- 1 = brown
- 2 = black
- 3 = blue



### PNP 3-wire

### NPN 3-wire

Cable length	Model description	③ WDK-M08PS/LL2-2
2 m/6.56 ft	<b>Part number</b>	<b>413.9100.213</b>
Cable length	Model description	③ WDK-M08PS/LL2-5
5 m/16.4 ft	<b>Part number</b>	<b>413.9100.216</b>
Material of cable sleeve		PUR
Material body/Contact carrier		PUR
Material of pull protection		CuZn39Pb3
Operating voltage	max.	30 V DC
Current carrying capacity	max.	2 A
Temperature range	min./max.	-25 °C/+90 °C -13 °F/+194 °F
Function indication		●
Operating voltage indication		●
Cable structure	mm <sup>2</sup>	3 x 0.25
Protection type after installation		IP 67/NEMA 4

Cable length	Model description	④ WDK-M08NS/LL2-2
2 m/6.56 ft	<b>Part number</b>	<b>413.9100.214</b>
Cable length	Model description	④ WDK-M08NS/LL2-5
5 m/16.4 ft	<b>Part number</b>	<b>413.9100.217</b>
Material of cable sleeve		PUR
Material body/Contact carrier		PUR
Material of pull protection		CuZn39Pb3
Operating voltage	max.	30 V DC
Current carrying capacity	max.	2 A
Temperature range	min./max.	-25 °C/+90 °C -13 °F/+194 °F
Function indication		●
Operating voltage indication		●
Cable structure	mm <sup>2</sup>	3 x 0.25
Protection type after installation		IP 67/NEMA 4



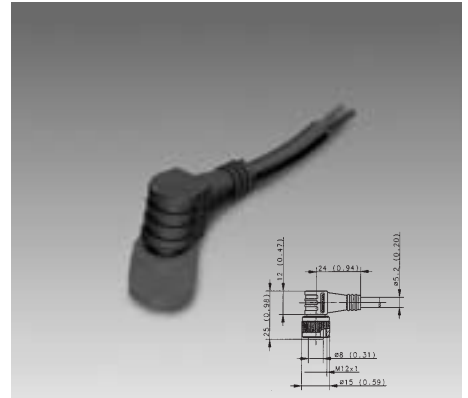
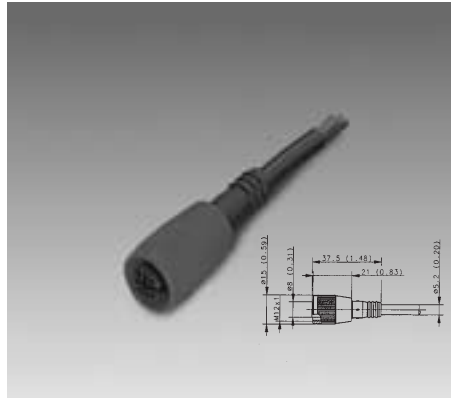
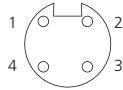
# Plug M 12 x 1 with lock nut

with moulded cable

All dimensions in mm (inches)

## Terminal code

- 1 = brown
- 2 = -
- 3 = blue
- 4 = black



## 3-wire

## 3-wire

Cable length 2 m/6.56 ft	Model description ①	GDK-M12US/S00-2	②	WDK-M12US/S00-2
	<b>Part number</b>	<b>413.9100.232</b>		<b>413.9100.234</b>
Cable length 5 m/16.4 ft	Model description ①	GDK-M12US/S00-5	②	WDK-M12US/S00-5
	<b>Part number</b>	<b>413.9100.233</b>		<b>413.9100.235</b>
Material of cable sleeve		PVC		PVC
Material body/Contact carrier		PUR		PUR
Material of pull protection		PA		PA
Operating voltage	max.	250 V AC/300 V DC		250 V AC/300 V DC
Current carrying capacity	max.	4 A		4 A
Temperature range	min./max.	-40 °C/+80 °C -40 °F/+176 °F		-40 °C/+80 °C -40 °F/+176 °F
Function indication		-		-
Operating voltage indication		-		-
Cable structure	mm <sup>2</sup>	3 x 0.34		3 x 0.34
Protection type after installation		IP 67/NEMA 4		IP 67/NEMA 4

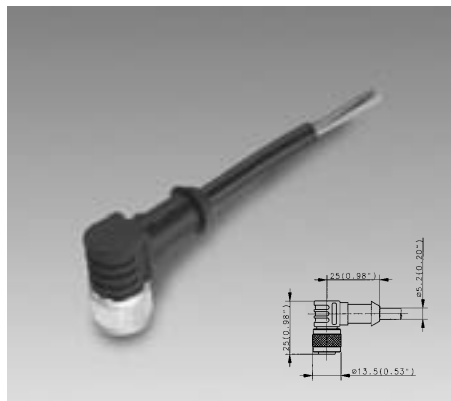
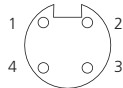
# Plug M 12 x 1 with lock nut

with moulded cable

All dimensions in mm (inches)

## Terminal code

- 1 = brown
- 2 = -
- 3 = blue
- 4 = black



## 3-wire

Cable length 2 m/6.56 ft	Model description ③	WDK-M12US/G00-2
	<b>Part number</b>	<b>413.9100.280</b>
Cable length 5 m/16.4 ft	Model description ③	WDK-M12US/G00-5
	<b>Part number</b>	<b>413.9100.281</b>
Material of cable sleeve		PVC
Material body/Contact carrier		PUR
Material of pull protection		CuZn39Pb3
Operating voltage	max.	250 V AC/300 V DC
Current carrying capacity	max.	4 A
Temperature range	min./max.	-40 °C/+80 °C -40 °F/+176 °F
Function indication		-
Operating voltage indication		-
Cable structure	mm <sup>2</sup>	3 x 0.34
Protection type after installation		IP 67/NEMA 4

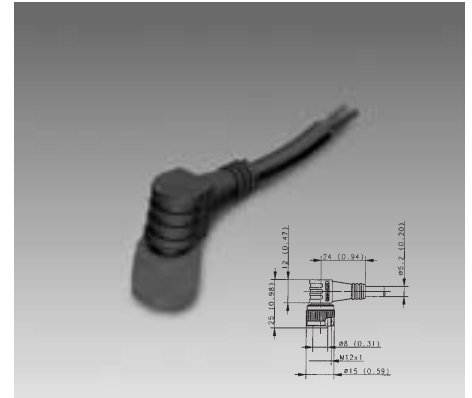
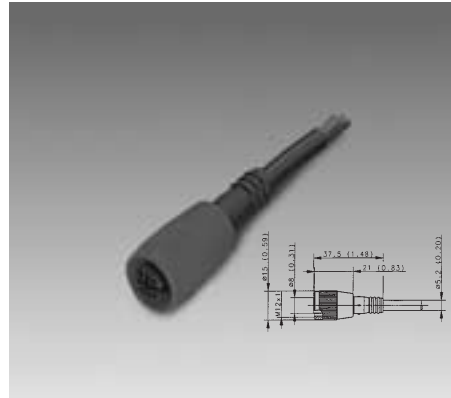
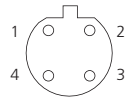
# AC plug M 12 x 1 with lock nut

with moulded cable

All dimensions in mm (inches)

## Terminal code

- 1 = black
- 2 = blue
- 3 = -
- 4 = -



		2-wire	2-wire
Cable length	Model description ①	GDK-M12AS/S00-2	② WDK-M12AS/S00-2
2 m/6.56 ft	<b>Part number</b>	<b>413.9100.248</b>	<b>413.9100.250</b>
Cable length	Model description ①	GDK-M12AS/S00-5	② WDK-M12AS/S00-5
5 m/16.4 ft	<b>Part number</b>	<b>413.9100.249</b>	<b>413.9100.251</b>
Material of cable sleeve		PVC	PVC
Material body/Contact carrier		PUR	PUR
Material of pull protection		PA	PA
Operating voltage	max.	250 V AC/300 V DC	250 V AC/300 V DC
Current carrying capacity	max.	4 A	4 A
Temperature range	min./max.	-40 °C/+80 °C -40 °F/+176 °F	-40 °C/+80 °C -40 °F/+176 °F
Function indication		-	-
Operating voltage indication		-	-
Cable structure	mm <sup>2</sup>	2 x 0.5	2 x 0.5
Protection type after installation		IP 67/NEMA 4	IP 67/NEMA 4

# Plug M 12 x 1 with lock nut

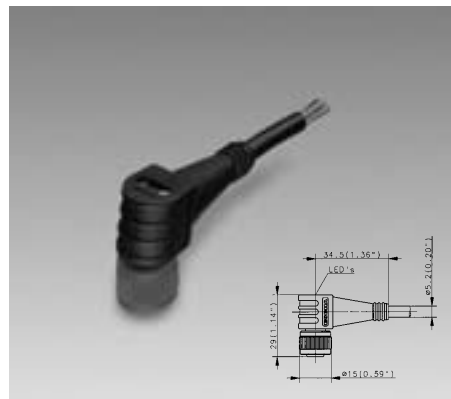
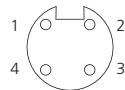
with moulded cable

Double LED

All dimensions in mm (inches)

## Terminal code

- 1 = brown
- 2 = -
- 3 = blue
- 4 = black



		PNP 3-wire	NPN 3-wire
Cable length	Model description ③	WDK-M12PS/SL2-2	④ WDK-M12NS/SL2-2
2 m/6.56 ft	<b>Part number</b>	<b>413.9100.240</b>	<b>413.9100.242</b>
Cable length	Model description ③	WDK-M12PS/SL2-5	④ WDK-M12NS/SL2-5
5 m/16.4 ft	<b>Part number</b>	<b>413.9100.241</b>	<b>413.9100.243</b>
Material of cable sleeve		PVC	PVC
Material body/Contact carrier		PUR	PUR
Material of pull protection		PA	PA
Operating voltage	max.	30 V DC	30 V DC
Current carrying capacity	max.	4 A	4 A
Temperature range	min./max.	-40 °C/+80 °C -40 °F/+176 °F	-40 °C/+80 °C -40 °F/+176 °F
Function indication		●	●
Operating voltage indication		●	●
Cable structure	mm <sup>2</sup>	3 x 0.34	3 x 0.34
Protection type after installation		IP 67/NEMA 4	IP 67/NEMA 4

# Plug M 12 x 1 with lock nut

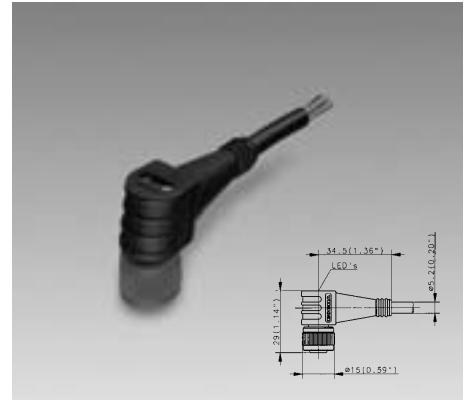
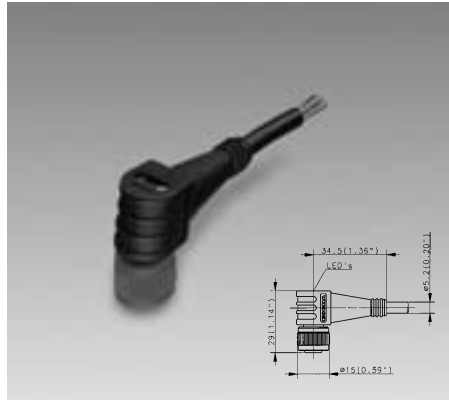
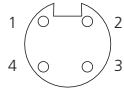
with moulded cable

Double LED

All dimensions in mm (inches)

## Terminal code

- 1 = brown
- 2 = white
- 3 = blue
- 4 = black



## PNP 4-wire

## NPN 4-wire

		① WDK-M12PA/SL2-2PU	② WDK-M12NA/SL2-2PU
Cable length	Model description	① WDK-M12PA/SL2-5PU	② WDK-M12NA/SL2-5PU
2 m/6.56 ft	<b>Part number</b>	<b>413.9100.244</b>	<b>413.9100.246</b>
Cable length	Model description	① WDK-M12PA/SL2-5PU	② WDK-M12NA/SL2-5PU
5 m/16.4 ft	<b>Part number</b>	<b>413.9100.245</b>	<b>413.9100.247</b>
Material of cable sleeve		PUR	PUR
Material body/Contact carrier		PUR	PUR
Material of pull protection		PA	PA
Operating voltage	max.	30 V DC	30 V DC
Current carrying capacity	max.	4 A	4 A
Temperature range	min./max.	-40 °C/+80 °C -40 °F/+176 °F	-40 °C/+80 °C -40 °F/+176 °F
Function indication		●	●
Operating voltage indication		●	●
Cable structure	mm <sup>2</sup>	4 x 0.25	4 x 0.25
Protection type after installation		IP 67/NEMA 4	IP 67/NEMA 4

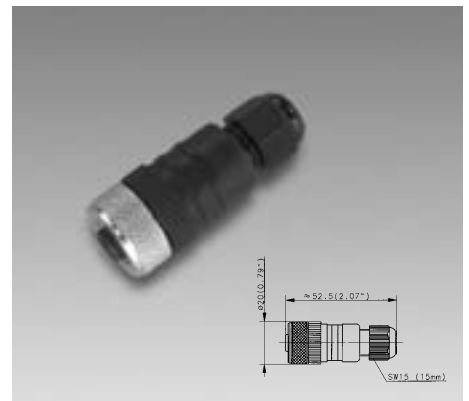
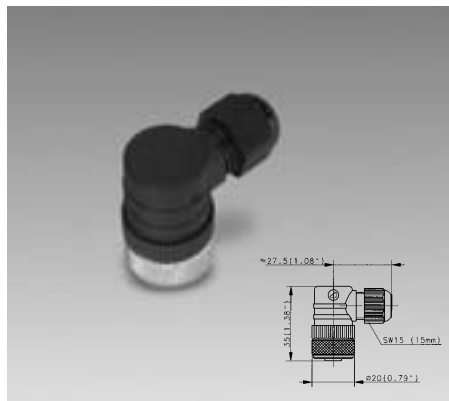
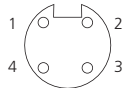
# Plug M 12 x 1 with lock nut

provide own cable

All dimensions in mm (inches)

## Terminal code

- 1 = Plus
- 2 = NC
- 3 = Minus
- 4 = NO



		③ WDA-M12UA/LO	③ GDA-M12UA/LO
Female plug	Model description	③ WDA-M12UA/LO	③ GDA-M12UA/LO
	<b>Part number</b>	<b>413.9100.101</b>	<b>413.9100.102</b>
Max. cable diameter	mm	3-6.5	3-6.5
Cross section mm <sup>2</sup>	max.	0.75	0.75
Material body/Contact carrier		PA	PA
Material of pull protection		CuZn39Pb3	CuZn39Pb3
Operating voltage	max.	125 V AC/150 V DC	125 V AC/150 V DC
Current carrying capacity	max.	4 A	4 A
Temperature range	min./max.	-25 °C/+90 °C -13 °F/+194 °F	-25 °C/+90 °C -13 °F/+194 °F
Function indication		-	-
Operating voltage indication		-	-
Cable structure	mm <sup>2</sup>	-	-
Protection type after installation		IP 67/NEMA 4	IP 67/NEMA 4

# Sensor testing unit



## Sensor testing unit

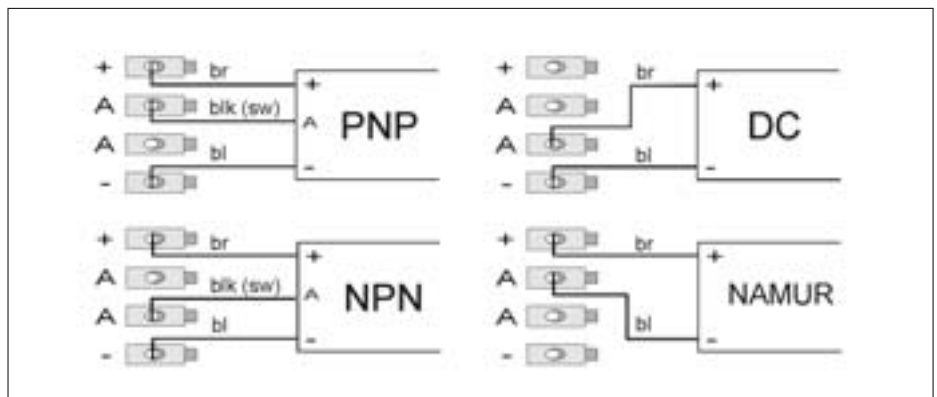
Technical data	
Model description	Sensortester
Part number	<b>651.0000.048</b>
Stock status: Ex stock/Built to order	●/-
Function	Sensor testing units for proximity sensors in DC-2-wire and 3-wire technology. Testing function: Indication of switching condition of the sensor via visual and acoustic signal
Supply voltage	9 V monobloc battery (6LR61)
Output voltage	15 V DC, 20 mA stabilised
Housing	Modified housing from the OR20 series
Temperature range	-25 °C/+70 °C
Input signals	NPN/PNP-3-wire, DC-2-wire, NAMUR

The sensor testing unit is suitable for checking proximity sensors in DC 2-wire and 3-wire technology. To indicate the switching conditions, colour LEDs and an acoustic signal are used.

- LED green: Operating voltage indication
- LED red: Weak battery
- LED yellow: Switching condition of sensor

The sensor testing units is provided with an automatic switch-off mechanism, deactivating the device (if not in operation) after approx. 30 s.

### Terminal assignment







# Enclosures

## Industrial enclosures

## Control enclosures

## Suspension systems

Model Page

**Selection criteria and additional enclosure information** **288**



**Aluminium enclosures CA Series** **294**

- High mechanical strength
- High corrosion resistance
- Perfect for external applications
- IP 65 rated
- Accessories
- Component aluminium enclosures

**296**



**Polycarbonate enclosures CT series** **312**

- Good mechanical strength
- Suitable for external applications
- IP 65 rated
- Accessories
- Component polycarbonate and ABS enclosures

**314**

**ABS enclosures CT series**

- Lower mechanical strength
- Limited external applications
- IP 65 rated
- Accessories



**CT-Module** **326**

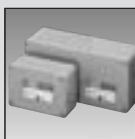
- Adaptable before, during and after installation
- Variety of options
- No machining required
- Reduced stock holding



**Polyester enclosures CP series** **360**

- High mechanical strength
- Very high corrosion resistance
- Excellent for external applications
- IP 65 rated
- Accessories
- Component polyester enclosures

**362**



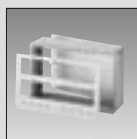
**Enclosures for Ex-applications** **373**

Model Page



**CC-10 compact control enclosures** **374**

- Cast aluminium design
- Aluminium cover frames
- Front plates
- Modern industrial design



**Lightweight control enclosure series CC-2000 SL** **382**

- Modular slim-line aluminium concept
- Direct installation of industry standard controls
- Various front plate mounting options
- Standard and customer specific sizes available
- Check list CC-2000 SL

**388**



**Control enclosures Type CC-4000** **390**

- Modular aluminium enclosure concept
- Direct mounting of industry standard controllers
- Various front plate-mounting options
- Standard and customer specific sizes
- Pedestal
- Check list CC-4000

**396**

Model Page

**Selection criteria for suspension systems** **400**



**Lightweight suspension system series CS-2000 SL 45/60** **402**

- Modular suspension system for light loads
- Al-connection profiles with or without cable channels
- Assembly access points on connecting components



**Medium load suspension system series CS-2000 50/60/80** **408**

- Modular suspension system for medium loads
- Steel connection profiles and cable channels
- Assembly access points on connecting components



**Heavy load suspension system series CS-2000 80/140** **422**

- Modular suspension systems for very high loads
- Steel connection profiles and cable channels
- Assembly access points on connecting components

**Suspension system accessories** **426**

## Stainless products

## Appendix

Model	Page	Model	Page
 <p><b>Compact control enclosures</b> <b>Type CC-480 NR</b></p> <ul style="list-style-type: none"> <li>• Material B.S.I. 304</li> <li>• Removal hinged front door</li> </ul>	<b>428</b>	 <p><b>Cable glands</b></p>	<b>446</b>
 <p><b>Control enclosures</b> <b>CC-600/CC-600 NR</b></p> <ul style="list-style-type: none"> <li>• Material painted mild steel or stainless steel B.S.I. 304</li> <li>• IP 65/66 Ingress protection</li> <li>• Front plate and hinged rear door</li> </ul>	<b>430</b>		
 <p><b>Suspension system for light to medium loads</b> <b>Type CS-480 NR</b></p> <ul style="list-style-type: none"> <li>• Material B.S.I. 304</li> <li>• IP 65 Ingress protection</li> </ul>	<b>434</b>		
 <p><b>Suspension system for medium to heavy loads</b> <b>Type CS-600 NR</b></p> <ul style="list-style-type: none"> <li>• Material B.S.I. 304 or anodised Al.</li> <li>• IP 66 Ingress protection</li> <li>• Modular system</li> </ul>	<b>438</b>		
<hr/>			
<input type="checkbox"/> <b>Available on request:</b>			
 <p><b>Terminal boxes</b> <b>Type CV-NR</b></p> <ul style="list-style-type: none"> <li>• Material 1.4301</li> <li>• IP 66 Ingress protection</li> <li>• foamed gasket</li> </ul>			
 <p><b>Wall cabinets</b> <b>Type CW-NR</b></p> <ul style="list-style-type: none"> <li>• Material 1.4301</li> <li>• IP 66 Ingress protection</li> <li>• Includes mounting plate</li> </ul>			



## Selection criteria for enclosures

The following questions will help you to select the most appropriate enclosure for your type of application from the wide range of the BERNSTEIN product line:

### 1. What are the dimensions of the required enclosure?

E.g. dimensions of printed circuit board, number of terminals, mechanical machining for cable glands, etc.  
> [select the required external dimensions](#)

### 2. What is the operating environment?

E.g. moisture, climate, temperature, high-frequency radiation, etc.  
> [select enclosure material, surface composition, gasket material](#)

### 3. What mechanical stress will occur?

E.g. impact stress, pressure, bending, etc.  
> [select enclosure material](#)

### 4. What chemical resistance is required?

E.g. cleaning agents, oils, lubricants, etc.  
> [select enclosure material](#)

### 5. What mechanical machining is necessary?

E.g. plugs, cable glands, windows, etc.  
> [draw up a model sketch for mechanical machining](#)

### 6. Which accessories are required?

E.g. mounting plate, mounting rail, terminals, windows, external hinges, internal hinges, etc.  
> [select required accessories](#)

### 7. Are any special made-to-order items necessary?

E.g. specific company colours, screen-printings of logos or symbols, etc.  
> [select and determine colour, screen-printing, etc.](#)

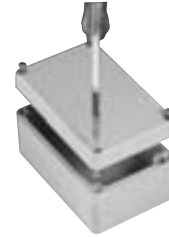
## Customised service

### What does the BERNSTEIN customised service include?

This service can save you the inconvenience of machining and enables you to use the enclosure - as delivered by BERNSTEIN - directly in the production process.

- Mechanical machining, even intricate outlines, using modern CNC machining centres
- Special coatings in accordance with customer specifications
- HF-proof designs, given special coatings and conductive gaskets
- Screen-printings and engravings on the enclosure surface
- Mounting of individual components from the wide range of BERNSTEIN accessories (external and internal hinges, mounting plates, mounting rails, terminals, cable glands)
- If required, BERNSTEIN aluminium enclosures can be further protected by applying the environmentally-friendly C 6100 Alodine yellow-passivating method, for use in corrosive surroundings. The application of an additional primer and final coat further guarantee resistance to corrosion.

## The BERNSTEIN quick release screw



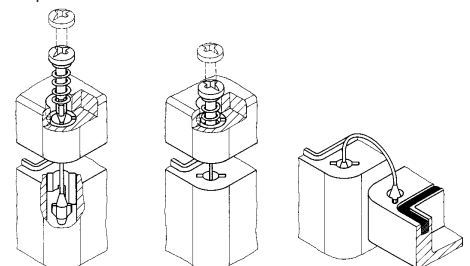
Invented and patented by BERNSTEIN, the quick release capability offers a useful innovation to our customers. The quick release screws save time and money if the enclosure is frequently opened and closed and comes with the following features:

1. Released through just a 90° turning action – closing and opening the enclosure with the quick release screws is considerably faster than with any other standard locking system (e.g. lid screws). This saves time and therefore money. All other mechanical characteristics of the enclosure and the IP 65 protection class are unaffected.
2. Easy lock/release at a glance the user can check whether the quick release is open or closed. This check does not involve any mechanical testing.
3. No accidental opening caused by vibration or shock. The quick release locks into place and is held there by a spring action. Accidental opening is impossible, thus increasing safety
4. Easy mounting – for any machining, coating or labelling that may be required by the customer at a later date, the quick release can be easily removed and then re-fitted. The screws are self-retaining in the lid.

BERNSTEIN quick-release internal hinge.

Simple, convenient, cost effective in addition to the quick release screws, BERNSTEIN offers the practical quick-release internal hinge for mounting enclosure lids on bases.

The alternative flexible internal hinges can be easily mounted on the enclosure without mechanical machining and can hold the enclosure lid after opening. In this way, the enclosure lid is both strain-relieved and captive.



# Protection class specification

## In accordance with IEC 529, EN 60529, VDE 470 P 1

The protection class of a closed device indicates the level of protection from external factors. It includes the degree of protection afforded to personnel (from touching live parts) and protection of the device from the ingress of particles and water. BERNSTEIN standard enclosures generally conform to the protection class IP 65.

1 <sup>st</sup> number	Meaning
Code	Degree of protection from shock and against particles
0	non-protected
1	protected against solid particles < 50 mm Ø
2	protected against medium-sized particles < 12 mm Ø
3	protected against small particles < 2.5 mm Ø
4	protected against small particles < 2.5 mm Ø
5	protected against dust ingress
6	dust-proof and complete protection from accidental contact
2 <sup>nd</sup> number	Meaning
Code	Degree of protection against water
0	non-protected
1	protected against vertically dripping water
2	protected against dripping water, when tilted up to 15 degree
3	protected against spraying water
4	protected against splashing water
5	protected against water jets
6	protected against heavy seas or powerful jets of water
7	protected against water immersion
8	protected against submersion
BERNSTEIN-Enclosure standard IP 65	
BERNSTEIN-Enclosure in IP 66, IP 67 on request	

### Protection class specification

In accordance with IEC 529, the specification of the protection class consists of a two-digit number.

#### Meaning of the 1st number:

Protection from accidental contact and ingress of foreign particles

#### Meaning of the 2nd number:

Protection against water ingress

### Example: Protection class IP 65

1st number (6):  
complete protection from accidental contact with live elements or from moving parts = protection from dust ingress

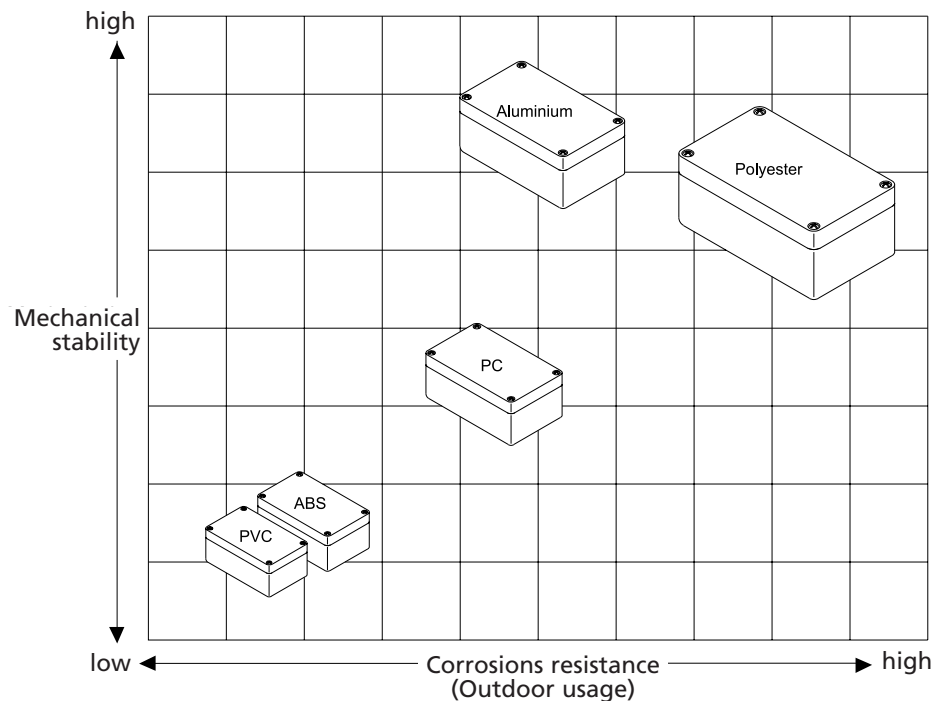
2nd number (5):  
a jet of water from any direction will not damage the enclosure = protection against water jets

## Mechanical stability

Mechanical stability is a major factor in determining the appropriate material. The following table specifies the essential properties of aluminium, polycarbonate, ABS and polyester.

Material property	Standard	Unit	Aluminium	Polycarbonate	ABS	Polyester
Density	DIN 53 479	g/cm <sup>3</sup>	2.65	1.2	1.05	1.8
Impact strength	DIN 53 453	mJ/mm <sup>2</sup>	150–300	65	60	80
Impact value	DIN 53 453	mJ/mm <sup>2</sup>	90–200	20	10	4
Tensile strength	DIN 53 455	N/mm <sup>2</sup>	180–300	65	43	45
Elongation at tear	DIN 53 455	%	60–90	90	20	20
Young's modules (bending test)	DIN 53 457	N/mm <sup>2</sup>	75 000	2300	2100	6500
Limiting bending stress	DIN 53 452	N/mm <sup>2</sup>		95	90	100
Burning behaviour	UL 94	Class		V 2	HB	V 0
Spec. contact resistance	DIN 53 482	Ω x cm		10 <sup>15</sup>	10 <sup>13</sup>	3 x 10 <sup>14</sup>
Surface resistance	DIN 53 482	Ω		≥ 10 <sup>15</sup>	4 x 10 <sup>14</sup>	> 10 <sup>12</sup>
Dielectric strength	DIN 53 481	kV/mm		25–40	24	25–40
Thermal conductivity (20 °C)	DIN 52 612	W/mK	120–160	0.21	0.18	0.25
Electr. conduct. capacity (20 °C)		m/Ω mm <sup>2</sup>	15–22			

This diagram shows how different enclosure materials react under mechanical stress and in a harsh operating environment.



## Chemical resistance

The degree of resistance to specific chemical substances depends on the material used for the enclosure. The following table specifies the resistance of BERNSTEIN aluminium, polycarbonate, ABS and polyester enclosures to certain chemicals frequently used in industrial surroundings. Please note that the table only gives standard values, since materials react differently to variations in chemical concentration or ambient temperatures. Furthermore, materials may react differently when exposed to several chemicals simultaneously. Appropriate preliminary tests are therefore recommended.

Our customers also have access to our in-house information service.

Chemicals	ABS	Polycarbonate	Polyester	Aluminium
Acetic acid	10% ○	10%	40%	+
Acetone	-	-	-	+
Acid	□	○	+	+
Ammonia	-	-	-	+
Benzene	-	-	+	+
Brake fluid	□	-	+	+
Butane	□	□	+	
Butanol	□	□	+	+
Calcium chloride	□	+	+	+
Carbon disulphide	□	-	-	+
Carbon tetrachloride	-	□	+	+
Caustic soda	-	-	40%	°
Chlorobenzene	-	-	+	+
Citric acid	10%	10%	+	+
Detergent	□	+	□	+
Diesel oil	+	○	+	+
Engine oils	□	+	+	+
Formaldehyde	+	□	30%	+
Formic acid	-	30%	10%	°
Freon 113	□	+	+	+
Fruit juice	□	+	+	+
Fuel oil	○	○	+	-
Glycerine	+	○	+	○
Hydraulic oil	□	+	+	+
Hydrochloric acid	10% ○	20%	+	+
Lactic acid	+	10%	+	+
Linseed oil	□	+	+	○
Lubricating oil	□	+	+	+
Methanol	□	-	-	○
Methylene chloride	□	-	-	+
Mineral oil	+	+	+	+
Nitric acid	30%	10%	10%	+
Oil of turpentine	□	□	+	○
Petrol	-	○	+	+
Potash lye	□	-	-	+
Potassium chloride	□	+	+	+
Potassium hydroxide	+	□	-	+
Soda ash	ó	+	+	+
Sodium chloride	ó	+	+	+
Sodium hydrate	+	□	-	+
Sulphuric acid	30%	50%	70%	+
Tartaric	□	10%	+	
Toluol	-	-	+	+
Trichloroethylene	-	□	-	+
Water (dist. water, river, tap, sea water)	+	+	+	+
Xylene	-	-	+	+
Zinc sulphate	□	+	+	○

The tests were performed at room temperature, if no other value is specified. If different substances are mixed, resistance may alter. No responsibility can therefore be accepted for the accuracy of specifications.

- +: resistant to all concentrations
- %: resistant to max. % concentrations
- : limited resistance
- : non-resistant
- : not known

## Customised service

### Advantages

The extensive BERNSTEIN customising service for standard enclosures offers some distinct advantages:

- The custom-made enclosure can be used immediately in the production process.
- Reducing production time and range, transferring risk to the supplier.
- Saving time by minimised handling and reduced logistics expenditure.
- Economical machining by BERNSTEIN specialists, using up-to-date equipment and thereby lowering costs.
- The customer benefits from BERNSTEIN's wealth of experience in providing a customised service.

### What does the BERNSTEIN customised service include?

This service can save you the inconvenience of machining and enables you to use the enclosure – as delivered by BERNSTEIN – directly in the production process.

- Mechanical machining, even intricate outlines, using modern CNC machining centres
- Special coatings in accordance with customer specifications
- HF-proof designs, given special coatings and conductive gaskets
- Screen-printings and engravings on the enclosure surface
- Mounting of individual components from the wide range of BERNSTEIN accessories (external and internal hinges, mounting plates, mounting rails, terminals, cable glands)

### The BERNSTEIN comprehensive customising service meets all requirements

#### Drilling

We can drill holes in all enclosure materials to meet your own specifications.

#### Threading

We can cut metric screw threads from M 12 x 1.5 to M 63 x 1.5. We can, if required, also provide special thread types (PG threads, imperial threads and NPT threads).

#### Milling

The experts in our CNC machining centres can also undertake complicated milling on your behalf. All machining procedures are archived for each individual customer so that they then can be repeated whenever necessary. This ensures that a consistently high standard is maintained.

#### Passivating

If required, BERNSTEIN aluminium enclosures can be further protected by applying the environmentally-friendly C 6100 Alodine yellow-passivating method, for use in corrosive surroundings. The application of an additional primer and final coat further guarantee resistance to corrosion.

#### Coating

We can supply enclosures in any colour or shade both RAL and non-standard colours. Standard and special colours are applied as wet or powder coating.

#### Screen-printing

We can print your enclosure surfaces and front plates in single-colour or multi-colour, as required, using durable colours suitable for industrial usage.

#### Engraving

Our computer-controlled engraving machines engrave all types of fonts and outlines.

#### Assembly

Components are, of course, assembled to meet your own individual requirements. Just select the mounting plates, mounting rails, terminal blocks, cable glands etc. from the wide range of BERNSTEIN accessories.

# BERNSTEIN manufacturing standard

## Technical information for enclosure machining

As an ISO 9001 certified company, BERNSTEIN has defined a manufacturing standard that is applied to all machining orders without alternative customer specification.

## Dimension tolerances

When preparing details for enclosure machining (see following drawings, showing orientation of enclosure when set up for machining), tolerances used for the first machining operation on each set up, are according to ISO 2768-mH.

If other dimensions or reference edges are used, the following maximum general tolerances are applicable for the first machining operation on each enclosure per set up (see table below).

Tolerances between further machining operations compared to each other can be limited to  $\pm 0.1$  mm.

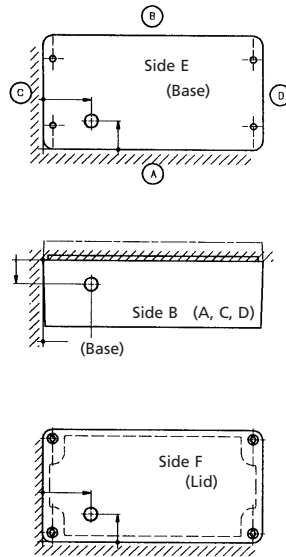
## General tolerances Standard programme

Die-casting (dc)	DIN 1688
CA-020 to CA-310	Part 4 GTA 13/5
CA-350, CA-370,	(August 1986)
CA-380, CA-400,	
CA-450	
Chilled casting (cc)	DIN 1688
CA-330, CA-360	Part 3 GTA 14/5
CA-390, CA-420,	(October 1980)
CA-460, CA-470,	
CA-480	
Resin-impregnated polyester moulding compounds	DIN 16901-130 (November 1982)
CP-140 to CP-280	
Resin-impregnated polyester mats	DIN 16901-140 (November 1982)
CP-300 to CPS-590	
PC/ABS	DIN 16901-130
CT-50 to CT-91	(November 1982)
Sand casting (G)	DIN 1688
	Part 1 GTA 15/5
	(October 1980)

## Reference edges for BERNSTEIN machining standards

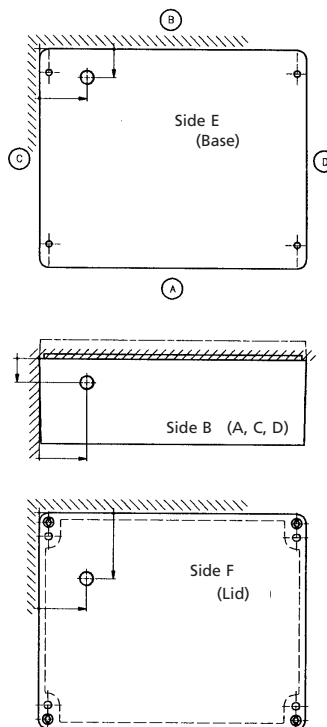
### Series

CA-020 to CA-240, CA-270 to CA-300  
CT-50 to CT-82, CP-140 to CP-300



### Series

CA-250, CA-310 to CA-480  
CT-84 to CT-91, CP-320 to CPS-590



## Minimum quantities

In order to keep enclosure machining as cost-effective for the user as possible, the following minimum purchase quantities are suggested:

Name	Minimum
CA-020 ... CA-080	20 pieces
CA-100 ... CA-190	10 pieces
CA-210 ... CA-310	10 pieces
CA-330 ... CA-480	5 pieces
CC-280 ... CC-480	5 pieces
CP-140 ... CP-195	20 pieces
CP-220 ... CP-320	10 pieces
CP-330 ... CP-460	5 pieces
CT-50 ... CT-76	20 pieces
CT-78 ... CT-89	10 pieces

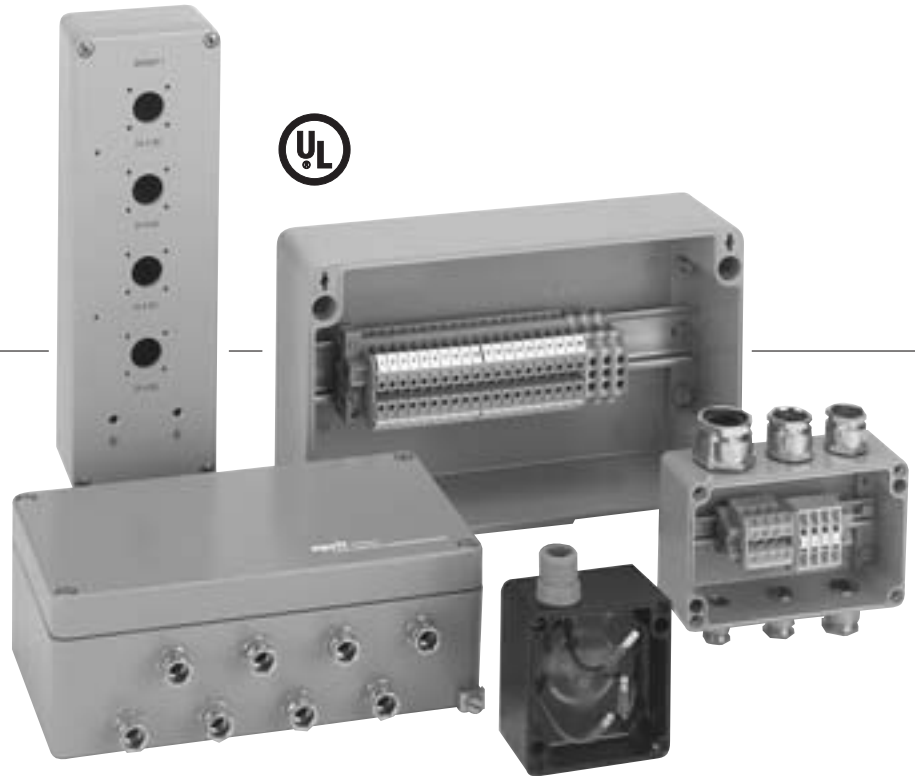
These quantities should be regarded as the minimum, if the customised enclosures are to be produced economically. Production includes mechanical machining, special coating, screen-printing, engraving or assembly of accessories. BERNSTEIN distributors will of course be pleased to advise you.

## Aluminium enclosures CA series

BERNSTEIN aluminium enclosures are ideally suited to housing electrical, electronic or pneumatic components. Their high mechanical strength ensures excellent protection against impact and all sizes are sealed to IP 65, according to IEC 529.

BERNSTEIN aluminium enclosures are fitted with copper earthing screws (M4 or M6) in both the base and lid, the surface below the screws is unpainted allowing a good earth connection to be made. The captive lid screws are made of stainless steel and are held in place by a lock integrated in the lid. A gasket (for standard enclosures) is factory-fitted, and ensures conformance with the protection class. BERNSTEIN aluminium enclosures are surface-coated in RAL 7001 (silver-grey), as standard.

BERNSTEIN aluminium enclosures are either die-cast or chill-cast. The dimension table shows the production method used for each respective enclosure.



Attachment points inside the enclosure can be used to hold equipment in place (mounting rail, mounting plate, printed circuit board etc.). Alternatively, the earthing points may be used. These inner attachment points are situated at different heights and positions. (Refer to the illustrations for detailed positions.)

### Technical data

#### Material

Die-cast aluminium or AlSi 12 (Cu) chill-cast

#### Gasket

Neoprene round seal (siliconised)  
alternative:  
Neoprene round seal (silicone-free)  
Silicone round seal

#### Lid screws

Stainless steel, captive, multi-purpose cross head  
alternative:  
– Stainless steel quarter turn quick release (die-cast types only)  
– Stainless steel hexagonal socket head screws  
– Lead-sealed steel lid screws (9 S 20 K), slotted head

#### Coating

RAL 7001 (silver-grey)  
alternative:  
– Special RAL colours  
– Special coatings

#### Temperature range

-40 °C to +80 °C (neoprene gasket)  
alternative:  
-50 °C to +130 °C (silicone gasket)  
or -30 °C to +100 °C (explosion-hazardous area)

#### Protection class

IP 65  
alternative:  
higher protection class by request

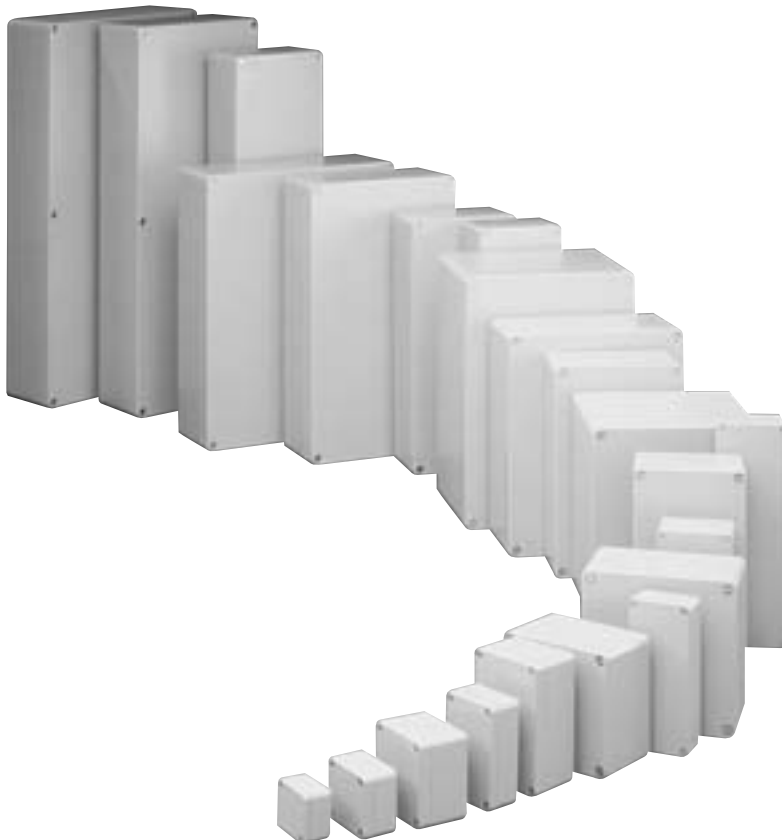
#### Approval

PTB No. Ex 83/3120  
PTB No. Ex-90C.3119  
PTB No. Ex-90.C.3117 U

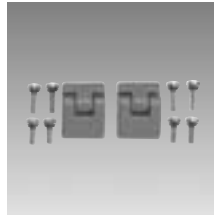
German Lloyd: No. 91 187-84HH

SEV 97.1 10396

UL: File E 168772 (N)



## Accessories for aluminium enclosures



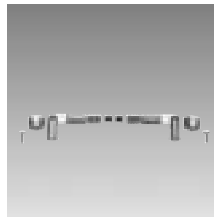
### External hinges

For hinged attachment of the enclosure lid. Swivelling angle of lid approx. 155°. Aluminium casting, RAL 7001 coating. Machining required to fit. Drill template is supplied.



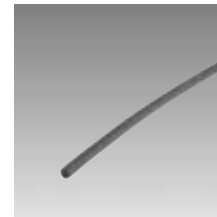
### Mounting plates

Galvanised sheet steel (thickness: CA-060 to CA-310, CA-350 to CA-400: 1.5 mm; CA-330, CA-420 to CA-480: 2.5 mm) allows mounting of additional equipment.



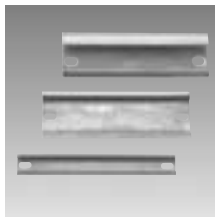
### Internal hinges

For hinged attachment of the enclosure lid. Swivelling angle of lid approx. 95°. Made of stainless steel. Machining required to fit.



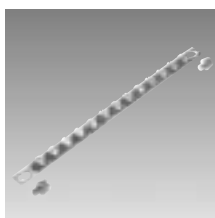
### Silicone lid gasket

Improved temperature range (-50 °C to +130 °C). Standard type made of silicone foam.



### Mounting rails

Standard rails TS-15, TS-32 or TS-35 (steel), yellow-passivated for attachment of terminal blocks.



### Earthing rails

Galvanised steel for connecting and routing of protective earth connection.



### External attachment brackets

Stainless steel for mounting enclosures without opening the lid. Can be mounted in 90° steps at the base of the enclosure.

## Aluminium enclosures – product line

Dimensions/mm			Aluminium enclosures		Cast type
L x	W x	H	Part number	Type	dc = die casting cc = chilled casting
50 x	<b>45</b> x	30	102.0.0000.00	CA-020	dc
58 x	<b>64</b> x	36	106.0.0000.00	CA-060	dc
98 x	<b>64</b> x	36	108.0.0000.00	CA-080	dc
150 x	<b>64</b> x	36	110.0.0000.00	CA-100	dc
75 x	<b>80</b> x	57	113.0.0000.00	CA-130	dc
75 x	<b>80</b> x	57	114.0.0000.00	CA-140	dc
125 x	<b>80</b> x	57	115.0.0000.00	CA-150	dc
125 x	<b>80</b> x	57	116.0.0000.00	CA-160	dc
175 x	<b>80</b> x	57	117.0.0000.00	CA-170	dc
175 x	<b>80</b> x	57	118.0.0000.00	CA-180	dc
250 x	<b>80</b> x	57	119.0.0000.00	CA-190	dc
122 x	<b>122</b> x	80	121.0.0000.00	CA-210	dc
122 x	<b>122</b> x	90	121.0.0000.50	CA-215	dc
122 x	<b>122</b> x	80	122.0.0000.00	CA-220	dc
220 x	<b>122</b> x	80	123.0.0000.00	CA-230	dc
220 x	<b>122</b> x	90	123.0.0000.50	CA-235	dc
220 x	<b>122</b> x	80	124.0.0000.00	CA-240	dc
360 x	<b>122</b> x	80	125.0.0000.00	CA-250	dc
160 x	<b>160</b> x	90	127.0.0000.00	CA-270	dc
160 x	<b>160</b> x	90	128.0.0000.00	CA-280	dc
260 x	<b>160</b> x	90	129.0.0000.00	CA-290	dc
260 x	<b>160</b> x	90	130.0.0000.00	CA-300	dc
360 x	<b>160</b> x	90	131.0.0000.00	CA-310	dc
560 x	<b>160</b> x	90	133.0.0000.00	CA-330	cc
200 x	<b>230</b> x	110	135.0.0000.00	CA-350	dc
200 x	<b>230</b> x	180	136.0.0000.00	CA-360	cc
280 x	<b>230</b> x	110	137.0.0000.00	CA-370	dc
330 x	<b>230</b> x	110	138.0.0000.00	CA-380	dc
330 x	<b>230</b> x	180	139.0.0000.00	CA-390	cc
401 x	<b>230</b> x	110	140.0.0000.00	CA-400	dc
600 x	<b>230</b> x	110	142.0.0000.00	CA-420	cc
402 x	<b>310</b> x	110	145.0.0000.00	CA-450	dc
402 x	<b>310</b> x	180	146.0.0000.00	CA-460	cc
600 x	<b>310</b> x	110	147.0.0000.00	CA-470	cc
600 x	<b>310</b> x	180	148.0.0000.00	CA-480	cc



# Component overview for aluminium enclosures CA series

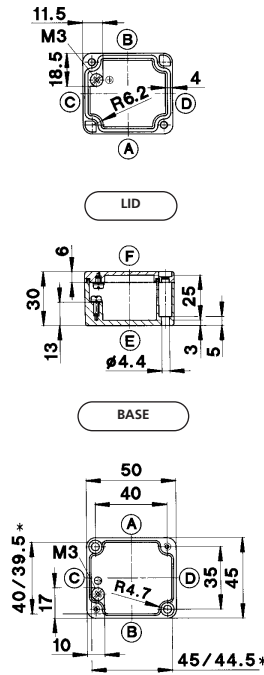
\*) Assembled on 2 mounting rails  
\*\*) Assembled on 3 mounting rails  
The number of terminals is reduced  
when partitions are used.

Model	Weidmüller				Phoenix			Wieland				Entelec						Phoenix							
	Block terminal				Block terminal			Block terminal				Terminal block						Terminal block							
Terminal width (mm):												5.2	6.2	5.2	6.2	8.2	10.2	12.2	5.2	6.2	7.5	5.2	6.2	8.2	10.2
Single core mm <sup>2</sup>	4	4	4	2.5	4	4	4	2.5	2.5	2.5	2.5	2.5	4	4	4	10	16	25	2.5	4	10	4	4	10	16
Stranded mm <sup>2</sup>	4	4	4	2.5	4	4	4	2.5	2.5	2.5	2.5	1.5	4	2.5	4	6	10	16	1.5	4	6	2.5	4	6	10
Nominal voltage V	380	380	380	380	500	500	500	500	500	500	500	250	380	750	750	750	750	750	500	500	500	750	750	750	750
Loading capacity A	36	36	36	25	36	36	36	25	25	25	25	20	35	26	35	46	63	85	27	36	65	36	36	65	87
Terminal bridging	-	-	-	-	-	-	-	-	-	-	-	-	o	o	o	o	o	o	-	o	-	o	o	o	o
Mounting rail TS 15	-	-	-	-	-	-	-	-	-	-	-	o	o	-	o	-	-	-	o	o	o	-	-	-	-
TS 32	o	-	-	-	-	-	-	-	-	-	-	-	-	o	o	o	o	o	-	-	-	o	o	o	o
TS 35	o	-	-	-	-	-	-	-	-	-	-	-	-	o	o	o	o	o	-	-	-	o	o	o	o
Part number	<b>9.40.1.10100.00</b>				<b>9.40.1.10020.00</b>			<b>9.40.1.10050.00</b>				<b>9.40.2.1270.00</b>						<b>9.40.2.0010.00</b>							
	<b>9.40.1.10090.00</b>				<b>9.40.1.10030.00</b>			<b>9.40.1.10060.00</b>				<b>9.40.2.0940.00</b>						<b>9.40.2.0020.00</b>							
	<b>9.40.1.10130.00</b>				<b>9.40.1.10040.00</b>			<b>9.40.1.10070.00</b>				<b>9.40.2.1090.00</b>						<b>9.40.2.0030.00</b>							
	<b>9.40.1.10010.00</b>				<b>9.40.1.10080.00</b>			<b>9.40.1.10080.00</b>				<b>9.40.2.1030.00</b>						<b>9.40.2.0050.00</b>							
	<b>9.40.1.10040.00</b>				<b>9.40.1.10040.00</b>			<b>9.40.1.10040.00</b>				<b>9.40.2.1040.00</b>						<b>9.40.2.0070.00</b>							
	<b>9.40.1.10040.00</b>				<b>9.40.1.10040.00</b>			<b>9.40.1.10040.00</b>				<b>9.40.2.1050.00</b>						<b>9.40.2.0090.00</b>							
	<b>9.40.1.10040.00</b>				<b>9.40.1.10040.00</b>			<b>9.40.1.10040.00</b>				<b>9.40.2.1060.00</b>						<b>9.40.2.0110.00</b>							
Type	BK 4	BK 6	BK 12	MK 3/4	G 5/4	G 5/6	G 5/12	KL-16/8	KL-16/12	KL-16/16	KL-16/20	DR 1.5/5	DR 4/6	MA 2.5/5	M 4/6	M 6/8	M 10/10	M 16/12	MBK	MBK 5/E	MBK 10	UK 3 N	UK 5 N	UK 10	UK 16
CA-020	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-
CA-060	1	-	-	-	1	-	-	-	-	-	-	4	-	-	-	-	-	-	4	-	-	-	-	-	-
CA-080	-	1	-	-	-	1	-	1	1	-	-	10	-	-	-	-	-	-	12	-	-	-	-	-	-
CA-100	-	-	1	-	-	-	1	-	-	1	1	20	-	-	-	-	-	-	20	-	-	-	-	-	-
CA-130	1	1	-	-	1	1	-	1	-	-	-	6	4	-	-	-	-	-	6	4	-	-	-	-	-
CA-140	1	1	-	-	1	1	-	1	-	-	-	6	4	-	-	-	-	-	6	4	4	-	-	-	-
CA-150	-	1	1	-	-	1	1	1	-	-	-	16	13	-	-	-	-	-	16	13	-	-	-	-	-
CA-160	-	1	1	-	-	1	1	1	-	-	-	16	13	-	-	-	-	-	16	13	10	-	-	-	-
CA-170	-	-	1	-	-	-	-	-	-	1	-	26	21	-	-	-	-	-	26	21	-	-	-	-	-
CA-180	-	-	1	-	-	-	1	-	-	1	-	26	21	-	-	-	-	-	26	21	17	-	-	-	-
CA-190	-	-	2	-	-	-	2	-	2	-	-	39	33	-	-	-	-	-	39	33	27	-	-	-	-
CA-210/215/220	-	-	-	-	-	-	-	-	-	-	-	-	-	12	10	8	6	5	-	-	-	12	10	8	6
CA-230/235/240	-	-	-	-	-	-	-	-	-	-	-	-	-	31	26	19	15	13	-	-	-	31	26	19	15
CA-250	-	-	-	-	-	-	-	-	-	-	-	-	-	58	49	37	29	24	-	-	-	58	49	37	29
CA-270/280	-	-	-	-	-	-	-	-	-	-	-	-	-	19	16	12	9	8	-	-	-	19	16	12	9
CA-290/300	-	-	-	-	-	-	-	-	-	-	-	-	-	38	32	24	19	16	-	-	-	38	32	24	19
CA-310	-	-	-	-	-	-	-	-	-	-	-	-	-	57	48	36	29	24	-	-	-	57	48	36	29
CA-330	-	-	-	-	-	-	-	-	-	-	-	-	-	96	80	61	48	40	-	-	-	96	80	61	48
CA-350	-	-	-	-	-	-	-	-	-	-	-	-	-	27	22	17	13	11	-	-	-	27	22	17	13
CA-350*)	-	-	-	-	-	-	-	-	-	-	-	-	-	54	44	34	26	-	-	-	-	54	44	34	26
CA-360	-	-	-	-	-	-	-	-	-	-	-	-	-	27	22	17	13	11	-	-	-	27	22	17	13
CA-360*)	-	-	-	-	-	-	-	-	-	-	-	-	-	54	44	34	26	-	-	-	-	54	44	34	-
CA-370	-	-	-	-	-	-	-	-	-	-	-	-	-	42	35	27	21	18	-	-	-	42	35	27	21
CA-370*)	-	-	-	-	-	-	-	-	-	-	-	-	-	84	70	54	42	-	-	-	-	84	70	54	42
CA-380	-	-	-	-	-	-	-	-	-	-	-	-	-	52	43	33	26	22	-	-	-	52	43	33	26
CA-380*)	-	-	-	-	-	-	-	-	-	-	-	-	-	104	86	66	52	-	-	-	-	104	86	66	52
CA-390	-	-	-	-	-	-	-	-	-	-	-	-	-	52	43	33	26	22	-	-	-	52	43	33	26
CA-390*)	-	-	-	-	-	-	-	-	-	-	-	-	-	104	86	66	52	-	-	-	-	104	86	66	52
CA-400	-	-	-	-	-	-	-	-	-	-	-	-	-	66	55	41	33	27	-	-	-	66	55	41	33
CA-400*)	-	-	-	-	-	-	-	-	-	-	-	-	-	132	110	82	66	-	-	-	-	132	110	82	66
CA-420	-	-	-	-	-	-	-	-	-	-	-	-	-	104	87	65	53	44	-	-	-	104	87	65	53
CA-420*)	-	-	-	-	-	-	-	-	-	-	-	-	-	208	174	130	106	-	-	-	-	208	174	130	106
CA-450	-	-	-	-	-	-	-	-	-	-	-	-	-	65	55	41	33	28	-	-	-	65	55	41	33
CA-450*)	-	-	-	-	-	-	-	-	-	-	-	-	-	130	110	82	66	56	-	-	-	130	110	82	66
CA-450**)	-	-	-	-	-	-	-	-	-	-	-	-	-	195	165	123	99	-	-	-	-	195	165	123	99
CA-460	-	-	-	-	-	-	-	-	-	-	-	-	-	65	55	41	33	28	-	-	-	65	55	41	33
CA-460*)	-	-	-	-	-	-	-	-	-	-	-	-	-	130	110	82	66	56	-	-	-	130	110	82	66
CA-460**)	-	-	-	-	-	-	-	-	-	-	-	-	-	195	165	123	99	-	-	-	-	195	165	123	99
CA-470	-	-	-	-	-	-	-	-	-	-	-	-	-	104	87	65	53	44	-	-	-	104	87	65	53
CA-470*)	-	-	-	-	-	-	-	-	-	-	-	-	-	208	174	130	106	88	-	-	-	208	174	130	106
CA-470**)	-	-	-	-	-	-	-	-	-	-	-	-	-	312	261	195	159	-	-	-	-	312	261	195	159
CA-480	-	-	-	-	-	-	-	-	-	-	-	-	-	104	87	65	53	44	-	-	-	104	87	65	53
CA-480*)	-	-	-	-	-	-	-	-	-	-	-	-	-	208	174	130	106	88	-	-	-	208	174	130	106
CA-480**)	-	-	-	-	-	-	-	-	-	-	-	-	-	312	261	195	159	-	-	-	-	312	261	195	159

	Siemens								WAGO								Weidmüller												
	Terminal block				Terminal block				Terminal block								Terminal block												
	Screw terminals				Caged tension spring				6.2	10.2	6.2	10.2	4.2	5.2	5.2	6.2	6.2	8.2	10.2	12.2	5.2	6.2	6.2	6.5	8.2	10.2	12.2	5.2	6.2
	4	4	10	25	4	4	10	2.5	2.5	2.5	2.5	1.5	2.5	2.5	4	4	6	10	16	2.5	4	4	6	10	16	25	4	6	
2.5	4	6	16	2.5	4	6	2.5	2.5	2.5	2.5	1.5	2.5	2.5	4	4	6	10	16	1.5	4	2.5	4	6	10	15	2.5	4		
750	750	750	750	750	750	750	800	800	800	800	800	800	800	800	800	800	800	800	250	380	750	750	750	750	750	750	750		
26	35	46	85	36	36	65	26	26	26	26	18	26	26	34	34	44	61	82	27	36	27	36	47	65	87	26	34		
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○		
-	○	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	○	○	○	-	-	-	-	-	-		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○	○	-	-		
○	○	○	○	○	○	○	-	-	○	○	○	○	○	○	○	○	○	○	-	-	-	-	-	-	-	-	○		
9.40.2.4000.00	9.40.2.4010.00	9.40.2.4020.00	9.40.2.4030.00	9.40.2.4040.00	9.40.2.4050.00	9.40.2.4060.00	9.40.2.3020.00	9.40.2.3030.00	9.40.2.3210.00	9.40.2.3220.00	9.40.2.3230.00	9.40.2.0930.00	9.40.2.3240.00	9.40.2.3250.00	9.40.2.3260.00	9.40.2.3270.00	9.40.2.3280.00	9.40.2.3290.00	9.40.2.0500.00	9.40.2.0130.00	9.40.2.0140.00	9.40.2.0150.00	9.40.2.0160.00	9.40.2.0470.00	9.40.2.0170.00	9.40.2.1460.00	9.40.2.1470.00		
8WA1011- 1DF11	8WA1011- 1DGG11	8WA1011- 1DHH1	8WA1204	8WA2011- 1DF20	8WA2011- 1DGG20	8WA2011- 1DHH20	264-701	264-721	264-711	264-731	279-621	280-601	280-901	281-601	281-901	282-601	284-601	283-601	AKZ 2.5 PA	AKZ 4 PA	SAK 2.5 PA	SAK 4 PA	SAK 6 NPA	SAK 10 PA	SAK 16 PA	WDU 2.5	WDU 4		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	5	3	-	-	-	-	-	-	-	-	-	-	6	4	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	5	3	-	-	-	-	-	-	-	-	-	-	6	4	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	13	8	-	-	-	-	-	-	-	-	-	-	16	12	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	13	8	-	-	-	-	-	-	-	-	-	-	16	12	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	21	13	-	-	-	-	-	-	-	-	-	-	26	20	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	21	13	-	-	-	-	-	-	-	-	-	-	26	20	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	34	20	-	-	-	-	-	-	-	-	-	-	41	33	-	-	-	-	-	-	-		
10	10	8	6	12	10	8	-	-	12	7	18	-	-	-	-	-	-	-	-	-	10	9	7	6	5	12	10		
27	25	20	16	31	26	20	-	-	28	17	43	-	-	-	-	-	-	-	-	-	26	24	20	15	12	31	26		
50	46	37	30	58	49	37	-	-	51	31	43	-	-	-	-	-	-	-	-	-	48	45	37	29	24	58	48		
16	15	12	9	19	16	12	-	-	10	17	25	20	20	17	17	12	10	8	-	-	16	15	12	9	8	19	16		
32	30	24	19	38	32	24	-	-	33	20	50	40	40	33	33	25	20	16	-	-	33	30	25	19	16	38	32		
49	45	37	29	57	48	36	-	-	50	30	76	60	60	50	50	37	30	28	-	-	48	45	36	29	24	57	48		
83	76	62	49	96	80	60	-	-	83	50	125	100	100	83	83	62	50	41	-	-	86	74	61	48	40	96	80		
22	21	17	13	26	22	17	-	-	23	14	35	28	28	23	23	17	14	11	-	-	22	20	17	13	11	26	22		
44	42	34	26	52	44	34	-	-	46	28	70	56	56	46	46	34	28	-	-	-	44	40	34	26	-	52	44		
22	20	17	13	26	22	10	-	-	23	14	35	28	28	23	23	17	14	11	-	-	22	20	17	13	11	26	22		
44	40	34	26	52	49	32	-	-	46	28	70	56	56	46	46	34	28	-	-	-	44	40	34	26	-	52	44		
36	33	27	21	42	35	26	-	-	36	22	55	44	44	37	37	27	22	18	-	-	35	32	26	21	18	42	35		
72	66	54	42	84	70	52	-	-	72	44	110	88	88	74	74	54	44	-	-	-	70	64	52	42	-	84	70		
44	51	33	26	51	43	32	-	-	45	27	68	54	54	45	45	33	27	22	-	-	43	40	32	26	22	51	43		
88	82	66	52	102	86	64	-	-	90	54	136	108	108	90	90	66	54	-	-	-	86	86	64	52	-	102	86		
44	40	33	26	51	43	32	-	-	45	27	68	54	54	45	45	33	27	22	-	-	43	40	32	26	22	51	43		
88	80	66	52	102	86	64	-	-	90	54	136	108	108	90	90	66	54	-	-	-	86	86	64	52	-	102	86		
56	52	42	33	65	54	41	-	-	57	34	86	68	68	57	57	42	34	28	-	-	54	50	41	33	27	65	54		
112	104	84	66	130	108	82	-	-	114	68	172	136	136	114	114	84	68	-	-	-	108	100	-	66	-	130	108		
89	82	67	53	103	86	65	-	-	90	54	135	108	108	90	90	67	54	45	-	-	87	80	65	52	44	103	86		
178	164	134	106	206	172	130	-	-	180	108	270	216	216	180	180	134	108	-	-	-	174	160	-	104	-	206	172		
56	52	42	34	65	55	41	-	-	57	34	86	69	69	57	57	43	34	28	-	-	54	50	41	33	27	65	54		
112	104	84	68	130	110	82	-	-	114	68	172	138	138	114	114	86	68	56	-	-	108	100	82	66	54	130	108		
163	156	126	102	195	165	123	-	-	171	102	258	207	207	171	171	129	102	-	-	-	162	150	-	99	-	195	162		
56	52	42	33	65	54	41	-	-	57	34	86	68	68	57	57	42	34	28	-	-	54	50	41	33	27	65	54		
112	104	84	66	130	108	82	-	-	114	68	172	136	136	114	114	84	68	56	-	-	108	100	82	66	54	130	108		
163	156	126	99	195	162	123	-	-	171	102	258	204	204	171	171	126	102	-	-	-	162	150	-	99	-	195	162		
89	82	67	53	103	86	65	-	-	90	54	135	108	108	90	90	67	54	45	-	-	87	80	65	52	44	103	86		
178	164	134	106	206	172	130	-	-	180	108	270	216	216	180	180	134	108	90	-	-	174	160	130	104	88	206	172		
267	246	201	159	309	258	195	-	-	270	162	405	324	324	270	270	201	162	-	-	-	261	240	-	156	-	309	258		
89	82	67	53	103	86	65	-	-	90	54	135	108	108	90	90	67	54	45	-	-	87	80	65	52	44	103	86		
178	164	134	106	206	172	130	-	-	180	108	270	216	216	180	180	134	108	90	-	-	174	160	130	104	88	206	172		
267	246	201	159	309	258	195	-	-	270	162	405	324	324	270	270	201	162	-	-	-	261	240	-	156	-	309	258		

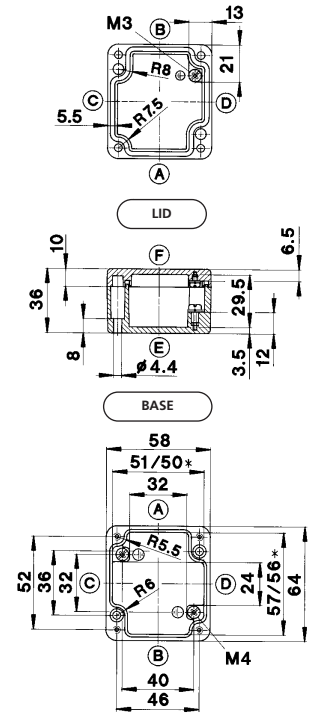
## 50 x 45 x 30 mm

CA-020  
Aluminium enclosure



## 58 x 64 x 36 mm

CA-060  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

Type	
Weight	(g)
External dimensions	(mm)
<b>Complete enclosures</b>	
Coated, with gasket and lid screws	
Coated, with gasket and hex. socket head screws	
Coated, with silicone gasket and lid screws	
Coated, with HF gasket and lid screws	
Saltwater-proof coating, with gasket and lid screws	
Saltwater-proof coating, passivated, lid screws with gasket	
Unwashed, unpainted, no accessories	
<b>Accessories</b> (separate or as a mounting set)	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail	
External attachment brackets	
External hinges side	
Internal hinges with lid guiding**	
Silicone gasket for wider temperature range (piece goods)	

### Max. Pg threads

CA-020	
70	
50 x 45 x 30	
<b>Part number</b>	
102.0.0000.00 ●	
-	
-	
-	
102.0.0100.00	
102.0.0060.00	
102.0.0340.00	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	

ISO M	12	16	20	25	32	40	50	63
Side A/B	1	0	0	0	0	0	0	0
Side C/D	1	0	0	0	0	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

CA-060	
160	
58 x 64 x 36	
<b>Part number</b>	
106.0.0000.00 ●	
-	
106.0.0940.00	
106.0.0080.00	
106.0.0100.00	
106.0.0060.00	
106.0.0380.00	
-	
951.1.0010.00 ●	
982.0.0000.00 ●	
-	
-	
-	
-	
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-	
923.1.0050.00 ●	

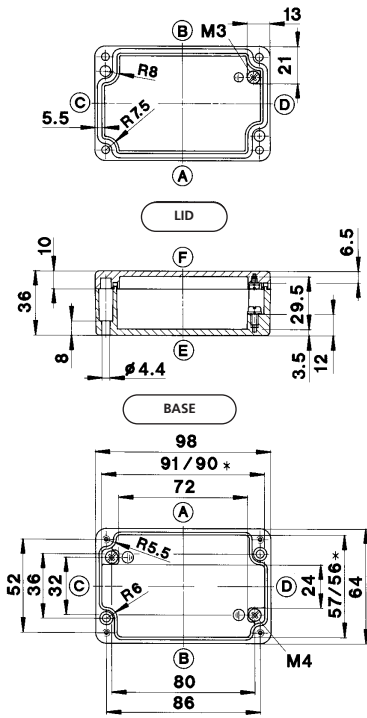
ISO M	12	16	20	25	32	40	50	63
Side A/B	2	1	0	0	0	0	0	0
Side C/D	1	0	0	0	0	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

## 98 x 64 x 36 mm

CA-080  
Aluminium enclosure



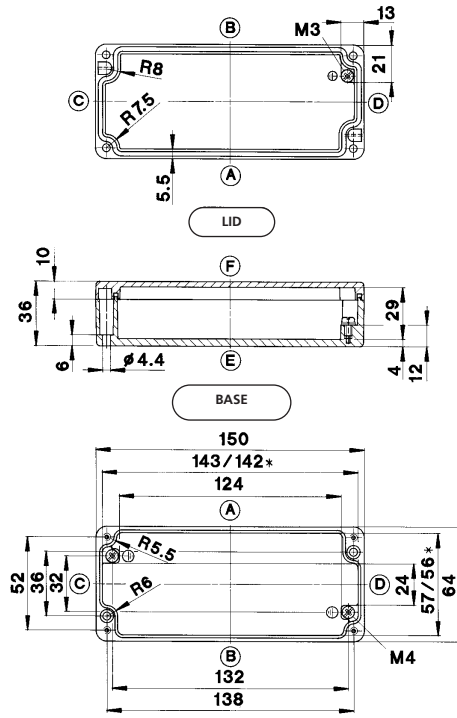
\* minimum dimensions at level of mounting plate support

CA-080
220
98 x 64 x 36
<b>Part number</b>
108.0.0000.00 ●
-
108.0.0090.00
108.0.0080.00
108.0.0100.00
108.0.0060.00
108.0.0420.00
-
951.1.0020.00 ●
982.0.0050.00 ●
-
-
-
-
-
-
923.1.0050.00 ●

ISO M	12	16	20	25	32	40	50	63
Side A/B	4	3	0	0	0	0	0	0
Side C/D	1	0	0	0	0	0	0	0
** mechanical enclosure machining required								
● = kept in stock								

## 150 x 64 x 36 mm

CA-100  
Aluminium enclosure



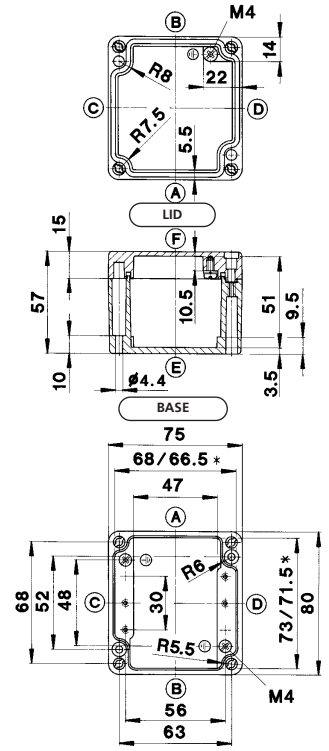
\* minimum dimensions at level of mounting plate support

CA-100
330
150 x 64 x 36
<b>Part number</b>
110.0.0000.00 ●
-
110.0.0760.00
110.0.0080.00
110.0.0100.00
110.0.0060.00
110.0.0530.00
-
951.1.0030.00 ●
982.0.0110.00 ●
-
-
-
-
-
-
923.1.0050.00 ●

ISO M	12	16	20	25	32	40	50	63
Side A/B	6	4	0	0	0	0	0	0
Side C/D	1	0	0	0	0	0	0	0
** mechanical enclosure machining required								
● = kept in stock								

## 75 x 80 x 57 mm

CA-130  
Aluminium enclosure



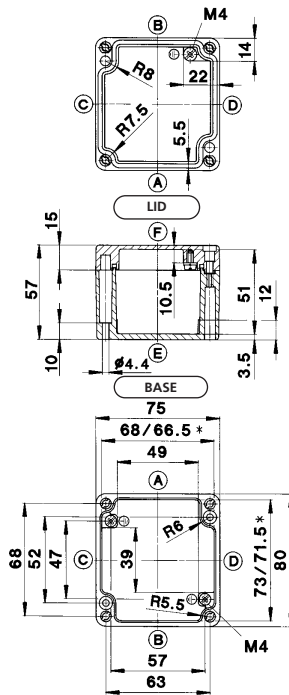
\* minimum dimensions at level of mounting plate support

CA-130
280
75 x 80 x 57
<b>Part number</b>
113.0.0000.00 ●
-
113.0.0820.00
113.0.0080.00
113.0.0100.00
113.0.0060.00
113.0.0570.00
-
982.3.0150.00 ●
982.0.0020.00 ●
-
-
-
-
-
980.1.0440.00 ●
-
923.1.0050.00 ●

ISO M	12	16	20	25	32	40	50	63
Side A/B	5	2	1	0	0	0	0	0
Side C/D	3	2	1	0	0	0	0	0
** mechanical enclosure machining required								
● = kept in stock								

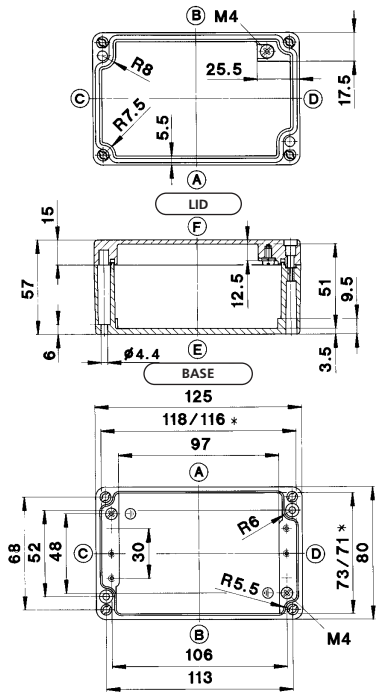
## 75 x 80 x 57 mm

CA-140  
Aluminium enclosure



## 125 x 80 x 57 mm

CA-150  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

Type	
Weight (g)	
External dimensions (mm)	
<b>Complete enclosures</b>	
Coated, with gasket and lid screws	
Coated, with gasket and hex. socket head screws	
Coated, with silicone gasket and lid screws	
Coated, with HF gasket and lid screws	
Saltwater-proof coating, with gasket and lid screws	
Saltwater-proof coating, passivated, lid screws with gasket	
Unwashed, unpainted, no accessories	
<b>Accessories</b> (separate or as a mounting set)	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail	
External attachment brackets	
External hinges side	
Internal hinges with lid guiding**	
Silicone gasket for wider temperature range (piece goods)	

### Max. Pg threads

CA-140	
280	
75 x 80 x 57	
<b>Part number</b>	
114.0.0000.00 ●	
–	
114.0.0860.00	
114.0.0080.00	
114.0.0100.00	
114.0.0060.00	
114.0.0800.00	
–	
951.1.0040.00 ●	
982.0.0350.00 ●	
–	
–	
–	
980.1.0440.00 ●	
–	
923.1.0050.00 ●	

ISO M	12	16	20	25	32	40	50	63
Side A/B	5	2	1	1	0	0	0	0
Side C/D	3	2	1	1	0	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

CA-150	
435	
125 x 80 x 57	
<b>Part number</b>	
115.0.0000.00 ●	
–	
115.0.0090.00	
115.0.0080.00	
115.0.0100.00	
115.0.0060.00	
115.0.0190.00	
–	
982.3.0160.00 ●	
982.0.0100.00 ●	
–	
–	
–	
980.1.0440.00 ●	
–	
923.1.0050.00 ●	

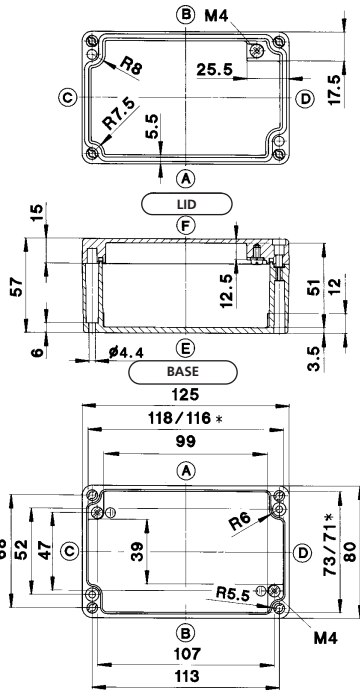
ISO M	12	16	20	25	32	40	50	63
Side A/B	10	4	3	2	0	0	0	0
Side C/D	3	2	1	0	0	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

## 125 x 80 x 57 mm

CA-160  
Aluminium enclosure



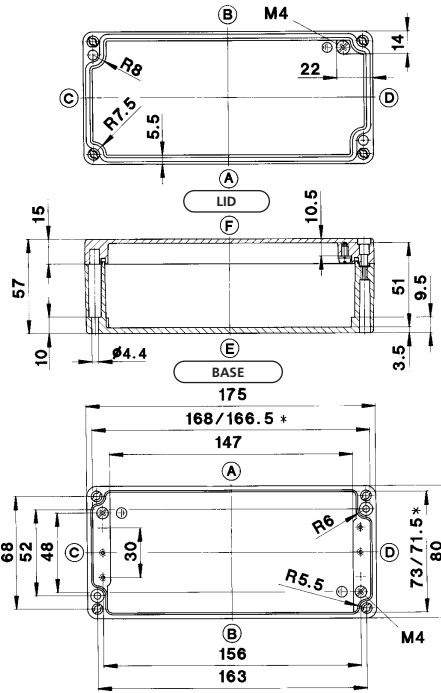
\* minimum dimensions at level of mounting plate support

CA-160
435
125 x 80 x 57
<b>Part number</b>
116.0.0000.00 ●
-
116.0.1380.00
116.0.0080.00
116.0.0100.00
116.0.0060.00
116.0.0450.00
-
951.1.0050.00 ●
982.0.0360.00 ●
-
-
-
980.1.0440.00 ●
-
923.1.0050.00 ●

ISO M	12	16	20	25	32	40	50	63
Side A/B	10	4	3	2	0	0	0	0
Side C/D	4	2	1	1	0	0	0	0
** mechanical enclosure machining required								
● = kept in stock								

## 175 x 80 x 57 mm

CA-170  
Aluminium enclosure



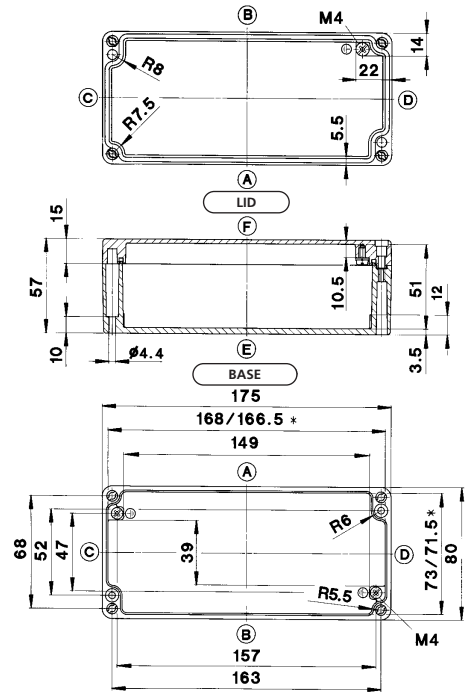
\* minimum dimensions at level of mounting plate support

CA-170
530
175 x 80 x 57
<b>Part number</b>
117.0.0000.00 ●
-
117.0.0090.00
117.0.0080.00
117.0.0100.00
117.0.0060.00
117.0.0160.00
-
982.3.0170.00 ●
982.0.0140.00 ●
-
-
-
980.1.0440.00 ●
-
923.1.0050.00 ●

ISO M	12	16	20	25	32	40	50	63
Side A/B	14	6	4	4	0	0	0	0
Side C/D	3	2	1	0	0	0	0	0
** mechanical enclosure machining required								
● = kept in stock								

## 175 x 80 x 57 mm

CA-180  
Aluminium enclosure



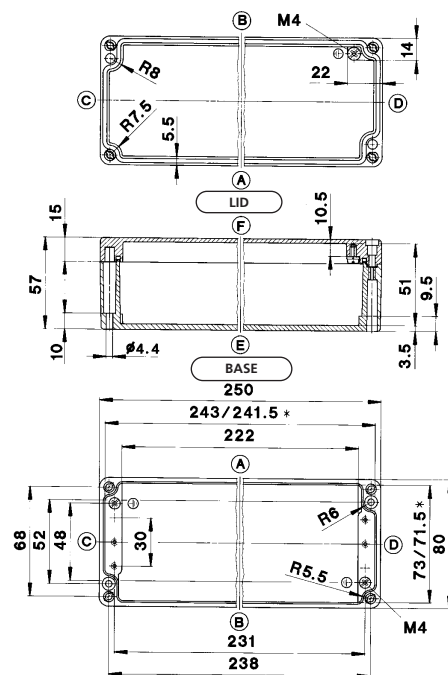
\* minimum dimensions at level of mounting plate support

CA-180
530
175 x 80 x 57
<b>Part number</b>
118.0.0000.00 ●
-
118.0.0440.00
118.0.0080.00
118.0.0100.00
118.0.0060.00
118.0.0400.00
-
951.1.0060.00 ●
982.0.0370.00 ●
-
-
-
980.1.0440.00 ●
-
923.1.0050.00 ●

ISO M	12	16	20	25	32	40	50	63
Side A/B	14	6	4	4	0	0	0	0
Side C/D	4	2	1	1	0	0	0	0
** mechanical enclosure machining required								
● = kept in stock								

## 250 x 80 x 57 mm

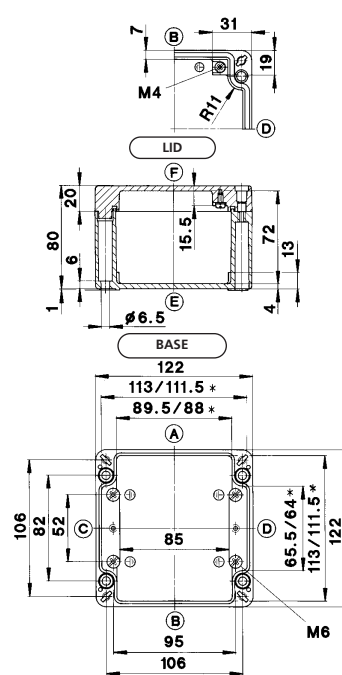
CA-190  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

## 122 x 122 x 80 mm

CA-210  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

Type	
Weight	(g)
External dimensions	(mm)
<b>Complete enclosures</b>	
Coated, with gasket and lid screws	
Coated, with gasket and hex. socket head screws	
Coated, with silicone gasket and lid screws	
Coated, with HF gasket and lid screws	
Saltwater-proof coating, with gasket and lid screws	
Saltwater-proof coating, passivated, lid screws with gasket	
Unwashed, unpainted, no accessories	
<b>Accessories</b> (separate or as a mounting set)	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail	
External attachment brackets	
External hinges side	
Internal hinges with lid guiding**	
Silicone gasket for wider temperature range (piece goods)	

### Max. Pg threads

CA-190	
710	
250 x 80 x 57	
<b>Part number</b>	
119.0.0000.00 ●	
–	
119.0.0480.00	
119.0.0080.00	
119.0.0100.00	
119.0.0060.00	
119.0.0260.00	
–	
982.3.0210.00 ●	
982.0.0190.00 ●	
–	
–	
–	
–	
980.1.0440.00 ●	
–	
923.1.0050.00 ●	

ISO M	12	16	20	25	32	40	50	63
Side A/B	22	9	7	5	0	0	0	0
Side C/D	3	2	1	0	0	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

CA-210	
940	
122 x 122 x 80	
<b>Part number</b>	
121.0.0000.00 ●	
121.0.0010.00	
121.0.0150.00	
121.0.0080.00	
121.0.0100.00	
121.0.0060.00	
121.0.0160.00	
–	
951.1.1500.00 ●	
–	
982.1.0000.00 ●	
982.2.0010.00	
981.0.0020.00	
982.4.0240.00 ●	
980.1.0470.00 ●	
980.1.0310.00	
923.1.0060.00 ●	

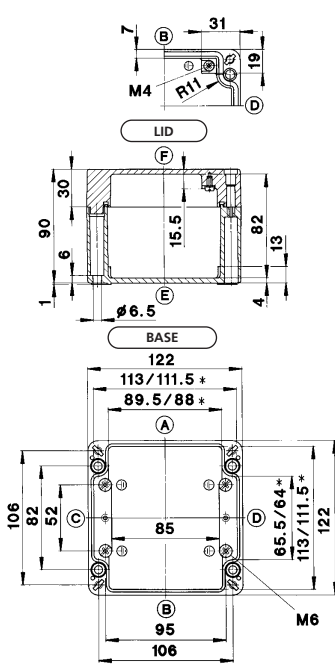
ISO M	12	16	20	25	32	40	50	63
Side A/B	12	6	4	2	2	0	0	0
Side C/D	5	2	2	1	0	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

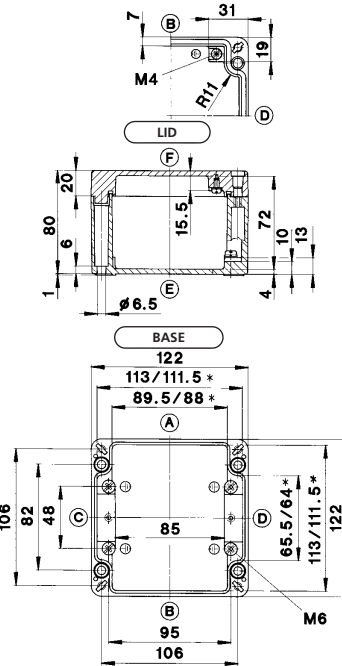
## 122 x 122 x 90 mm

CA-215  
Aluminium enclosure



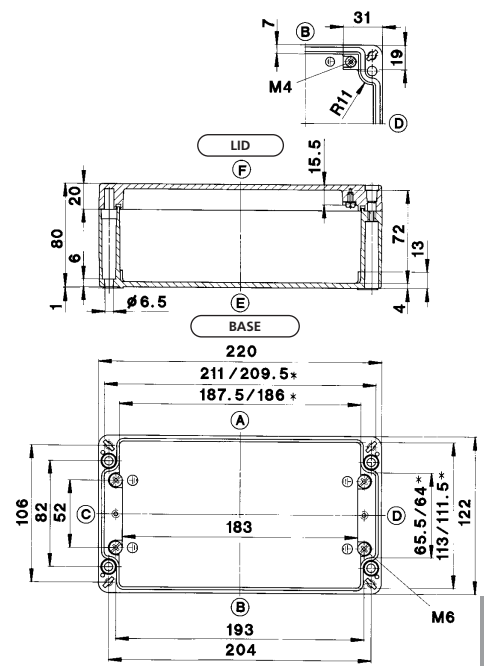
## 122 x 122 x 80 mm

CA-220  
Aluminium enclosure



## 220 x 122 x 80 mm

CA-230  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

CA-215	
920	122 x 122 x 90
Part number	
121.0.0000.50 ●	
121.0.0010.50	
121.0.0110.50	
121.0.0080.50	
121.0.0100.50	
121.0.0060.50	
121.0.0120.50	
951.1.1500.00 ●	
-	
982.1.0000.00 ●	
982.2.0010.00 ●	
981.0.0020.00 ●	
982.4.0240.00 ●	
980.1.0470.00 ●	
980.1.0310.00 ●	
923.1.0060.00 ●	

ISO M	12	16	20	25	32	40	50	63
Side A/B	12	6	4	2	2	0	0	0
Side C/D	5	2	2	1	0	0	0	0
** mechanical enclosure machining required								
● = kept in stock								

CA-220	
940	122 x 122 x 80
Part number	
122.0.0000.00 ●	
122.0.0010.00	
122.0.0270.00	
122.0.0080.00	
122.0.0100.00	
122.0.0060.00	
122.0.0610.00	
951.1.0080.00 ●	
-	
982.1.0000.00 ●	
982.2.0010.00 ●	
981.0.0020.00 ●	
982.4.0240.00 ●	
980.1.0470.00 ●	
980.1.0310.00	
923.1.0060.00 ●	

ISO M	12	16	20	25	32	40	50	63
Side A/B	12	6	4	2	2	0	0	0
Side C/D	5	2	2	1	0	0	0	0
** mechanical enclosure machining required								
● = kept in stock								

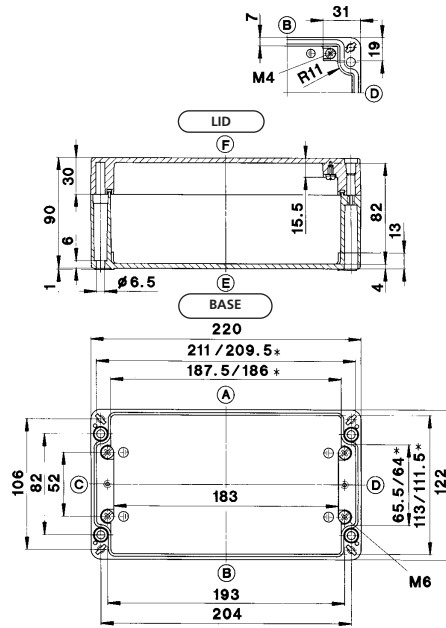
CA-230	
1410	220 x 122 x 80
Part number	
123.0.0000.00 ●	
123.0.0010.00	
123.0.0160.00	
123.0.0080.00	
123.0.0100.00	
123.0.0060.00	
123.0.0150.00	
951.1.0950.00 ●	
-	
982.1.0050.00 ●	
982.2.0070.00 ●	
981.0.0080.00 ●	
982.4.0240.00 ●	
980.1.0470.00 ●	
980.1.0310.00	
923.1.0060.00 ●	

ISO M	12	16	20	25	32	40	50	63
Side A/B	27	12	8	5	4	0	0	0
Side C/D	5	2	2	1	0	0	0	0
** mechanical enclosure machining required								
● = kept in stock								



## 220 x 122 x 90 mm

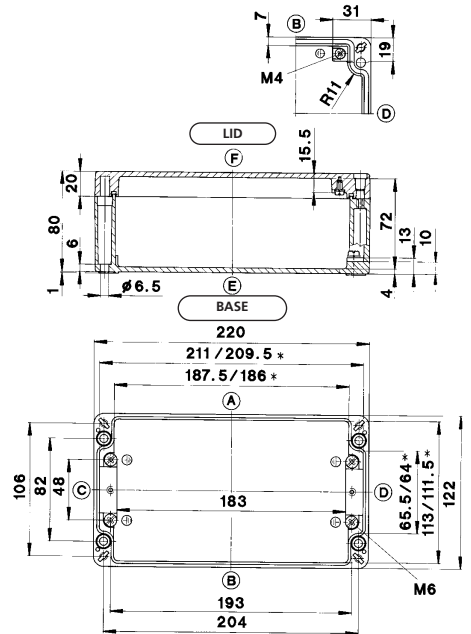
CA-235  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

## 220 x 122 x 80 mm

CA-240  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

Type	
Weight	(g)
External dimensions	(mm)
<b>Complete enclosures</b>	
Coated, with gasket and lid screws	
Coated, with gasket and hex. socket head screws	
Coated, with silicone gasket and lid screws	
Coated, with HF gasket and lid screws	
Saltwater-proof coating, with gasket and lid screws	
Saltwater-proof coating, passivated, lid screws with gasket	
Unwashed, unpainted, no accessories	
<b>Accessories</b> (separate or as a mounting set)	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail	
External attachment brackets	
External hinges side	
Internal hinges with lid guiding**	
Silicone gasket for wider temperature range (piece goods)	

### Max. Pg threads

CA-235	
1410	
220 x 122 x 90	
<b>Part number</b>	
123.0.0000.50 ●	
123.0.0010.50	
123.0.0110.50	
123.0.0080.50	
123.0.0100.50	
123.0.0060.50	
123.0.0120.50	
951.1.0950.00 ●	
-	
982.1.0050.00 ●	
982.2.0070.00 ●	
981.0.0080.00 ●	
982.4.0240.00 ●	
980.1.0470.00 ●	
980.1.0310.00 ●	
923.1.0060.00 ●	

ISO M	12	16	20	25	32	40	50	63
Side A/B	27	12	8	5	4	0	0	0
Side C/D	5	2	2	1	0	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

CA-240	
1410	
220 x 122 x 80	
<b>Part number</b>	
124.0.0000.00 ●	
124.0.0010.00	
124.0.0970.00	
124.0.0080.00	
124.0.0100.00	
124.0.0060.00	
124.0.0820.00	
951.1.0090.00 ●	
-	
982.1.0050.00 ●	
982.2.0070.00 ●	
981.0.0080.00 ●	
982.0.0240.00 ●	
980.1.0470.00 ●	
980.1.0310.00 ●	
923.1.0060.00 ●	

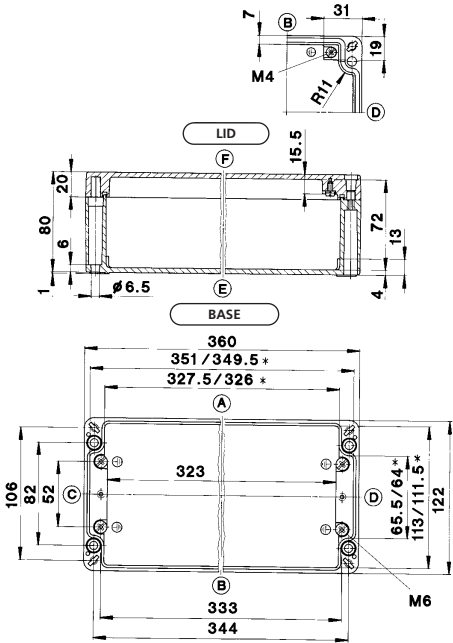
ISO M	12	16	20	25	32	40	50	63
Side A/B	27	12	8	5	4	0	0	0
Side C/D	5	2	2	1	0	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

### 360 x 122 x 80 mm

CA-250  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

CA-250
1860
360 x 122 x 80
<b>Part number</b>
125.0.0000.00 ●
125.0.0010.00
125.0.1240.00
125.0.0080.00
125.0.0100.00
125.0.0060.00
125.0.0110.00
951.1.1740.00 ●
-
982.1.0120.00 ●
982.2.0150.00 ●
981.0.0140.00 ●
982.4.0240.00 ●
980.1.0470.00 ●
980.1.0310.00 ●
923.1.0060.00 ●

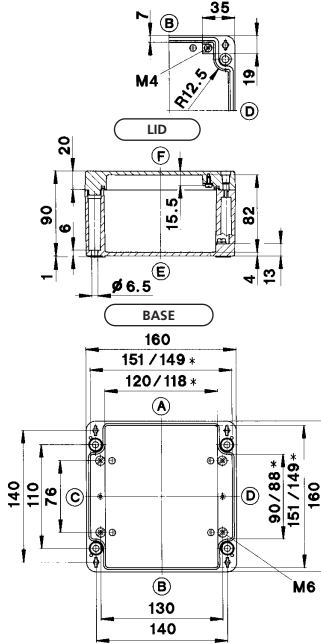
ISO M	12	16	20	25	32	40	50	63
Side A/B	48	21	16	9	6	0	0	0
Side C/D	5	2	2	1	0	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

### 160 x 160 x 90 mm

CA-270  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

CA-270
1410
160 x 160 x 90
<b>Part number</b>
127.0.0000.00 ●
127.0.0010.00
127.0.0120.00
127.0.0080.00
127.0.0100.00
127.0.0060.00
127.0.0130.00
951.1.1490.00 ●
-
982.1.0020.00 ●
982.2.0030.00 ●
981.0.0040.00 ●
982.4.0240.00 ●
980.1.0470.00 ●
980.1.0300.00 ●
923.1.0060.00 ●

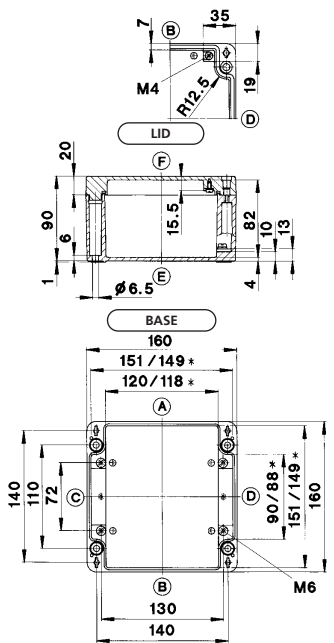
ISO M	12	16	20	25	32	40	50	63
Side A/B	20	9	6	4	2	2	1	0
Side C/D	8	4	3	2	2	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

### 160 x 160 x 90 mm

CA-280  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

CA-280
1410
160 x 160 x 90
<b>Part number</b>
128.0.0000.00 ●
128.0.0010.00
128.0.0590.00
128.0.0080.00
128.0.0100.00
128.0.0060.00
128.0.0330.00
951.1.0110.00 ●
-
982.1.0020.00 ●
982.2.0030.00 ●
981.0.0040.00 ●
982.4.0240.00 ●
980.1.0470.00 ●
980.1.0300.00 ●
923.1.0060.00 ●

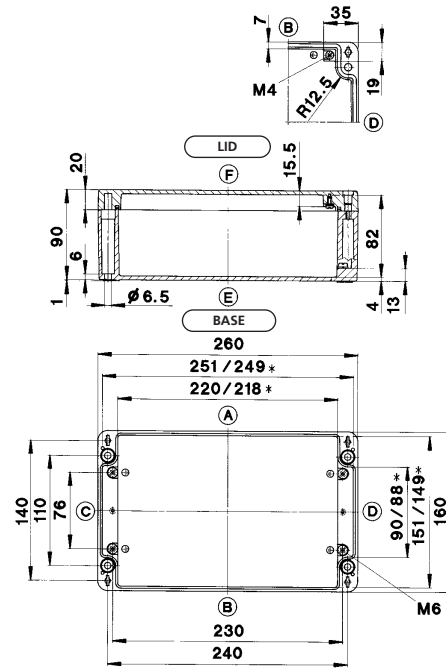
ISO M	12	16	20	25	32	40	50	63
Side A/B	20	9	6	4	2	2	1	0
Side C/D	8	4	3	2	2	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

## 260 x 160 x 90 mm

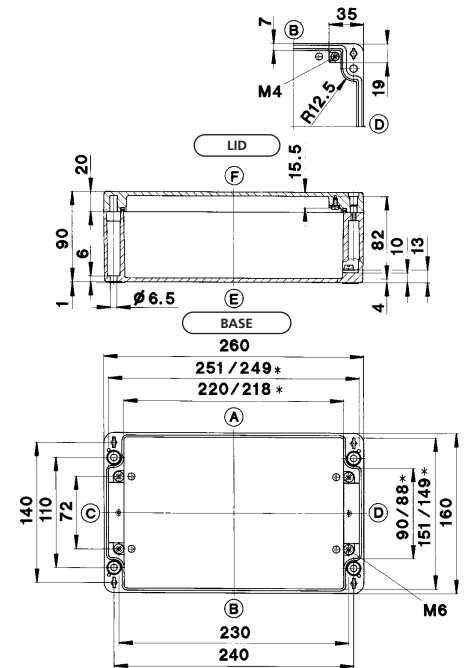
CA-290  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

## 260 x 160 x 90 mm

CA-300  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

Type	CA-290
Weight (g)	1960
External dimensions (mm)	260 x 160 x 90
<b>Complete enclosures</b>	<b>Part number</b>
Coated, with gasket and lid screws	129.0.0000.00 ●
Coated, with gasket and hex. socket head screws	129.0.0010.00
Coated, with silicone gasket and lid screws	129.0.0470.00
Coated, with HF gasket and lid screws	129.0.0080.00
Saltwater-proof coating, with gasket and lid screws	129.0.0100.00
Saltwater-proof coating, passivated, lid screws with gasket	129.0.0060.00
Unwashed, unpainted, no accessories	129.0.0110.00
<b>Accessories</b> (separate or as a mounting set)	
Mounting plate	951.1.0960.00 ●
TS 15 mounting rail	-
TS 32 mounting rail	982.1.0080.00 ●
TS 35 mounting rail	982.2.0110.00 ●
Grounding rail	981.0.0100.00 ●
External attachment brackets	982.4.0240.00 ●
External hinges side	980.1.0470.00 ●
Internal hinges with lid guiding**	980.1.0300.00 ●
Silicone gasket for wider temperature range (piece goods)	923.1.0060.00 ●

### Max. Pg threads

ISO M	12	16	20	25	32	40	50	63
Side A/B	36	17	12	7	4	3	3	0
Side C/D	8	4	3	2	2	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

Type	CA-300
Weight (g)	1960
External dimensions (mm)	260 x 160 x 90
<b>Complete enclosures</b>	<b>Part number</b>
Coated, with gasket and lid screws	130.0.0000.00 ●
Coated, with gasket and hex. socket head screws	130.0.0010.00
Coated, with silicone gasket and lid screws	130.0.0640.00
Coated, with HF gasket and lid screws	130.0.0080.00
Saltwater-proof coating, with gasket and lid screws	130.0.0100.00
Saltwater-proof coating, passivated, lid screws with gasket	130.0.0060.00
Unwashed, unpainted, no accessories	130.0.0410.00
<b>Accessories</b> (separate or as a mounting set)	
Mounting plate	951.1.0120.00 ●
TS 15 mounting rail	-
TS 32 mounting rail	982.1.0080.00 ●
TS 35 mounting rail	982.2.0110.00 ●
Grounding rail	981.0.0100.00 ●
External attachment brackets	982.4.0240.00 ●
External hinges side	980.1.0470.00 ●
Internal hinges with lid guiding**	980.1.0300.00 ●
Silicone gasket for wider temperature range (piece goods)	923.1.0060.00 ●

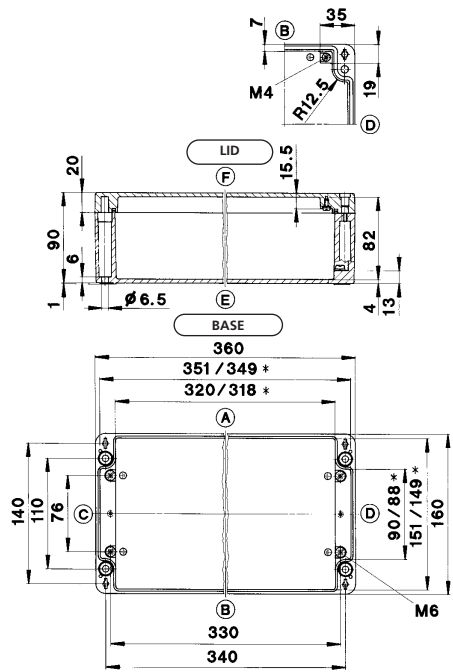
ISO M	12	16	20	25	32	40	50	63
Side A/B	36	17	12	7	4	3	3	0
Side C/D	8	4	3	2	2	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

### 360 x 160 x 90 mm

CA-310  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

CA-310
2550
360 x 160 x 90
<b>Part number</b>
131.0.0000.00 ●
131.0.0010.00
131.0.1580.00
131.0.0080.00
131.0.0100.00
131.0.0060.00
131.0.0710.00
951.1.1750.00 ●
-
982.1.0120.00 ●
982.2.0150.00 ●
981.0.0420.00 ●
982.4.0240.00 ●
980.1.0470.00 ●
980.1.0300.00 ●
923.1.0060.00 ●

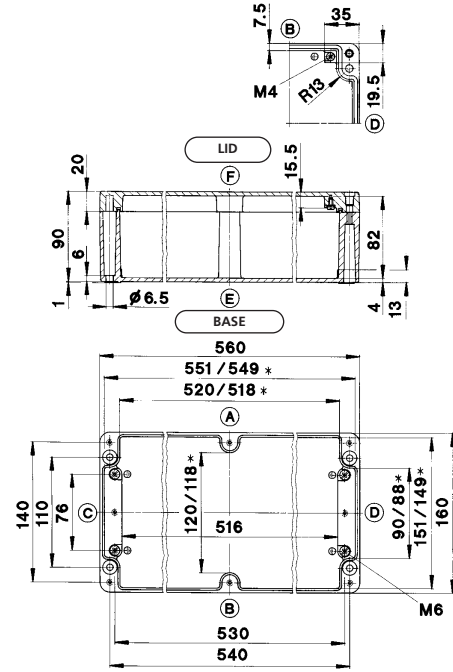
ISO M	12	16	20	25	32	40	50	63
Side A/B	54	26	18	11	6	5	4	0
Side C/D	8	4	3	2	2	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

### 560 x 160 x 90 mm

CA-330  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

CA-330
2730
560 x 160 x 90
<b>Part number</b>
133.0.0000.00 ●
133.0.0010.00
133.0.0560.00
133.0.0080.00
133.0.0100.00
133.0.0060.00
133.0.0220.00
951.1.0140.00 ●
-
982.1.0150.00 ●
982.2.0180.00 ●
981.0.0160.00 ●
982.4.0240.00 ●
980.1.0470.00 ●
980.1.0300.00 ●
923.1.0090.00 ●

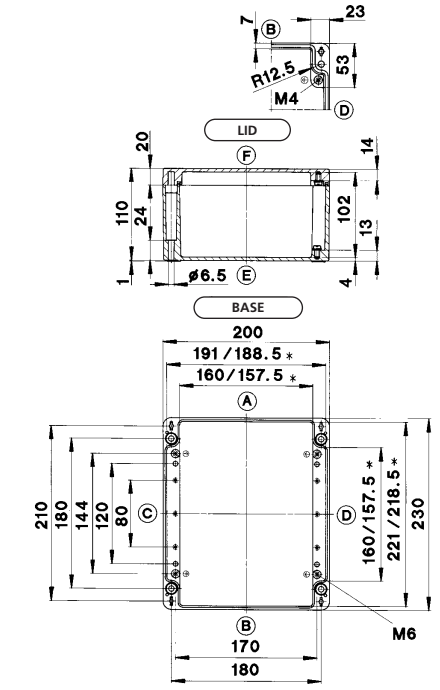
ISO M	12	16	20	25	32	40	50	63
Side A/B	84	40	28	16	10	8	6	0
Side C/D	8	4	3	2	2	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

### 200 x 230 x 110 mm

CA-350  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

CA-350
2730
200 x 230 x 110
<b>Part number</b>
135.0.0000.00 ●
135.0.0010.00
135.0.0780.00
135.0.0080.00
135.0.0100.00
135.0.0060.00
135.0.0170.00
951.1.0150.00 ●
-
982.1.0030.00 ●
982.2.0050.00 ●
981.0.0070.00 ●
982.4.0230.00 ●
980.1.0470.00 ●
980.1.0300.00 ●
923.1.0060.00 ●

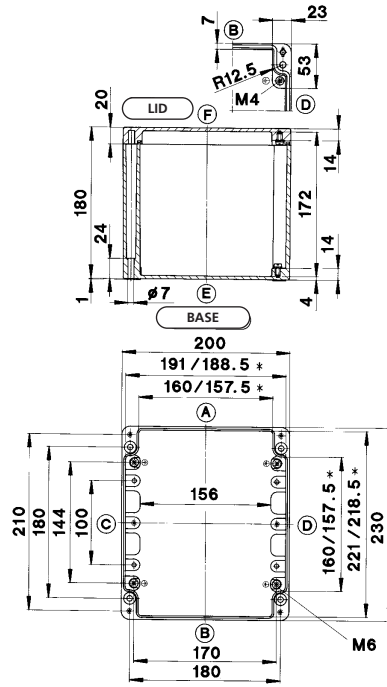
ISO M	12	16	20	25	32	40	50	63
Side A/B	35	15	12	8	4	3	2	2
Side C/D	26	12	8	5	3	2	2	1

\*\* mechanical enclosure machining required

● = kept in stock

## 200 x 230 x 180 mm

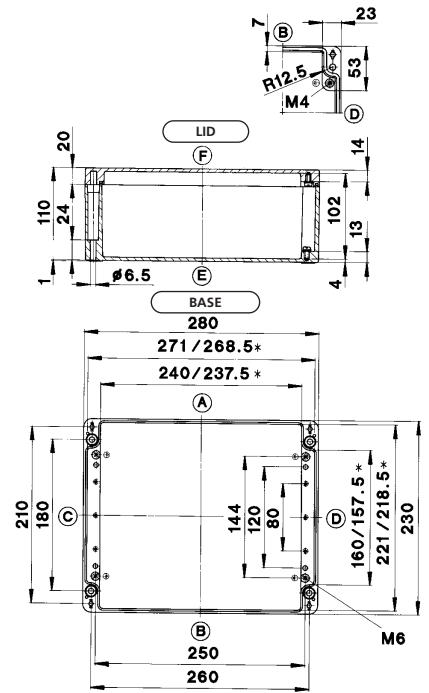
CA-360  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

## 280 x 230 x 110 mm

CA-370  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

Type	CA-360
Weight (g)	3680
External dimensions (mm)	200 x 230 x 180
<b>Complete enclosures</b>	<b>Part number</b>
Coated, with gasket and lid screws	136.0.0000.00 ●
Coated, with gasket and hex. socket head screws	136.0.0010.00
Coated, with silicone gasket and lid screws	136.0.0440.00
Coated, with HF gasket and lid screws	136.0.0080.00
Saltwater-proof coating, with gasket and lid screws	136.0.0100.00
Saltwater-proof coating, passivated, lid screws with gasket	136.0.0060.00
Unwashed, unpainted, no accessories	136.0.0430.00
<b>Accessories</b> (separate or as a mounting set)	
Mounting plate	951.1.0150.00 ●
TS 15 mounting rail	-
TS 32 mounting rail	982.1.0030.00 ●
TS 35 mounting rail	982.2.0050.00 ●
Grounding rail	981.0.0070.00 ●
External attachment brackets	982.4.0230.00 ●
External hinges side	980.1.0470.00 ●
Internal hinges with lid guiding**	980.1.0300.00 ●
Silicone gasket for wider temperature range (piece goods)	923.1.0060.00 ●

### Max. Pg threads

ISO M	12	16	20	25	32	40	50	63
Side A/B	56	32	20	13	9	5	4	4
Side C/D	52	27	18	12	8	5	3	3

\*\* mechanical enclosure machining required

● = kept in stock

Type	CA-370
Weight (g)	3840
External dimensions (mm)	280 x 230 x 110
<b>Complete enclosures</b>	<b>Part number</b>
Coated, with gasket and lid screws	137.0.0000.00 ●
Coated, with gasket and hex. socket head screws	137.0.0010.00
Coated, with silicone gasket and lid screws	137.0.0730.00
Coated, with HF gasket and lid screws	137.0.0080.00
Saltwater-proof coating, with gasket and lid screws	137.0.0100.00
Saltwater-proof coating, passivated, lid screws with gasket	137.0.0060.00
Unwashed, unpainted, no accessories	137.0.0150.00
<b>Accessories</b> (separate or as a mounting set)	
Mounting plate	951.1.0160.00 ●
TS 15 mounting rail	-
TS 32 mounting rail	982.1.0090.00 ●
TS 35 mounting rail	982.2.0120.00 ●
Grounding rail	981.0.0110.00 ●
External attachment brackets	982.4.0230.00 ●
External hinges side	980.1.0470.00 ●
Internal hinges with lid guiding**	980.1.0300.00 ●
Silicone gasket for wider temperature range (piece goods)	923.1.0060.00 ●

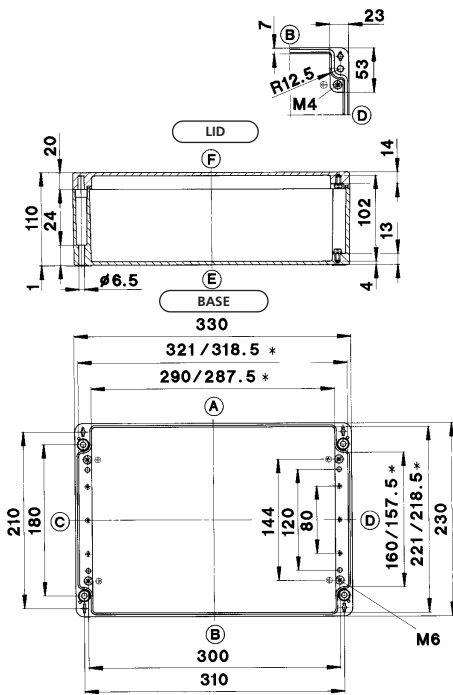
ISO M	12	16	20	25	32	40	50	63
Side A/B	53	25	18	11	7	4	3	3
Side C/D	26	12	8	5	3	2	2	1

\*\* mechanical enclosure machining required

● = kept in stock

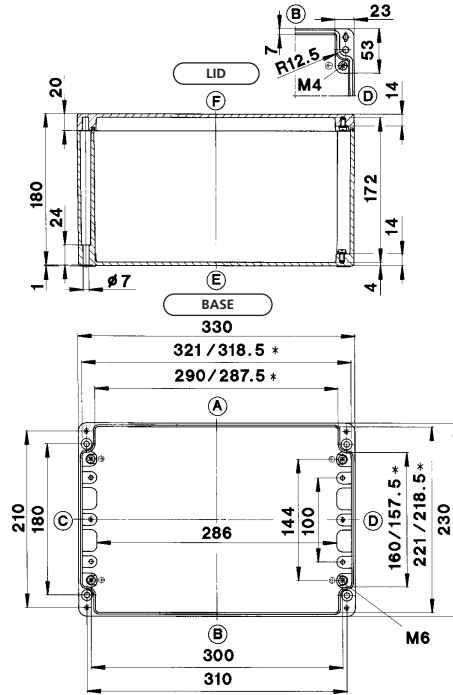
### 330 x 230 x 110 mm

CA-380  
Aluminium enclosure



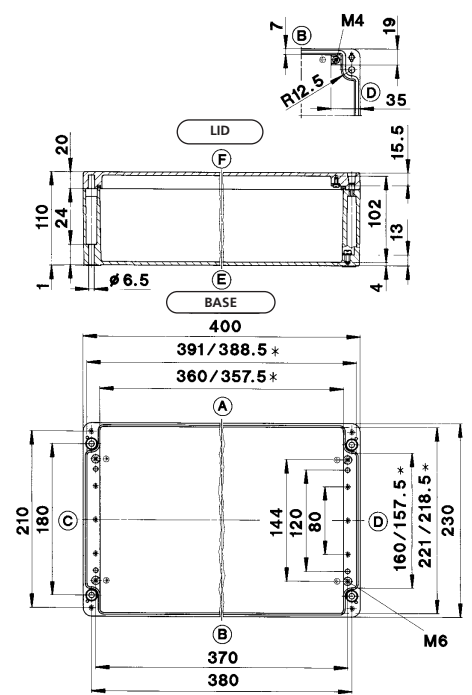
### 330 x 230 x 180 mm

CA-390  
Aluminium enclosure



### 400 x 230 x 110 mm

CA-400  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

CA-380
4270
330 x 230 x 110
<b>Part number</b>
138.0.0000.00 ●
138.0.0010.00
138.0.0520.00
138.0.0080.00
138.0.0100.00
138.0.0060.00
138.0.0140.00
951.1.0170.00 ●
-
982.1.0110.00 ●
982.2.0140.00 ●
981.0.0130.00 ●
982.4.0230.00 ●
980.1.0470.00 ●
980.1.0300.00 ●
923.1.0060.00 ●

ISO M	12	16	20	25	32	40	50	63
Side A/B	65	30	23	12	9	5	4	3
Side C/D	24	12	8	5	3	2	2	1
** mechanical enclosure machining required								
● = kept in stock								

CA-390
5300
330 x 230 x 180
<b>Part number</b>
139.0.0000.00 ●
139.0.0010.00
139.0.0200.00
139.0.0080.00
139.0.0100.00
139.0.0060.00
139.0.0120.00
951.1.0170.00 ●
-
982.1.0110.00 ●
982.2.0140.00 ●
981.0.0130.00 ●
982.4.0230.00 ●
980.1.0470.00 ●
980.1.0300.00 ●
923.1.0060.00 ●

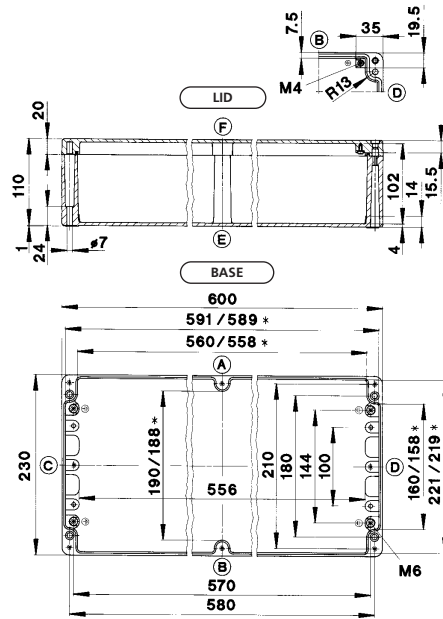
ISO M	12	16	20	25	32	40	50	63
Side A/B	108	54	40	25	15	9	8	6
Side C/D	52	27	18	12	8	5	3	3
** mechanical enclosure machining required								
● = kept in stock								

CA-400
4870
400 x 230 x 110
<b>Part number</b>
140.0.0000.00 ●
140.0.0010.00
140.0.0620.00
140.0.0080.00
140.0.0100.00
140.0.0060.00
140.0.0130.00
951.1.2940.00 ●
-
982.1.0140.00 ●
982.2.0170.00 ●
981.0.0150.00 ●
982.4.0230.00 ●
980.1.0470.00 ●
980.1.0300.00 ●
923.1.0060.00 ●

ISO M	12	16	20	25	32	40	50	63
Side A/B	80	38	27	17	11	6	5	4
Side C/D	26	12	8	5	3	2	2	1
** mechanical enclosure machining required								
● = kept in stock								

## 600 x 230 x 110 mm

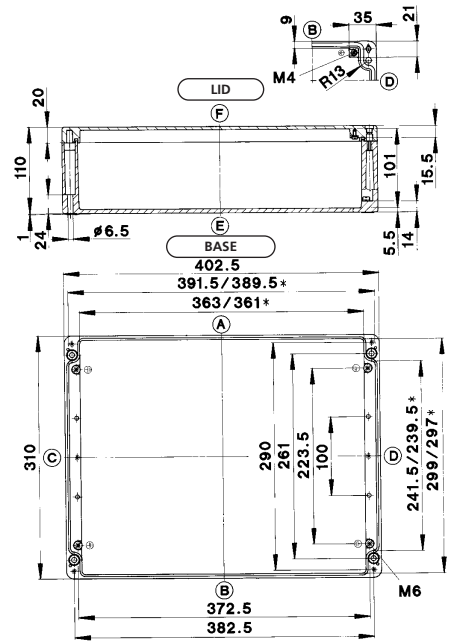
CA-420  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

## 402.5 x 310 x 110 mm

CA-450  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

Type	CA-420
Weight (g)	6380
External dimensions (mm)	600 x 230 x 110
<b>Complete enclosures</b>	<b>Part number</b>
Coated, with gasket and lid screws	142.0.0000.00 ●
Coated, with gasket and hex. socket head screws	142.0.0010.00
Coated, with silicone gasket and lid screws	142.0.0550.00
Coated, with HF gasket and lid screws	142.0.0080.00
Saltwater-proof coating, with gasket and lid screws	142.0.0100.00
Saltwater-proof coating, passivated, lid screws with gasket	142.0.0060.00
Unwashed, unpainted, no accessories	142.0.0110.00
<b>Accessories (separate or as a mounting set)</b>	
Mounting plate	951.1.0190.00 ●
TS 15 mounting rail	-
TS 32 mounting rail	982.1.0160.00 ●
TS 35 mounting rail	982.2.0190.00 ●
Grounding rail	981.0.0170.00 ●
External attachment brackets	982.4.0230.00 ●
External hinges side	980.1.0470.00 ●
Internal hinges with lid guiding**	980.1.0300.00 ●
Silicone gasket for wider temperature range (piece goods)	923.1.0060.00 ●

### Max. Pg threads

ISO M	12	16	20	25	32	40	50	63
Side A/B	120	56	42	24	16	8	8	6
Side C/D	28	13	8	5	3	2	2	1

\*\* mechanical enclosure machining required

● = kept in stock

Type	CA-450
Weight (g)	5810
External dimensions (mm)	402.5 x 310 x 110
<b>Complete enclosures</b>	<b>Part number</b>
Coated, with gasket and lid screws	145.0.0000.00 ●
Coated, with gasket and hex. socket head screws	145.0.0010.00
Coated, with silicone gasket and lid screws	145.0.0520.00
Coated, with HF gasket and lid screws	145.0.0080.00
Saltwater-proof coating, with gasket and lid screws	145.0.0100.00
Saltwater-proof coating, passivated, lid screws with gasket	145.0.0060.00
Unwashed, unpainted, no accessories	145.0.0250.00
<b>Accessories (separate or as a mounting set)</b>	
Mounting plate	951.1.0200.00 ●
TS 15 mounting rail	-
TS 32 mounting rail	982.1.0140.00 ●
TS 35 mounting rail	982.2.0170.00 ●
Grounding rail	981.0.0150.00 ●
External attachment brackets	982.4.0230.00 ●
External hinges side	980.1.0470.00 ●
Internal hinges with lid guiding**	980.1.0300.00 ●
Silicone gasket for wider temperature range (piece goods)	923.1.0090.00 ●

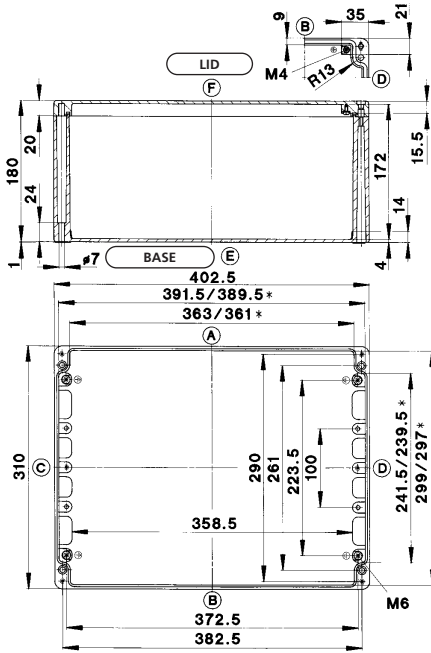
ISO M	12	16	20	25	32	40	50	63
Side A/B	80	38	27	17	11	6	5	4
Side C/D	38	21	13	7	5	4	3	2

\*\* mechanical enclosure machining required

● = kept in stock

### 402.5 x 310 x 180 mm

CA-460  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

CA-460
7420
402.5 x 310 x 180
<b>Part number</b>
146.0.0000.00 ●
146.0.0010.00
146.0.0130.00
146.0.0080.00
146.0.0100.00
146.0.0060.00
146.0.0490.00
951.1.0200.00 ●
-
982.1.0140.00 ●
982.2.0170.00 ●
981.0.0150.00 ●
982.4.0230.00 ●
980.1.0470.00 ●
980.1.0300.00 ●
923.1.0090.00 ●

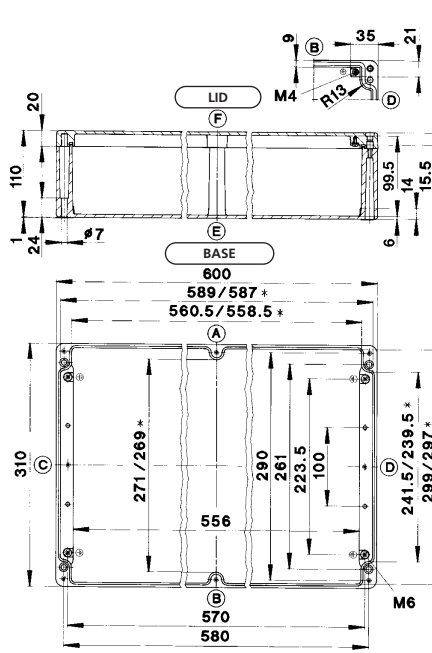
ISO M	12	16	20	25	32	40	50	63
Side A/B	136	68	50	30	21	12	10	8
Side C/D	74	38	28	18	12	8	6	3

\*\* mechanical enclosure machining required

● = kept in stock

### 600 x 310 x 110 mm

CA-470  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

CA-470
8480
600 x 310 x 110
<b>Part number</b>
147.0.0000.00 ●
147.0.0010.00
147.0.0560.00
147.0.0080.00
147.0.0100.00
147.0.0060.00
147.0.0620.00
951.1.0210.00 ●
-
982.1.0160.00 ●
982.2.0190.00 ●
981.0.0170.00 ●
982.4.0230.00 ●
980.1.0470.00 ●
980.1.0300.00 ●
923.1.0090.00 ●

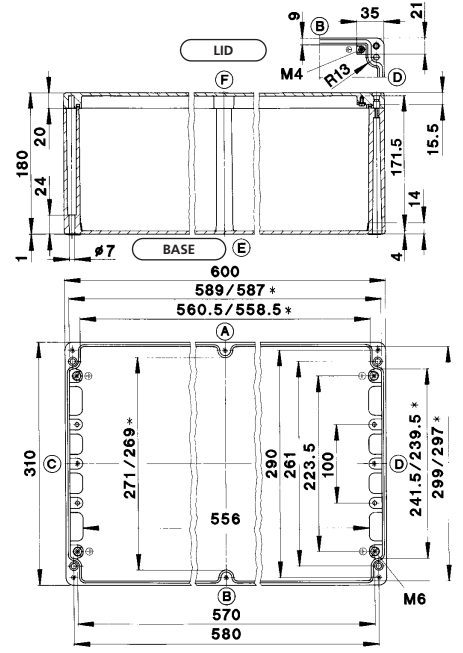
ISO M	12	16	20	25	32	40	50	63
Side A/B	120	56	42	24	16	8	8	6
Side C/D	38	17	13	7	5	4	3	2

\*\* mechanical enclosure machining required

● = kept in stock

### 600 x 310 x 180 mm

CA-480  
Aluminium enclosure



\* minimum dimensions at level of mounting plate support

CA-480
10840
600 x 310 x 180
<b>Part number</b>
148.0.0000.00 ●
148.0.0010.00
148.0.0450.00
148.0.0080.00
148.0.0100.00
148.0.0060.00
148.0.0170.00
951.1.0210.00 ●
-
982.1.0160.00 ●
982.2.0190.00 ●
981.0.0170.00 ●
982.4.0230.00 ●
980.1.0470.00 ●
980.1.0300.00 ●
923.1.0090.00 ●

ISO M	12	16	20	25	32	40	50	63
Side A/B	200	100	76	46	30	18	14	12
Side C/D	74	38	28	18	12	8	6	5

\*\* mechanical enclosure machining required

● = kept in stock



## Polycarbonate and ABS enclosures with quick release lid screws CT series

The CT series of BERNSTEIN plastic enclosures are made from high-quality Polycarbonate or ABS. They are especially suitable for encapsulating electrical and electronic components or for use as complete compact control housings. All enclosures are optionally available with a transparent Polycarbonate lid. The enclosures meet protection class IP 65 as standard.

All CT enclosures are provided with mounting bosses moulded directly into the base. Components, mounting rails or other assemblies may be easily secured using the self-tapping screws provided. BERNSTEIN CT enclosures always contain centrally positioned bosses to attach DIN rails.

BERNSTEIN enclosures are also supplied with patented stainless steel quick release screws as standard (a unique BERNSTEIN innovation). The screw is simply pressed into the holes in the lid where they are automatically retained and a quarter turn firmly secures the lid to the base. A gasket is factory-fitted (for standard enclosures) to ensure IP 65 protection. BERNSTEIN Polycarbonate and ABS enclosures are supplied in RAL 7035 (light grey) as standard.

### Technical data

#### Material

Polycarbonate, transparent  
Polycarbonate or ABS

#### Gasket

Neoprene round seal (siliconised)  
alternative:  
Neoprene round seal (silicone-free)  
Silicone round seal

#### Quick release screws

Stainless steel, self-locking, multi-purpose cross-head  
alternative:  
Stainless steel lid screw, multi-purpose cross-head  
Lead-sealed steel lid screws (9 S 20 K) galvanised, slotted head

#### Colour

RAL 7035 (light grey)  
alternative:  
other colours on request

#### Temperature

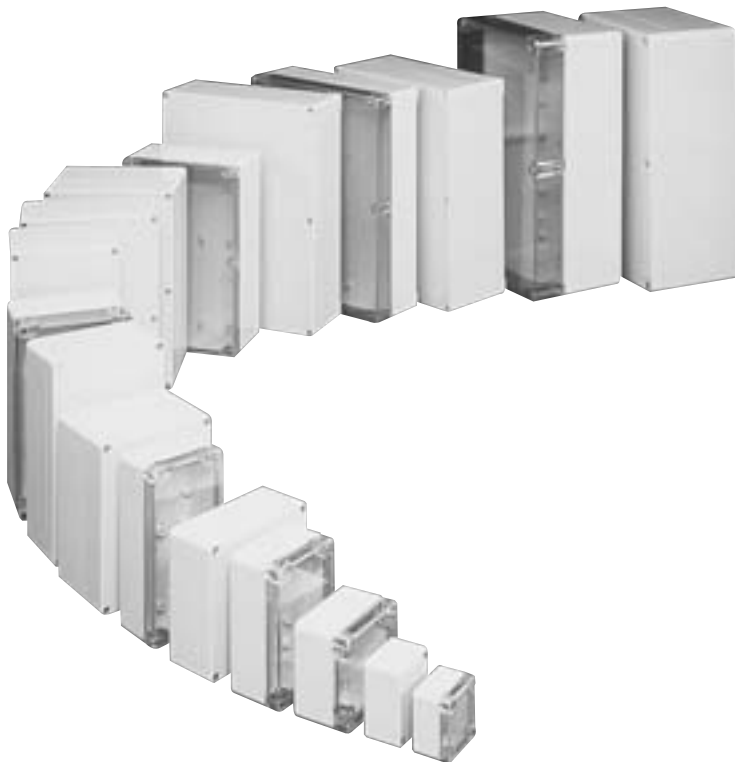
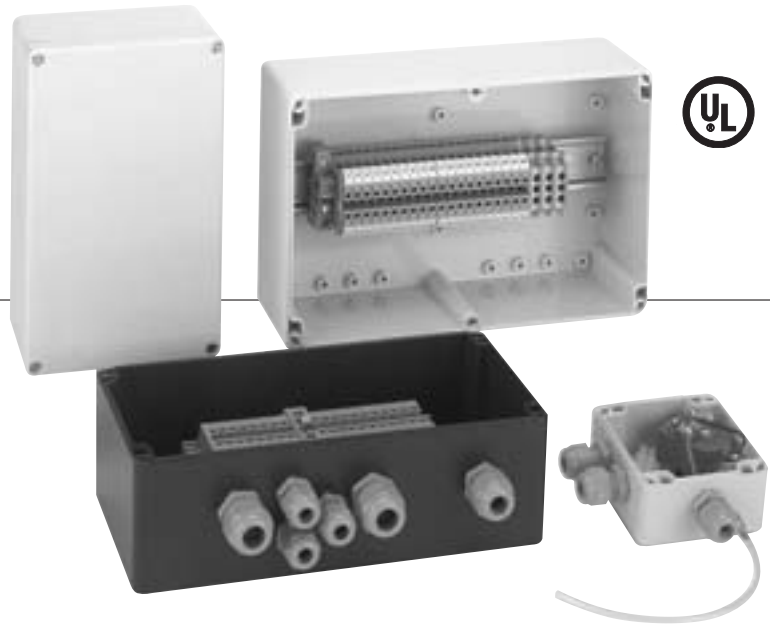
-40 °C to +80 °C (neoprene gasket)  
alternative:  
-40 °C to +120 °C (silicone gasket)

#### Protection class

IP 65  
alternative:  
higher protection classes on request

#### Approval

UL: File E 182264 (only Polycarbonate enclosures)

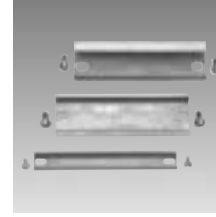


## Accessories Polycarbonate and ABS enclosure



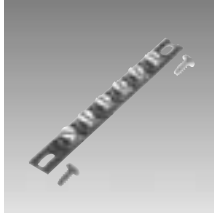
### Mounting plates

Laminated paper (Pertinax) (thickness: CT-50 to CT-60: 1.5 mm; CT-62 to CT-78: 2.0 mm; CT-80 to CT-91: 2.5 mm), can be used for subsequent mounting of equipment.



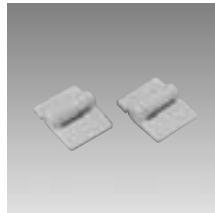
### Mounting rails

Standard TS-15, TS-32 and TS-35 rails (steel); yellow-passivated for terminal block attachment.



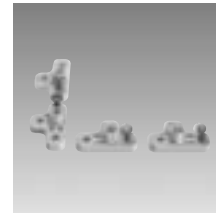
### Earthing rails

Galvanised steel for connecting and routing protective earth connections.



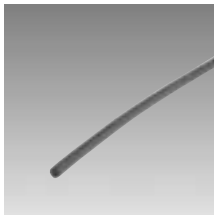
### External hinges

Polycarbonate, for the hinged mounting of enclosure lids. Opening angle of lid approx. 195°, easy lock-in mechanism at 170°, easy assembly press-fit hinges. (CT-88: screw attachment).



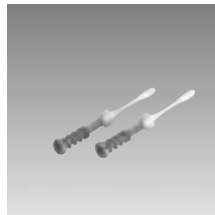
### External attachment brackets

Polycarbonate, for mounting enclosures without opening the lid. Colour: RAL 7035.



### Silicone lid gasket

Improved temperature range (-40 °C to +120 °C). Standard type made of silicone foam.



### Flexible quick-release internal hinges

For enclosure lids, captive and strain-relieved. Opening angle of lid > 180°. Stainless steel with polyamide ends.



### Brass press-fit bushes

With metric M3 attachment screws for mounting equipment with metric screws in the mounting bosses of the base (M4 for CT-88).

## Product line overview of polycarbonate and ABS enclosures

Dimensions/mm L x W x H	Polycarbonate enclosures		Polycarbonate enclosures with transparent lid (PC)		ABS enclosures		ABS enclosures with transparent lid (PC)	
	Part number	Type	Part number	Type	Part number	Type	Part number	Type
52 x 50 x 35	250.0.0000.00	CT-501	250.1.0000.00	CT-501 T	350.0.0000.00	CT-502	350.1.0000.00	CT-502 T
65 x 50 x 35	252.0.0000.00	CT-521	252.1.0000.00	CT-521 T	352.0.0000.00	CT-522	352.1.0000.00	CT-522 T
82 x 80 x 55	254.0.0000.00	CT-541	254.1.0000.00	CT-541 T	354.0.0000.00	CT-542	354.1.0000.00	CT-542 T
82 x 80 x 85	256.0.0000.00	CT-561	256.1.0000.00	CT-561 T	356.0.0000.00	CT-562	356.1.0000.00	CT-562 T
120 x 80 x 55	258.0.0000.00	CT-581	258.1.0000.00	CT-581 T	358.0.0000.00	CT-582	358.1.0000.00	CT-582 T
120 x 80 x 85	260.0.0000.00	CT-601	260.1.0000.00	CT-601 T	360.0.0000.00	CT-602	360.1.0000.00	CT-602 T
160 x 80 x 55	262.0.0000.00	CT-621	262.1.0000.00	CT-621 T	362.0.0000.00	CT-622	362.1.0000.00	CT-622 T
160 x 80 x 85	264.0.0000.00	CT-641	264.1.0000.00	CT-641 T	364.0.0000.00	CT-642	364.1.0000.00	CT-642 T
122 x 120 x 55	266.0.0000.00	CT-661	266.1.0000.00	CT-661 T	366.0.0000.00	CT-662	366.1.0000.00	CT-662 T
122 x 120 x 85	268.0.0000.00	CT-681	268.1.0000.00	CT-681 T	368.0.0000.00	CT-682	368.1.0000.00	CT-682 T
160 x 120 x 90	272.0.0000.00	CT-721	272.1.0000.00	CT-721 T	372.0.0000.00	CT-722	372.1.0000.00	CT-722 T
200 x 120 x 75	276.0.0000.00	CT-761	276.1.0000.00	CT-761 T	376.0.0000.00	CT-762	376.1.0000.00	CT-762 T
200 x 120 x 90	278.0.0000.00	CT-781	278.1.0000.00	CT-781 T	378.0.0000.00	CT-782	378.1.0000.00	CT-782 T
240 x 120 x 100	280.0.0000.00	CT-801	280.1.0000.00	CT-801 T	380.0.0000.00	CT-802	380.1.0000.00	CT-802 T
200 x 150 x 75	282.0.0000.00	CT-821	282.1.0000.00	CT-821 T	382.0.0000.00	CT-822	382.1.0000.00	CT-822 T
240 x 160 x 90	284.0.0000.00	CT-841	284.1.0000.00	CT-841 T	384.0.0000.00	CT-842	384.1.0000.00	CT-842 T
240 x 160 x 120	286.0.0000.00	CT-861	286.1.0000.00	CT-861 T	386.0.0000.00	CT-862	386.1.0000.00	CT-862 T
250 x 160 x 90	290.0.0000.00	CT-901	290.1.0000.00	CT-901 T	390.0.0000.00	CT-902	390.1.0000.00	CT-902 T
250 x 160 x 120	291.0.0000.00	CT-911	291.1.0000.00	CT-911 T	391.0.0000.00	CT-912	391.1.0000.00	CT-912 T
360 x 200 x 150	288.0.0000.00	CT-881	288.1.0000.00	CT-881 T	388.0.0000.00	CT-882	388.1.0000.00	CT-882 T
300 x 230 x 86	287.0.0000.00	CT-871	287.1.0000.00	CT-871 T	387.0.0000.00	CT-872	387.1.0000.00	CT-872 T
300 x 230 x 110	289.0.0000.00	CT-891	289.1.0000.00	CT-891 T	389.0.0000.00	CT-892	389.1.0000.00	CT-892 T

# Component overview polycarbonate/ABS enclosures

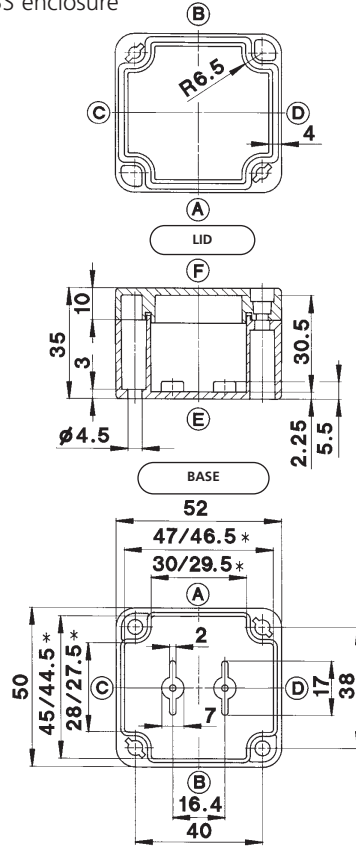
Model	Weidmüller			Phoenix				Wieland					Entelec						Phoenix					
	Block terminal			Block terminal				Block terminal					Terminal block						Terminal block					
Terminal width (mm):													5.2	6.2	5.2	6.2	8.2	10.2	5.2	6.2	7.5	5.2	6.2	8.2
Single-core mm <sup>2</sup>	4	4	4	4	4	4	4	2.5	2.5	2.5	2.5	2.5	2.5	4	4	4	10	16	2.5	4	10	4	4	10
Stranded mm <sup>2</sup>	4	4	4	4	4	4	4	2.5	2.5	2.5	2.5	2.5	1.5	4	2.5	4	6	10	1.5	4	6	2.5	4	6
Nominal voltage V	380	380	380	500	500	500	500	500	500	500	500	500	250	380	750	750	750	750	500	500	500	750	750	750
Loading capacity A	36	36	36	36	36	36	36	25	25	25	25	25	20	35	26	35	46	85	27	36	65	36	36	65
Terminal bridging	-	-	-	-	-	-	-	-	-	-	-	-	-	o	o	o	o	o	-	o	-	o	o	o
Mounting rail TS 15	-	-	-	-	-	-	-	-	-	-	-	-	o	o	-	-	-	-	o	o	o	-	-	-
TS 32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	o	o	o	o	-	-	-	o	o	o
TS 35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	o	o	o	o	-	-	-	o	o	o
Part number	<b>9.40.1.0100.00</b>	<b>9.40.1.0090.00</b>	<b>9.40.1.0130.00</b>	<b>9.40.1.0180.00</b>	<b>9.40.1.0020.00</b>	<b>9.40.1.0030.00</b>	<b>9.40.1.0040.00</b>	<b>9.40.1.0140.00</b>	<b>9.40.1.0050.00</b>	<b>9.40.1.0060.00</b>	<b>9.40.1.0070.00</b>	<b>9.40.1.0080.00</b>	<b>9.40.2.1270.00</b>	<b>9.40.2.0940.00</b>	<b>9.40.2.1090.00</b>	<b>9.40.2.1030.00</b>	<b>9.40.2.1040.00</b>	<b>9.40.2.1050.00</b>	<b>9.40.2.0010.00</b>	<b>9.40.2.0020.00</b>	<b>9.40.2.0030.00</b>	<b>9.40.2.0050.00</b>	<b>9.40.2.0070.00</b>	<b>9.40.2.0090.00</b>
Type	BK 4	BK 6	BK 12	G 5/3	G 5/4	G 5/6	G 5/12	KL-16/4	KL-16/8	KL-16/12	KL-16/16	KL-16/20	DR 1.5/5	DR 4/6	MA 2.5/5	M 4/6	M 6/8	M 10/10	MBK	MBK 5/E	MBK 10	UK 3 N	UK 5 N	UK 10
CT-50	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CT-52	1	-	-	-	1	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CT-54	-	1	-	-	-	1	-	1	1	-	-	-	-	7	6	-	-	-	-	7	6	5	-	-
CT-56	-	-	-	-	-	1	-	1	1	-	-	-	-	7	6	4	4	-	-	7	6	5	4	4
CT-58	-	-	-	-	-	-	1	-	1	1	-	-	-	15	12	-	-	-	-	15	12	10	-	-
CT-60	-	-	-	-	-	-	1	-	1	1	-	-	-	15	12	10	10	6	6	15	12	10	10	10
CT-62	-	-	-	-	-	-	-	-	-	1	1	1	-	22	19	-	-	-	-	22	18	15	-	-
CT-64	-	-	-	-	-	-	-	-	-	1	1	1	-	22	19	16	16	10	10	22	19	15	16	16
CT-66	-	-	-	-	-	-	-	-	1	1	1	1	-	15	13	-	-	-	-	15	13	11	-	-
CT-68	-	-	-	-	-	-	-	-	1	1	1	1	-	15	13	15	13	10	8	15	13	11	15	13
CT-72	-	-	-	-	-	-	-	-	-	1	1	1	-	22	19	22	19	4	11	22	19	15	22	19
CT-76	-	-	-	-	-	-	-	-	-	-	-	1	-	30	25	30	25	19	15	30	25	21	30	25
CT-78	-	-	-	-	-	-	-	-	-	-	-	-	-	30	25	30	25	19	15	30	25	21	30	25
CT-80	-	-	-	-	-	-	-	-	-	-	-	-	-	38	32	38	32	24	19	38	32	26	38	32
CT-82	-	-	-	-	-	-	-	-	-	-	-	-	-	27	23	27	23	17	14	27	23	19	27	23
CT-84	-	-	-	-	-	-	-	-	-	-	-	-	-	38	32	38	32	24	19	38	32	26	38	32
CT-86	-	-	-	-	-	-	-	-	-	-	-	-	-	38	32	38	32	24	19	38	32	26	38	32
CT-87	-	-	-	-	-	-	-	-	-	-	-	-	-	50	40	50	40	31	25	50	40	34	50	40
CT-87*)	-	-	-	-	-	-	-	-	-	-	-	-	-	100	80	100	80	62	50	100	80	68	100	80
CT-88	-	-	-	-	-	-	-	-	-	-	-	-	-	60	50	60	50	38	30	60	49	40	47	47
CT-88*)	-	-	-	-	-	-	-	-	-	-	-	-	-	120	100	120	100	76	60	120	98	80	94	94
CT-89	-	-	-	-	-	-	-	-	-	-	-	-	-	50	40	50	40	31	25	50	40	32	50	46
CT-89*)	-	-	-	-	-	-	-	-	-	-	-	-	-	100	80	100	80	62	50	100	80	64	100	62
CT-90/91	-	-	-	-	-	-	-	-	-	-	-	-	-	38	32	38	32	24	19	38	32	26	38	32

\*) Assembled on 2 mounting rails  
 \*\*) Assembled on 3 mounting rails  
 The number of terminals is reduced when partitions are used.

	Siemens								WAGO												Weidmüller							
	Terminal block				Terminal block				Terminal block												Terminal block							
	Screw terminals				Caged tension spring				6.2	10.2	6.2	10.2	4.2	5.2	5.2	6.2	6.2	8.2	10.2	12.2	5.2	6.2	6.2	6.5	8.2	10.2	5.2	6.2
	4	4	10	25	4	4	10	2.5	2.5	2.5	2.5	1.5	2.5	2.5	4	4	6	10	16	2.5	4	4	6	10	16	4	6	
	2.5	4	6	16	2.5	4	6	2.5	2.5	2.5	2.5	1.5	2.5	2.5	4	4	6	10	16	1.5	4	2.5	4	6	10	2.5	4	
	750	750	750	750	750	750	750	800	800	800	800	800	800	800	800	800	800	800	800	250	380	750	750	750	750	750	750	
	26	35	46	85	36	36	65	26	26	26	26	18	26	26	26	34	34	44	61	82	27	36	27	36	47	65	26	34
	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-		
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○	○	-	-		
	○	○	○	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	<b>9.40.2.4000.00</b>	<b>9.40.2.4010.00</b>	<b>9.40.2.4020.00</b>	<b>9.40.2.4030.00</b>	<b>9.40.2.4040.00</b>	<b>9.40.2.4050.00</b>	<b>9.40.2.4060.00</b>	<b>9.40.2.3020.00</b>	<b>9.40.2.3030.00</b>	<b>9.40.2.3210.00</b>	<b>9.40.2.3220.00</b>	<b>9.40.2.3230.00</b>	<b>9.40.2.0930.00</b>	<b>9.40.2.3240.00</b>	<b>9.40.2.3250.00</b>	<b>9.40.2.3260.00</b>	<b>9.40.2.3270.00</b>	<b>9.40.2.3280.00</b>	<b>9.40.2.3290.00</b>	<b>9.40.2.0500.00</b>	<b>9.40.2.0130.00</b>	<b>9.40.2.0140.00</b>	<b>9.40.2.0150.00</b>	<b>9.40.2.0160.00</b>	<b>9.40.2.0470.00</b>	<b>9.40.2.1460.00</b>	<b>9.40.2.1470.00</b>	
	8WA1011-IDF11	8WA1011-IDG11	8WA1011-IDH11	8WA1204	8WA2011-IDF20	8WA2011-IDG20	8WA2011-IDH20	264-701	264-721	264-711	264-731	279-621	280-601	280-901	281-601	281-901	282-601	284-601	283-601	AKZ 2.5 PA	AKZ 4 PA	SAK 2.5 PA	SAK 4 PA	SAK 6 NPA	SAK 10 PA	WDU 2.5	WDU 4	
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	7	4	-	-	-	-	-	-	-	-	-	-	7	6	-	-	-	-	-	-	
	6	5	-	-	7	6	-	7	4	-	-	-	-	-	-	-	-	-	-	7	6	4	-	-	-	-	-	
	-	-	-	-	-	-	-	13	8	-	-	-	-	-	-	-	-	-	-	15	12	-	-	-	-	-	-	
	12	11	-	-	15	12	-	13	8	-	-	-	-	-	-	-	-	-	-	15	12	10	9	6	6	-	-	
	-	-	-	-	-	-	-	20	12	-	-	-	-	-	-	-	-	-	-	22	19	-	-	-	-	-	-	
	19	18	14	11	22	18	14	20	12	-	-	-	-	-	-	-	-	-	-	22	19	16	15	10	10	-	-	
	-	-	-	-	-	-	-	13	8	-	-	-	-	-	-	-	-	-	-	15	13	-	-	-	-	-	-	
	13	12	10	8	15	13	10	-	-	13	8	21	16	16	13	14	10	8	6	15	13	13	12	10	8	15	13	
	19	17	14	11	22	19	14	-	-	19	11	30	24	24	20	20	14	12	9	22	19	19	17	14	11	22	19	
	26	24	19	15	30	25	19	-	-	26	15	40	32	32	26	26	19	16	13	30	25	25	24	19	15	30	25	
	26	24	19	15	30	25	19	-	-	26	15	40	32	32	26	26	19	16	13	30	25	25	24	19	15	30	25	
	33	30	24	19	38	32	24	-	-	33	20	50	40	40	33	33	25	20	16	38	32	32	30	24	19	38	32	
	23	21	17	14	27	22	17	-	-	26	16	40	32	32	26	27	20	16	13	27	23	23	21	17	14	27	23	
	32	30	24	19	38	31	24	-	-	33	20	50	40	40	33	33	25	20	16	38	32	32	30	24	19	38	32	
	32	30	24	19	38	31	24	-	-	33	20	50	40	40	33	33	25	20	16	38	32	32	30	24	19	38	32	
	42	39	31	25	49	41	31	-	-	43	25	65	52	52	43	43	32	26	21	50	40	40	39	31	25	50	40	
	84	78	62	50	98	82	62	-	-	86	50	130	104	104	86	86	64	52	-	100	80	80	78	62	50	100	80	
	50	46	37	32	58	48	36	-	-	51	30	77	61	61	51	51	38	30	25	60	50	50	47	38	30	60	50	
	100	92	74	64	116	96	72	-	-	102	60	144	122	122	102	102	76	60	-	120	100	100	94	76	60	-	-	
	42	39	31	25	49	41	31	-	-	43	25	65	52	52	43	43	32	26	21	50	40	40	39	31	25	50	40	
	84	78	62	50	98	82	62	-	-	86	50	130	104	104	86	86	64	52	-	100	80	80	78	62	50	100	80	
	32	30	24	19	38	31	24	-	-	33	20	50	40	40	33	33	25	20	16	38	32	32	30	24	19	38	32	

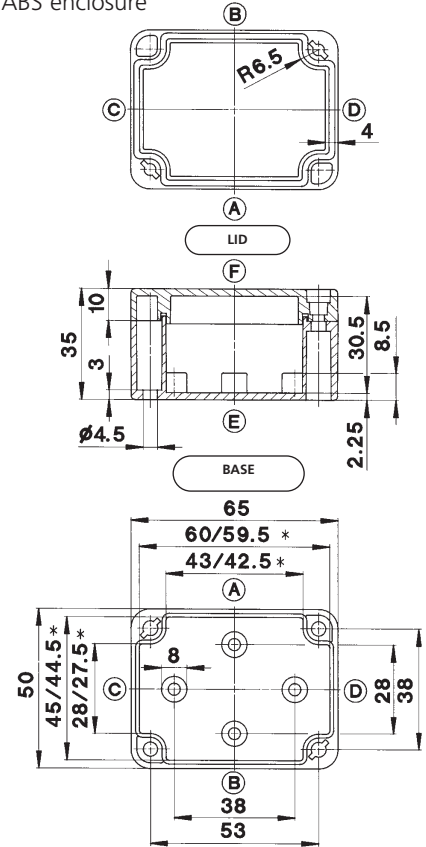
## 52 x 50 x 35 mm

CT-501  
Polycarbonate enclosure  
CT-502  
ABS enclosure



## 65 x 50 x 35 mm

CT-521  
Polycarbonate enclosure  
CT-522  
ABS enclosure



\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

Type	
Weight (g)	
External dimensions (mm)	
<b>Complete enclosures</b>	
PC, with gasket and quick release	
PC, with gasket and screw release	
PC, with gasket, transparent lid (PC) and quick release	
PC, with gasket, transparent lid (PC) and screw release	
ABS, with gasket and quick release	
ABS, with gasket and screw release	
ABS, with gasket, transparent lid (PC) and quick release	
ABS, with gasket, transparent lid (PC) and screw release	
<b>Accessories (separate or as a mounting set)</b>	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail (attachment on central C/D cams)	
External attachment brackets	
External hinges**	
Internal hinges, flexible, for quick-release enclosures	
Silicone gasket for wider temperature range (piece goods)	
Mounting bushes with metr. M 3 x 8 screws (4 pcs.)	

### Max. Pg threads

CT-501	CT-502
40	38
External dimensions	52 x 50 x 35
<b>Part number</b>	
250.0.0000.00 ●	
250.0.0010.00	
250.1.0000.00 ●	
250.1.0010.00	
	350.0.0000.00 ●
	350.0.0010.00
	350.1.0000.00 ●
	350.1.0010.00
951.2.0090.00 ●	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	

ISO M	12	16	20	25	32	40	50	63
Side A/B	1	0	0	0	0	0	0	0
Side C/D	1	0	0	0	0	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

CT-521	CT-522
50	47
External dimensions	65 x 50 x 35
<b>Part number</b>	
252.0.0000.00 ●	
252.0.0010.00	
252.1.0000.00 ●	
252.1.0010.00	
	352.0.0000.00 ●
	352.0.0010.00
	352.1.0000.00 ●
	352.1.0010.00
951.2.0100.00 ●	
982.0.0010.00 ●	
-	
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-	
-	
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-	
-	
980.0.0250.00 ●	

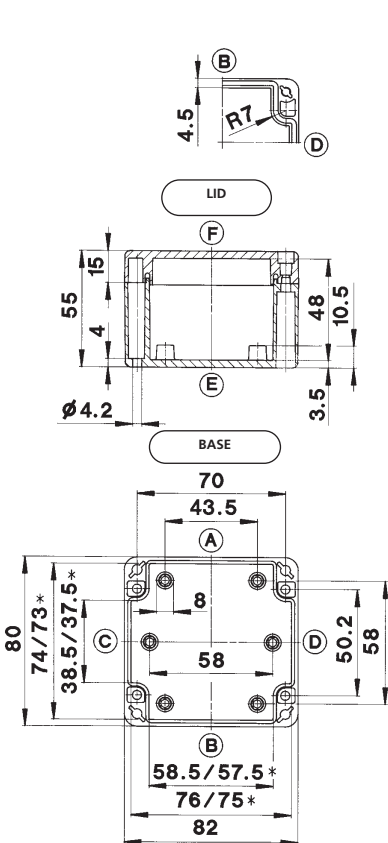
ISO M	12	16	20	25	32	40	50	63
Side A/B	2	0	0	0	0	0	0	0
Side C/D	0	0	0	0	0	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

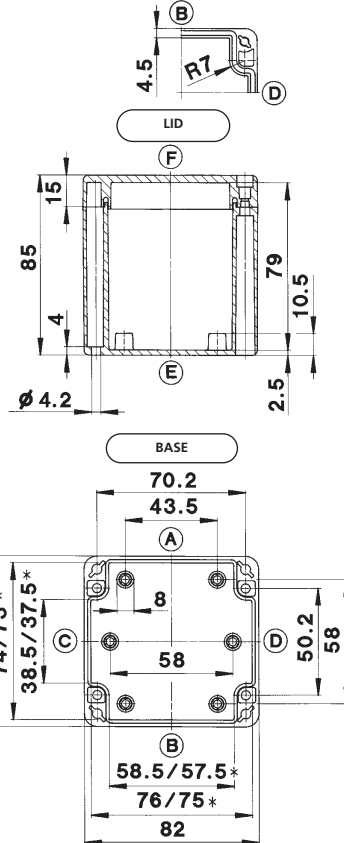
## 82 x 80 x 55 mm

CT-541  
Polycarbonate enclosure  
CT-542  
ABS enclosure



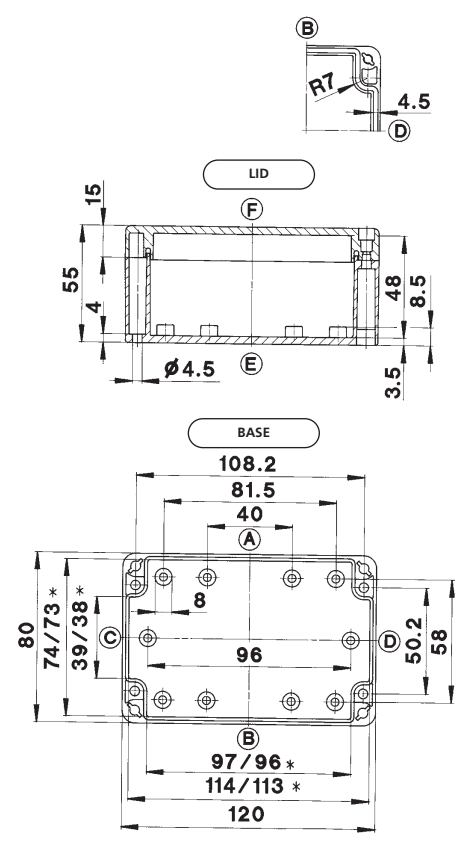
## 82 x 80 x 85 mm

CT-561  
Polycarbonate enclosure  
CT-562  
ABS enclosure



## 120 x 80 x 55 mm

CT-581  
Polycarbonate enclosure  
CT-582  
ABS enclosure



\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

CT-541	CT-542
140	116
82 x 80 x 55	
<b>Part number</b>	
254.0.0000.00 ●	
254.0.0010.00	
254.1.0000.00 ●	
254.1.0010.00	
	354.0.0000.00 ●
	354.0.0010.00
	354.1.0000.00 ●
	354.1.0010.00

CT-561	CT-562
175	150
82 x 80 x 85	
<b>Part number</b>	
256.0.0000.00 ●	
256.0.0010.00	
256.1.0000.00 ●	
256.1.0010.00	
	356.0.0000.00 ●
	356.0.0010.00
	356.1.0000.00 ●
	356.1.0010.00

CT-581	CT-582
180	135
120 x 80 x 55	
<b>Part number</b>	
258.0.0000.00 ●	
258.0.0010.00	
258.1.0000.00 ●	
258.1.0010.00	
	358.0.0000.00 ●
	358.0.0010.00
	358.1.0000.00 ●
	358.1.0010.00

951.2.0110.00 ●
982.0.0040.00 ●
-
982.2.0000.00 ●
-
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0760.00 ●
923.1.0050.00 ●
980.0.0250.00 ●

951.2.0110.00 ●
982.0.0040.00 ●
-
982.2.0000.00 ●
-
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0760.00 ●
923.1.0050.00 ●
980.0.0250.00 ●

951.2.0120.00 ●
982.0.0090.00 ●
-
982.2.0020.00 ●
981.0.0010.00
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0760.00 ●
923.1.0050.00 ●
980.0.0400.00 ●

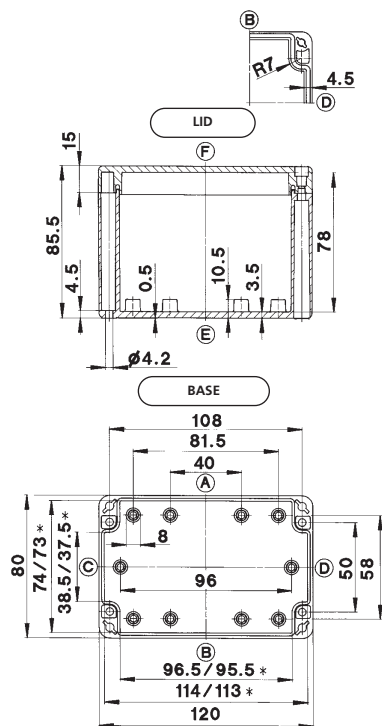
ISO M	12	16	20	25	32	40	50	63
Side A/B	5	2	2	0	0	0	0	0
Side C/D	2	1	0	0	0	0	0	0
** mechanical enclosure machining required								
● = kept in stock								

ISO M	12	16	20	25	32	40	50	63
Side A/B	10	5	3	2	1	1	1	0
Side C/D	5	2	1	1	1	0	0	0
** mechanical enclosure machining required								
● = kept in stock								

ISO M	12	16	20	25	32	40	50	63
Side A/B	9	4	3	2	0	0	0	0
Side C/D	2	1	1	0	0	0	0	0
** mechanical enclosure machining required								
● = kept in stock								

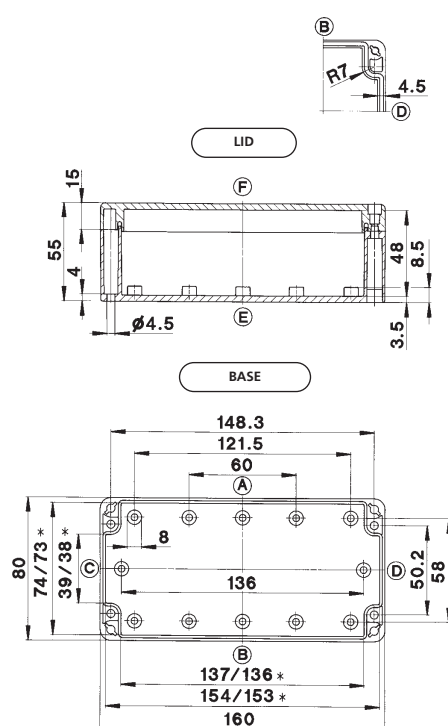
## 120 x 80 x 85 mm

CT-601  
Polycarbonate enclosure  
CT-602  
ABS enclosure



## 160 x 80 x 55 mm

CT-621  
Polycarbonate enclosure  
CT-622  
ABS enclosure



\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

Type	
Weight (g)	
External dimensions (mm)	
<b>Complete enclosures</b>	
PC, with gasket and quick release	
PC, with gasket and screw release	
PC, with gasket, transparent lid (PC) and quick release	
PC, with gasket, transparent lid (PC) and screw release	
ABS, with gasket and quick release	
ABS, with gasket and screw release	
ABS, with gasket, transparent lid (PC) and quick release	
ABS, with gasket, transparent lid (PC) and screw release	
<b>Accessories (separate or as a mounting set)</b>	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail (attachment on central C/D cams)	
External attachment brackets	
External hinges**	
Internal hinges, flexible, for quick-release enclosures	
Silicone gasket for wider temperature range (piece goods)	
Mounting bushes with metr. M 3 x 8 screws (4 pcs.)	

### Max. Pg threads

CT-601	CT-602
225	192
120 x 80 x 85	
<b>Part number</b>	
260.0.0000.00 ●	
260.0.0010.00	
260.1.0000.00 ●	
260.1.0010.00	
	360.0.0000.00 ●
	360.0.0010.00
	360.1.0000.00 ●
	360.1.0010.00
951.2.0120.00 ●	
982.0.0090.00 ●	
–	
982.2.0020.00 ●	
981.0.0010.00	
980.2.0020.00 ●	
980.2.0250.00 ●	
980.1.0760.00 ●	
923.1.0050.00 ●	
980.0.0250.00 ●	

ISO M	12	16	20	25	32	40	50	63
Side A/B	15	6	6	3	2	1	1	0
Side C/D	5	2	1	1	1	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

CT-621	CT-622
225	199
160 x 80 x 55	
<b>Part number</b>	
262.0.0000.00 ●	
262.0.0010.00	
262.1.0000.00 ●	
262.1.0010.00	
	362.0.0000.00 ●
	362.0.0010.00
	362.1.0000.00 ●
	362.1.0010.00
951.2.0130.00 ●	
982.0.0130.00 ●	
–	
982.2.0280.00 ●	
981.0.0050.00	
980.2.0020.00 ●	
980.2.0250.00 ●	
980.1.0760.00 ●	
923.1.0050.00 ●	
980.0.0400.00 ●	

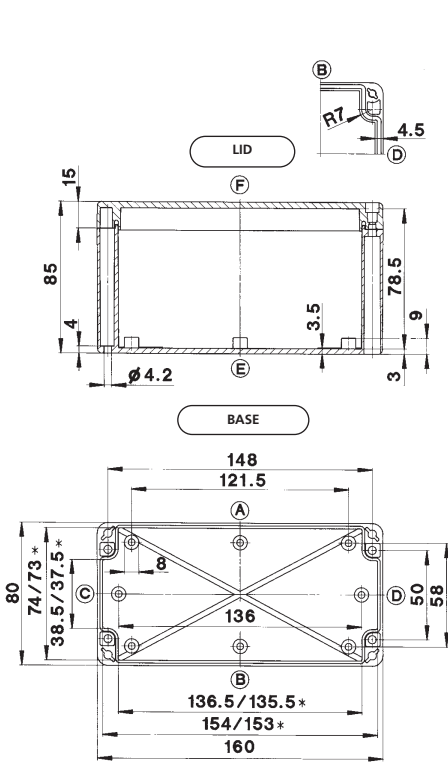
ISO M	12	16	20	25	32	40	50	63
Side A/B	11	5	4	3	0	0	0	0
Side C/D	2	1	1	0	0	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

## 160 x 80 x 85 mm

CT-641  
Polycarbonate enclosure  
CT-642  
ABS enclosure



\* minimum dimensions at level of mounting plate support

CT-641	CT-642
240	225
160 x 80 x 85	
Part number	
264.0.0000.00 ●	
264.0.0010.00	
264.1.0000.00 ●	
264.1.0010.00	
	364.0.0000.00 ●
	364.0.0010.00
	364.1.0000.00 ●
	364.1.0010.00

951.2.0130.00 ●
982.0.0130.00 ●
-
982.2.0280.00 ●
981.0.0050.00
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0760.00 ●
923.1.0050.00 ●
980.0.0250.00 ●

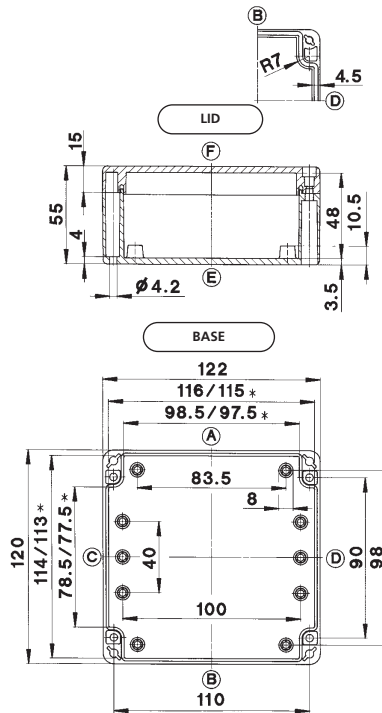
ISO M	12	16	20	25	32	40	50	63
Side A/B	22	10	8	5	3	2	2	0
Side C/D	5	2	1	1	1	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

## 122 x 120 x 55 mm

CT-661  
Polycarbonate enclosure  
CT-662  
ABS enclosure



\* minimum dimensions at level of mounting plate support

CT-661	CT-662
240	218
122 x 120 x 55	
Part number	
266.0.0000.00 ●	
266.0.0010.00	
266.1.0000.00 ●	
266.1.0010.00	
	366.0.0000.00 ●
	366.0.0010.00
	366.1.0000.00 ●
	366.1.0010.00

951.2.0140.00 ●
982.0.0080.00 ●
-
982.2.0020.00 ●
981.0.0030.00
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0760.00 ●
923.1.0050.00 ●
980.0.0250.00 ●

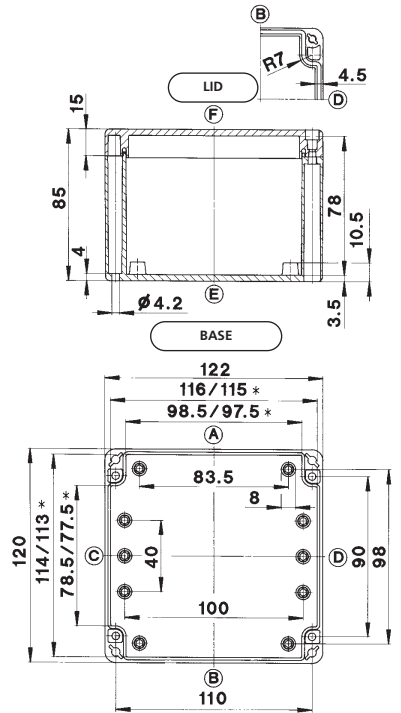
ISO M	12	16	20	25	32	40	50	63
Side A/B	9	4	3	2	0	0	0	0
Side C/D	4	3	2	0	0	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

## 122 x 120 x 85 mm

CT-681  
Polycarbonate enclosure  
CT-682  
ABS enclosure



\* minimum dimensions at level of mounting plate support

CT-681	CT-682
295	269
122 x 120 x 85	
Part number	
268.0.0000.00 ●	
268.0.0010.00	
268.1.0000.00 ●	
268.1.0010.00	
	368.0.0000.00 ●
	368.0.0010.00
	368.1.0000.00 ●
	368.1.0010.00

951.2.0140.00 ●
-
982.1.0010.00 ●
982.2.0020.00 ●
981.0.0030.00
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0760.00 ●
923.1.0050.00 ●
980.0.0250.00 ●

ISO M	12	16	20	25	32	40	50	63
Side A/B	15	6	6	3	20	1	1	0
Side C/D	10	3	3	2	1	0	0	0

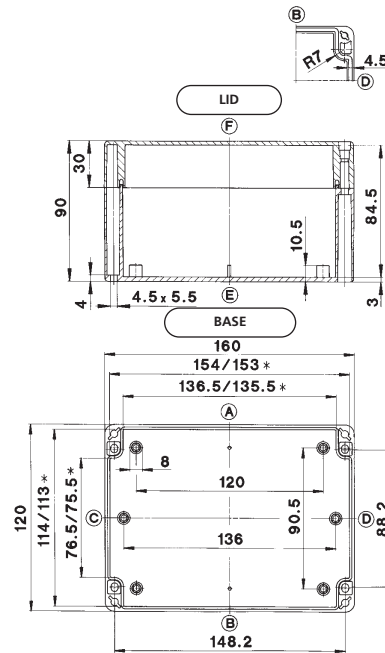
\*\* mechanical enclosure machining required

● = kept in stock



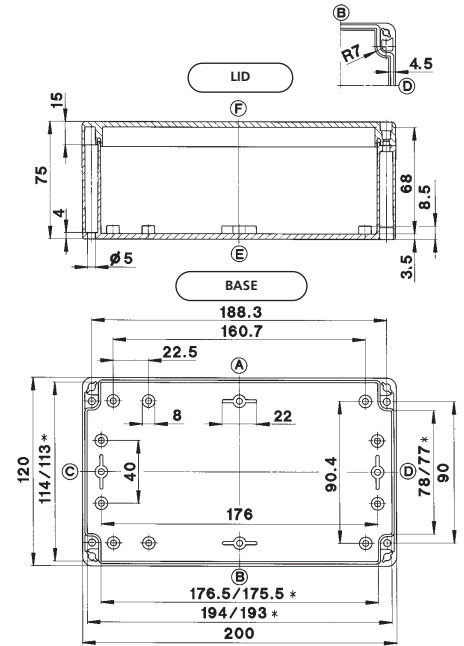
## 160 x 120 x 90 mm

CT-721  
Polycarbonate enclosure  
CT-722  
ABS enclosure



## 200 x 120 x 75 mm

CT-761  
Polycarbonate enclosure  
CT-762  
ABS enclosure



\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

Type	
Weight (g)	
External dimensions (mm)	
<b>Complete enclosures</b>	
PC, with gasket and quick release	
PC, with gasket and screw release	
PC, with gasket, transparent lid (PC) and quick release	
PC, with gasket, transparent lid (PC) and screw release	
ABS, with gasket and quick release	
ABS, with gasket and screw release	
ABS, with gasket, transparent lid (PC) and quick release	
ABS, with gasket, transparent lid (PC) and screw release	
<b>Accessories (separate or as a mounting set)</b>	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail (attachment on central C/D cams)	
External attachment brackets	
External hinges**	
Internal hinges, flexible, for quick-release enclosures	
Silicone gasket for wider temperature range (piece goods)	
Mounting bushes with metr. M 3 x 8 screws (4 pcs.)	

### Max. Pg threads

	CT-721	CT-722
Weight (g)	360	310
External dimensions (mm)	160 x 120 x 90	
<b>Part number</b>		
PC, with gasket and quick release	<b>272.0.0000.00 ●</b>	
PC, with gasket and screw release	<b>272.0.0010.00</b>	
PC, with gasket, transparent lid (PC) and quick release	<b>272.1.0000.00 ●</b>	
PC, with gasket, transparent lid (PC) and screw release	<b>272.1.0010.00</b>	
ABS, with gasket and quick release		<b>372.0.0000.00 ●</b>
ABS, with gasket and screw release		<b>372.0.0010.00</b>
ABS, with gasket, transparent lid (PC) and quick release		<b>372.1.0000.00 ●</b>
ABS, with gasket, transparent lid (PC) and screw release		<b>372.1.0010.00</b>
Mounting plate	<b>951.2.0360.00 ●</b>	
TS 15 mounting rail	-	
TS 32 mounting rail	<b>982.1.0250.00 ●</b>	
TS 35 mounting rail	<b>982.2.0280.00 ●</b>	
Grounding rail (attachment on central C/D cams)	<b>981.0.0400.00</b>	
External attachment brackets	<b>980.2.0020.00 ●</b>	
External hinges**	<b>980.2.0250.00 ●</b>	
Internal hinges, flexible, for quick-release enclosures	<b>980.1.0790.00 ●</b>	
Silicone gasket for wider temperature range (piece goods)	<b>923.1.0050.00 ●</b>	
Mounting bushes with metr. M 3 x 8 screws (4 pcs.)	<b>980.0.0250.00 ●</b>	

ISO M	12	16	20	25	32	40	50	63
Side A/B	18	10	7	3	3	0	0	0
Side C/D	9	5	2	2	1	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

	CT-761	CT-762
Weight (g)	400	373
External dimensions (mm)	200 x 120 x 75	
<b>Part number</b>		
PC, with gasket and quick release	<b>276.0.0000.00 ●</b>	
PC, with gasket and screw release	<b>276.0.0010.00</b>	
PC, with gasket, transparent lid (PC) and quick release	<b>276.1.0000.00 ●</b>	
PC, with gasket, transparent lid (PC) and screw release	<b>276.1.0010.00</b>	
ABS, with gasket and quick release		<b>376.0.0000.00 ●</b>
ABS, with gasket and screw release		<b>376.0.0010.00</b>
ABS, with gasket, transparent lid (PC) and quick release		<b>376.1.0000.00 ●</b>
ABS, with gasket, transparent lid (PC) and screw release		<b>376.1.0010.00</b>
Mounting plate	<b>951.2.0150.00 ●</b>	
TS 15 mounting rail	-	
TS 32 mounting rail	<b>982.1.0040.00 ●</b>	
TS 35 mounting rail	<b>982.2.0060.00 ●</b>	
Grounding rail (attachment on central C/D cams)	<b>981.0.0060.00</b>	
External attachment brackets	<b>980.2.0020.00 ●</b>	
External hinges**	<b>980.2.0250.00 ●</b>	
Internal hinges, flexible, for quick-release enclosures	<b>980.1.0760.00 ●</b>	
Silicone gasket for wider temperature range (piece goods)	<b>923.1.0050.00 ●</b>	
Mounting bushes with metr. M 3 x 8 screws (4 pcs.)	<b>980.0.0400.00 ●</b>	

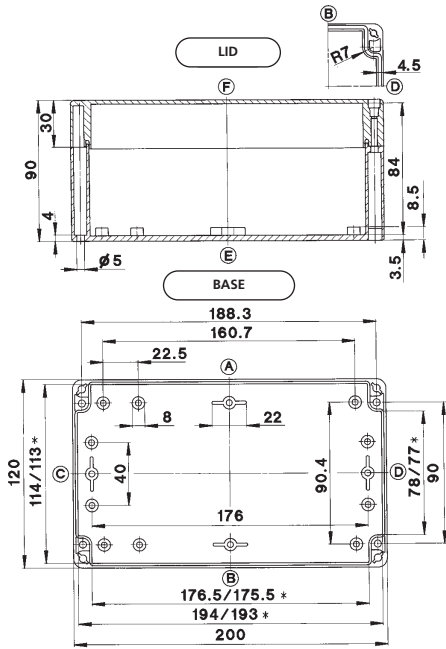
ISO M	12	16	20	25	32	40	50	63
Side A/B	26	12	8	5	3	0	0	0
Side C/D	10	5	2	2	1	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

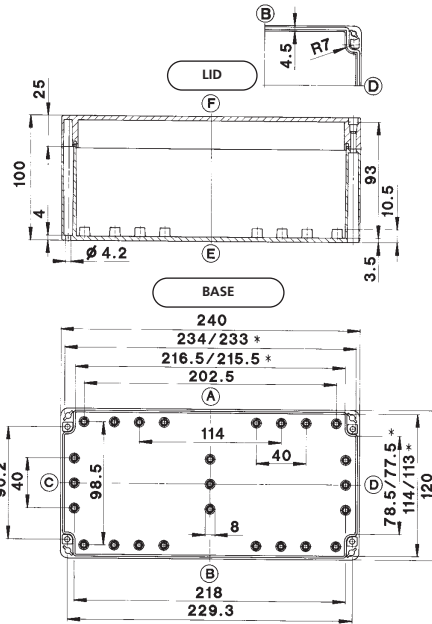
## 200 x 120 x 90 mm

CT-781  
Polycarbonate enclosure  
CT-782  
ABS enclosure



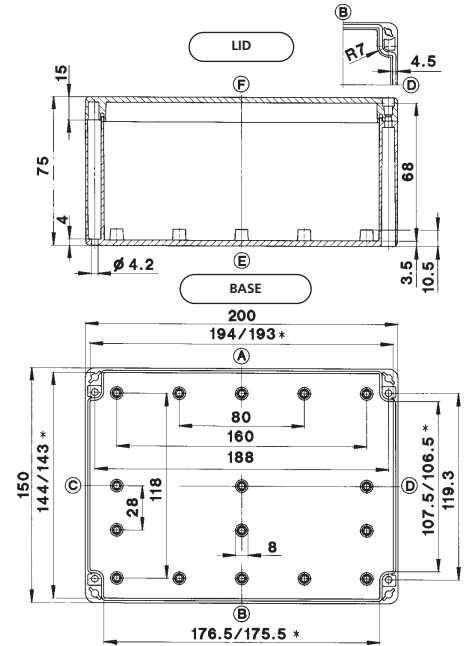
## 240 x 120 x 100 mm

CT-801  
Polycarbonate enclosure  
CT-802  
ABS enclosure



## 200 x 150 x 75 mm

CT-821  
Polycarbonate enclosure  
CT-822  
ABS enclosure



\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

CT-781	CT-782
420	365
200 x 120 x 90	
Part number	
278.0.0000.00 ●	
278.0.0010.00	
278.1.0000.00 ●	
278.1.0010.00	
	378.0.0000.00 ●
	378.0.0010.00
	378.1.0000.00 ●
	378.1.0010.00

CT-801	CT-802
540	478
240 x 120 x 100	
Part number	
280.0.0000.00 ●	
280.0.0010.00	
280.1.0000.00 ●	
280.1.0010.00	
	380.0.0000.00 ●
	380.0.0010.00
	380.1.0000.00 ●
	380.1.0010.00

CT-821	CT-822
475	425
200 x 150 x 75	
Part number	
282.0.0000.00 ●	
282.0.0010.00	
282.1.0000.00 ●	
282.1.0010.00	
	382.0.0000.00 ●
	382.0.0010.00
	382.1.0000.00 ●
	382.1.0010.00

951.2.0150.00 ●
-
982.1.0040.00 ●
982.2.0060.00 ●
981.0.0060.00
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0790.00 ●
923.1.0050.00 ●
980.0.0400.00 ●

951.2.0160.00 ●
-
982.1.0060.00 ●
982.2.0080.00 ●
981.0.0090.00
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0780.00 ●
923.1.0050.00 ●
980.0.0250.00 ●

951.2.0170.00 ●
-
982.1.0170.00 ●
982.2.0200.00 ●
981.0.0060.00
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0760.00 ●
923.1.0050.00 ●
980.0.0250.00 ●

ISO M	12	16	20	25	32	40	50	63
Side A/B	26	12	8	5	3	0	0	0
Side C/D	10	5	2	2	1	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

ISO M	12	16	20	25	32	40	50	63
Side A/B	34	17	12	6	5	3	3	2
Side C/D	10	6	3	2	1	1	0	0

\*\* mechanical enclosure machining required

● = kept in stock

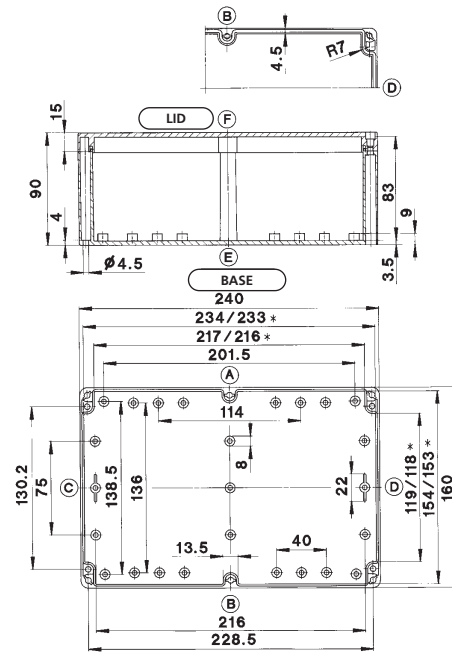
ISO M	12	16	20	25	32	40	50	63
Side A/B	22	12	9	5	3	0	0	0
Side C/D	12	6	3	2	2	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

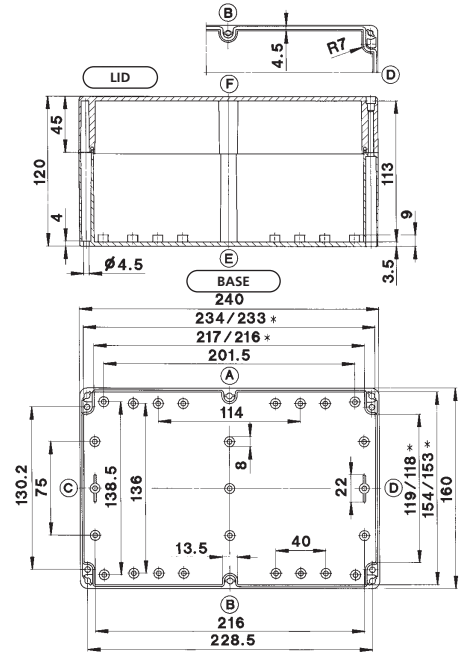
## 240 x 160 x 90 mm

CT-841  
Polycarbonate enclosure  
CT-842  
ABS enclosure



## 240 x 160 x 120 mm

CT-861  
Polycarbonate enclosure  
CT-862  
ABS enclosure



\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

Type	
Weight	(g)
External dimensions	(mm)
<b>Complete enclosures</b>	
PC, with gasket and quick release	
PC, with gasket and screw release	
PC, with gasket, transparent lid (PC) and quick release	
PC, with gasket, transparent lid (PC) and screw release	
ABS, with gasket and quick release	
ABS, with gasket and screw release	
ABS, with gasket, transparent lid (PC) and quick release	
ABS, with gasket, transparent lid (PC) and screw release	
<b>Accessories (separate or as a mounting set)</b>	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail (attachment on central C/D cams)	
External attachment brackets	
External hinges**	
Internal hinges, flexible, for quick-release enclosures	
Silicone gasket for wider temperature range (piece goods)	
Mounting bushes with metr. M 3 x 8 screws (4 pcs.)	

### Max. Pg threads

CT-841	CT-842
650	528
240 x 160 x 90	
<b>Part number</b>	
284.0.0000.00 ●	
284.0.0010.00	
284.1.0000.00 ●	
284.1.0010.00	
	384.0.0000.00 ●
	384.0.0010.00
	384.1.0000.00 ●
	384.1.0010.00
951.2.0180.00 ●	
-	
982.1.0060.00 ●	
982.2.0080.00 ●	
981.0.0090.00	
980.2.0020.00 ●	
980.2.0250.00 ●	
980.1.0760.00 ●	
923.1.0050.00 ●	
980.0.0400.00 ●	

ISO M	12	16	20	25	32	40	50	63
Side A/B	36	16	12	8	4	2	2	2
Side C/D	17	8	5	3	2	2	1	0

\*\* mechanical enclosure machining required

● = kept in stock

CT-861	CT-862
785	636
240 x 160 x 120	
<b>Part number</b>	
286.0.0000.00 ●	
286.0.0010.00	
286.1.0000.00 ●	
286.1.0010.00	
	386.0.0000.00 ●
	386.0.0010.00
	386.1.0000.00 ●
	386.1.0010.00
951.2.0180.00 ●	
-	
982.1.0060.00 ●	
982.2.0080.00 ●	
981.0.0090.00	
980.2.0020.00 ●	
980.2.0250.00 ●	
980.1.0800.00 ●	
923.1.0050.00 ●	
980.0.0400.00 ●	

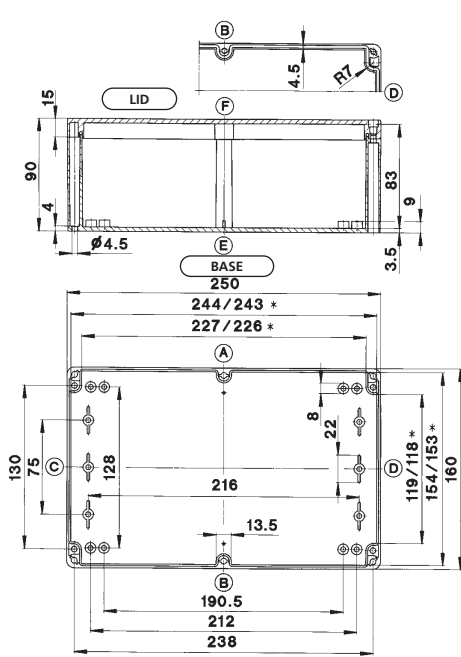
ISO M	12	16	20	25	32	40	50	63
Side A/B	36	16	12	8	4	2	2	2
Side C/D	17	8	5	3	2	2	1	0

\*\* mechanical enclosure machining required

● = kept in stock

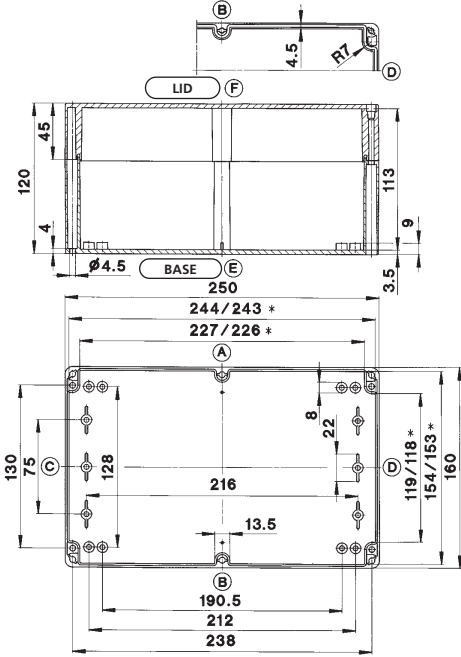
## 250 x 160 x 90 mm

CT-901  
Polycarbonate enclosure  
CT-902  
ABS enclosure



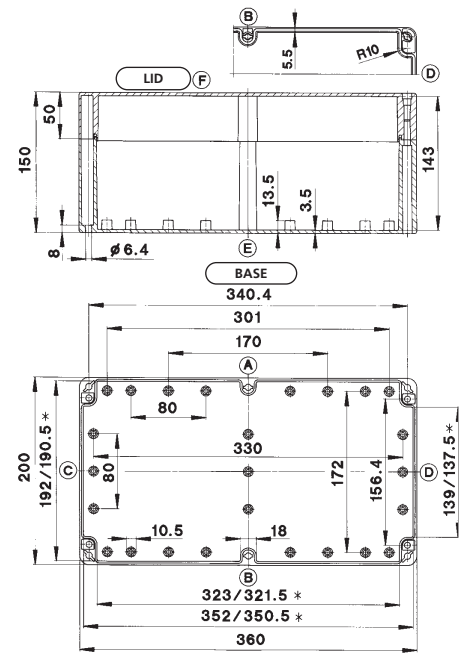
## 250 x 160 x 120 mm

CT-911  
Polycarbonate enclosure  
CT-912  
ABS enclosure



## 360 x 200 x 150 mm

CT-881  
Polycarbonate enclosure  
CT-882  
ABS enclosure



\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

CT-901	CT-902
680	550
250 x 160 x 90	
<b>Part number</b>	
290.0.0000.00 ●	
290.0.0010.00	
290.1.0000.00 ●	
290.1.0010.00	
	390.0.0000.00 ●
	390.0.0010.00
	390.1.0000.00 ●
	390.1.0010.00

CT-911	CT-912
830	660
250 x 160 x 120	
<b>Part number</b>	
291.0.0000.00 ●	
291.0.0010.00	
291.1.0000.00 ●	
291.1.0010.00	
	391.0.0000.00 ●
	391.0.0010.00
	391.1.0000.00 ●
	391.1.0010.00

CT-881	CT-882
1550	1375
360 x 200 x 150	
<b>Part number</b>	
288.0.0000.00 ●	
288.0.0010.00	
288.1.0000.00 ●	
288.1.0010.00	
	388.0.0000.00 ●
	388.0.0010.00
	388.1.0000.00 ●
	388.1.0010.00

951.2.1870.00 ●
-
982.1.0060.00 ●
982.2.0080.00 ●
981.0.0090.00
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0760.00 ●
923.1.0050.00 ●
980.0.0400.00 ●

951.2.1870.00 ●
-
982.1.0060.00 ●
982.2.0080.00 ●
981.0.0090.00
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0800.00 ●
923.1.0050.00 ●
980.0.0400.00 ●

951.2.0200.00 ●
-
982.1.0130.00
982.2.0160.00
981.0.0340.00
-
980.2.0260.00 ●
-
923.1.0060.00 ●
980.0.0260.00 ● (M 4 x 8)

ISO M	12	16	20	25	32	40	50	63
Side A/B	38	16	12	8	4	2	2	2
Side C/D	17	8	5	3	2	2	1	0

\*\* mechanical enclosure machining required

● = kept in stock

ISO M	12	16	20	25	32	40	50	63
Side A/B	38	16	12	8	4	2	2	2
Side C/D	17	8	5	3	2	2	1	0

\*\* mechanical enclosure machining required

● = kept in stock

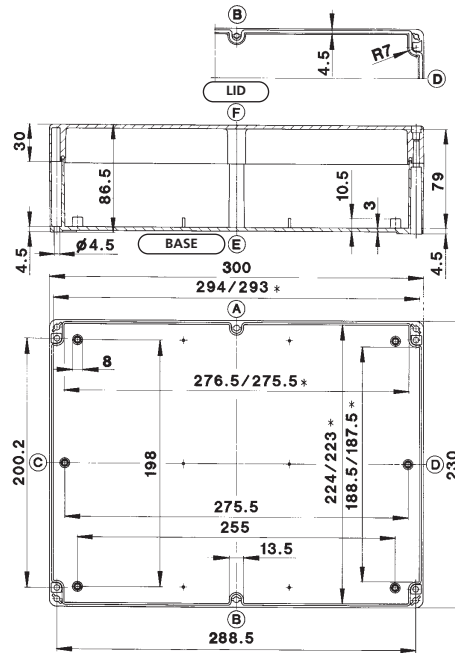
ISO M	12	16	20	25	32	40	50	63
Side A/B	70	32	24	16	10	6	4	4
Side C/D	26	11	8	5	3	2	2	1

\*\* mechanical enclosure machining required

● = kept in stock

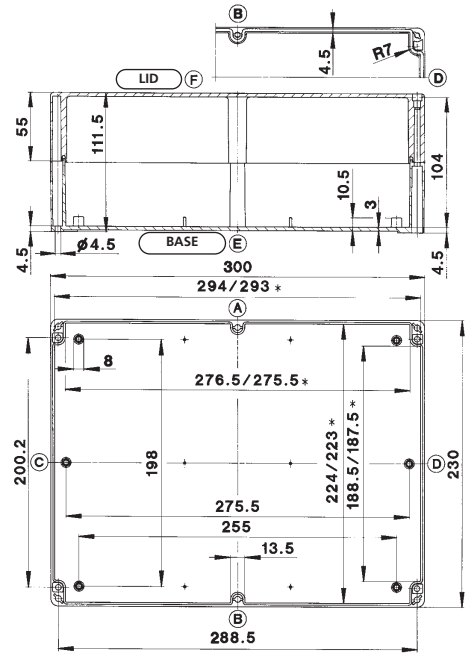
## 300 x 230 x 86 mm

CT-871  
Polycarbonate enclosure  
CT-872  
ABS enclosure



## 300 x 230 x 111 mm

CT-891  
Polycarbonate enclosure  
CT-892  
ABS enclosure



\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

Type	
Weight (g)	
External dimensions (mm)	
<b>Complete enclosures</b>	
PC, with gasket and quick release	
PC, with gasket and screw release	
PC, with gasket, transparent lid (PC) and quick release	
PC, with gasket, transparent lid (PC) and screw release	
ABS, with gasket and quick release	
ABS, with gasket and screw release	
ABS, with gasket, transparent lid (PC) and quick release	
ABS, with gasket, transparent lid (PC) and screw release	
<b>Accessories (separate or as a mounting set)</b>	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail (attachment on central C/D cams)	
External attachment brackets	
External hinges**	
Internal hinges, flexible, for quick-release enclosures	
Silicone gasket for wider temperature range (piece goods)	
Mounting bushes with metr. M 3 x 8 screws (4 pcs.)	

### Max. Pg threads

CT-871	CT-872
915	850
300 x 230 x 86	
<b>Part number</b>	
287.0.0000.00 ●	
287.0.0010.00	
287.1.0000.00 ●	
287.1.0010.00	
	387.0.0000.00 ●
	387.0.0010.00
	387.1.0000.00 ●
	387.1.0010.00
951.2.0190.00 ●	
-	
982.1.0100.00 ●	
982.2.0130.00 ●	
981.0.0120.00	
980.2.0020.00 ●	
980.2.0250.00 ●	
980.1.0790.00 ●	
-	
980.0.0250.00 ●	

ISO M	12	16	20	25	32	40	50	63
Side A/B	34	14	10	6	4	0	0	0
Side C/D	21	13	5	4	2	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

CT-891	CT-892
1155	1000
300 x 230 x 110	
<b>Part number</b>	
289.0.0000.00 ●	
289.0.0010.00	
289.1.0000.00 ●	
289.1.0010.00	
	389.0.0000.00 ●
	389.0.0010.00
	389.1.0000.00 ●
	389.1.0010.00
951.2.0190.00 ●	
-	
982.1.0100.00 ●	
982.2.0130.00 ●	
981.0.0120.00	
980.2.0020.00 ●	
980.2.0250.00 ●	
980.1.0820.00 ●	
-	
980.0.0250.00 ●	

ISO M	12	16	20	25	32	40	50	63
Side A/B	34	14	10	6	4	0	0	0
Side C/D	21	13	5	4	2	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock



## CT-Module Plastic Enclosures

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### Universal applications

- Adaptable before, during and after installation
- Variety of options
- No machining required
- Reduced stock holding



Knock-outs CT-S



Flange CT-C



Quick release latch CT-W

## CT-Module

### Application areas and features

Technical features of PC and ABS					
	Standard	Unit	PC	PC + fibre glass	ABS
<b>Mechanical properties</b>					
Impact strength +23°C	ISO 179-1eU	kJ/m <sup>2</sup>	good	good	good
–30°C	ISO 179-1eU	kJ/m <sup>2</sup>	good	good	–
Elastic Modulus	ISO 527	Mpa	2400	4000	2100
<b>Temperature properties</b>					
Vicat softening point B50	ISO 306	°C	145	144	94
Longterm use, heat	UL 7468	°C	125	120	60
Longterm use, cold		°C	–50	–50	–40
Flammability	UL 94	class	V-2	V-0	HB
<b>Electrical properties</b>					
Disruptive strength	EC 243-1	kV/mm	30	30	32
Creeping current limit	IEC 112	V	275	175	525
<b>Physical properties</b>					
Moisture absorption	ISO 62	%	0.15	0.13	
Density	ISO 1183	g/cm <sup>3</sup>	1.20	1.25	1.04



Extension frame

CT-Module Plastic enclosures are manufactured from high-quality polycarbonate or ABS. They are particularly suitable for housing electrical and electronic components as well as small control devices. All enclosures are offered with a transparent polycarbonate. The enclosures protection class IP 66/67. Standard colour is RAL 7035.

#### Gasket material: Polyurethane (PUR)

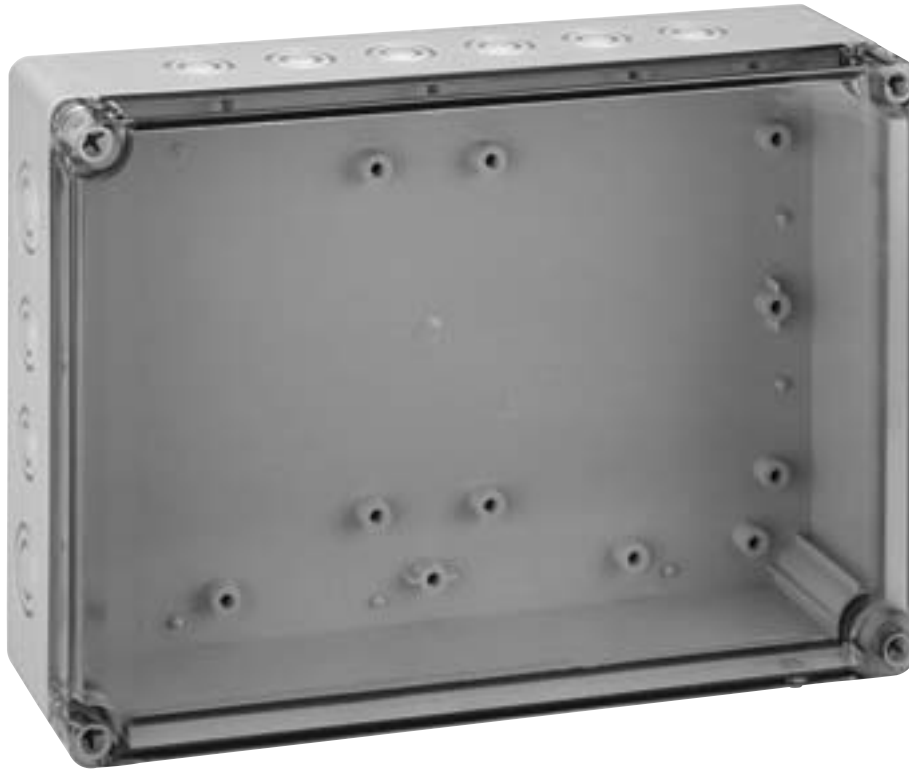
Technical properties of PUR		
	Unit	PUR
Temperature	°C	–50 – +130
Tensile strength	Mpa	0.4
Elongation at break	%	110
Hardness	Shore A	6
Specific weight	g/cm <sup>3</sup>	0.4
Permanent compression	%	5



## CT-Module Plastic Enclosures

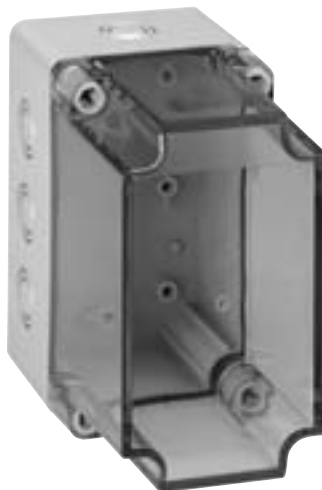
Type: CT-S

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### Features

- 17 sizes in ABS or polycarbonate
- Grey or transparent polycarbonate lid
- Captive lid screws (with wire seal option)
- Foam (PUR) gasket, IP 66/67
- Metric or PG 'knock-outs' option on polycarbonate bases
- Base depth 50 mm
- Lid depth 25, 50, 75 or 100 mm



# CT-Module Plastic Enclosures

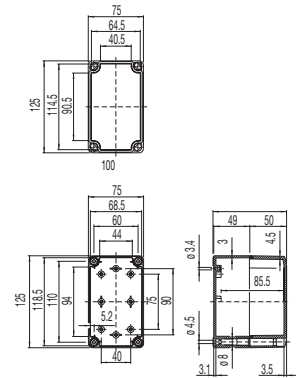
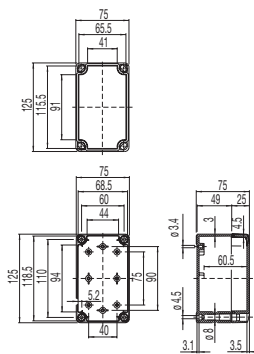
Type: CT-S

## 75 x 125 x 75 mm

CT-S 201 PC-Enclosure  
CT-S 301 ABS-Enclosure

## 75 x 125 x 100 mm

CT-S 202 PC-Enclosure  
CT-S 302 ABS-Enclosure



Type		CT-S 201	CT-S 301
Material		PC	ABS
Weight (g)		209	184
External dimensions (mm)		75 x 125 x 75	75 x 125 x 75
		<b>Part number</b>	<b>Part number</b>
Metric knock-outs (grey lid)		<b>212.0010.000</b>	
Metric knock-outs (transparent lid)		<b>212.1010.000</b>	
PG knock-outs (grey lid)		<b>213.0010.000</b>	
PG knock-outs (transparent lid)		<b>213.1010.000</b>	
Without knock-outs (grey lid)		<b>211.0010.000</b>	<b>311.0010.000</b>
Without knock-outs (transparent lid)		<b>211.1010.000</b>	<b>311.1010.000</b>

Accessories (also see P 359)			
Dim's (mm)	Material	CT-S 201	CT-S 301
48 x 98 x 1.5	St, Zn	<b>929.5001.000</b>	<b>929.5001.000</b>
35 x 50	St, Zn	<b>929.2001.000</b>	<b>929.2001.000</b>
35 x 100	St, Zn	<b>929.2002.000</b>	<b>929.2002.000</b>
	PA	<b>929.3001.000</b>	<b>929.3001.000</b>
	PC	<b>929.3002.000</b>	<b>929.3002.000</b>
35	PA	<b>929.3011.000</b>	<b>929.3011.000</b>
4 x 8	St, Zn	<b>929.3005.000</b>	<b>929.3005.000</b>
M2	Ms	<b>929.3004.000</b>	<b>929.3004.000</b>

Knock-outs (only PC-Enclosures)	
Metric	1 x M16/25 + 3 x M12/20
PG	8 x PG 9/13.5

Type		CT-S 202	CT-S 302
Material		PC	ABS
Weight (g)		274	243
External dimensions (mm)		75 x 125 x 100	75 x 125 x 100
		<b>Part number</b>	<b>Part number</b>
Metric knock-outs (grey lid)		<b>212.0020.000</b>	
Metric knock-outs (transparent lid)		<b>212.1020.000</b>	
PG knock-outs (grey lid)		<b>213.0020.000</b>	
PG knock-outs (transparent lid)		<b>213.1020.000</b>	
Without knock-outs (grey lid)		<b>211.0020.000</b>	<b>311.0020.000</b>
Without knock-outs (transparent lid)		<b>211.1020.000</b>	<b>311.1020.000</b>

Accessories (also see P 359)			
Dim's (mm)	Material	CT-S 202	CT-S 302
48 x 98 x 1.5	St, Zn	<b>929.5001.000</b>	<b>929.5001.000</b>
35 x 50	St, Zn	<b>929.2001.000</b>	<b>929.2001.000</b>
35 x 100	St, Zn	<b>929.2002.000</b>	<b>929.2002.000</b>
	PA	<b>929.3001.000</b>	<b>929.3001.000</b>
	PC	<b>929.3002.000</b>	<b>929.3002.000</b>
60	PA	<b>929.3012.000</b>	<b>929.3012.000</b>
4 x 8	St, Zn	<b>929.3005.000</b>	<b>929.3005.000</b>
M2	Ms	<b>929.3004.000</b>	<b>929.3004.000</b>

Knock-outs (only PC-Enclosures)	
Metric	1 x M16/25 + 3 x M12/20
PG	8 x PG 9/13.5

# CT-Module Plastic Enclosures

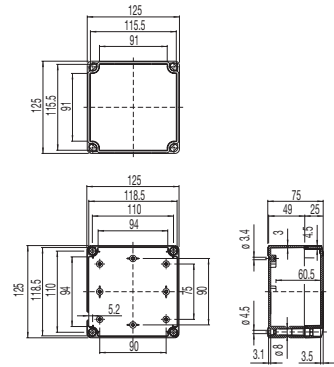
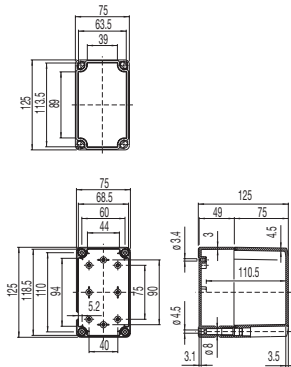
## Type: CT-S

### 75 x 125 x 125 mm

CT-S 203 PC-Enclosure  
CT-S 303 ABS-Enclosure

### 125 x 125 x 75 mm

CT-S 204 PC-Enclosure  
CT-S 304 ABS-Enclosure



Type	
Material	
Weight (g)	
External dimensions (mm)	
Metric knock-outs (grey lid)	
Metric knock-outs (transparent lid)	
PG knock-outs (grey lid)	
PG knock-outs (transparent lid)	
Without knock-outs (grey lid)	
Without knock-outs (transparent lid)	

	CT-S 203	CT-S 303
Material	PC	ABS
Weight (g)	300	266
External dimensions (mm)	75 x 125 x 125	75 x 125 x 125
<b>Part number</b>	<b>Part number</b>	
Metric knock-outs (grey lid)	<b>212.0030.000</b>	-
Metric knock-outs (transparent lid)	<b>212.1030.000</b>	-
PG knock-outs (grey lid)	<b>213.0030.000</b>	-
PG knock-outs (transparent lid)	<b>213.1030.000</b>	-
Without knock-outs (grey lid)	<b>211.0030.000</b>	<b>311.0030.000</b>
Without knock-outs (transparent lid)	<b>211.1030.000</b>	<b>311.1030.000</b>

	CT-S 204	CT-S 304
Material	PC	ABS
Weight (g)	283	250
External dimensions (mm)	125 x 125 x 75	125 x 125 x 75
<b>Part number</b>	<b>Part number</b>	
Metric knock-outs (grey lid)	<b>212.0040.000</b>	-
Metric knock-outs (transparent lid)	<b>212.1040.000</b>	-
PG knock-outs (grey lid)	<b>213.0040.000</b>	-
PG knock-outs (transparent lid)	<b>213.1040.000</b>	-
Without knock-outs (grey lid)	<b>211.0040.000</b>	<b>311.0040.000</b>
Without knock-outs (transparent lid)	<b>211.1040.000</b>	<b>311.1040.000</b>

Accessories (also see P 359)	
Mounting plate	
DIN rail	
DIN rail	
Hinges (pair)	
External mounting brackets	
Lid screws (Set of 4)	
Internal mounting screws	
Threaded inserts (Set of 4)	

Dim's (mm)	Material		
48 x 98 x 1.5	St, Zn	<b>929.5001.000</b>	<b>929.5001.000</b>
35 x 50	St, Zn	<b>929.2001.000</b>	<b>929.2001.000</b>
35 x 100	St, Zn	<b>929.2002.000</b>	<b>929.2002.000</b>
	PA	<b>929.3001.000</b>	<b>929.3001.000</b>
	PC	<b>929.3002.000</b>	<b>929.3002.000</b>
35	PA	<b>929.3011.000</b>	<b>929.3011.000</b>
4 x 8	St, Zn	<b>929.3005.000</b>	<b>929.3005.000</b>
M2	Ms	<b>929.3004.000</b>	<b>929.3004.000</b>

Dim's (mm)	Material		
98 x 98 x 1.5	St, Zn	<b>929.5002.000</b>	<b>929.5002.000</b>
35 x 100	St, Zn	<b>929.2002.000</b>	<b>929.2002.000</b>
	PA	<b>929.3001.000</b>	<b>929.3001.000</b>
	PC	<b>929.3002.000</b>	<b>929.3002.000</b>
60	PA	<b>929.3012.000</b>	<b>929.3012.000</b>
4 x 8	St, Zn	<b>929.3005.000</b>	<b>929.3005.000</b>
M2	Ms	<b>929.3004.000</b>	<b>929.3004.000</b>

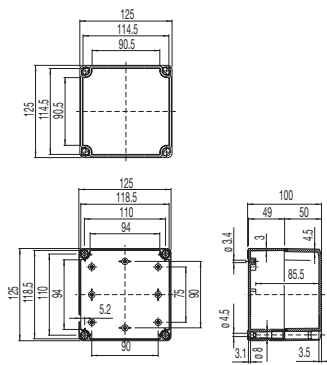
Knock-outs (only PC-Enclosures)	
Metric	
PG	

Metric	1 x M16/25 + 3 x M12/20
PG	8 x PG 9/13.5

Metric	2 x M16/25 + 3 x M12/20
PG	4 x PG 16/21 + 4 x PG 9/13.5

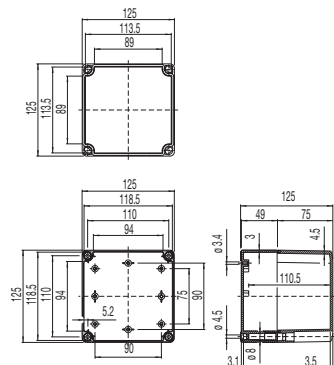
## 125 x 125 x 100 mm

CT-S 205 PC-Enclosure  
CT-S 305 ABS-Enclosure



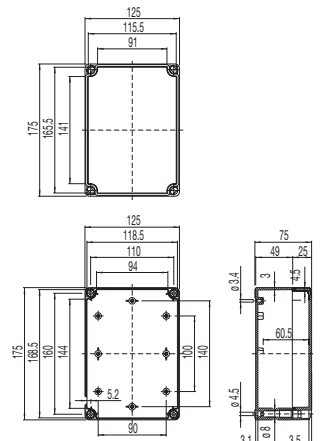
## 125 x 125 x 125 mm

CT-S 206 PC-Enclosure  
CT-S 306 ABS-Enclosure



## 125 x 175 x 75 mm

CT-S 207 PC-Enclosure  
CT-S 307 ABS-Enclosure



	CT-S 205	CT-S 305
	PC	ABS
	357	317
	125 x 125 x 100	125 x 125 x 100
	<b>Part number</b>	<b>Part number</b>
	<b>212.0050.000</b>	-
	<b>212.1050.000</b>	-
	<b>213.0050.000</b>	-
	<b>213.1050.000</b>	-
	<b>211.0050.000</b>	<b>311.0050.000</b>
	<b>211.1050.000</b>	<b>311.1050.000</b>

	CT-S 206	CT-S 306
	PC	ABS
	398	353
	125 x 125 x 125	125 x 125 x 125
	<b>Part number</b>	<b>Part number</b>
	<b>212.0060.000</b>	-
	<b>212.1060.000</b>	-
	<b>213.0060.000</b>	-
	<b>213.1060.000</b>	-
	<b>211.0060.000</b>	<b>311.0060.000</b>
	<b>211.1060.000</b>	<b>311.1060.000</b>

	CT-S 207	CT-S 307
	PC	ABS
	381	328
	125 x 175 x 75	125 x 175 x 75
	<b>Part number</b>	<b>Part number</b>
	<b>212.0070.000</b>	-
	<b>212.1070.000</b>	-
	<b>213.0070.000</b>	-
	<b>213.1070.000</b>	-
	<b>211.0070.000</b>	<b>311.0070.000</b>
	<b>211.1070.000</b>	<b>311.1070.000</b>

Dim's (mm)	Material		
98 x 98 x 1.5	St, Zn	<b>929.5002.000</b>	<b>929.5002.000</b>
35 x 100	St, Zn	<b>929.2002.000</b>	<b>929.2002.000</b>
	PA	<b>929.3001.000</b>	<b>929.3001.000</b>
	PC	<b>929.3002.000</b>	<b>929.3002.000</b>
60	PA	<b>929.3012.000</b>	<b>929.3012.000</b>
4 x 8	St, Zn	<b>929.3005.000</b>	<b>929.3005.000</b>
M2	Ms	<b>929.3004.000</b>	<b>929.3004.000</b>

Dim's (mm)	Material		
98 x 98 x 1.5	St, Zn	<b>929.5002.000</b>	<b>929.5002.000</b>
35 x 100	St, Zn	<b>929.2002.000</b>	<b>929.2002.000</b>
	PA	<b>929.3001.000</b>	<b>929.3001.000</b>
	PC	<b>929.3002.000</b>	<b>929.3002.000</b>
35	PA	<b>929.3011.000</b>	<b>929.3011.000</b>
4 x 8	St, Zn	<b>929.3005.000</b>	<b>929.3005.000</b>
M2	Ms	<b>929.3004.000</b>	<b>929.3004.000</b>

Dim's (mm)	Material		
98 x 148 x 1.5	St, Zn	<b>929.5003.000</b>	<b>929.5003.000</b>
35 x 150	St, Zn	<b>929.2004.000</b>	<b>929.2004.000</b>
35 x 100	St, Zn	<b>929.2002.000</b>	<b>929.2002.000</b>
	PA	<b>929.3001.000</b>	<b>929.3001.000</b>
	PC	<b>929.3002.000</b>	<b>929.3002.000</b>
35	PA	<b>929.3011.000</b>	<b>929.3011.000</b>
4 x 8	St, Zn	<b>929.3005.000</b>	<b>929.3005.000</b>
M2	Ms	<b>929.3004.000</b>	<b>929.3004.000</b>

2 x M16/25 + 3 x M12/20  
4 x PG 16/21 + 4 x PG 9/13.5

2 x M16/25 + 3 x M12/20  
4 x PG 16/21 + 4 x PG 9/13.5

2 x M16/25 + 4 x M12/20  
4 x PG 16/21 + 8 x PG 9/13.5

# CT-Module Plastic Enclosures

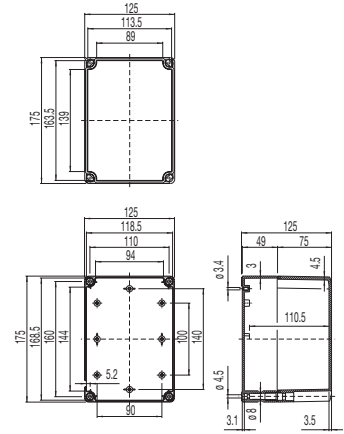
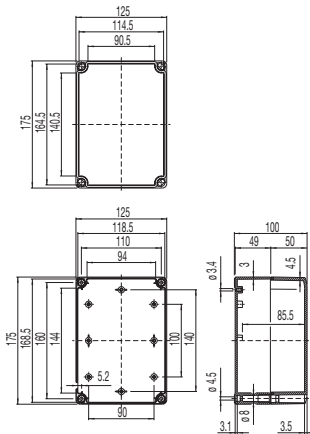
## Type: CT-S

### 125 x 175 x 100 mm

CT-S 208 PC-Enclosure  
CT-S 308 ABS-Enclosure

### 125 x 175 x 125 mm

CT-S 209 PC-Enclosure  
CT-S 309 ABS-Enclosure



Type	
Material	
Weight (g)	
External dimensions (mm)	
Metric knock-outs (grey lid)	
Metric knock-outs (transparent lid)	
PG knock-outs (grey lid)	
PG knock-outs (transparent lid)	
Without knock-outs (grey lid)	
Without knock-outs (transparent lid)	

	CT-S 208	CT-S 308
Material	PC	ABS
Weight (g)	465	401
External dimensions (mm)	125 x 175 x 100	125 x 175 x 100
<b>Part number</b>	<b>Part number</b>	
Metric knock-outs (grey lid)	<b>212.0080.000</b>	-
Metric knock-outs (transparent lid)	<b>212.1080.000</b>	-
PG knock-outs (grey lid)	<b>213.0080.000</b>	-
PG knock-outs (transparent lid)	<b>213.1080.000</b>	-
Without knock-outs (grey lid)	<b>211.0080.000</b>	<b>311.0080.000</b>
Without knock-outs (transparent lid)	<b>211.1080.000</b>	<b>311.1080.000</b>

	CT-S 209	CT-S 309
Material	PC	ABS
Weight (g)	530	459
External dimensions (mm)	125 x 175 x 125	125 x 175 x 125
<b>Part number</b>	<b>Part number</b>	
Metric knock-outs (grey lid)	<b>212.0090.000</b>	-
Metric knock-outs (transparent lid)	<b>212.1090.000</b>	-
PG knock-outs (grey lid)	<b>213.0090.000</b>	-
PG knock-outs (transparent lid)	<b>213.1090.000</b>	-
Without knock-outs (grey lid)	<b>211.0090.000</b>	<b>311.0090.000</b>
Without knock-outs (transparent lid)	<b>211.1090.000</b>	<b>311.1090.000</b>

Accessories (also see P 359)	
Mounting plate	
DIN rail	
DIN rail	
Hinges (pair)	
External mounting brackets	
Lid screws (Set of 4)	
Internal mounting screws	
Threaded inserts (Set of 4)	

Dim's (mm)	Material		
98 x 148 x 1.5	St, Zn	<b>929.5003.000</b>	<b>929.5003.000</b>
35 x 150	St, Zn	<b>929.2004.000</b>	<b>929.2004.000</b>
35 x 100	St, Zn	<b>929.2002.000</b>	<b>929.2002.000</b>
	PA	<b>929.3001.000</b>	<b>929.3001.000</b>
	PC	<b>929.3002.000</b>	<b>929.3002.000</b>
60	PA	<b>929.3012.000</b>	<b>929.3012.000</b>
4 x 8	St, Zn	<b>929.3005.000</b>	<b>929.3005.000</b>
M2	Ms	<b>929.3004.000</b>	<b>929.3004.000</b>

Dim's (mm)	Material		
98 x 148 x 1.5	St, Zn	<b>929.5003.000</b>	<b>929.5003.000</b>
35 x 150	St, Zn	<b>929.2004.000</b>	<b>929.2004.000</b>
35 x 100	St, Zn	<b>929.2002.000</b>	<b>929.2002.000</b>
	PA	<b>929.3001.000</b>	<b>929.3001.000</b>
	PC	<b>929.3002.000</b>	<b>929.3002.000</b>
35	PA	<b>929.3011.000</b>	<b>929.3011.000</b>
4 x 8	St, Zn	<b>929.3005.000</b>	<b>929.3005.000</b>
M2	Ms	<b>929.3004.000</b>	<b>929.3004.000</b>

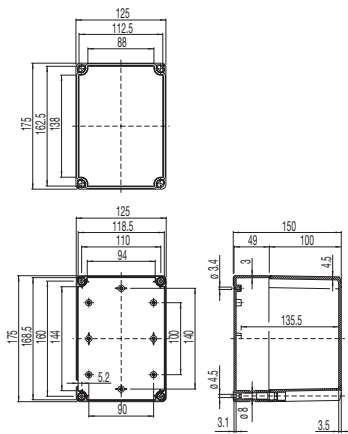
Knock-outs (only PC-Enclosures)	
Metric	
PG	

2 x M16/25 + 4 x M12/20	
4 x PG 16/21 + 8 x PG 9/13.5	

2 x M16/25 + 4 x M12/20	
4 x PG 16/21 + 8 x PG 9/13.5	

## 125 x 175 x 150 mm

CT-S 210 PC-Enclosure  
CT-S 310 ABS-Enclosure



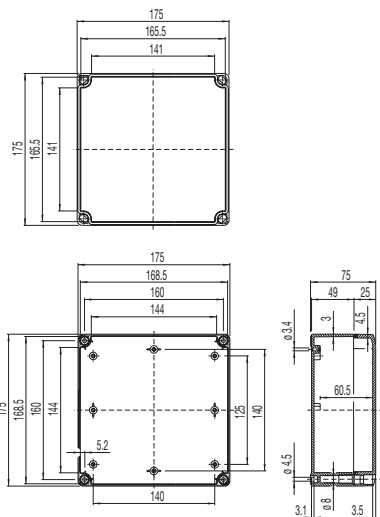
	CT-S 210	CT-S 310
	PC	ABS
	603	521
	125x175x150	125x175x150
	<b>Part number</b>	<b>Part number</b>
	<b>212.0100.000</b>	–
	<b>212.1100.000</b>	–
	<b>213.0100.000</b>	–
	<b>213.1100.000</b>	–
	<b>211.0100.000</b>	<b>311.0100.000</b>
	<b>211.1100.000</b>	<b>311.1100.000</b>

Dim's (mm)	Material		
98 x 148 x 1.5	St, Zn	<b>929.5003.000</b>	<b>929.5003.000</b>
35 x 150	St, Zn	<b>929.2004.000</b>	<b>929.2004.000</b>
35 x 100	St, Zn	<b>929.2002.000</b>	<b>929.2002.000</b>
	PA	<b>929.3001.000</b>	<b>929.3001.000</b>
	PC	<b>929.3002.000</b>	<b>929.3002.000</b>
35	PA	<b>929.3011.000</b>	<b>929.3011.000</b>
4 x 8	St, Zn	<b>929.3005.000</b>	<b>929.3005.000</b>
M2	Ms	<b>929.3004.000</b>	<b>929.3004.000</b>

2 x M16/25 + 4 x M12/20  
4 x PG 16/21 + 8 x PG 9/13.5

## 175 x 175 x 75 mm

CT-S 211 PC-Enclosure  
CT-S 311 ABS-Enclosure



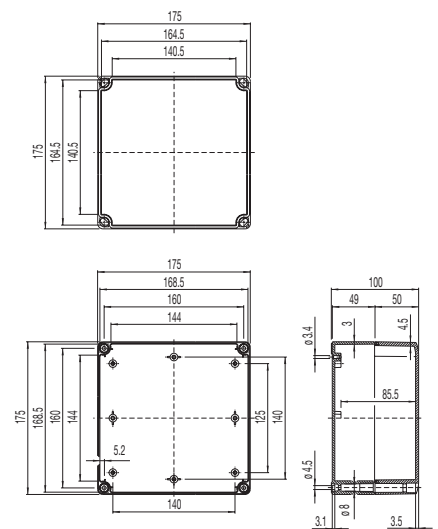
	CT-S 211	CT-S 311
	PC	ABS
	461	392
	175 x 175 x 75	175 x 175 x 75
	<b>Part number</b>	<b>Part number</b>
	<b>212.0110.000</b>	–
	<b>212.1110.000</b>	–
	<b>213.0110.000</b>	–
	<b>213.1110.000</b>	–
	<b>211.0110.000</b>	<b>311.0110.000</b>
	<b>211.1110.000</b>	<b>311.1110.000</b>

Dim's (mm)	Material		
148x148x1.5	St, Zn	<b>929.5004.000</b>	<b>929.5004.000</b>
35 x 150	St, Zn	<b>929.2004.000</b>	<b>929.2004.000</b>
	PA	<b>929.3001.000</b>	<b>929.3001.000</b>
	PC	<b>929.3002.000</b>	<b>929.3002.000</b>
35	PA	<b>929.3011.000</b>	<b>929.3011.000</b>
4 x 8	St, Zn	<b>929.3005.000</b>	<b>929.3005.000</b>
M2	Ms	<b>929.3004.000</b>	<b>929.3004.000</b>

2 x M12/20 + 2 x M16/25 + 5 x M12/20  
4 x PG 16/21 + 4 x PG 9/16 + 10 x PG 9/13.5

## 175 x 175 x 100 mm

CT-S 212 PC-Enclosure  
CT-S 312 ABS-Enclosure



	CT-S 212	CT-S 312
	PC	ABS
	573	490
	175 x 175 x 100	175 x 175 x 100
	<b>Part number</b>	<b>Part number</b>
	<b>212.0120.000</b>	–
	<b>212.1120.000</b>	–
	<b>213.0120.000</b>	–
	<b>213.1120.000</b>	–
	<b>211.0120.000</b>	<b>311.0120.000</b>
	<b>211.1120.000</b>	<b>311.1120.000</b>

Dim's (mm)	Material		
148x148x1.5	St, Zn	<b>929.5004.000</b>	<b>929.5004.000</b>
35 x 150	St, Zn	<b>929.2004.000</b>	<b>929.2004.000</b>
	PA	<b>929.3001.000</b>	<b>929.3001.000</b>
	PC	<b>929.3002.000</b>	<b>929.3002.000</b>
60	PA	<b>929.3012.000</b>	<b>929.3012.000</b>
4 x 8	St, Zn	<b>929.3005.000</b>	<b>929.3005.000</b>
M2	Ms	<b>929.3004.000</b>	<b>929.3004.000</b>

2 x M12/20 + 2 x M16/25 + 5 x M12/20  
4 x PG 16/21 + 4 x PG 9/16 + 10 x PG 9/13.5

# CT-Module Plastic Enclosures

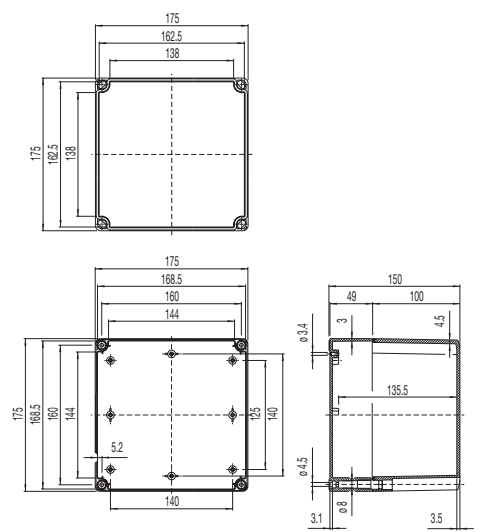
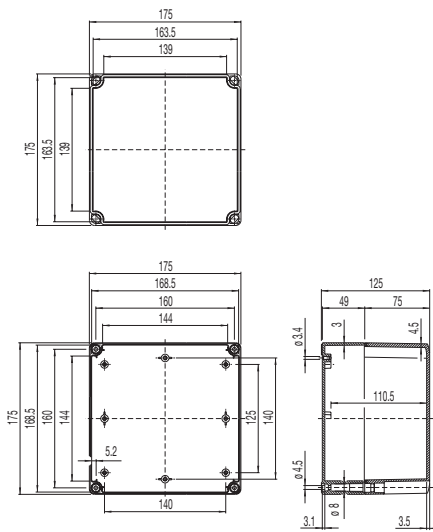
## Type: CT-S

### 175 x 175 x 125 mm

CT-S 213 PC-Enclosure  
CT-S 313 ABS-Enclosure

### 175 x 175 x 150 mm

CT-S 214 PC-Enclosure  
CT-S 314 ABS-Enclosure



Type	
Material	
Weight (g)	
External dimensions (mm)	

	CT-S 213	CT-S 313
Material	PC	ABS
Weight (g)	640	557
External dimensions (mm)	175 x 175 x 125	175 x 175 x 125

	CT-S 214	CT-S 314
Material	PC	ABS
Weight (g)	717	616
External dimensions (mm)	175 x 175 x 150	175 x 175 x 150

	Part number	Part number
Metric knock-outs (grey lid)	212.0130.000	-
Metric knock-outs (transparent lid)	212.1130.000	-
PG knock-outs (grey lid)	213.0130.000	-
PG knock-outs (transparent lid)	213.1130.000	-
Without knock-outs (grey lid)	211.0130.000	311.0130.000
Without knock-outs (transparent lid)	211.1130.000	311.1130.000

	Part number	Part number
Metric knock-outs (grey lid)	212.0130.000	-
Metric knock-outs (transparent lid)	212.1130.000	-
PG knock-outs (grey lid)	213.0130.000	-
PG knock-outs (transparent lid)	213.1130.000	-
Without knock-outs (grey lid)	211.0130.000	311.0130.000
Without knock-outs (transparent lid)	211.1130.000	311.1130.000

	Part number	Part number
Metric knock-outs (grey lid)	212.0140.000	-
Metric knock-outs (transparent lid)	212.1140.000	-
PG knock-outs (grey lid)	213.0140.000	-
PG knock-outs (transparent lid)	213.1140.000	-
Without knock-outs (grey lid)	211.0140.000	311.0140.000
Without knock-outs (transparent lid)	211.1140.000	311.1140.000

Accessories (also see P 359)	
Mounting plate	
DIN rail	
DIN rail	
Hinges (pair)	
External mounting brackets	
Lid screws (Set of 4)	
Internal mounting screws	
Threaded inserts (Set of 4)	

Dim's (mm)	Material		
148x148x1.5	St, Zn	929.5004.000	929.5004.000
35 x 150	St, Zn	929.2004.000	929.2004.000
	PA	929.3001.000	929.3001.000
	PC	929.3002.000	929.3002.000
35	PA	929.3011.000	929.3011.000
4 x 8	St, Zn	929.3005.000	929.3005.000
M2	Ms	929.3004.000	929.3004.000

Dim's (mm)	Material		
148x148x1.5	St, Zn	929.5004.000	929.5004.000
35 x 150	St, Zn	929.2004.000	929.2004.000
	PA	929.3001.000	929.3001.000
	PC	929.3002.000	929.3002.000
35	PA	929.3011.000	929.3011.000
4 x 8	St, Zn	929.3005.000	929.3005.000
M2	Ms	929.3004.000	929.3004.000

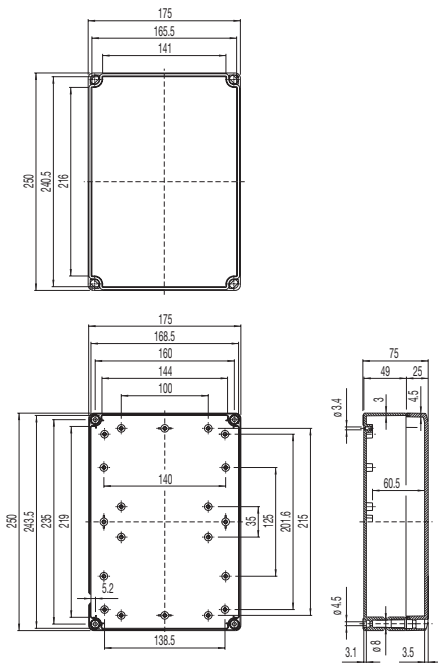
Knock-outs (only PC-Enclosures)	
Metric	
PG	

Metric	2 x M12/20 + 2 x M16/25 + 5 x M12/20
PG	4 x PG 16/21 + 4 x PG 9/16 + 10 x PG 9/13.5

Metric	2 x M12/20 + 2 x M16/25 + 5 x M12/20
PG	4 x PG 16/21 + 4 x PG 9/16 + 10 x PG 9/13.5

## 175 x 250 x 75 mm

CT-S 215 PC-Enclosure  
CT-S 315 ABS-Enclosure



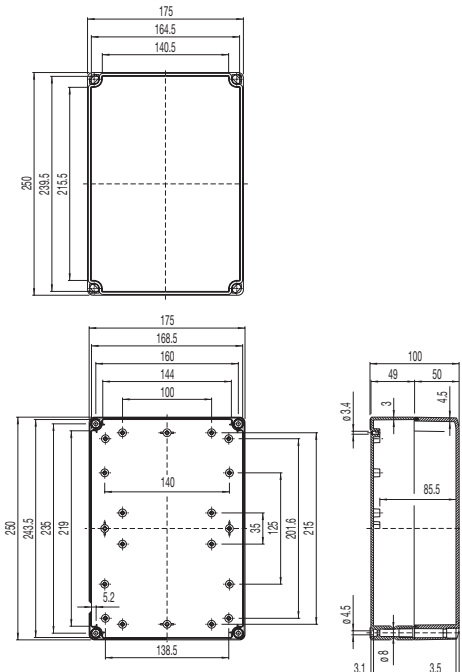
	CT-S 215	CT-S 315
	PC	ABS
	631	553
	175 x 250 x 75	175 x 250 x 75
	<b>Part number</b>	<b>Part number</b>
	<b>212.0150.000</b>	-
	<b>212.1150.000</b>	-
	<b>213.0150.000</b>	-
	<b>213.1150.000</b>	-
	<b>211.0150.000</b>	<b>311.0150.000</b>
	<b>211.1150.000</b>	<b>311.1150.000</b>

Dim's (mm)	Material		
148x223x1.5	St, Zn	<b>929.5005.000</b>	<b>929.5005.000</b>
35 x 225	St, Zn	<b>929.2005.000</b>	<b>929.2005.000</b>
35 x 150	St, Zn	<b>929.2004.000</b>	<b>929.2004.000</b>
	PA	<b>929.3001.000</b>	<b>929.3001.000</b>
	PC	<b>929.3002.000</b>	<b>929.3002.000</b>
35	PA	<b>929.3011.000</b>	<b>929.3011.000</b>
4 x 8	St, Zn	<b>929.3005.000</b>	<b>929.3005.000</b>
M2	Ms	<b>929.3004.000</b>	<b>929.3004.000</b>

2 x M12/20 + 2 x M16/25 + 6 x M12/20  
4 x PG 16/21 + 4 x PG 9/16 + 12 x PG 9/13.5

## 175 x 250 x 100 mm

CT-S 216 PC-Enclosure  
CT-S 316 ABS-Enclosure



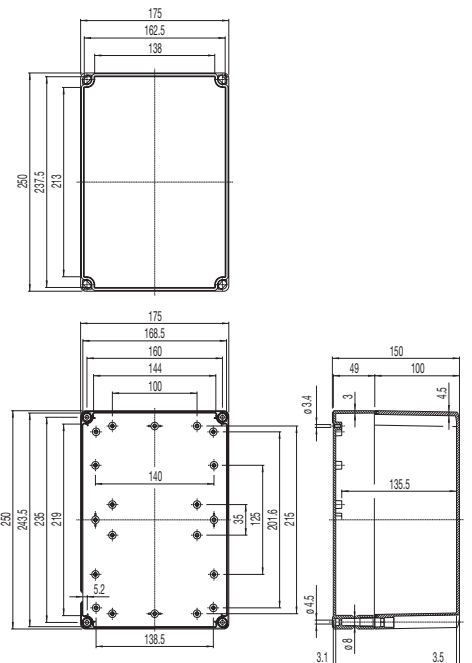
	CT-S 216	CT-S 316
	PC	ABS
	743	666
	175 x 250 x 100	175 x 250 x 100
	<b>Part number</b>	<b>Part number</b>
	<b>212.0160.000</b>	-
	<b>212.1160.000</b>	-
	<b>213.0160.000</b>	-
	<b>213.1160.000</b>	-
	<b>211.0160.000</b>	<b>311.0160.000</b>
	<b>211.1160.000</b>	<b>311.1160.000</b>

Dim's (mm)	Material		
148x223x1.5	St, Zn	<b>929.5005.000</b>	<b>929.5005.000</b>
35 x 225	St, Zn	<b>929.2005.000</b>	<b>929.2005.000</b>
35 x 150	St, Zn	<b>929.2004.000</b>	<b>929.2004.000</b>
	PA	<b>929.3001.000</b>	<b>929.3001.000</b>
	PC	<b>929.3002.000</b>	<b>929.3002.000</b>
35	PA	<b>929.3011.000</b>	<b>929.3011.000</b>
4 x 8	St, Zn	<b>929.3005.000</b>	<b>929.3005.000</b>
M2	Ms	<b>929.3004.000</b>	<b>929.3004.000</b>

2 x M12/20 + 2 x M16/25 + 6 x M12/20  
4 x PG 16/21 + 4 x PG 9/16 + 12 x PG 9/13.5

## 175 x 250 x 150 mm

CT-S 217 PC-Enclosure  
CT-S 317 ABS-Enclosure



	CT-S 217	CT-S 317
	PC	ABS
	947	842
	175x250x150	175 x 250 x 150
	<b>Part number</b>	<b>Part number</b>
	<b>212.0170.000</b>	-
	<b>212.1170.000</b>	-
	<b>213.0170.000</b>	-
	<b>213.1170.000</b>	-
	<b>211.0170.000</b>	<b>311.0170.000</b>
	<b>211.1170.000</b>	<b>311.1170.000</b>

Dim's (mm)	Material		
148x223x1.5	St, Zn	<b>929.5005.000</b>	<b>929.5005.000</b>
35 x 225	St, Zn	<b>929.2005.000</b>	<b>929.2005.000</b>
35 x 150	St, Zn	<b>929.2004.000</b>	<b>929.2004.000</b>
	PA	<b>929.3001.000</b>	<b>929.3001.000</b>
	PC	<b>929.3002.000</b>	<b>929.3002.000</b>
35	PA	<b>929.3011.000</b>	<b>929.3011.000</b>
4 x 8	St, Zn	<b>929.3005.000</b>	<b>929.3005.000</b>
M2	Ms	<b>929.3004.000</b>	<b>929.3004.000</b>

2 x M12/20 + 2 x M16/25 + 6 x M12/20  
4 x PG 16/21 + 4 x PG 9/16 + 12 x PG 9/13.5

Enclosures



## CT-Module Plastic Enclosures

Type: CT-C



### Features

- Polycarbonate enclosure range can be linked 'side-by-side' to form larger units
- Pre-formed flange knock-outs on all base sides
- Variety of flange plate options (full details P 359)
- Grey or transparent lid
- Foam (PUR) gasket, IP 66/67
- 132 or 187 mm depth (using 55 mm extension frame)
- Corner elevator brackets allow height adjustment of optional internal front plate



# CT-Module Plastic Enclosures

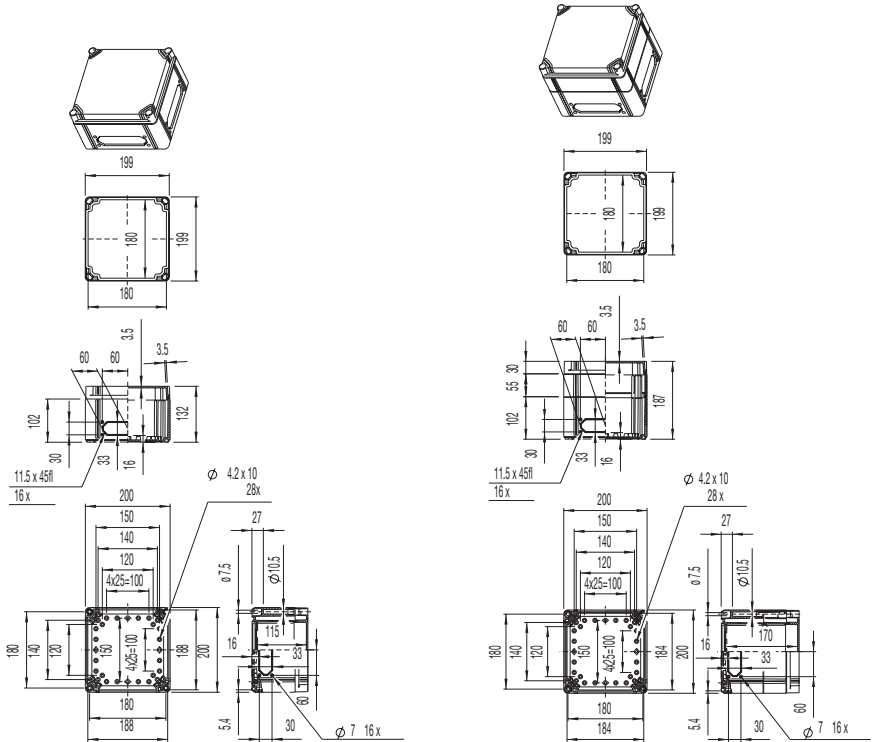
Type: CT-C

## 200 x 200 x 130 mm

CT-C 201 PC-Enclosure

## 200 x 200 x 185 mm

CT-C 202 PC-Enclosure



Type	
Material	
Weight	(g)
External dimensions	(mm)

Grey lid	
Transparent lid	

Accessories (also see P 359)	
Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
Hinges (pair)	
External mounting brackets	
Lid screws (std) (Set of 4)	
<b>Flange Plates</b>	

	CT-C 201
	PC
	1039
	200 x 200 x 130
	<b>Part number</b>
	<b>224.0010.000</b>
	<b>224.1010.000</b>

Dim's (mm)	Material	
186x166x1.5	Al	<b>929.4001.000</b>
160x160x1.5	St	<b>929.5010.000</b>
35 x 160	St	<b>929.2010.000</b>
35 x 160	St	<b>929.2010.000</b>
	PA	<b>929.3061.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>
		<b>4 x F1</b>

	CT-C 202
	PC
	1367
	200 x 200 x 185
	<b>Part number</b>
	<b>224.0020.000</b>
	<b>224.1020.000</b>

Dim's (mm)	Material	
186x166x1.5	Al	<b>929.4001.000</b>
160x160x1.5	St	<b>929.5010.000</b>
35 x 160	St	<b>929.2010.000</b>
35 x 160	St	<b>929.2010.000</b>
	PA	<b>929.3061.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>
		<b>4 x F1</b>

Enclosures

# CT-Module Plastic Enclosures

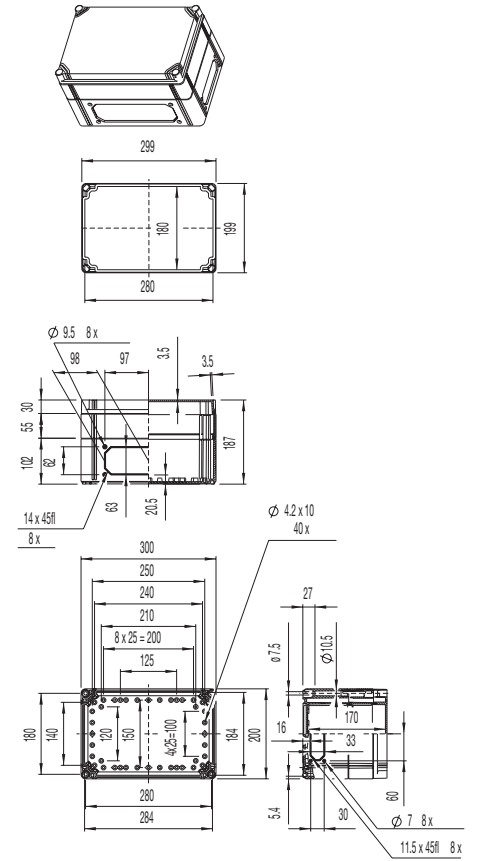
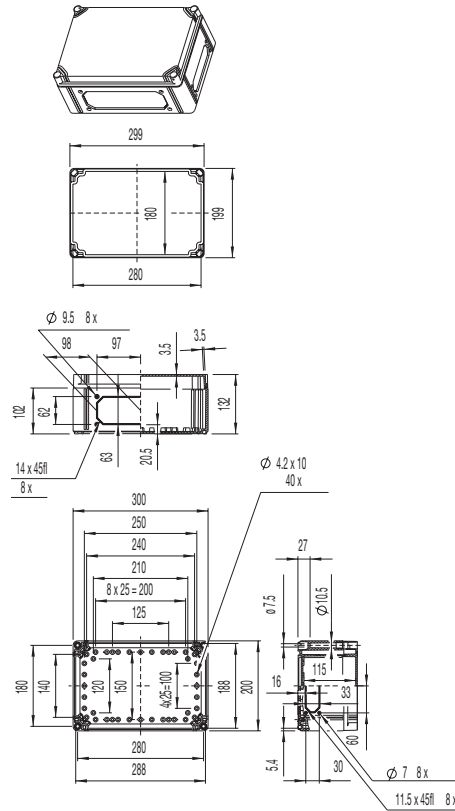
Type: CT-C

## 200 x 300 x 130 mm

CT-C 203 PC-Enclosure

## 200 x 300 x 185 mm

CT-C 204 PC-Enclosure



Type	
Material	
Weight	(g)
External dimensions	(mm)

	CT-C 203
	PC
	1349
	200 x 300 x 130

	CT-C 204
	PC
	1733
	200 x 300 x 185

Grey lid	
Transparent lid	

	<b>Part number</b>
	<b>224.0030.000</b>
	<b>224.1030.000</b>

	<b>Part number</b>
	<b>224.0040.000</b>
	<b>224.1040.000</b>

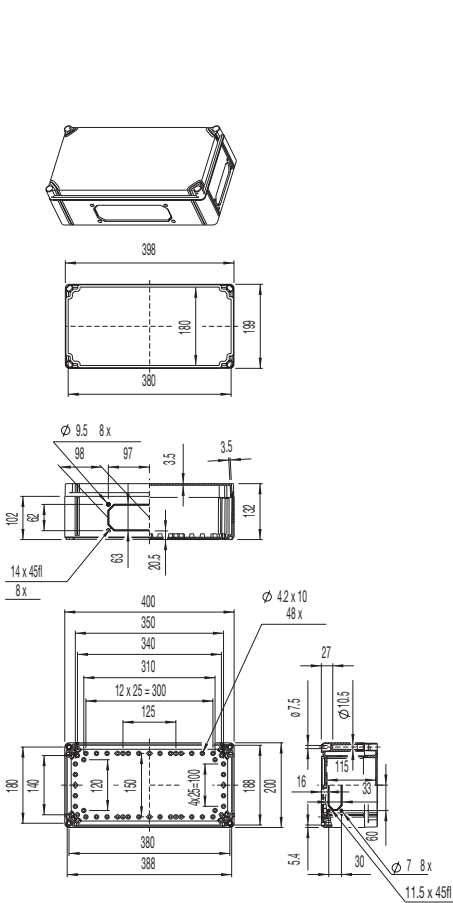
Accessories (also see P 359)	
Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
Hinges (pair)	
External mounting brackets	
Lid screws (std) (Set of 4)	
<b>Flange Plates</b>	

Dim's (mm)	Material	
186 x 286 x 1.5	Al	<b>929.4003.000</b>
160 x 260 x 1.5	St	<b>929.5011.000</b>
35 x 260	St	<b>929.2012.000</b>
35 x 160	St	<b>929.2010.000</b>
	PA	<b>929.3061.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>
		<b>2 x F1 + 2 x F2</b>

Dim's (mm)	Material	
186 x 286 x 1.5	Al	<b>929.4003.000</b>
160 x 260 x 1.5	St	<b>929.5011.000</b>
35 x 260	St	<b>929.2012.000</b>
35 x 160	St	<b>929.2010.000</b>
	PA	<b>929.3061.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>
		<b>2 x F1 + 2 x F2</b>

## 200 x 400 x 130 mm

CT-C 205 PC-Enclosure



CT-C 205

PC

1674

200 x 400 x 130

**Part number**

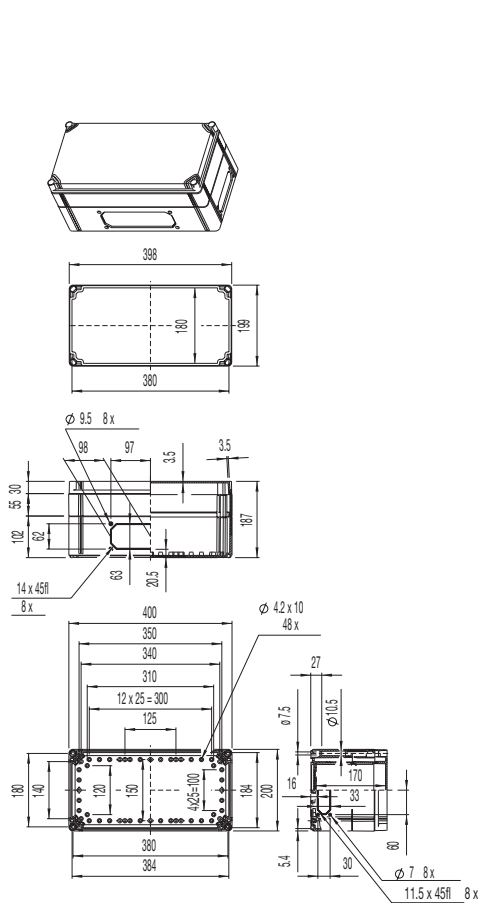
**224.0050.000**

**224.1050.000**

Dim's (mm)	Material	
186 x 386 x 1.5	Al	<b>929.4005.000</b>
160 x 360 x 1.5	St	<b>929.5012.000</b>
35 x 160	St	<b>929.2010.000</b>
35 x 360	St	<b>929.2014.000</b>
	PA	<b>929.3061.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>
		<b>2 x F1 + 2 x F2</b>

## 200 x 400 x 185 mm

CT-C 206 PC-Enclosure



CT-C 206

PC

2131

200 x 400 x 185

**Part number**

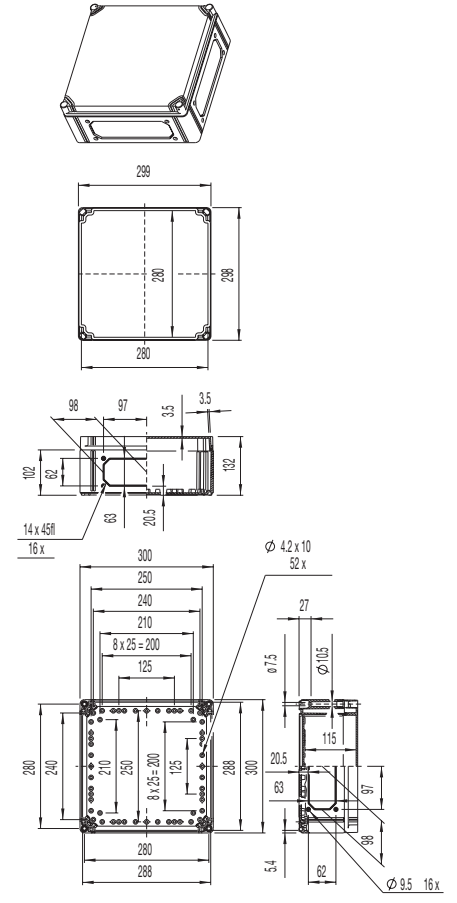
**224.0060.000**

**224.1060.000**

Dim's (mm)	Material	
186 x 386 x 1.5	Al	<b>929.4005.000</b>
160 x 360 x 1.5	St	<b>929.5012.000</b>
35 x 160	St	<b>929.2010.000</b>
35 x 360	St	<b>929.2014.000</b>
	PA	<b>929.3061.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>
		<b>2 x F1 + 2 x F2</b>

## 300 x 300 x 130 mm

CT-C 207 PC-Enclosure



CT-C 207

PC

1738

300 x 300 x 130

**Part number**

**224.0070.000**

**224.1070.000**

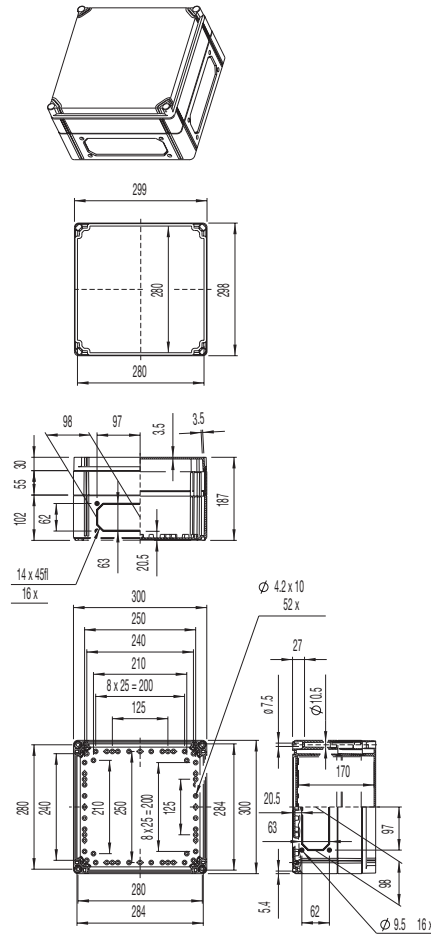
Dim's (mm)	Material	
286 x 286 x 1.5	Al	<b>929.4006.000</b>
260 x 260 x 1.5	St	<b>929.5013.000</b>
35 x 260	St	<b>929.2012.000</b>
	PA	<b>929.3061.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>
		<b>4 x F2</b>

# CT-Module Plastic Enclosures

## Type: CT-C

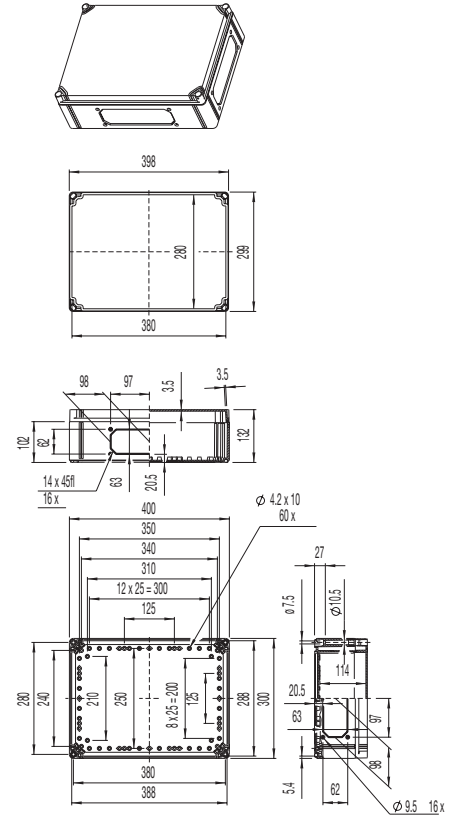
### 300 x 300 x 185 mm

CT-C 208 PC-Enclosure



### 300 x 400 x 130 mm

CT-C 209 PC-Enclosure



Type	
Material	
Weight	(g)
External dimensions	(mm)

Grey lid	
Transparent lid	

Accessories (also see P 359)	
Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
Hinges (pair)	
External mounting brackets	
Lid screws (std) (Set of 4)	
<b>Flange Plates</b>	

	CT-C 208
	PC
	2188
	300 x 300 x 185
	<b>Part number</b>
	<b>224.0080.000</b>
	<b>224.1080.000</b>

Dim's (mm)	Material	
286 x 286 x 1.5	Al	<b>929.4006.000</b>
260 x 260 x 1.5	St	<b>929.5013.000</b>
35 x 260	St	<b>929.2012.000</b>
	PA	<b>929.3061.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>
		<b>4 x F2</b>

	CT-C 209
	PC
	2199
	300 x 400 x 130
	<b>Part number</b>
	<b>224.0090.000</b>
	<b>224.1090.000</b>

Dim's (mm)	Material	
286 x 386 x 1.5	Al	<b>929.4008.000</b>
260 x 360 x 1.5	St	<b>929.5014.000</b>
35 x 360	St	<b>929.2014.000</b>
35 x 260	St	<b>929.2012.000</b>
	PA	<b>929.3061.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>
		<b>4 x F2</b>



# CT-Module Plastic Enclosures

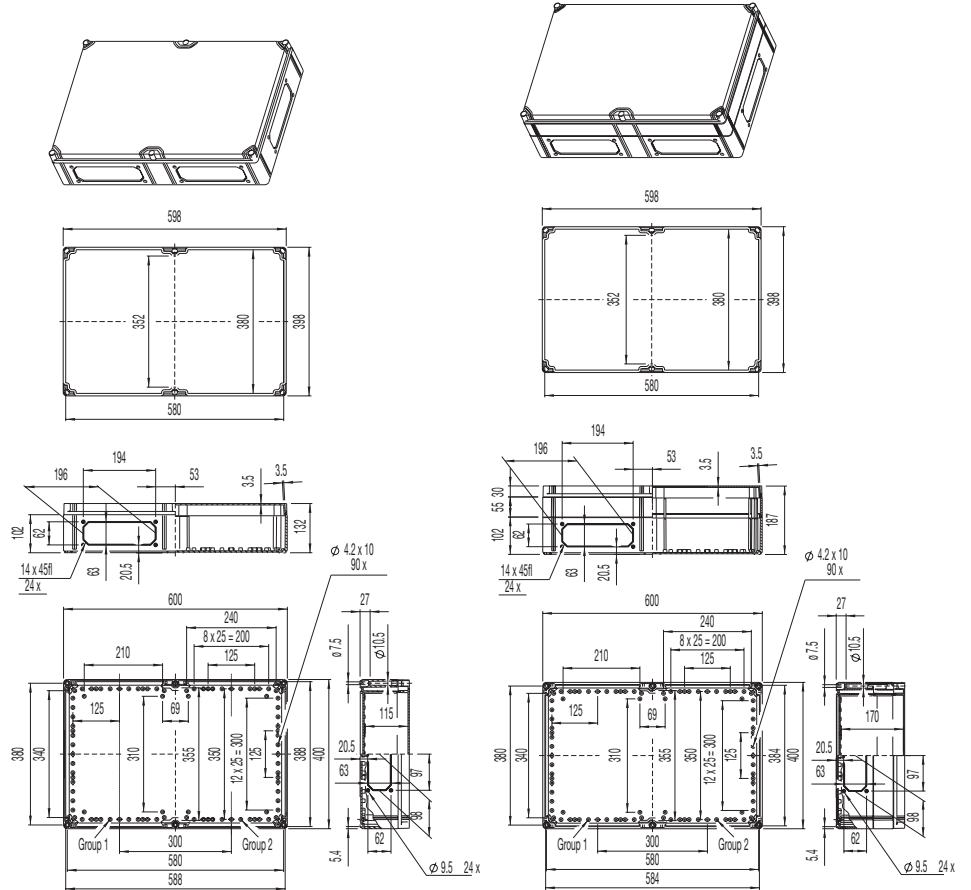
Type: CT-C

## 400 x 600 x 130 mm

CT-C 213 PC-Enclosure

## 400 x 600 x 185 mm

CT-C 214 PC-Enclosure



Type	
Material	
Weight (g)	
External dimensions (mm)	

	CT-C 213
	PC
	3964
	400 x 600 x 130

	CT-C 214
	PC
	4730
	400 x 600 x 185

Grey lid	
Transparent lid	

	<b>Part number</b>
	<b>224.0130.000</b>
	<b>224.1130.000</b>

	<b>Part number</b>
	<b>224.0140.000</b>
	<b>224.1140.000</b>

Accessories (also see P 359)	
Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
Hinges (pair)	
External mounting brackets	
Lid screws (std) (Set of 4)	
<b>Flange Plates</b>	

Dim's (mm)	Material	
386x586x1.5	Al	<b>929.4012.000</b>
360x560x1.5	St	<b>929.5018.000</b>
35 x 360	St	<b>929.2014.000</b>
	PA	<b>929.3061.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>
	<b>6 x F2</b>	

Dim's (mm)	Material	
386x586x1.5	Al	<b>929.4012.000</b>
360x560x1.5	St	<b>929.5018.000</b>
35 x 360	St	<b>929.2014.000</b>
	PA	<b>929.3061.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>
	<b>6 x F2</b>	





## CT-Module Plastic Enclosures

Type: CT-W

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### Features

- Hinged lid with robust hinges
- Quick release lid latches (can be padlocked)
- Grey or transparent lid
- Foam (PUR) gasket, IP 66/67
- 132 or 187 mm depth (using 55 mm extension frame)
- Corner elevator brackets allow height adjustment of optional internal front plate

# CT-Module Plastic Enclosures

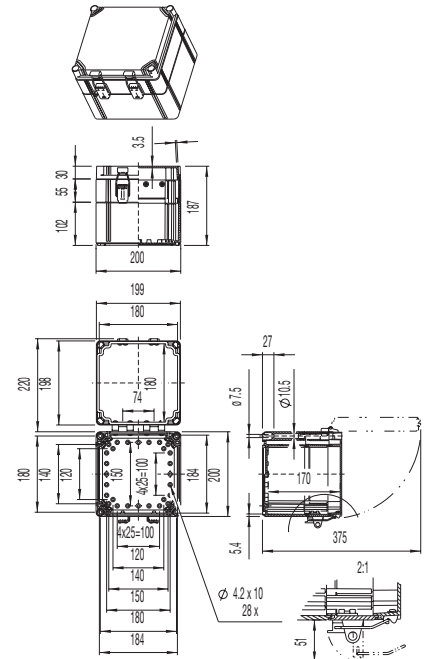
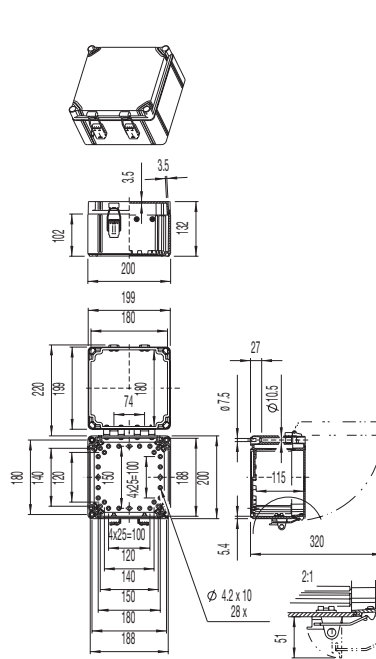
## 200 x 200 x 130 mm

CT-W 201 PC-Enclosure

## 200 x 200 x 185 mm

CT-W 202 PC-Enclosure

Type: CT-W



Type	
Material	
Weight	(g)
External dimensions	(mm)

	CT-W 201
	PC
	1149
	200 x 200 x 130

	CT-W 202
	PC
	1453
	200 x 200 x 185

Grey lid	
Transparent lid	

	<b>Part number</b>
	<b>234.0010.000</b>
	<b>234.1010.000</b>

	<b>Part number</b>
	<b>234.0020.000</b>
	<b>234.1020.000</b>

Accessories (also see P 359)	
Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
External mounting brackets	
Lid screws (std) (Set of 4)	

Dim's (mm)	Material	
186x166x1.5	Al	<b>929.4001.000</b>
160x160x1.5	St	<b>929.5010.000</b>
35 x 160	St	<b>929.2010.000</b>
35 x 160	St	<b>929.2010.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>

Dim's (mm)	Material	
186x166x1.5	Al	<b>929.4001.000</b>
160x160x1.5	St	<b>929.5010.000</b>
35 x 160	St	<b>929.2010.000</b>
35 x 160	St	<b>929.2010.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>

Enclosures

# CT-Module Plastic Enclosures

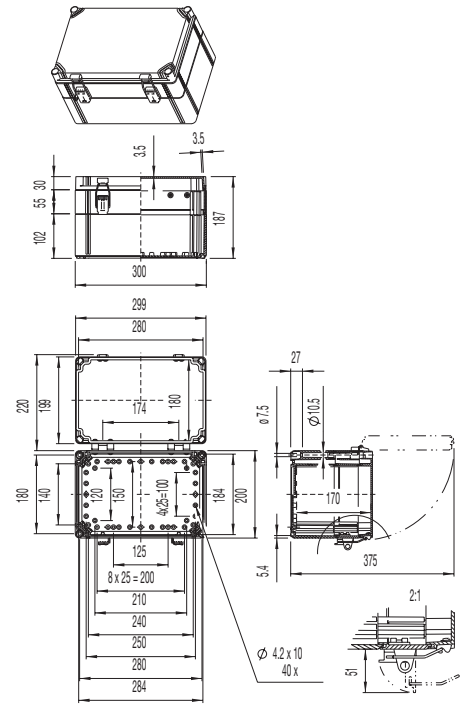
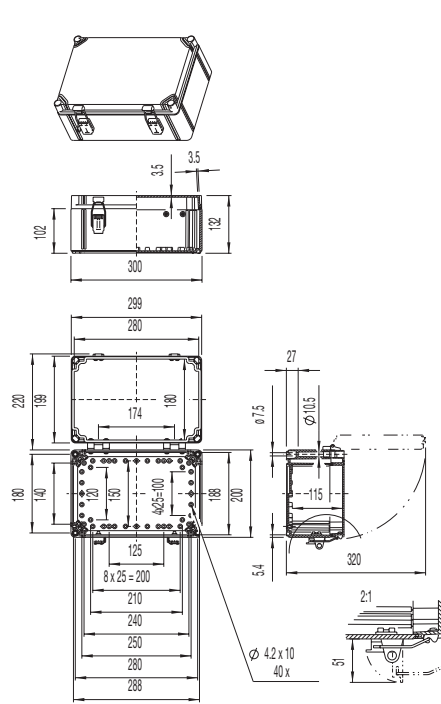
Type: CT-W

## 200 x 300 x 130 mm

CT-W 203 PC-Enclosure

## 200 x 300 x 185 mm

CT-W 204 PC-Enclosure



Type	
Material	
Weight	(g)
External dimensions	(mm)

	CT-W 203
	PC
	1459
	200 x 300 x 130

	CT-W 204
	PC
	1819
	200 x 300 x 185

	<b>Part number</b>
Grey lid	<b>234.0030.000</b>
Transparent lid	<b>234.1030.000</b>

	<b>Part number</b>
	<b>234.0040.000</b>
	<b>234.1040.000</b>

	<b>Part number</b>
	<b>234.0040.000</b>
	<b>234.1040.000</b>

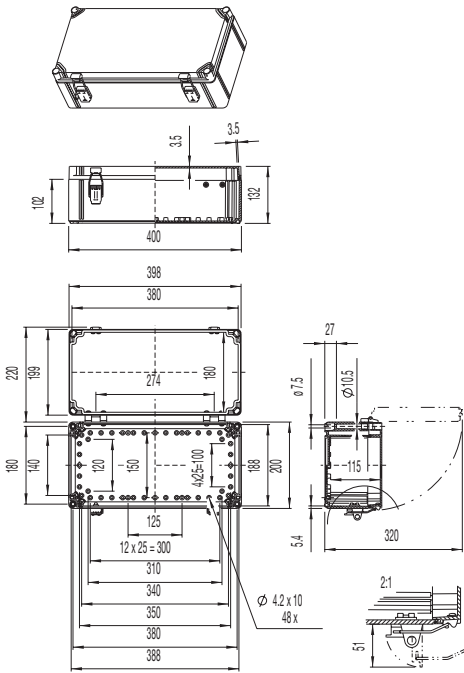
Accessories (also see P 359)	
Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
External mounting brackets	
Lid screws (std) (Set of 4)	

Dim's (mm)	Material	
186x286x1.5	Al	<b>929.4003.000</b>
160x260x1.5	St	<b>929.5011.000</b>
35 x 260	St	<b>929.2012.000</b>
35 x 160	St	<b>929.2010.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>

Dim's (mm)	Material	
186x286x1.5	Al	<b>929.4003.000</b>
160x260x1.5	St	<b>929.5011.000</b>
35 x 260	St	<b>929.2012.000</b>
35 x 160	St	<b>929.2010.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>

## 200 x 400 x 130 mm

CT-W 205 PC-Enclosure



CT-W 205

PC

1784

200 x 400 x 130

**Part number**

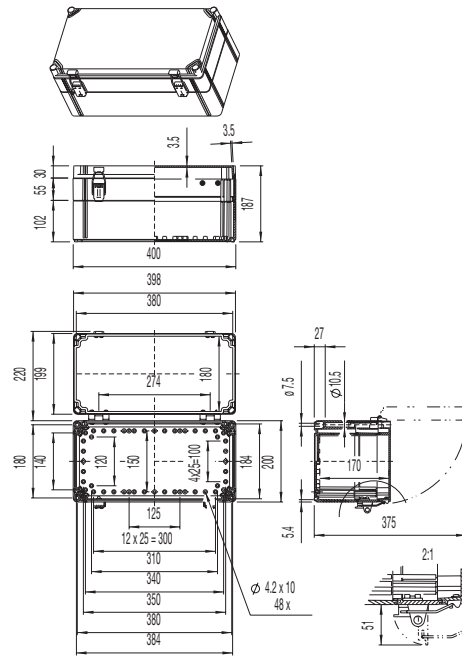
**234.0050.000**

**234.1050.000**

Dim's (mm)	Material	
186x386x1.5	Al	<b>929.4005.000</b>
160x360x1.5	St	<b>929.5012.000</b>
35 x 160	St	<b>929.2010.000</b>
35 x 360	St	<b>929.2014.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>

## 200 x 400 x 185 mm

CT-W 206 PC-Enclosure



CT-W 206

PC

2217

200 x 400 x 185

**Part number**

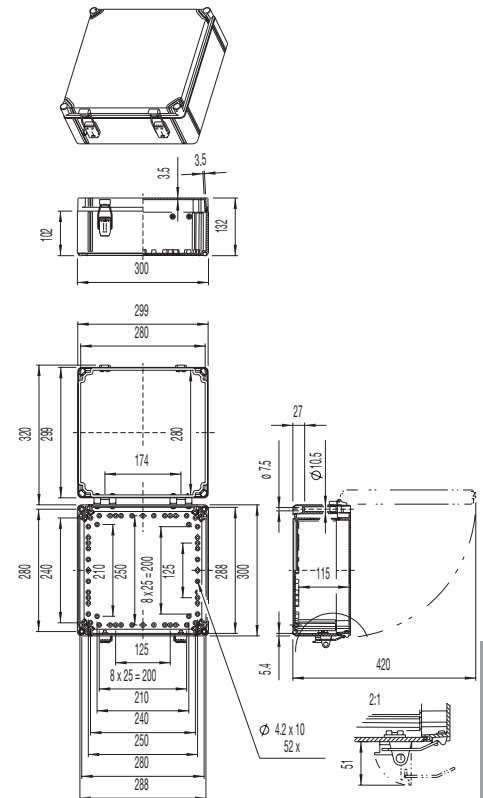
**234.0060.000**

**234.1060.000**

Dim's (mm)	Material	
186x386x1.5	Al	<b>929.4005.000</b>
160x360x1.5	St	<b>929.5012.000</b>
35 x 160	St	<b>929.2010.000</b>
35 x 360	St	<b>929.2014.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>

## 300 x 300 x 130 mm

CT-W 207 PC-Enclosure



CT-W 207

PC

1848

300 x 300 x 130

**Part number**

**234.0070.000**

**234.1070.000**

Dim's (mm)	Material	
286x286x1.5	Al	<b>929.4006.000</b>
260x260x1.5	St	<b>929.5013.000</b>
35 x 260	St	<b>929.2012.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>

# CT-Module Plastic Enclosures

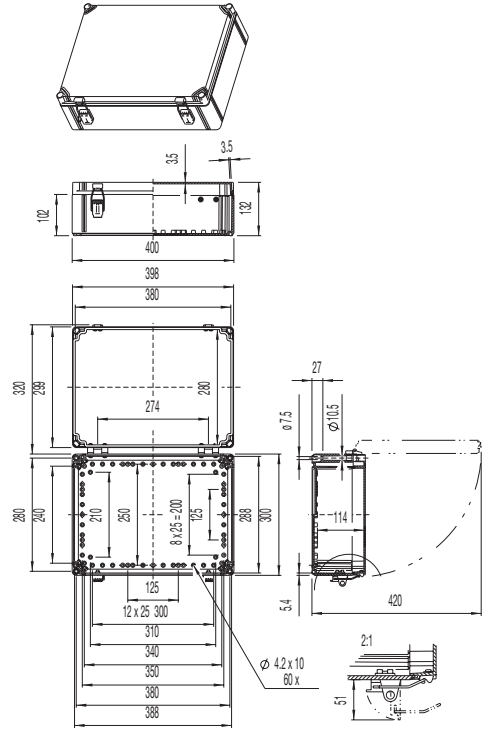
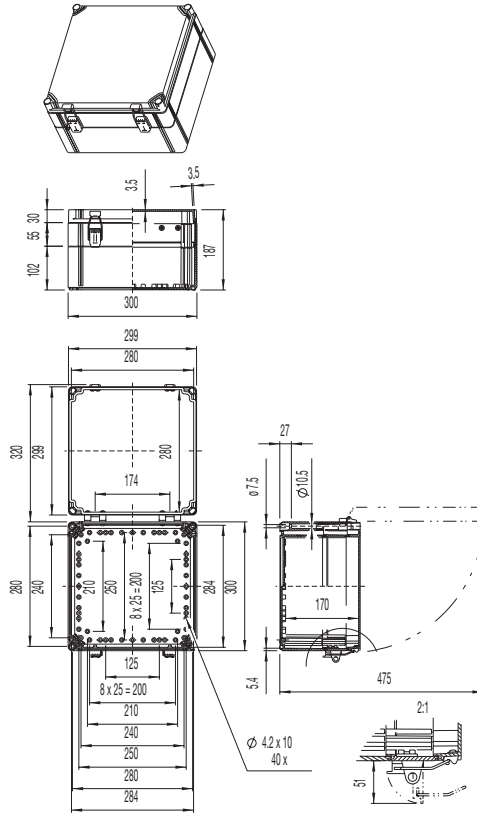
Type: CT-W

## 300 x 300 x 185 mm

CT-W 208 PC-Enclosure

## 300 x 400 x 130 mm

CT-W 209 PC-Enclosure



Type	
Material	
Weight (g)	
External dimensions (mm)	

	CT-W 208
	PC
	2298
	300 x 300 x 185

	CT-W 209
	PC
	2257
	300 x 400 x 130

Grey lid	
Transparent lid	

	<b>Part number</b>
	<b>234.0080.000</b>
	<b>234.1080.000</b>

	<b>Part number</b>
	<b>234.0090.000</b>
	<b>234.1090.000</b>

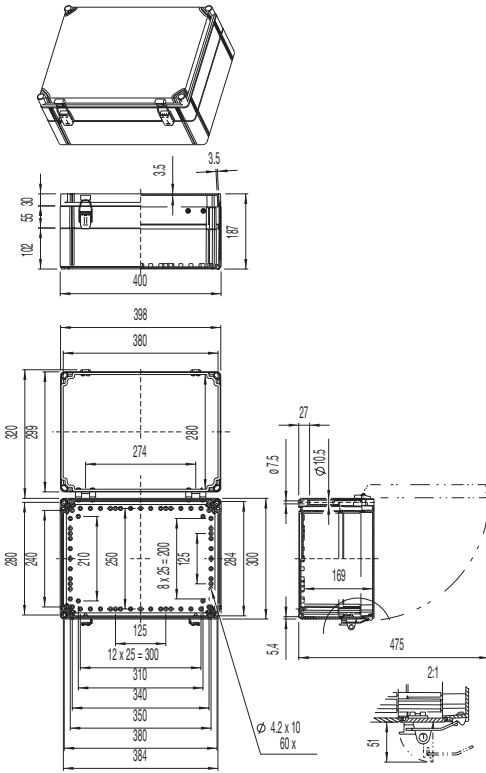
Accessories (also see P 359)	
Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
External mounting brackets	
Lid screws (std) (Set of 4)	

Dim's (mm)	Material	
286x286x1.5	Al	<b>929.4006.000</b>
260x260x1.5	St	<b>929.5013.000</b>
35 x 260	St	<b>929.2012.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>

Dim's (mm)	Material	
286x386x1.5	Al	<b>929.4008.000</b>
260x360x1.5	St	<b>929.5014.000</b>
35 x 360	St	<b>929.2014.000</b>
35 x 260	St	<b>929.2012.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>

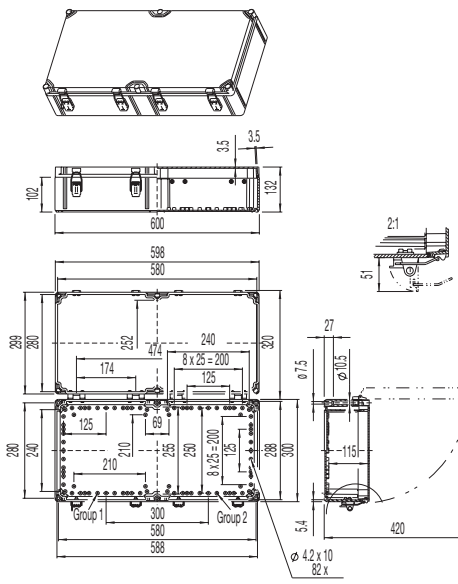
### 300 x 400 x 185 mm

CT-W 210 PC-Enclosure



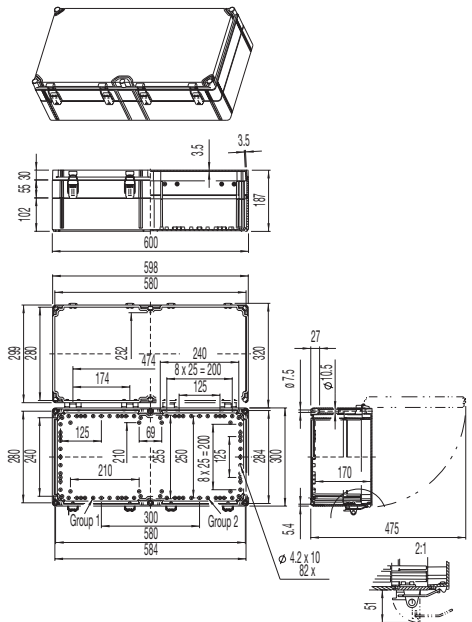
### 300 x 600 x 130 mm

CT-W 211 PC-Enclosure



### 300 x 600 x 185 mm

CT-W 212 PC-Enclosure



CT-W 210
PC
2737
300 x 400 x 185
<b>Part number</b>
<b>234.0100.000</b>
<b>234.1100.000</b>

CT-W 211
PC
3212
300 x 600 x 130
<b>Part number</b>
<b>234.0110.000</b>
<b>234.1110.000</b>

CT-W 212
PC
3703
300 x 600 x 185
<b>Part number</b>
<b>234.0120.000</b>
<b>234.1120.000</b>

Dim's (mm)	Material	
286x386x1.5	Al	<b>929.4008.000</b>
260x360x1.5	St	<b>929.5014.000</b>
35 x 360	St	<b>929.2014.000</b>
35 x 260	St	<b>929.2012.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>

Dim's (mm)	Material	
286x586x1.5	Al	<b>929.4010.000</b>
260x560x1.5	St	<b>929.5016.000</b>
35 x 260	St	<b>929.2012.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>

Dim's (mm)	Material	
286x586x1.5	Al	<b>929.4010.000</b>
260x560x1.5	St	<b>929.5016.000</b>
35 x 260	St	<b>929.2012.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>

# CT-Module Plastic Enclosures

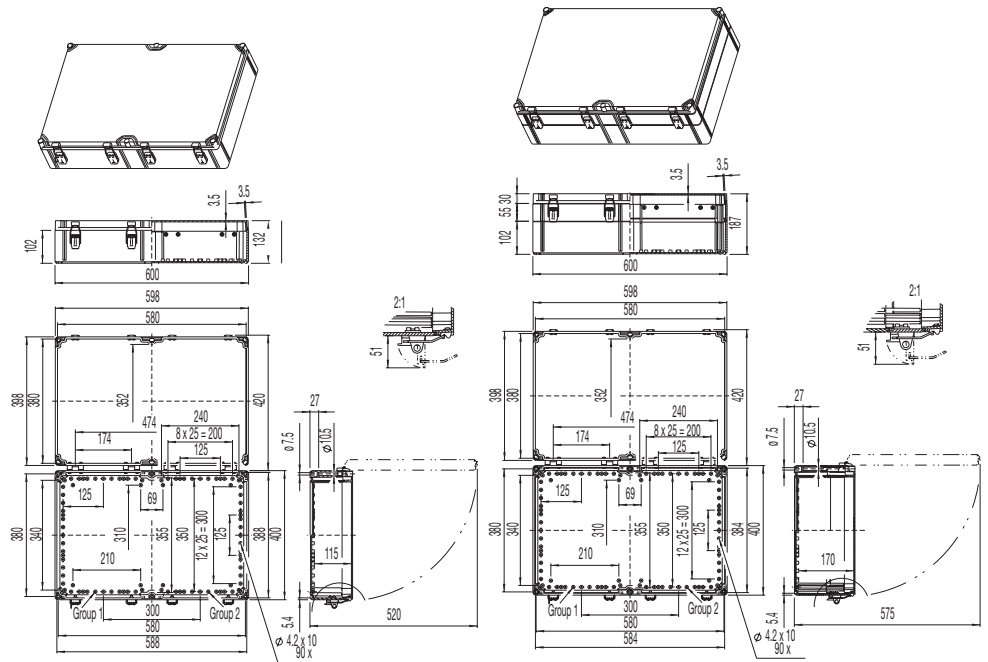
Type: CT-W

## 400 x 600 x 130 mm

CT-W 213 PC-Enclosure

## 400 x 600 x 185 mm

CT-W 214 PC-Enclosure



Type	
Material	
Weight (g)	
External dimensions (mm)	
<b>PC-Enclosures</b>	
Grey lid	
Transparent lid	

	CT-W 213
	PC
	4176
	400 x 600 x 130
	<b>Part number</b>
	<b>234.0130.000</b>
	<b>234.1130.000</b>

	CT-W 214
	PC
	4942
	400 x 600 x 185
	<b>Part number</b>
	<b>234.0140.000</b>
	<b>234.1140.000</b>

Accessories (also see P 359)	
Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
External mounting brackets	
Lid screws (std) (Set of 4)	

Dim's (mm)	Material	
386x586x1.5	Al	<b>929.4012.000</b>
360x560x1.5	St	<b>929.5018.000</b>
35 x 360	St	<b>929.2014.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>

Dim's (mm)	Material	
386x586x1.5	Al	<b>929.4012.000</b>
360x560x1.5	St	<b>929.5018.000</b>
35 x 360	St	<b>929.2014.000</b>
	PC	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>





## CT-Module Plastic Enclosures

Type: CT-O



### Features

- Grey or transparent lid
- Foam (PUR) gasket, IP 66/67
- 132 or 187 mm depth (using 55 mm extension frame)
- Optional corner elevator brackets allow height adjustment of internal mounting plate.



# CT-Module Plastic Enclosures

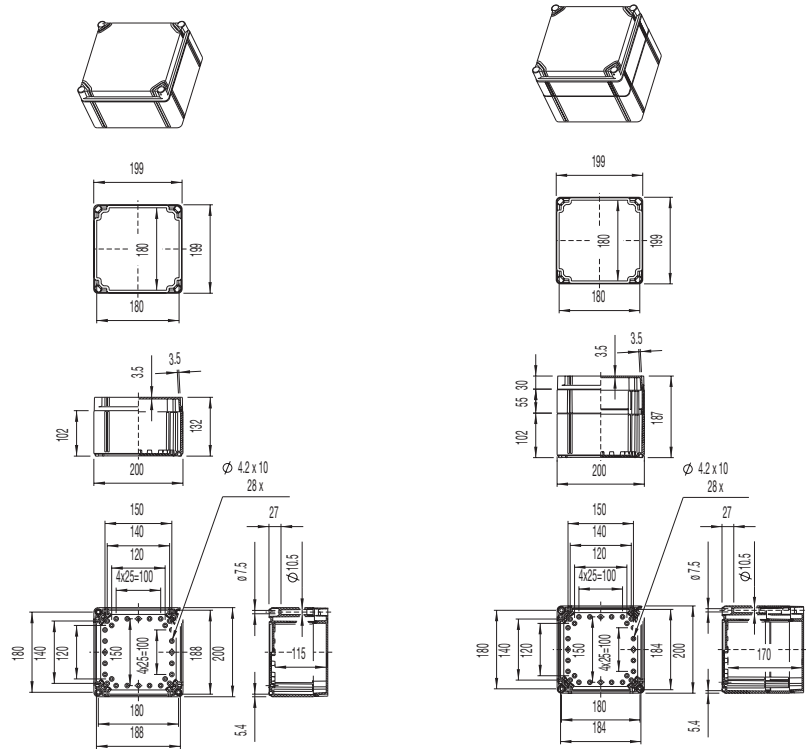
Type: CT-O

## 200 x 200 x 130 mm

CT-O 201 PC-Enclosure  
CT-O 301 ABS-Enclosure

## 200 x 200 x 185 mm

CT-O 202 PC-Enclosure  
CT-O 302 ABS-Enclosure



Type	
Material	
Weight (g)	
External dimensions (mm)	
Grey lid	
Transparent lid	

	CT-O 201	CT-O 301
	PC	ABS
	1039	894
	200 x 200 x 130	200 x 200 x 130
	<b>Part number</b>	<b>Part number</b>
	<b>244.0010.000</b>	<b>344.0010.000</b>
	<b>244.1010.000</b>	<b>344.1010.000</b>

	CT-O 202	CT-O 302
	PC	ABS
	1367	1222
	200 x 200 x 185	200 x 200 x 185
	<b>Part number</b>	<b>Part number</b>
	<b>244.0020.000</b>	<b>344.0020.000</b>
	<b>244.1020.000</b>	<b>344.1020.000</b>

Accessories (also see P 359)	
Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
External mounting brackets	
Lid screws (std) (Set of 4)	
Threaded inserts	

Dim's (mm)	Material		
186x166x1.5	Al	<b>929.4001.000</b>	<b>929.4001.000</b>
160x160x1.5	St	<b>929.5010.000</b>	<b>929.5010.000</b>
35 x 160	St	<b>929.2010.000</b>	<b>929.2010.000</b>
35 x 160	St	<b>929.2010.000</b>	<b>929.2010.000</b>
	PC	<b>929.3063.000</b>	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>	<b>929.3091.000</b>
M3	Ms	<b>929.3069.000</b>	<b>929.3069.000</b>

Dim's (mm)	Material		
186x166x1.5	Al	<b>929.4001.000</b>	<b>929.4001.000</b>
160x160x1.5	St	<b>929.5010.000</b>	<b>929.5010.000</b>
35 x 160	St	<b>929.2010.000</b>	<b>929.2010.000</b>
35 x 160	St	<b>929.2010.000</b>	<b>929.2010.000</b>
	PC	<b>929.3063.000</b>	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>	<b>929.3091.000</b>
M3	Ms	<b>929.3069.000</b>	<b>929.3069.000</b>

# CT-Module Plastic Enclosures

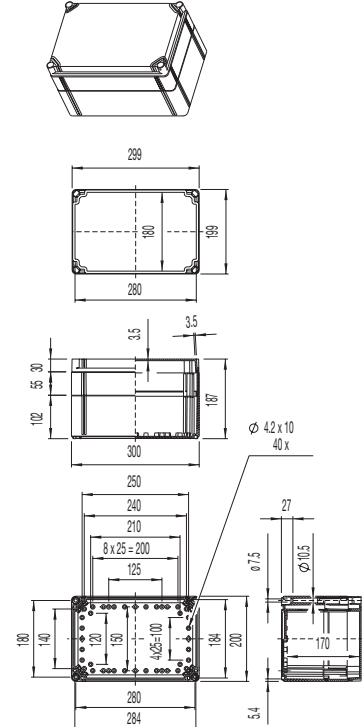
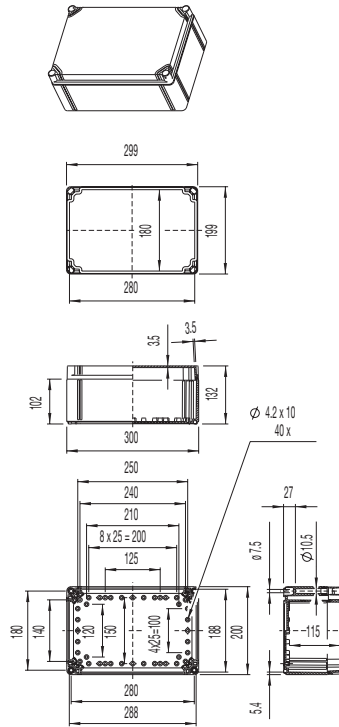
Type: CT-O

## 200 x 300 x 130 mm

CT-O 203 PC-Enclosure  
CT-O 303 ABS-Enclosure

## 200 x 300 x 185 mm

CT-O 204 PC-Enclosure  
CT-O 304 ABS-Enclosure



Type	
Material	
Weight	(g)
External dimensions	(mm)

	CT-O 203	CT-O 303
Material	PC	ABS
Weight	1349	1176
External dimensions	200 x 300 x 130	200 x 300 x 130
	<b>Part number</b>	<b>Part number</b>
Grey lid	<b>244.0030.000</b>	<b>344.0030.000</b>
Transparent lid	<b>244.1030.000</b>	<b>344.1030.000</b>

	CT-O 204	CT-O 304
Material	PC	ABS
Weight	1733	1560
External dimensions	200 x 300 x 185	200 x 300 x 185
	<b>Part number</b>	<b>Part number</b>
Grey lid	<b>244.0040.000</b>	<b>344.0040.000</b>
Transparent lid	<b>244.1040.000</b>	<b>344.1040.000</b>

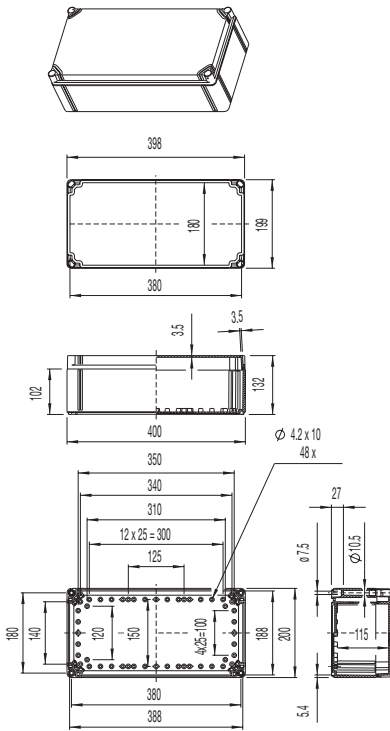
Accessories (also see P 359)	
Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
External mounting brackets	
Lid screws (std) (Set of 4)	
Threaded inserts	

Dim's (mm)	Material		
186x286 x 1.5	Al	<b>929.4003.000</b>	<b>929.4003.000</b>
160x260 x 1.5	St	<b>929.5011.000</b>	<b>929.5011.000</b>
35 x 260	St	<b>929.2012.000</b>	<b>929.2012.000</b>
35 x 160	St	<b>929.2010.000</b>	<b>929.2010.000</b>
	PC	<b>929.3063.000</b>	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>	<b>929.3091.000</b>
M3	Ms	<b>929.3069.000</b>	<b>929.3069.000</b>

Dim's (mm)	Material		
186x286 x 1.5	Al	<b>929.4003.000</b>	<b>929.4003.000</b>
160x260 x 1.5	St	<b>929.5011.000</b>	<b>929.5011.000</b>
35 x 260	St	<b>929.2012.000</b>	<b>929.2012.000</b>
35 x 160	St	<b>929.2010.000</b>	<b>929.2010.000</b>
	PC	<b>929.3063.000</b>	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>	<b>929.3091.000</b>
M3	Ms	<b>929.3069.000</b>	<b>929.3069.000</b>

## 200 x 400 x 130 mm

CT-O 205 PC-Enclosure  
CT-O 305 ABS-Enclosure

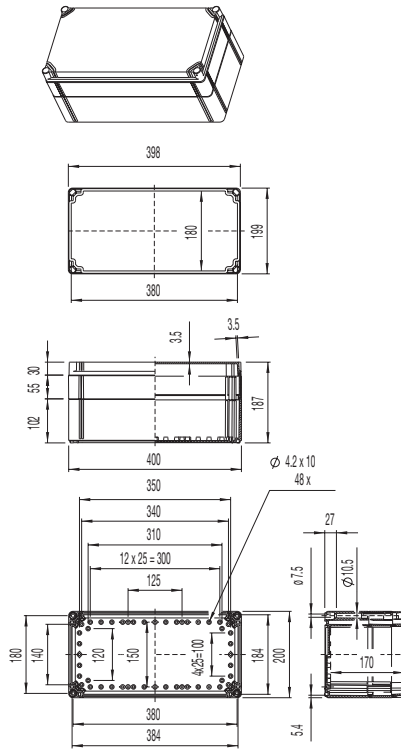


	CT-O 205	CT-O 305
	PC	ABS
	1674	1467
	200x400x130	200x400x130
	<b>Part number</b>	<b>Part number</b>
	<b>244.0050.000</b>	<b>344.0050.000</b>
	<b>244.1050.000</b>	<b>344.1050.000</b>

Dim's (mm)	Material		
186x386x1.5	Al	<b>929.4005.000</b>	<b>929.4005.000</b>
160x360x1.5	St	<b>929.5012.000</b>	<b>929.5012.000</b>
35 x 160	St	<b>929.2010.000</b>	<b>929.2010.000</b>
35 x 360	St	<b>929.2014.000</b>	<b>929.2014.000</b>
	PC	<b>929.3063.000</b>	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>	<b>929.3091.000</b>
M3	Ms	<b>929.3069.000</b>	<b>929.3069.000</b>

## 200 x 400 x 185 mm

CT-O 206 PC-Enclosure  
CT-O 306 ABS-Enclosure

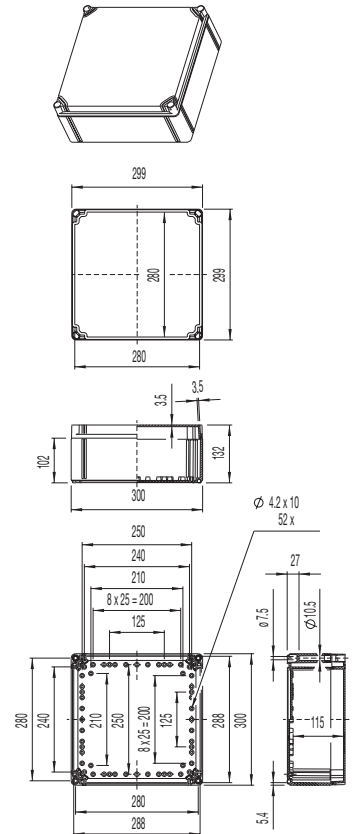


	CT-O 206	CT-O 306
	PC	ABS
	2131	1924
	200x400x185	200x400x185
	<b>Part number</b>	<b>Part number</b>
	<b>244.0060.000</b>	<b>344.0060.000</b>
	<b>244.1060.000</b>	<b>344.1060.000</b>

Dim's (mm)	Material		
186x386x1.5	Al	<b>929.4005.000</b>	<b>929.4005.000</b>
160x360x1.5	St	<b>929.5012.000</b>	<b>929.5012.000</b>
35 x 160	St	<b>929.2010.000</b>	<b>929.2010.000</b>
35 x 360	St	<b>929.2014.000</b>	<b>929.2014.000</b>
	PC	<b>929.3063.000</b>	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>	<b>929.3091.000</b>
M3	Ms	<b>929.3069.000</b>	<b>929.3069.000</b>

## 300 x 300 x 130 mm

CT-O 207 PC-Enclosure  
CT-O 307 ABS-Enclosure



	CT-O 207	CT-O 307
	PC	ABS
	1738	1510
	300x300x130	300x300x130
	<b>Part number</b>	<b>Part number</b>
	<b>244.0070.000</b>	<b>344.0070.000</b>
	<b>244.1070.000</b>	<b>344.1070.000</b>

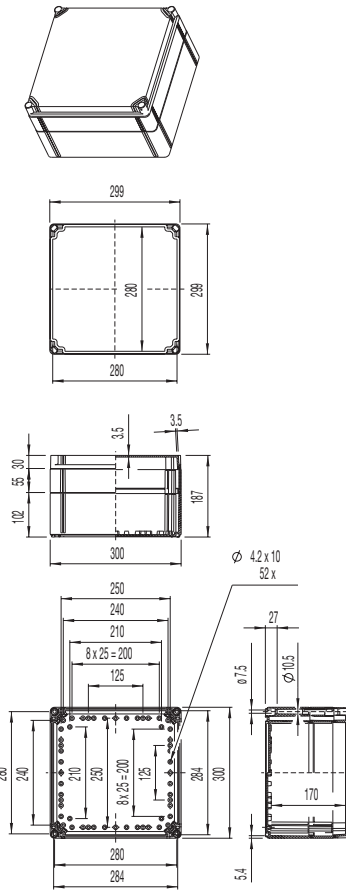
Dim's (mm)	Material		
286x286x1.5	Al	<b>929.4006.000</b>	<b>929.4006.000</b>
260x260x1.5	St	<b>929.5013.000</b>	<b>929.5013.000</b>
35 x 260	St	<b>929.2012.000</b>	<b>929.2012.000</b>
	PC	<b>929.3063.000</b>	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>	<b>929.3091.000</b>
M3	Ms	<b>929.3069.000</b>	<b>929.3069.000</b>

# CT-Module Plastic Enclosures

## Type: CT-O

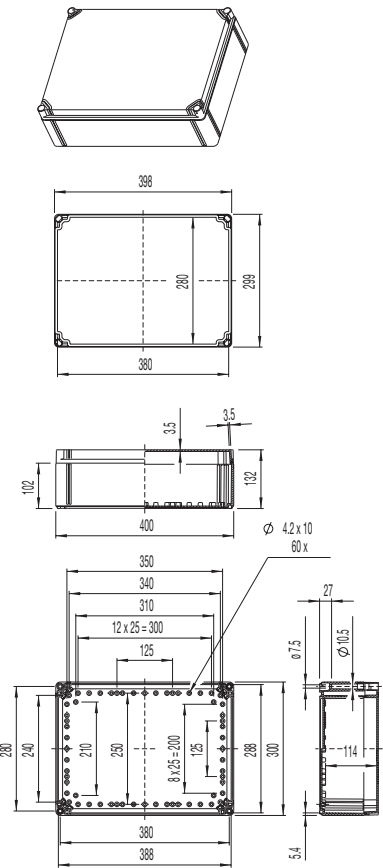
### 300 x 300 x 185 mm

CT-O 208 PC-Enclosure  
CT-O 308 ABS-Enclosure



### 300 x 400 x 130 mm

CT-O 209 PC-Enclosure  
CT-O 309 ABS-Enclosure



Type	
Material	
Weight	(g)
External dimensions	(mm)

Grey lid	
Transparent lid	

Accessories (also see P 359)	
Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
External mounting brackets	
Lid screws (std) (Set of 4)	
Threaded inserts	

	CT-O 208	CT-O 308
Material	PC	ABS
Weight	2188	1960
External dimensions	300 x 300 x 185	300 x 300 x 185
	<b>Part number</b>	<b>Part number</b>
Grey lid	<b>244.0080.000</b>	<b>344.0080.000</b>
Transparent lid	<b>244.1080.000</b>	<b>344.1080.000</b>

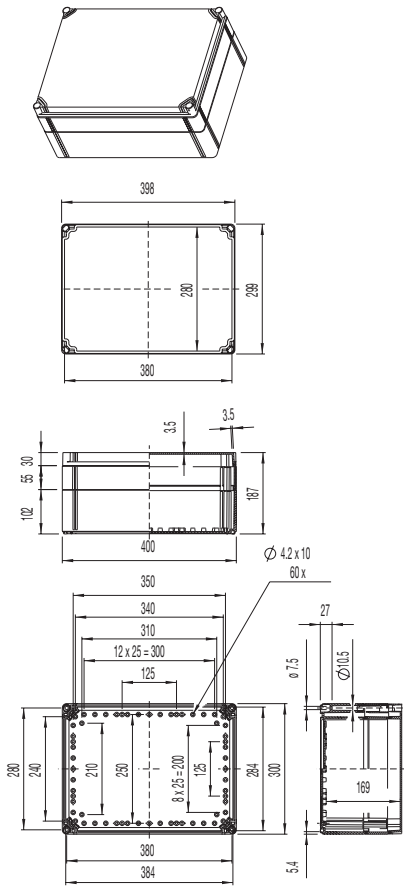
Dim's (mm)	Material		
286x286x1.5	Al	<b>929.4006.000</b>	<b>929.4006.000</b>
260x260x1.5	St	<b>929.5013.000</b>	<b>929.5013.000</b>
35 x 260	St	<b>929.2012.000</b>	<b>929.2012.000</b>
	PC	<b>929.3063.000</b>	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>	<b>929.3091.000</b>
M3	Ms	<b>929.3069.000</b>	<b>929.3069.000</b>

	CT-O 209	CT-O 309
Material	PC	ABS
Weight	2199	1950
External dimensions	300 x 400 x 130	300 x 400 x 130
	<b>Part number</b>	<b>Part number</b>
Grey lid	<b>244.0090.000</b>	<b>344.0090.000</b>
Transparent lid	<b>244.1090.000</b>	<b>344.1090.000</b>

Dim's (mm)	Material		
286x386x1.5	Al	<b>929.4008.000</b>	<b>929.4008.000</b>
260x360x1.5	St	<b>929.5014.000</b>	<b>929.5014.000</b>
35 x 360	St	<b>929.2014.000</b>	<b>929.2014.000</b>
35 x 260	St	<b>929.2012.000</b>	<b>929.2012.000</b>
	PC	<b>929.3063.000</b>	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>	<b>929.3091.000</b>
M3	Ms	<b>929.3069.000</b>	<b>929.3069.000</b>

### 300 x 400 x 185 mm

CT-O 210 PC-Enclosure  
CT-O 310 ABS-Enclosure

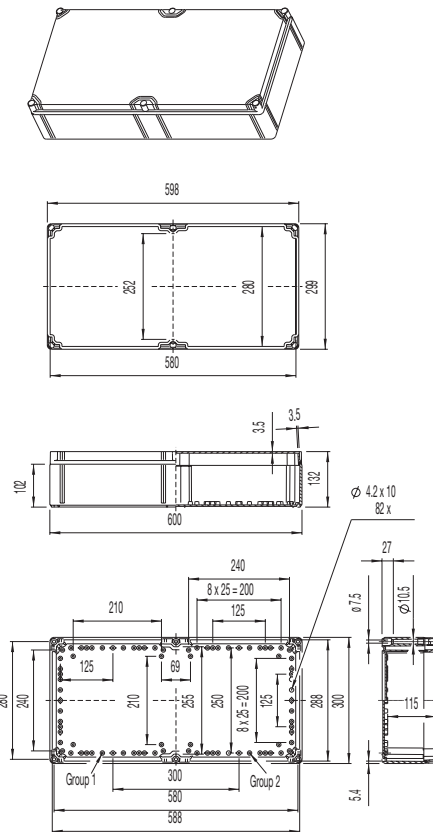


	CT-O 210	CT-O 310
	PC	ABS
	2703	2454
	300 x 400 x 185	300 x 400 x 185
	<b>Part number</b>	<b>Part number</b>
	<b>244.0100.000</b>	<b>344.0100.000</b>
	<b>244.1100.000</b>	<b>344.1100.000</b>

Dim's (mm)	Material		
286x386x1.5	Al	<b>929.4008.000</b>	<b>929.4008.000</b>
260x360x1.5	St	<b>929.5014.000</b>	<b>929.5014.000</b>
35 x 360	St	<b>929.2014.000</b>	<b>929.2014.000</b>
35 x 260	St	<b>929.2012.000</b>	<b>929.2012.000</b>
	PC	<b>929.3063.000</b>	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>	<b>929.3091.000</b>
M3	Ms	<b>929.3069.000</b>	<b>929.3069.000</b>

### 300 x 600 x 130 mm

CT-O 211 PC-Enclosure  
CT-O 311 ABS-Enclosure

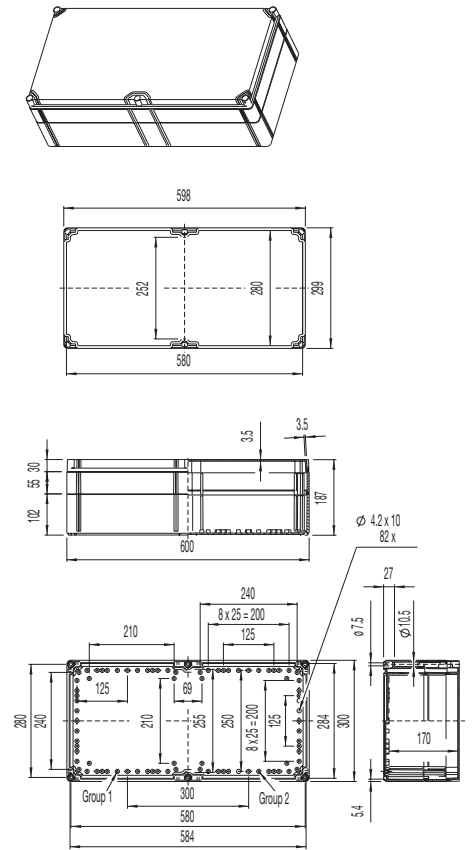


	CT-O 211	CT-O 311
	PC	ABS
	3000	2696
	300 x 600 x 130	300 x 600 x 130
	<b>Part number</b>	<b>Part number</b>
	<b>244.0110.000</b>	<b>344.0110.000</b>
	<b>244.1110.000</b>	<b>344.1110.000</b>

Dim's (mm)	Material		
286x586x1.5	Al	<b>929.4010.000</b>	<b>929.4010.000</b>
260x560x1.5	St	<b>929.5016.000</b>	<b>929.5016.000</b>
35 x 260	St	<b>929.2012.000</b>	<b>929.2012.000</b>
	PC	<b>929.3063.000</b>	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>	<b>929.3091.000</b>
M3	Ms	<b>929.3069.000</b>	<b>929.3069.000</b>

### 300 x 600 x 185 mm

CT-O 212 PC-Enclosure  
CT-O 312 ABS-Enclosure



	CT-O 212	CT-O 312
	PC	ABS
	3703	3399
	300 x 600 x 185	300 x 600 x 185
	<b>Part number</b>	<b>Part number</b>
	<b>244.0120.000</b>	<b>344.0120.000</b>
	<b>244.1120.000</b>	<b>344.1120.000</b>

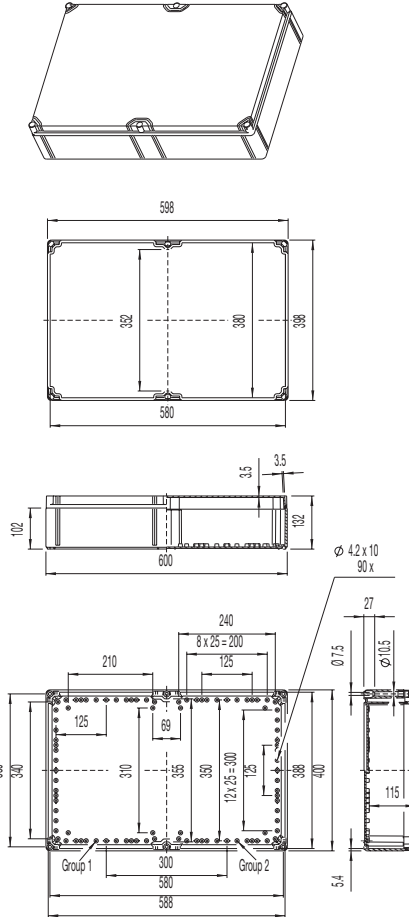
Dim's (mm)	Material		
286x586x1.5	Al	<b>929.4010.000</b>	<b>929.4010.000</b>
260x560x1.5	St	<b>929.5016.000</b>	<b>929.5016.000</b>
35 x 260	St	<b>929.2012.000</b>	<b>929.2012.000</b>
	PC	<b>929.3063.000</b>	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>	<b>929.3091.000</b>
M3	Ms	<b>929.3069.000</b>	<b>929.3069.000</b>

# CT-Module Plastic Enclosures

Type: CT-O

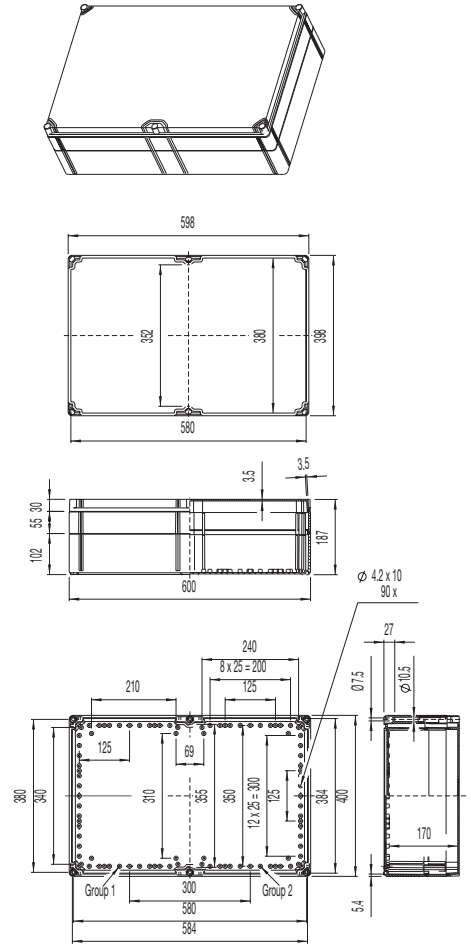
## 400 x 600 x 130

CT-O 213 PC-Enclosure  
CT-O 313 ABS-Enclosure



## 400 x 600 x 185

CT-O 214 PC-Enclosure  
CT-O 314 ABS-Enclosure



Type	
Material	
Weight	(g)
External dimensions	(mm)

Grey lid	
Transparent lid	

Accessories (also see P 359)	
Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
External mounting brackets	
Lid screws (std) (Set of 4)	
Threaded inserts	

	CT-O 213	CT-O 313
Material	PC	ABS
Weight	3964	3484
External dimensions	400 x 600 x 130	400 x 600 x 130
<b>Part number</b>	<b>244.0130.000</b>	<b>344.0130.000</b>
<b>Part number</b>	<b>244.1130.000</b>	<b>344.1130.000</b>

Dim's (mm)	Material		
386x586 x 1.5	Al	<b>929.4012.000</b>	<b>929.4012.000</b>
360x560 x 1.5	St	<b>929.5018.000</b>	<b>929.5018.000</b>
35 x 360	St	<b>929.2014.000</b>	<b>929.2014.000</b>
	PC	<b>929.3063.000</b>	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>	<b>929.3091.000</b>
M3	Ms	<b>929.3069.000</b>	<b>929.3069.000</b>

	CT-O 214	CT-O 314
Material	PC	ABS
Weight	4730	4250
External dimensions	400 x 600 x 185	400 x 600 x 185
<b>Part number</b>	<b>244.0140.000</b>	<b>344.0140.000</b>
<b>Part number</b>	<b>244.1140.000</b>	<b>344.1140.000</b>

Dim's (mm)	Material		
386x586 x 1.5	Al	<b>929.4012.000</b>	<b>929.4012.000</b>
360x560 x 1.5	St	<b>929.5018.000</b>	<b>929.5018.000</b>
35 x 360	St	<b>929.2014.000</b>	<b>929.2014.000</b>
	PC	<b>929.3063.000</b>	<b>929.3063.000</b>
42	PA	<b>929.3091.000</b>	<b>929.3091.000</b>
M3	Ms	<b>929.3069.000</b>	<b>929.3069.000</b>

## Accessories CT-Module



Cover flange



Knock-out flange



Membrane flange



Assembly handle

### Flanges & Accessories for CT-C

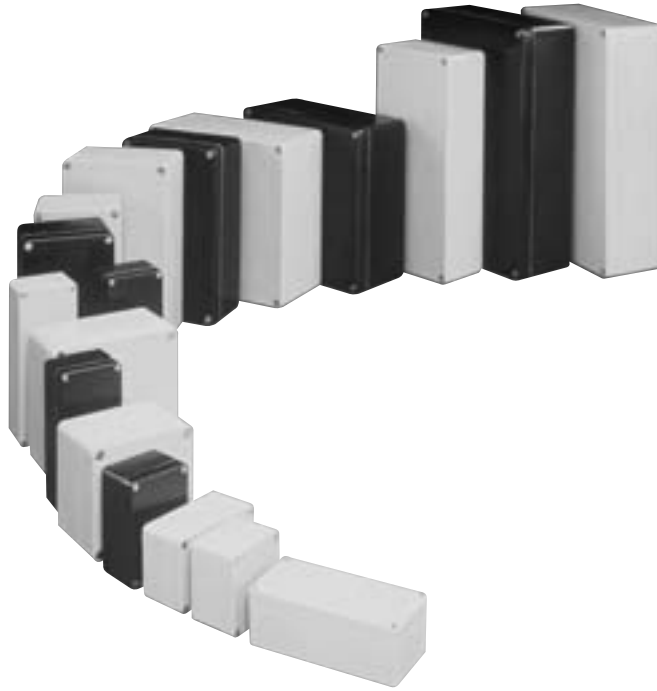
Part number	Cover flanges
929.6022.000	Size F1 without gasket, PC/ABS
929.6024.000	Size F2 with gasket (PUR), PC
	<b>Threaded flanges</b>
	<b>Size F1</b>
929.6006.000	3x PG 16 without gasket
929.6007.000	3x PG 21 without gasket
929.6008.000	1x PG 29 without gasket, PC/ABS
	<b>Size F2 with gasket</b>
929.6001.000	3x PG 21 + 4x PG 16 with gasket
929.6002.000	2x PG 29 + 6x PG 16 with gasket
929.6003.000	2x PG 36 + 4x PG 16 with gasket
929.6004.000	8x PG 16 with gasket
929.6005.000	10x PG 11 with gasket
	<b>Knock-out flanges, Size F2</b>
929.6010.000	7x PG 11 + 7x PG 9/16 with gasket
929.6011.000	2x PG 21/29/36 + 2x PG 9/16 + 1x PG 11 with gasket
929.6012.000	5x PG 16/21 + 2x PG 11 with gasket
929.6025.000	7x M 16 + 7x M 12/20
929.6026.000	2x M 20/32/50 + 2x M 12/20 + 2x M 16
929.6027.000	5x M 20/32 + 2x M 16 + 1x M 12/20
	<b>Membrane flange, Size F1</b>
929.6013.000	for 5x Ø 7–30 mm, EPDM
929.6017.000	3x Ø 21 + 4x Ø 15 mm without gasket, TPE
929.6018.000	4x Ø 16 + 6x Ø 13 mm without gasket, TPE
	<b>Membrane flange, Size F2</b>
929.6014.000	for 25x Ø 5–26 mm, EPDM
929.6015.000	for 35x Ø 5–26 mm, EPDM
929.6016.000	for 3x Ø 24–60 mm, EPDM
929.6019.000	3x Ø 30 + 6x Ø 18 + 16x Ø 14 mm without gasket, TPE
929.6020.000	9x Ø 18 + 24x Ø 14 mm without gasket, TPE
	<b>Flange Accessories, Size F1 &amp; F2</b>
929.3020.000	50 mm extension frame for F2
929.3021.000	Flange gasket F1
929.3022.000	Flange gasket F2
929.3023.000	Fixing screw set F1 (PA)
929.3024.000	Fixing screw set F1 (St with PA head)
929.3025.000	Fixing screw set F2 (PA)
929.3026.000	Fixing screw set F2 (St with PA head)
929.3027.000	Assembly handle F2

### Accessories for CT-O, C & W

Part number	
929.3040.000	Latch (pair)
929.3041.000	Latch (separate) GRP/AISI304
929.3042.000	Latch handle
929.3043.000	Latch hook, PA
929.3044.000	O-ring seal
929.3045.000	Padlock plate, AISI304
929.3046.000	Fixing screw for hook
929.3047.000	Fixing screw for latch
929.3006.000	Filler plug for 25 mm lid
929.3007.000	Filler plug for 50 mm lid
929.3008.000	Filler plug for 100 mm lid
929.3060.000	Screw for frame
929.3061.000	Hinge (pair)
929.3062.000	Hinge (pair) including two lid plugs
929.3065.000	Mounting plate elevator brackets (Set of 4)
929.3067.000	Threaded bushes & lid screw, PA
929.3068.000	Mounting screw for rail & plate
929.3069.000	Threaded inserts
929.3070.000	M 3 threaded bush (Set of 4)
929.3071.000	Lid plugs, PE
929.3072.000	Lid padlock (inc two keys)
929.3073.000	Spare key for padlock
929.3075.000	4x 15-mm-distance inc screw M5, St
929.3098.000	Winged lid screw
	<b>Accessories for CT-S</b>
929.3001.000	Hinges (pair)
929.3002.000	External mounting brackets
929.3004.000	Threaded inserts
929.3005.000	Internal mounting screws
929.3006.000	Filler plug for 25-mm-Lid
929.3007.000	Filler plug for 50-mm-Lid
929.3008.000	Filler plug for 100-mm-Lid
929.3011.000	Lid screw (Set of 4), 35 mm
929.3012.000	Lid screw (Set of 4), 60 mm
	<b>Front plates with hinges for CT-C, CT-W and CT-O</b>
929.4001.000	186 x 166 x 1.5 Hinge side: 200 mm
929.4002.000	186 x 286 x 1.5 Hinge side: 200 mm
929.4003.000	186 x 286 x 1.5 Hinge side: 300 mm
929.4004.000	186 x 386 x 1.5 Hinge side: 200 mm
929.4005.000	186 x 386 x 1.5 Hinge side: 400 mm
929.4006.000	286 x 286 x 1.5 Hinge side: 300 mm
929.4007.000	286 x 386 x 1.5 Hinge side: 300 mm
929.4008.000	286 x 386 x 1.5 Hinge side: 400 mm
929.4009.000	286 x 586 x 1.5 Hinge side: 300 mm
929.4010.000	286 x 586 x 1.5 Hinge side: 600 mm
929.4011.000	386 x 586 x 1.5 Hinge side: 400 mm
929.4012.000	386 x 586 x 1.5 Hinge side: 600 mm



## Polyester enclosures CP series



BERNSTEIN polyester enclosures from the CP and CPS series are made of high-quality glass-fibre reinforced polyester. The reduced surface resistance ( $RO < 10^9$  ohms) of the black polyester enclosures (CPS) makes them ideally suited to use in 'EX' areas and in generally harsh conditions. They can encapsulate electrical, electronic and control components. All enclosures comply with protection class IP 65 (according to DIN).

BERNSTEIN polyester enclosures provide either M4 or M6 internal mounting options, depending on the size of the base. These galvanised brass bushes are embedded in the interior of the base, permitting the assembly of mounting plates, mounting rails, PCBs etc.

The captive stainless steel lid screws are held in place by a lock integrated in the lid. The threaded bushes for lid attachment are also made of stainless steel. A gasket is factory-fitted (for standard enclosures), guaranteeing the protection class. The polyester enclosures are available in grey (RAL 7000, light grey) or black material (RAL 9005, jet black), as standard.

### Technical data

#### Material

Glass-fibre reinforced polyester in grey or glass-fibre reinforced polyester in black

#### Gasket

Neoprene round seal (siliconised)  
alternative:  
Neoprene round seal (silicone-free)  
Silicone round seal

#### Lid screws

Stainless steel, captive, multi-purpose cross-head  
alternative:  
Allen screws, stainless steel, captive

#### Colour

RAL 7000 (grey)  
or RAL 9005 (deep black)  
alternative:  
other colours on request

#### Temperature

-40 °C to +80 °C (neoprene gasket)  
alternative:  
-50 °C to +130 °C (silicone gasket)  
or -30 °C to +100 °C  
(explosion-hazardous areas)

#### Protection class

IP 65  
alternative:  
higher protection classes on request

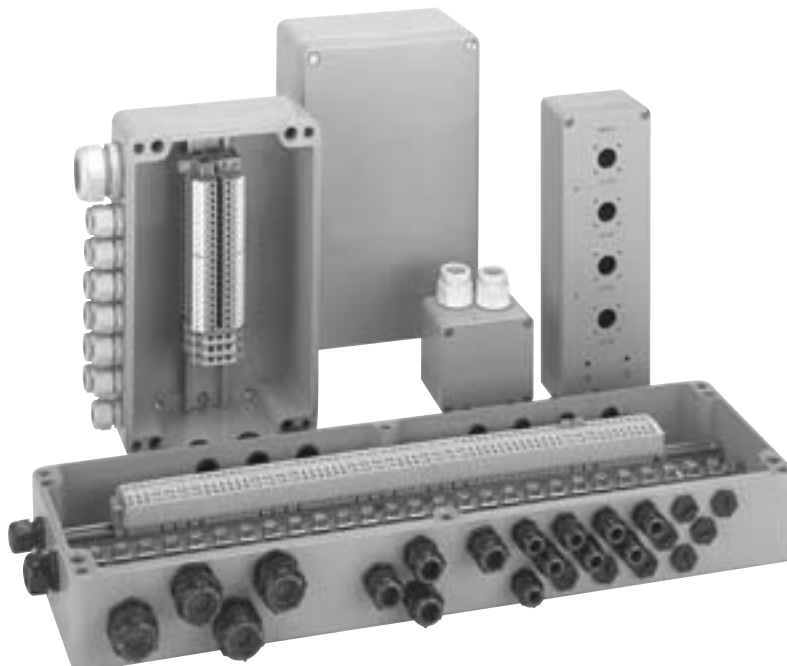
#### Approval

PTB No. Ex-83/3120  
PTB No. Ex-90.C.3118  
PTB No. Ex-90.C.3116 U

German Lloyd: No. 91 186-84HH

SEV 97.1 10396

UL: File E 182264

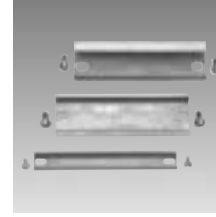


## Accessories Polyester enclosures



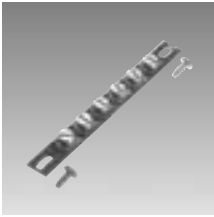
### Mounting plates

galvanised sheet steel or laminated paper (thickness: CP-140 to CP-195, laminated paper 1.5 mm; CP-220 to CP-320 and CP-370 to CP-460 sheet steel 1.5 mm; CP-330 sheet steel 2.5 mm), permitting the extended mounting of equipment.



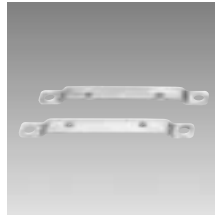
### Mounting rails

Standard rails TS-15, TS-32 or TS-35 (steel), yellow-passivated for holding terminal blocks.



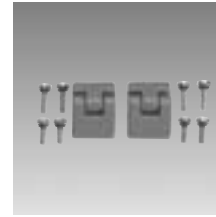
### Earthing rails

Galvanised steel for connecting and routing of protective earth connections.



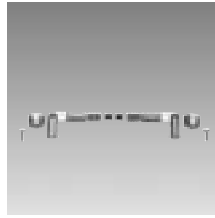
### External attachment brackets

Stainless steel for mounting enclosures without lid opening. The butt-straps always run in parallel to the narrow face of the enclosures.



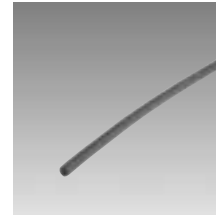
### External hinges

For hinged attachment of the enclosure lid. Opening angle of lid approx. 155°. Aluminium casting, RAL 7001 or RAL 9005. Mechanical machining is required for mounting. Drill template is supplied.



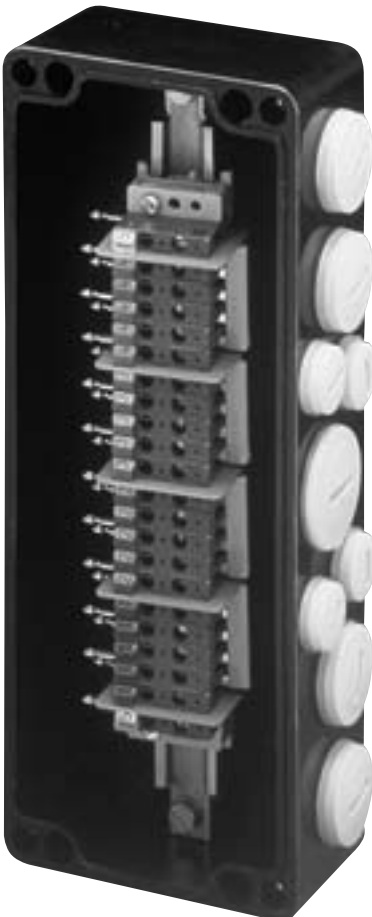
### Internal hinges

For hinged attachment of the enclosure lid. Opening angle of lid approx. 95°. Stainless steel. Mechanical machining is required for mounting.



### Silicone lid gasket

with improved temperature range (-50 °C to +130 °C). Standard type made of silicone foam.



## Overview – polyester enclosures

Dimensions/mm L x W x H	Polyester enclosures (grey)		Polyester enclosures (black)	
	Part number	Type	Part number	Type
80 x 75 x 55	414.0.0000.00	CP-140	514.0.0000.00	CPS-140
80 x 75 x 75	414.0.0000.50	CP-145	514.0.0000.50	CPS-145
110 x 75 x 55	415.0.0000.00	CP-150	515.0.0000.00	CPS-150
110 x 75 x 75	415.0.0000.50	CP-155	515.0.0000.50	CPS-155
160 x 75 x 55	417.0.0000.00	CP-170	517.0.0000.00	CPS-170
160 x 75 x 75	417.0.0000.50	CP-175	517.0.0000.50	CPS-175
190 x 75 x 55	419.0.0000.00	CP-190	519.0.0000.00	CPS-190
190 x 75 x 75	419.0.0000.50	CP-195	519.0.0000.50	CPS-195
122 x 120 x 90	422.0.0000.00	CP-220	522.0.0000.00	CPS-220
220 x 120 x 90	424.0.0000.00	CP-240	524.0.0000.00	CPS-240
160 x 160 x 90	428.0.0000.00	CP-280	528.0.0000.00	CPS-280
260 x 160 x 90	430.0.0000.00	CP-300	530.0.0000.00	CPS-300
360 x 160 x 90	432.0.0000.00	CP-320	532.0.0000.00	CPS-320
560 x 160 x 90	433.0.0000.00	CP-330	533.0.0000.00	CPS-330
255 x 250 x 120	437.0.0000.00	CP-370	537.0.0000.00	CPS-370
400 x 250 x 120	440.0.0000.00	CP-400	540.0.0000.00	CPS-400
400 x 405 x 120	445.0.0000.00	CP-450	545.0.0000.00	CPS-450
400 x 405 x 165	446.0.0000.00	CP-460	546.0.0000.00	CPS-460

## Component overview polyester enclosures

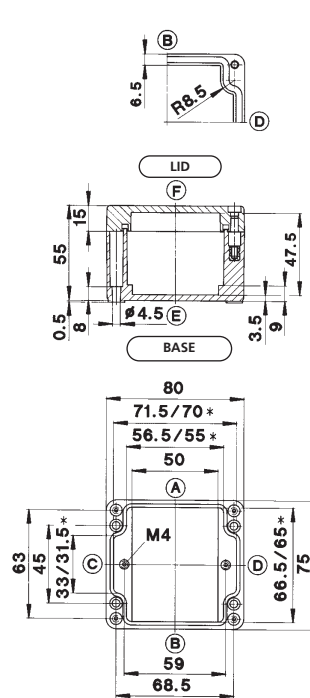
Model	Weidmüller			Phoenix			Wieland			Entelec						Phoenix								
	Block terminal			Block terminal			Block terminal			Terminal block						Terminal block								
Terminal width (mm):										5.2	6.2	5.2	6.2	6.2	8.2	10.2	12.2	5.2	6.2	7.5	5.2	6.2	8.2	10.2
Single-core mm <sup>2</sup>	4	4	4	4	4	4	2.5	2.5	2.5	2.5	4	4	6	4	10	16	25	2.5	4	10	4	4	10	16
Stranded mm <sup>2</sup>	4	4	4	4	4	4	2.5	2.5	2.5	1.5	4	2.5	4	4	6	10	16	1.5	4	6	2.5	4	6	10
Nominal voltage V	380	380	380	500	500	500	500	500	500	250	380	750	750	750	750	750	750	–	500	500	750	750	750	750
Loading capacity A	36	36	36	36	36	36	25	25	25	20	35	26	35	35	46	63	85	27	36	65	36	36	65	87
Terminal bridging	–	–	–	–	–	–	–	–	–	–	○	○	○	○	–	○	○	○	○	○	○	○	○	○
Mounting rail TS 15	–	–	–	–	–	–	–	–	–	○	○	–	–	–	–	–	–	○	○	○	–	–	–	–
TS 32	–	–	–	–	–	–	–	–	–	–	–	○	○	○	○	○	○	–	–	–	○	○	○	○
TS 35	–	–	–	–	–	–	–	–	–	–	–	○	○	○	○	○	○	–	–	–	○	○	○	○
Part number	<b>9.40.1.0100.00</b>	<b>9.40.1.0090.00</b>	<b>9.40.1.0130.00</b>	<b>9.40.1.0020.00</b>	<b>9.40.1.0030.00</b>	<b>9.40.1.0040.00</b>	<b>9.40.1.0050.00</b>	<b>9.40.1.0060.00</b>	<b>9.40.1.0080.00</b>	<b>9.40.2.1270.00</b>	<b>9.40.2.0940.00</b>	<b>9.40.2.1090.00</b>	<b>9.40.2.1030.00</b>	<b>9.40.2.1280.00</b>	<b>9.40.2.1040.00</b>	<b>9.40.2.1050.00</b>	<b>9.40.2.1060.00</b>	<b>9.40.2.0010.00</b>	<b>9.40.2.0020.00</b>	<b>9.40.2.0030.00</b>	<b>9.40.2.0050.00</b>	<b>9.40.2.0070.00</b>	<b>9.40.2.0090.00</b>	<b>9.40.2.0110.00</b>
Type	BK 4	BK 6	BK 12	G 5/4	G 5/6	G 5/12	KL-16/8	KL-16/12	KL-16/20	DR 1.5/5	DR 4/6	MA 2.5/5	M 4/6	MS 4/6	M 6/8	M 10/10	M 16/12	MBK	MBK 5/E	MBK 10	UK 3 N	UK 5 N	UK 10	UK 16
CP-140/145	1	1	–	1	1	–	–	–	–	7	6	–	–	–	–	–	–	7	6	5	–	–	–	–
CP-150/155	–	1	–	–	1	–	1	1	–	13	11	–	–	–	–	–	–	13	11	9	–	–	–	–
CP-170/175	–	–	1	–	–	1	–	–	1	22	19	–	–	–	–	–	–	22	19	15	–	–	–	–
CP-190/195	–	–	–	–	–	–	–	2	1	28	24	–	–	–	–	–	–	28	24	19	–	–	–	–
CP-220	–	–	–	–	–	–	–	–	–	–	–	12	10	10	8	6	5	–	–	–	12	10	8	6
CP-240	–	–	–	–	–	–	–	–	–	–	–	31	26	26	19	16	13	–	–	–	31	26	19	16
CP-280	–	–	–	–	–	–	–	–	–	–	–	19	16	16	12	10	8	–	–	–	19	16	12	10
CP-300	–	–	–	–	–	–	–	–	–	–	–	39	32	32	24	20	16	–	–	–	39	32	24	20
CP-320	–	–	–	–	–	–	–	–	–	–	–	58	48	48	37	29	24	–	–	–	58	48	37	29
CP-330	–	–	–	–	–	–	–	–	–	–	–	96	80	80	61	48	40	–	–	–	96	80	61	48
CP-370	–	–	–	–	–	–	–	–	–	–	–	38	32	32	24	19	16	–	–	–	38	32	24	19
CP-370*)	–	–	–	–	–	–	–	–	–	–	–	76	64	64	48	38	–	–	–	–	76	64	48	38
CP-400	–	–	–	–	–	–	–	–	–	–	–	66	55	55	41	33	28	–	–	–	66	55	41	33
CP-400*)	–	–	–	–	–	–	–	–	–	–	–	132	110	110	82	106	–	–	–	–	132	110	82	66
CP-450	–	–	–	–	–	–	–	–	–	–	–	66	55	55	41	33	28	–	–	–	66	55	41	33
CP-450*)	–	–	–	–	–	–	–	–	–	–	–	132	110	110	82	66	56	–	–	–	132	110	82	66
CP-450**)	–	–	–	–	–	–	–	–	–	–	–	198	165	165	123	99	84	–	–	–	198	165	123	99
CP-460	–	–	–	–	–	–	–	–	–	–	–	66	55	55	41	33	28	–	–	–	66	55	41	33
CP-460*)	–	–	–	–	–	–	–	–	–	–	–	132	110	110	82	66	56	–	–	–	132	110	82	66
CP-460**)	–	–	–	–	–	–	–	–	–	–	–	198	165	165	123	99	84	–	–	–	198	165	123	99

\*) Assembled on 2 mounting rails  
 \*\*) Assembled on 3 mounting rails  
 The number of terminals is reduced when partitions are used.

	Siemens				WAGO												Weidmüller												
	Terminal block		Terminal block		Terminal block												Terminal block												
	Screw terminals				Caged tension spring		6.2	10.2	6.2	10.2	4.2	5.2	5.2	6.2	6.2	8.2	10.2	12.2	5.2	6.2	6.2	6.5	8.2	10.2	12.2	5.2	6.2		
	4	6	10	25	4	4	10	2.5	2.5	2.5	2.5	1.5	2.5	2.5	4	4	6	10	16	2.5	4	4	6	10	16	25	4	6	
	2.5	4	6	16	2.5	4	6	2.5	2.5	2.5	2.5	1.5	2.5	2.5	4	4	6	10	16	1.5	4	2.5	4	6	10	15	2.5	4	
	750	750	750	750	750	750	750	800	800	800	800	800	800	800	800	800	800	800	800	250	380	750	750	750	750	750	750	750	
	26	35	46	85	36	36	65	26	26	26	26	18	26	26	34	34	44	44	61	82	27	36	27	36	47	65	87	26	34
	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
	-	○	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	○	○	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○	○	○	-	-	
	○	○	○	○	○	○	○	-	-	○	○	○	○	○	○	○	○	○	○	-	-	-	-	-	-	-	○	○	
	9.40.2.4000.00	9.40.2.4010.00	9.40.2.4020.00	9.40.2.4030.00	9.40.2.4040.00	9.40.2.4050.00	9.40.2.4060.00	9.40.2.3020.00	9.40.2.3030.00	9.40.2.3210.00	9.40.2.3220.00	9.40.2.3230.00	9.40.2.0930.00	9.40.2.3240.00	9.40.2.3250.00	9.40.2.3260.00	9.40.2.3270.00	9.40.2.3280.00	9.40.2.3290.00	9.40.2.0500.00	9.40.2.0130.00	9.40.2.0140.00	9.40.2.0150.00	9.40.2.0160.00	9.40.2.0470.00	9.40.2.0170.00	9.40.2.1460.00	9.40.2.1470.00	
	8WA1011-IDF11	8WA1011-IDG11	8WA1011-IDH11	8WA1204	8WA2011-IDF20	8WA2011-IDG20	8WA2011-IDH20	264-701	264-721	264-711	264-731	279-621	280-601	280-901	281-601	281-901	282-601	284-601	283-601	AKZ 2.5 PA	AKZ 4 PA	SAK 2.5 PA	SAK 4 PA	SAK 6 NPA	SAK 10 PA	SAK 16 PA	WDU 2.5	WDU 4	
	-	-	-	-	-	-	-	7	4	-	-	-	-	-	-	-	-	-	-	7	6	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	12	7	-	-	-	-	-	-	-	-	-	-	13	11	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	20	12	-	-	-	-	-	-	-	-	-	-	22	19	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	25	15	-	-	-	-	-	-	-	-	-	-	28	24	-	-	-	-	-	-	-	
	12	11	9	17	14	12	9	-	-	13	7	20	16	16	13	13	9	8	6	-	-	10	10	8	6	5	12	10	
	28	26	21	17	33	28	21	-	-	29	17	44	35	35	29	29	22	17	14	-	-	26	25	19	16	13	31	26	
	16	15	12	9	19	16	12	-	-	17	10	26	20	20	17	17	12	10	8	-	-	16	15	12	10	8	19	16	
	35	32	26	21	41	34	26	-	-	33	20	51	40	40	33	13	25	20	16	-	-	32	31	24	20	16	39	32	
	52	48	39	31	60	50	38	-	-	50	30	76	60	60	50	50	37	30	25	-	-	48	46	37	29	24	58	48	
	85	78	64	51	98	82	62	-	-	83	50	125	100	100	83	83	62	50	41	-	-	86	74	61	48	40	96	80	
	34	32	26	20	40	33	25	-	-	33	21	53	42	42	35	35	26	21	17	-	-	32	30	24	19	16	38	32	
	68	64	52	40	80	66	50	-	-	66	42	106	84	84	70	70	52	42	37	-	-	64	60	48	38	-	76	64	
	58	54	44	35	68	57	43	-	-	59	35	89	71	71	59	59	44	35	29	-	-	55	52	41	33	28	66	55	
	116	108	88	70	136	114	86	-	-	118	70	178	142	142	118	118	88	70	58	-	-	110	104	82	106	-	132	110	
	59	54	44	35	68	57	43	-	-	59	35	90	71	71	59	59	44	35	29	-	-	55	52	41	33	28	66	55	
	118	108	88	70	136	114	86	-	-	118	70	180	142	142	118	118	88	70	58	-	-	110	104	82	66	56	132	110	
	177	162	132	205	204	171	129	-	-	117	105	270	213	213	177	177	132	105	87	-	-	165	156	123	99	84	198	165	
	59	54	44	35	68	57	43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	55	52	41	33	28	66	55	
	118	108	88	70	136	114	86	-	-	-	-	-	-	-	-	-	-	-	-	-	-	110	104	82	66	56	132	110	
	177	162	132	205	204	171	129	-	-	-	-	-	-	-	-	-	-	-	-	-	-	165	156	123	99	84	198	165	

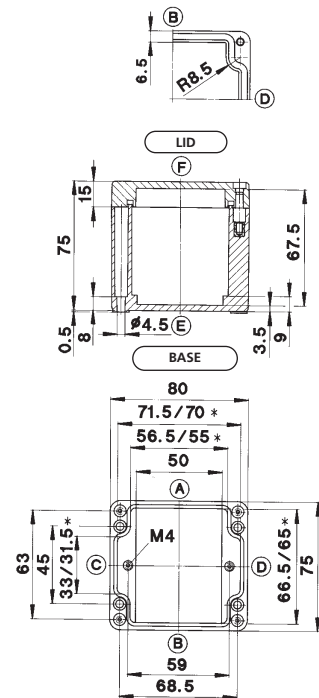
## 80 x 75 x 55 mm

CP-140  
Polyester enclosure, grey  
CPS-140  
Polyester enclosure, black



## 80 x 75 x 75 mm

CP-145  
Polyester enclosure, grey  
CPS-145  
Polyester enclosure, black



\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

Type	
Weight (g)	
External dimensions (mm)	
<b>Complete enclosures</b>	
Grey (CP), with gasket and lid screws	
Grey (CP), with gasket, hex. socket head screws	
Grey (CP), with silicone gasket and lid screws	
Black (CPS), with gasket and lid screws	
Black (CPS), with gasket, hex. socket head screws	
Black (CPS), with silicone gasket and lid screws	
<b>Accessories</b> (separate or as a mounting set)	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail	
External attachment brackets	
External hinges for CP enclosure (grey)**	
External hinges for CPS enclosure (black)**	
Internal hinges with lid guiding**	
Silicone gasket for wider temperature range (piece goods)	

CP-140	CPS-140
230	230
80 x 75 x 55	
<b>Part number</b>	
<b>414.0.0000.00 ●</b>	
<b>414.0.0010.00</b>	
<b>414.0.0140.00</b>	
	<b>514.0.0000.00 ●</b>
	<b>514.0.0010.00</b>
	<b>514.0.0170.00</b>
<b>982.3.0000.00 ●</b>	
<b>982.0.0030.00 ●</b>	
-	
-	
-	
<b>982.4.0000.00 ●</b>	
-	
-	
-	
<b>923.1.0060.00 ●</b>	

CP-145	CPS-145
300	300
80 x 75 x 75	
<b>Part number</b>	
<b>414.0.0000.50 ●</b>	
<b>414.0.0010.50</b>	
<b>414.0.0100.50</b>	
	<b>514.0.0000.50 ●</b>
	<b>514.0.0010.50</b>
	<b>514.0.0100.50</b>
<b>982.3.0000.00 ●</b>	
<b>982.0.0030.00 ●</b>	
-	
-	
-	
<b>982.4.0000.00 ●</b>	
-	
-	
-	
<b>923.1.0060.00 ●</b>	

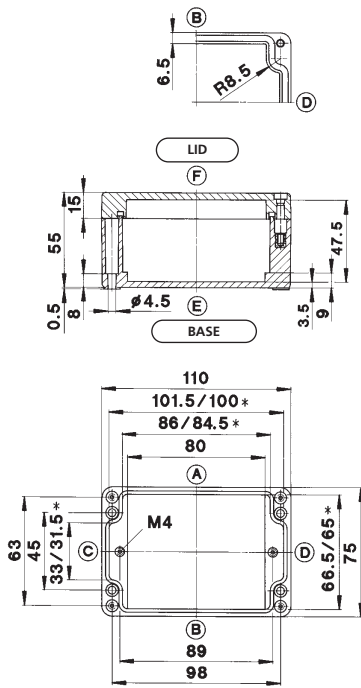
### Max. Pg threads

ISO M	12	16	20	25	32	40	50	63
Side A/B	5	2	2	1	0	0	0	0
Side C/D	2	1	1	0	0	0	0	0
** mechanical enclosure machining required								
● = kept in stock								

ISO M	12	16	20	25	32	40	50	63
Side A/B	8	4	2	1	1	0	0	0
Side C/D	4	1	1	1	1	0	0	0
** mechanical enclosure machining required								
● = kept in stock								

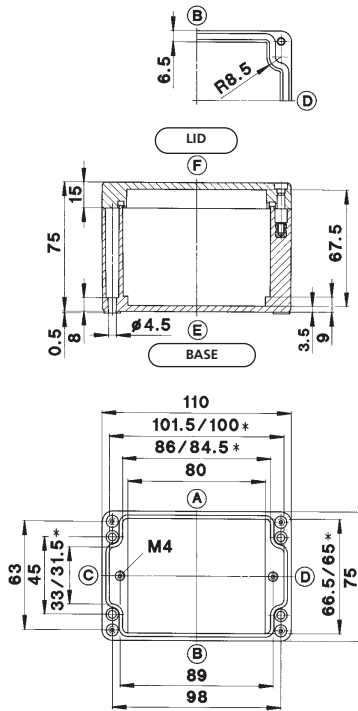
## 110 x 75 x 55 mm

CP-150  
Polyester enclosure, grey  
CPS-150  
Polyester enclosure, grey



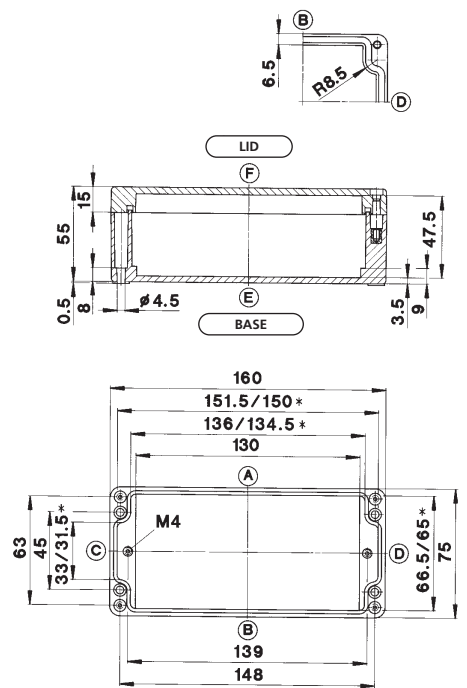
## 110 x 75 x 75 mm

CP-155  
Polyester enclosure, grey  
CPS-155  
Polyester enclosure, grey



## 160 x 75 x 55 mm

CP-170  
Polyester enclosure, grey  
CPS-170  
Polyester enclosure, grey



\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

CP-150	CPS-150
295	295
110 x 75 x 55	
<b>Part number</b>	
415.0.0000.00 ●	
415.0.0010.00	
415.0.0250.00	
	515.0.0000.00 ●
	515.0.0010.00
	515.0.0310.00
982.3.0010.00 ●	
982.0.0060.00 ●	
-	
-	
-	
982.4.0000.00 ●	
-	
-	
-	
923.1.0060.00 ●	
-	
-	

CP-155	CPS-155
360	360
110 x 75 x 75	
<b>Part number</b>	
415.0.0000.50 ●	
415.0.0010.50	
415.0.0100.50	
	515.0.0000.50 ●
	515.0.0010.50
	515.0.0100.50
982.3.0010.00 ●	
982.0.0060.00 ●	
-	
-	
-	
982.4.0000.00 ●	
-	
-	
-	
923.1.0060.00 ●	
-	
-	

CP-170	CPS-170
405	405
160 x 75 x 55	
<b>Part number</b>	
417.0.0000.00 ●	
417.0.0010.00	
417.0.0160.00	
	517.0.0000.00 ●
	517.0.0010.00
	517.0.0100.00
982.3.0020.00 ●	
982.0.0120.00 ●	
-	
-	
-	
982.4.0000.00 ●	
-	
-	
-	
923.1.0060.00 ●	
-	
-	

ISO M	12	16	20	25	32	40	50	63
Side A/B	8	3	2	2	0	0	0	0
Side C/D	2	1	1	0	0	0	0	0

\*\* mechanical enclosure machining required  
● = kept in stock

ISO M	12	16	20	25	32	40	50	63
Side A/B	12	6	3	2	2	0	0	0
Side C/D	4	1	1	1	1	0	0	0

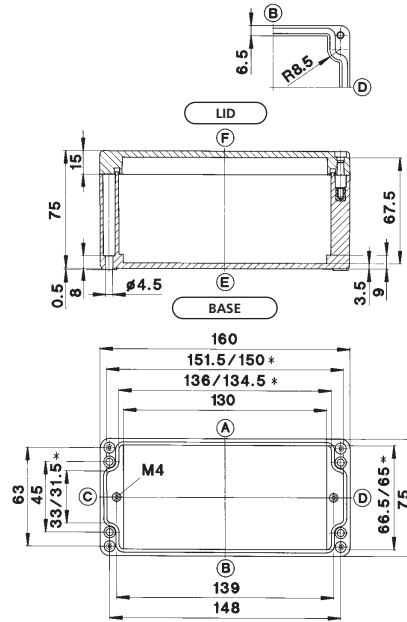
\*\* mechanical enclosure machining required  
● = kept in stock

ISO M	12	16	20	25	32	40	50	63
Side A/B	12	5	4	3	0	0	0	0
Side C/D	2	1	1	0	0	0	0	0

\*\* mechanical enclosure machining required  
● = kept in stock

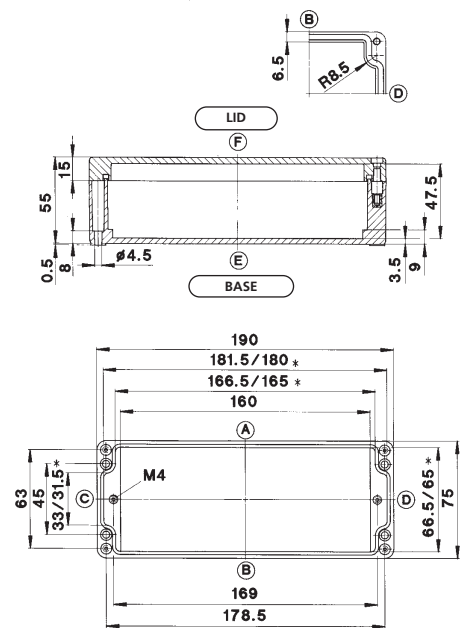
## 160 x 75 x 75 mm

CP-175  
Polyester enclosure, grey  
CPS-175  
Polyester enclosure, black



## 190 x 75 x 55 mm

CP-190  
Polyester enclosure, grey  
CPS-190  
Polyester enclosure, black



\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

Type	
Weight (g)	
External dimensions (mm)	
<b>Complete enclosures</b>	
Grey (CP), with gasket and lid screws	
Grey (CP), with gasket, hex. socket head screws	
Grey (CP), with silicone gasket and lid screws	
Black (CPS), with gasket and lid screws	
Black (CPS), with gasket, hex. socket head screws	
Black (CPS), with silicone gasket and lid screws	
<b>Accessories</b> (separate or as a mounting set)	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail	
External attachment brackets	
External hinges for CP enclosure (grey)**	
External hinges for CPS enclosure (black)**	
Internal hinges with lid guiding**	
Silicone gasket for wider temperature range (piece goods)	

CP-175	CPS-175
460	460
160 x 75 x 75	
<b>Part number</b>	
417.0.0000.50 ●	
417.0.0010.50	
417.0.0100.50	
	517.0.0000.50 ●
	517.0.0010.50
	517.0.0100.50
982.3.0020.00 ●	
982.0.0120.00 ●	
-	
-	
-	
982.4.0000.00 ●	
-	
-	
-	
923.1.0060.00 ●	

CP-190	CPS-190
450	450
190 x 75 x 55	
<b>Part number</b>	
419.0.0000.00 ●	
419.0.0010.00	
419.0.0150.00	
	519.0.0000.00 ●
	519.0.0010.00
	519.0.0100.00
982.3.0030.00 ●	
982.0.0150.00 ●	
-	
-	
-	
982.4.0000.00 ●	
-	
-	
-	
923.1.0060.00 ●	

### Max. Pg threads

ISO M	12	16	20	25	32	40	50	63
Side A/B	18	10	6	4	3	0	0	0
Side C/D	4	1	1	1	1	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

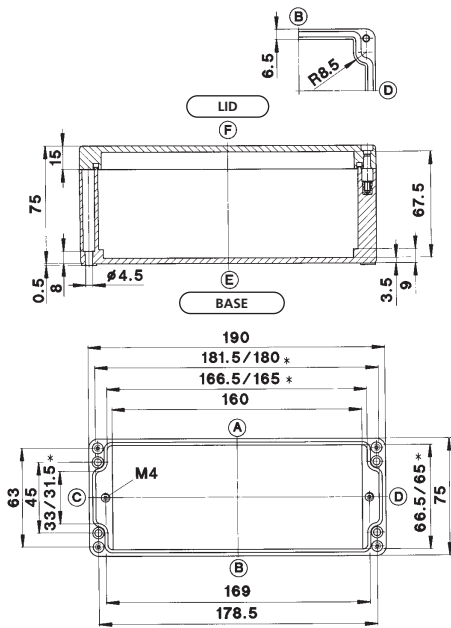
ISO M	12	16	20	25	32	40	50	63
Side A/B	16	7	5	4	0	0	0	0
Side C/D	2	1	1	0	0	0	0	0

\*\* mechanical enclosure machining required

● = kept in stock

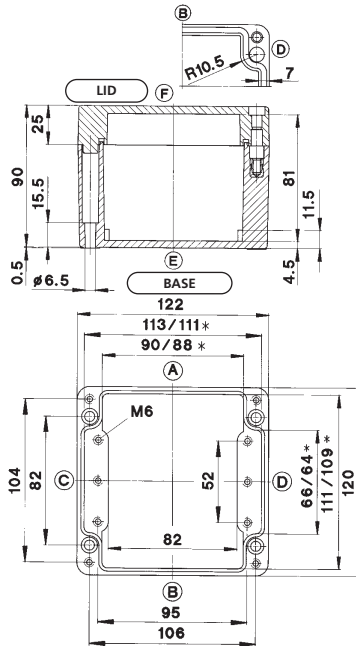
## 190 x 75 x 75 mm

CP-195  
Polyester enclosure, grey  
CPS-195  
Polyester enclosure, black



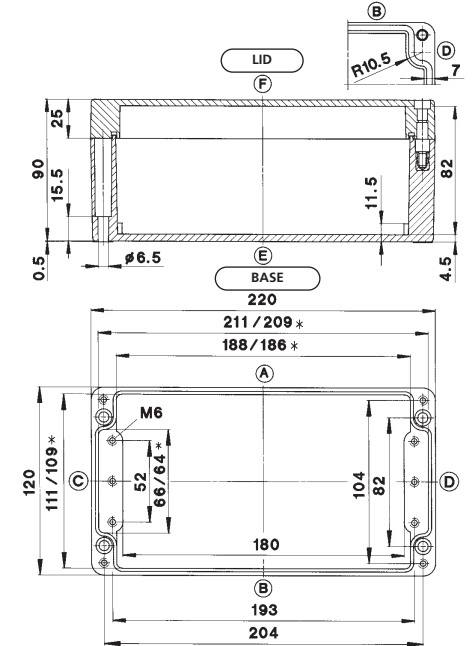
## 122 x 120 x 90 mm

CP-220  
Polyester enclosure, grey  
CPS-220  
Polyester enclosure, black



## 220 x 120 x 90 mm

CP-240  
Polyester enclosure, grey  
CPS-240  
Polyester enclosure, black



\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

CP-195	CPS-195
530	530
190 x 75 x 75	
<b>Part number</b>	
419.0.0000.50 ●	
419.0.0010.50	
419.0.0100.50	
	519.0.0000.50 ●
	519.0.0010.50
	519.0.0100.50
982.3.0030.00 ●	
982.0.0150.00 ●	
-	
-	
-	
982.4.0000.00 ●	
-	
-	
923.1.0060.00 ●	

CP-220	CPS-220
750	750
122 x 120 x 90	
<b>Part number</b>	
422.0.0000.00 ●	
422.0.0010.00	
422.0.0180.00	
	522.0.0000.00 ●
	522.0.0010.00
	522.0.0400.00
982.3.0040.00 ●	
-	
982.1.0000.00 ●	
982.2.0010.00 ●	
981.0.0020.00 ●	
982.4.0010.00 ●	
980.1.0450.00 ●	
980.1.0460.00 ●	
-	
923.1.0060.00 ●	

CP-240	CPS-240
1060	1060
220 x 120 x 90	
<b>Part number</b>	
424.0.0000.00 ●	
424.0.0010.00	
424.0.0470.00	
	524.0.0000.00 ●
	524.0.0010.00
	524.0.0400.00
982.3.0050.00 ●	
-	
982.1.0050.00 ●	
982.2.0070.00 ●	
981.0.0080.00 ●	
982.4.0010.00 ●	
980.1.0450.00 ●	
980.1.0460.00 ●	
-	
923.1.0060.00 ●	

ISO M	12	16	20	25	32	40	50	63
Side A/B	24	12	8	4	3	0	0	0
Side C/D	14	1	1	1	1	0	0	0

\*\* mechanical enclosure machining required  
● = kept in stock

ISO M	12	16	20	25	32	40	50	63
Side A/B	13	6	4	3	2	1	0	0
Side C/D	6	3	2	2	1	0	0	0

\*\* mechanical enclosure machining required  
● = kept in stock

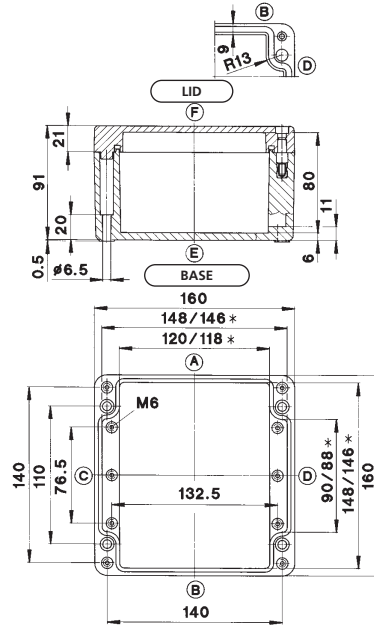
ISO M	12	16	20	25	32	40	50	63
Side A/B	27	12	9	6	4	3	0	0
Side C/D	6	3	2	2	1	0	0	0

\*\* mechanical enclosure machining required  
● = kept in stock



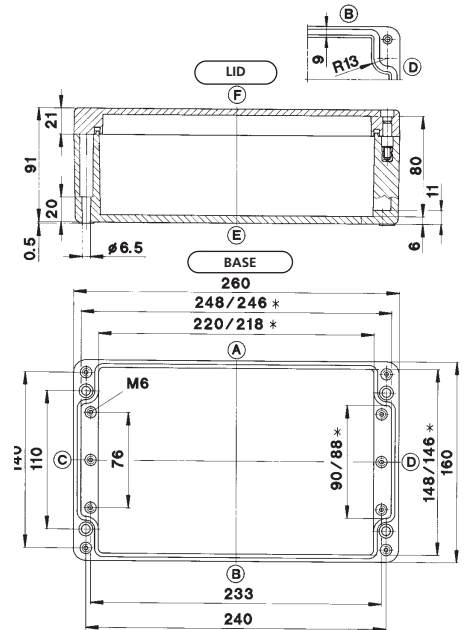
## 160 x 160 x 91 mm

CP-280  
Polyester enclosure, grey  
CPS-280  
Polyester enclosure, black



## 260 x 160 x 91 mm

CP-300  
Polyester enclosure, grey  
CPS-300  
Polyester enclosure, black



\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

Type	
Weight (g)	
External dimensions (mm)	
<b>Complete enclosures</b>	
Grey (CP), with gasket and lid screws	
Grey (CP), with gasket, hex. socket head screws	
Grey (CP), with silicone gasket and lid screws	
Black (CPS), with gasket and lid screws	
Black (CPS), with gasket, hex. socket head screws	
Black (CPS), with silicone gasket and lid screws	
<b>Accessories</b> (separate or as a mounting set)	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail	
External attachment brackets	
External hinges for CP enclosure (grey)**	
External hinges for CPS enclosure (black)**	
Internal hinges with lid guiding**	
Silicone gasket for wider temperature range (piece goods)	

CP-280	CPS-280
1130	1130
160 x 160 x 91	
<b>Part number</b>	
428.0.0000.00 ●	
428.0.0010.00	
428.0.0200.00	
	528.0.0000.00 ●
	528.0.0010.00
	528.0.0100.00
982.3.0060.00 ●	
-	
982.1.0020.00 ●	
982.2.0030.00 ●	
981.0.0040.00 ●	
982.4.0040.00 ●	
980.1.0450.00 ●	
980.1.0460.00 ●	
980.1.0320.00 ●	
923.1.0090.00 ●	

CP-300	CPS-300
1710	1710
260 x 160 x 91	
<b>Part number</b>	
430.0.0000.00 ●	
430.0.0010.00	
430.0.0140.00	
	530.0.0000.00 ●
	530.0.0010.00
	530.0.0340.00
982.3.0070.00 ●	
-	
982.1.0080.00 ●	
982.2.0110.00 ●	
981.0.0100.00 ●	
982.4.0040.00 ●	
980.1.0450.00 ●	
980.1.0460.00 ●	
980.1.0320.00 ●	
923.1.0090.00 ●	

### Max. Pg threads

ISO M	12	16	20	25	32	40	50	63
Side A/B	18	8	6	4	2	2	1	0
Side C/D	9	4	3	2	2	1	0	0

\*\* mechanical enclosure machining required

● = kept in stock

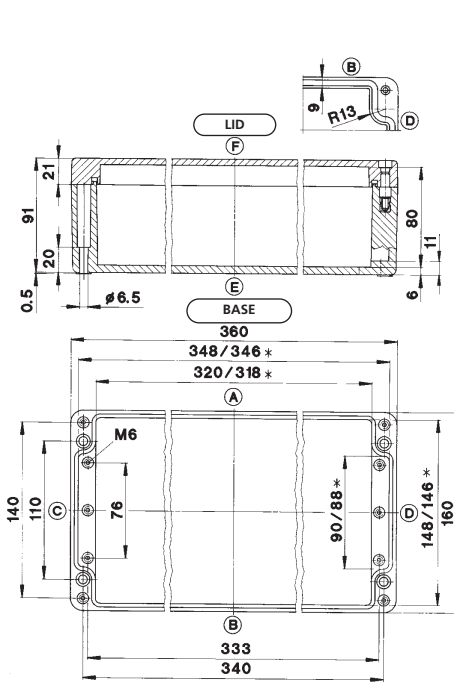
ISO M	12	16	20	25	32	40	50	63
Side A/B	33	15	12	8	4	3	3	0
Side C/D	9	4	3	2	2	1	0	0

\*\* mechanical enclosure machining required

● = kept in stock

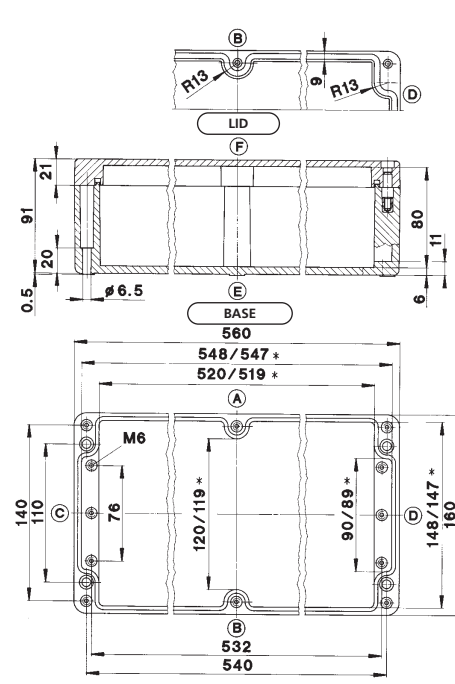
### 360 x 160 x 91 mm

CP-320  
Polyester enclosure, grey  
CPS-320  
Polyester enclosure, black



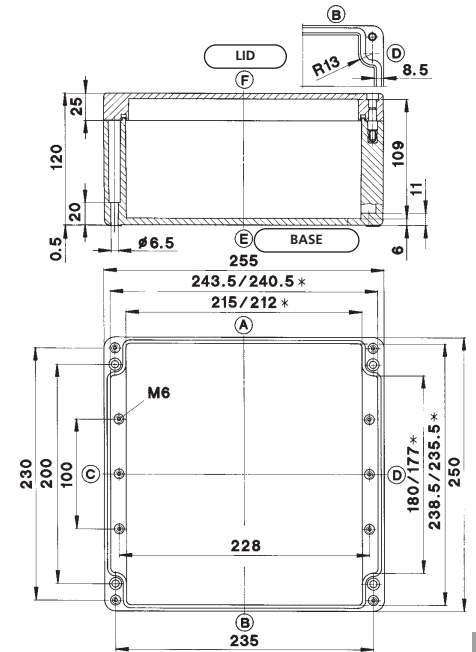
### 560 x 160 x 91 mm

CP-330  
Polyester enclosure, grey  
CPS-330  
Polyester enclosure, black



### 255 x 250 x 120 mm

CP-370  
Polyester enclosure, grey  
CPS-370  
Polyester enclosure, black



\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

CP-320	CPS-320
2150	2150
360 x 160 x 91	
Part number	
432.0.0000.00 ●	
432.0.0010.00	
432.0.0310.00	
	532.0.0000.00 ●
	532.0.0010.00
	532.0.0210.00
982.3.0080.00 ●	
-	
982.1.0120.00 ●	
982.2.0150.00 ●	
981.0.0140.00 ●	
982.4.0040.00 ●	
980.1.0450.00 ●	
980.1.0460.00 ●	
980.1.0320.00 ●	
923.1.0090.00 ●	

CP-330	CPS-330
3185	3185
560 x 160 x 91	
Part number	
433.0.0000.00 ●	
433.0.0010.00	
433.0.0100.00	
	533.0.0000.00 ●
	533.0.0010.00
	533.0.0100.00
982.3.0850.00 ●	
-	
982.1.0150.00 ●	
982.2.0180.00 ●	
981.0.0160.00 ●	
982.4.0040.00 ●	
980.1.0450.00 ●	
980.1.0460.00 ●	
980.1.0320.00 ●	
923.1.0090.00 ●	

CP-370	CPS-370
2650	2650
255 x 250 x 120	
Part number	
437.0.0000.00 ●	
437.0.0010.00	
437.0.0100.00	
	537.0.0000.00 ●
	537.0.0010.00
	537.0.0230.00
982.3.0090.00 ●	
-	
982.1.0070.00 ●	
982.2.0100.00 ●	
981.0.0350.00 ●	
982.4.0110.00 ●	
980.1.0450.00 ●	
980.1.0460.00 ●	
980.1.0320.00 ●	
923.1.0090.00 ●	

ISO M	12	16	20	25	32	40	50	63
Side A/B	48	23	18	11	7	5	4	0
Side C/D	9	4	3	2	2	1	0	0

\*\* mechanical enclosure machining required

● = kept in stock

ISO M	12	16	20	25	32	40	50	63
Side A/B	76	40	28	18	10	8	6	0
Side C/D	9	4	3	2	2	1	0	0

\*\* mechanical enclosure machining required

● = kept in stock

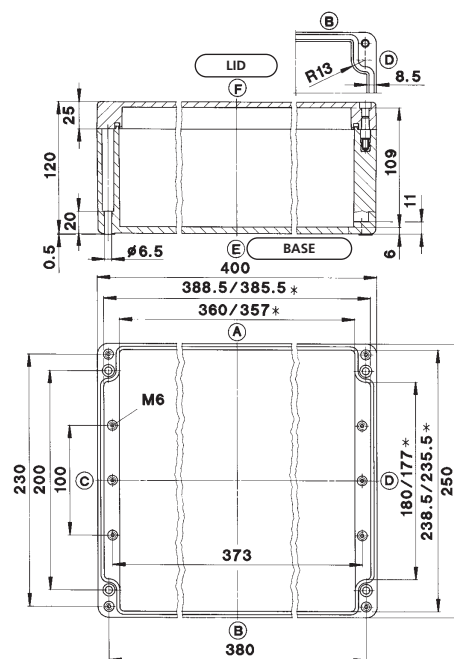
ISO M	12	16	20	25	32	40	50	63
Side A/B	42	23	17	11	7	4	3	3
Side C/D	32	14	10	16	4	3	2	2

\*\* mechanical enclosure machining required

● = kept in stock

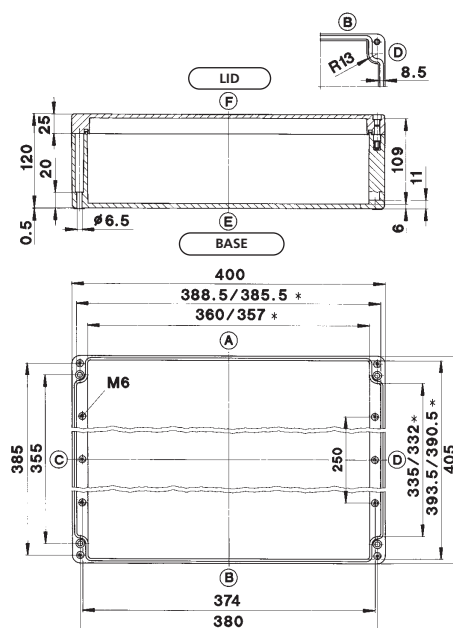
## 400 x 250 x 120 mm

CP-400  
Polyester enclosure, grey  
CPS-400  
Polyester enclosure, black



## 400 x 405 x 120 mm

CP-450  
Polyester enclosure, grey  
CPS-450  
Polyester enclosure, black



\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

Type	
Weight (g)	
External dimensions (mm)	
<b>Complete enclosures</b>	
Grey (CP), with gasket and lid screws	
Grey (CP), with gasket, hex. socket head screws	
Grey (CP), with silicone gasket and lid screws	
Black (CPS), with gasket and lid screws	
Black (CPS), with gasket, hex. socket head screws	
Black (CPS), with silicone gasket and lid screws	
<b>Accessories</b> (separate or as a mounting set)	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail	
External attachment brackets	
External hinges for CP enclosure (grey)**	
External hinges for CPS enclosure (black)**	
Internal hinges with lid guiding**	
Silicone gasket for wider temperature range (piece goods)	

CP-400	CPS-400
3650	3650
400 x 250 x 120	
<b>Part number</b>	
440.0.0000.00 ●	
440.0.0010.00	
440.0.0770.00	
	540.0.0000.00 ●
	540.0.0010.00
	540.0.0100.00
982.3.0100.00 ●	
-	
982.1.0140.00 ●	
982.2.0170.00 ●	
981.0.0150.00 ●	
982.4.0110.00 ●	
980.1.0450.00 ●	
980.1.0460.00 ●	
980.1.0320.00 ●	
923.1.0090.00 ●	

CP-450	CPS-450
5580	5580
400 x 405 x 120	
<b>Part number</b>	
445.0.0000.00 ●	
445.0.0010.00	
445.0.0130.00	
	545.0.0000.00 ●
	545.0.0010.00
	545.0.0100.00
982.3.0110.00 ●	
-	
982.1.0140.00 ●	
982.2.0170.00 ●	
981.0.0150.00 ●	
982.4.0120.00 ●	
980.1.0450.00 ●	
980.1.0460.00 ●	
980.1.0320.00 ●	
923.1.0090.00 ●	

### Max. Pg threads

ISO M	12	16	20	25	32	40	50	63
Side A/B	74	38	27	17	13	6	5	4
Side C/D	32	14	10	8	4	3	2	2

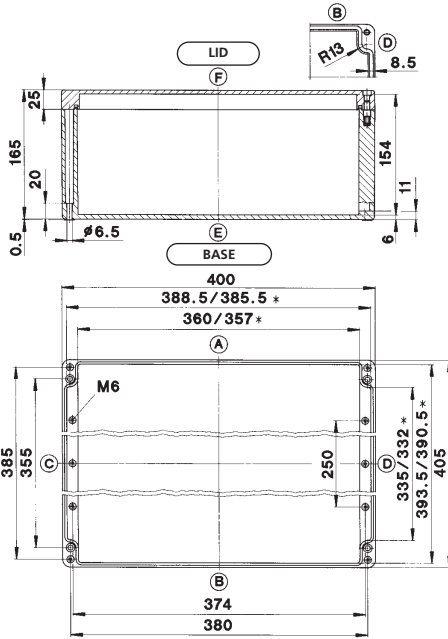
\*\* mechanical enclosure machining required  
● = kept in stock

ISO M	12	16	20	25	32	40	50	63
Side A/B	74	38	27	17	13	6	5	4
Side C/D	57	29	20	15	7	5	4	4

\*\* mechanical enclosure machining required  
● = kept in stock

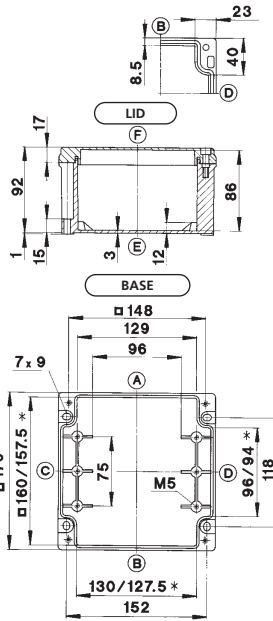
## 400 x 405 x 165 mm

CP-460  
Polyester enclosure, grey  
CPS-460  
Polyester enclosure, black



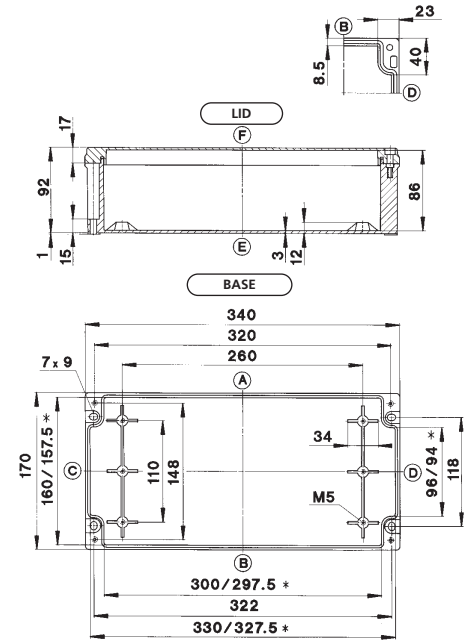
## 170 x 170 x 92 mm

CPS-530  
Polyester enclosure, black



## 340 x 170 x 92 mm

CPS-550  
Polyester enclosure, black



\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

CP-460	CPS-460
7740	7740
400 x 405 x 165	
<b>Part number</b>	
446.0.0000.00 ●	
446.0.0010.00	
446.0.0100.00	
	546.0.0000.00 ●
	546.0.0010.00
	546.0.0100.00
982.3.0110.00 ●	
-	
982.1.0140.00 ●	
982.2.0170.00 ●	
981.0.0150.00 ●	
982.4.0120.00 ●	
980.1.0450.00 ●	
980.1.0460.00 ●	
980.1.0320.00 ●	
923.1.0090.00 ●	
-	
-	

CPS-530	
850	
170 x 170 x 92	
<b>Part number</b>	
-	
-	
-	
553.0.0000.00 ●	
-	
-	
-	
982.1.0440.00	
-	
981.0.0440.00	
-	
-	
-	
-	
923.1.0060.00 ●	
-	
-	

CPS-550	
1800	
340 x 170 x 92	
<b>Part number</b>	
-	
-	
-	
555.0.0000.00 ●	
-	
-	
-	
982.1.0450.00	
-	
981.0.0450.00	
-	
-	
-	
-	
923.1.0060.00 ●	
-	
-	

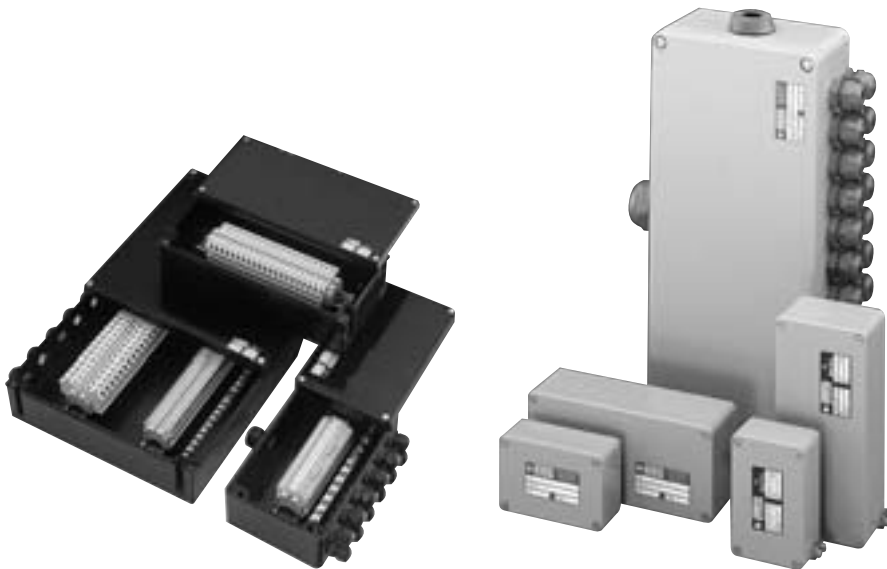
ISO M	12	16	20	25	32	40	50	63
Side A/B	105	56	40	27	20	10	9	8
Side C/D	92	45	30	23	12	9	6	5
** mechanical enclosure machining required								
● = kept in stock								

ISO M	12	16	20	25	32	40	50	63
Side A/B	22	11	8	4	3	2	2	0
Side C/D	10	4	3	2	2	2	1	0
** mechanical enclosure machining required								
● = kept in stock								

ISO M	12	16	20	25	32	40	50	63
Side A/B	48	22	15	9	6	5	3	0
Side C/D	10	4	3	2	2	1	0	0
** mechanical enclosure machining required								
● = kept in stock								



## EExe and EExi terminal boxes in polyester and aluminium for 'Ex' areas



All BERNSTEIN polyester and aluminium enclosures are available in EExe and EExi versions. For further details please refer to the BERNSTEIN Ex products catalogue.

### Special conditions for EExe and EExi terminal boxes in explosion-hazardous areas

Electric distribution boards or terminal boxes are required for connecting and branching cables. For terminal boxes in explosion-hazardous areas, special measures must be taken to prevent unacceptably high temperatures and the possibility of sparks or electrical arcing within the enclosure.

- Only enclosure materials and component materials adhering to the temperature range required for Ex devices are used.
- Enclosures and cable glands correspond to the protection class **IP 65** - (minimum specified ingress protection is IP 54), and are therefore well protected from dust and liquids.
- All enclosures and cable insertions are tested to ensure resistance to an impact force of 7 Nm - without affecting the protection class. All protective earth and ground connections are high reliability parts.
- All lid screws are captive and are located outside the working space. Lid screws and spring rings are stainless steel and type tags are made of polyester (self-adhesive, no corrosion problems).
- All fittings (terminals, cable glands, etc.) supplied by the manufacturer must be Ex compliant.
- The surface resistance of black polyester Enclosures is decreased to  $< 10^9$  ohm in order to prevent damaging electrostatic discharge. As an enclosure material, polyester is especially resistant to chemically aggressive ambient conditions.
- Polyester enclosures in self-extinguishing material, regulation Vb0 according to UL - Subj. 94.

## CC-10 compact control enclosures

## Application fields and characteristics



BERNSTEIN compact control enclosures from the CC-10 product line are ideal for use as remote operator control stations. Made from die-cast aluminium these enclosures are available from stock in 11 standard sizes. All sizes have an earthing point in the lid and the base for protective earth connection. The captive lid screws are stainless steel and are concealed by push fit corner pieces. The anodised aluminium frontplate (ordered separately) is fixed internally and sealed to the frame with a neoprene gasket maintaining an IP 65 rating for the complete enclosure.

Attachment points provided inside the enclosure facilitate easy mounting of components (mounting rail, mounting plate, PCBs etc.).

### Technical data

#### Material

Aluminium, die-casting AlSi12 (copper)

#### Gasket

Neoprene round seal for lid and front plate  
alternative:  
Silicone round seal

#### Lid screws

Stainless steel, captive screw, multi-purpose cross-head with plastic covering

#### Coating

Base RAL 7035 (light grey)  
Frame RAL 7035 (light grey)  
Frame screw coverings  
RAL 7035 (light grey)  
alternative:  
Special colours according to RAL,  
special coatings

#### Temperature range

- 40 °C to + 80 °C (neoprene gasket)  
alternative:  
- 50 °C to + 130 °C (silicone gasket)

#### Protection class

IP 65

### Material

BERNSTEIN compact control enclosures feature a high mechanical resistance. Their excellent chemical and petro-chemical resistance makes them suitable for a wide range of applications. The enclosures are supplied with a standard coating, affording a good resistance to corrosion. This resistance can be further improved by the application of an additional protective coating. Alternatively, they can be passivated, or a special protective coating resistant to saltwater and ideal for external use, can be applied. Aluminium has excellent heat dissipation and HF radio shielding properties.

A special gasket (silicon or conductive material) can be used to further increase heat and EMC resistance.

### Applications

As compact control enclosures in automation, machine and installation engineering, in utility vehicles, construction or agricultural machinery, in mechanical and plant engineering. Suitable for all uses where operating and indicator controls with a high corrosion resistance and in a high protection class are to be encapsulated with a high mechanical resistance. The front plate is supplied separately, facilitating mounting of fittings. The high industrial standards achieved by BERNSTEIN, allow their enclosures to be effective in a wide range of automation control and instrumentation applications.

### Angled adaptor

BERNSTEIN offers a wide range of accessories for the CC-10. These include angled adaptors which allow the enclosure to be inclined. This makes it possible to install the enclosure in an ergonomic inclined position on a wall or machine. The angled adaptors for the CC-10 compact control enclosure are available in 15° and 30° angles.



# Complete enclosures and accessories

## CC-10 series



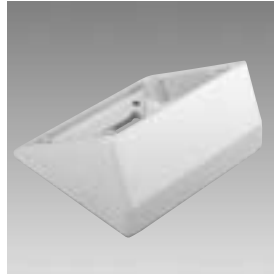
**Standard type**  
enclosure in RAL 7035, light grey, caps in RAL 7035 (light grey), gasket mounted, packaged.



**Front plate**  
clear-anodised aluminium, 3 mm thick, for holding operating controls or indicator panels.



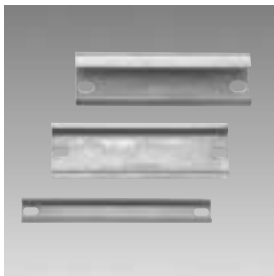
**Handles**  
made from naturally-anodised aluminium profile with plastic corner shoulders in RAL 7035 for subsequent attachment to the frame and base.



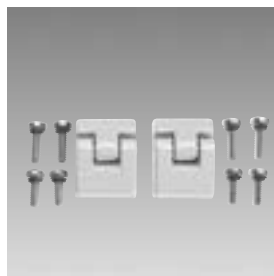
**Angled adaptor**  
with 15°- or 30° angle, RAL 7035, light grey, including gaskets and mounting screws. Mechanical machining required.



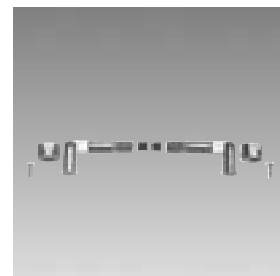
**Mounting plates**  
from galvanised sheet metal (thickness: CC-270 to CC-400: 1.5 mm; CC-450 and CC-460: 2.5 mm) allows for further addition of mounted fittings.



**Mounting rails**  
TS-32 and TS-35, steel, yellow-passivated for terminal block attachment.



**External hinges**  
for hinged mounting of enclosure frames. Opening angle of frame approx. 155°. Aluminium casting, RAL 7035. Mechanical machining required for mounting. Drill template is supplied.



**Internal hinges**  
for hinge attachment of the enclosure lid. Opening angle of lid approx. 95°. Stainless steel. Mechanical machining is required for enclosure mounting.



**Frame gasket, front plate gasket**  
silicone; improved temperature range (-50 °C to +130 °C). Standard type made of silicone foam.

### Overview – CC-10 compact control enclosures

Dimensions/mm L x W x H	CC-10 aluminium enclosures with crimped protective frames		Frame	Base
	Part number	Type	dc = die cast cc = chilled casting	
160 x 160 x 105	127.3.0010.00	CC-270	dc	dc
260 x 160 x 105	129.3.0010.00	CC-290	dc	dc
360 x 160 x 105	131.3.0010.00	CC-310	dc	dc
200 x 230 x 125	135.3.0010.00	CC-350	dc	dc
200 x 230 x 195	136.3.0010.00	CC-360	dc	cc
280 x 230 x 125	137.3.0010.00	CC-370	dc	dc
330 x 230 x 125	138.3.0010.00	CC-380	dc	dc
330 x 230 x 195	139.3.0010.00	CC-390	dc	cc
400 x 230 x 125	140.3.0010.00	CC-400	dc	dc
402 x 310 x 125	145.3.0010.00	CC-450	dc	dc
402 x 310 x 195	146.3.0010.00	CC-460	dc	cc

### Customising service

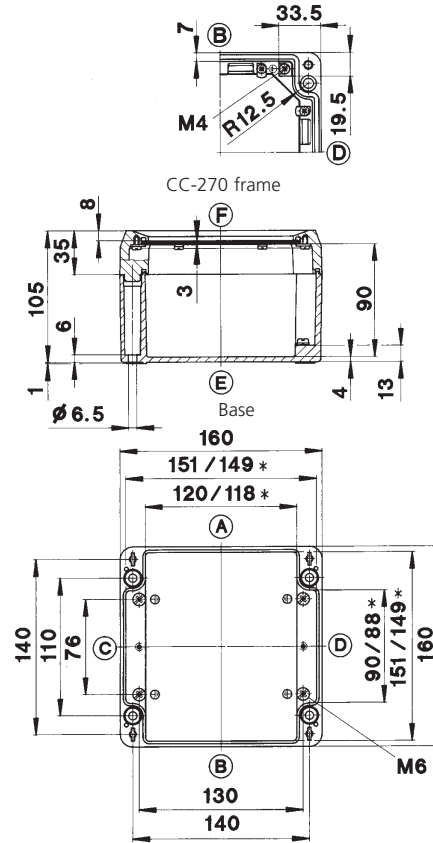
The range of accessories for individual enclosures can be supplied separately or pre-assembled. The BERNSTEIN customising service provides complete mechanical machining. The fittings (terminals, cable glands or customised mounting

components) are included in the service, as is the individual finishing of enclosures. The custom-made front plates (supplied separately) can also be mechanically machined and supplied with individual screen-printing or engraving.



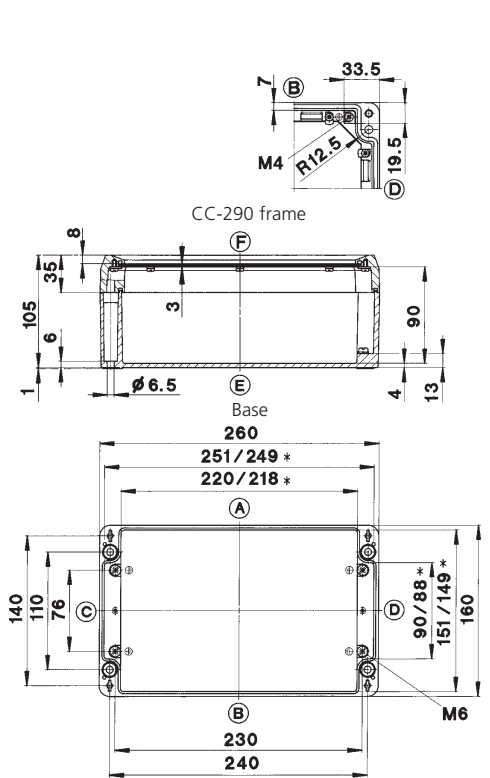
## 160 x 160 x 105 mm

CC-270 aluminium control enclosure



## 260 x 160 x 105 mm

CC-290 aluminium control enclosure

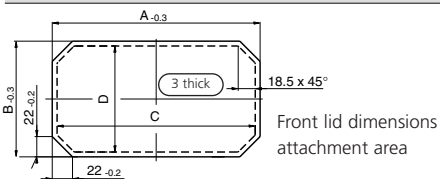


\* minimum dimensions at level of mounting plate support

\* minimum dimensions at level of mounting plate support

Type	CC-270
Weight (g)	1800
External dimensions (mm)	160 x 160 x 105
<b>Complete enclosures</b>	<b>Part number</b>
coated, with gasket and lid screws	<b>127.3.0010.00 ●</b>
<b>Accessories</b> (separate or as a mounting set)	
Front plate	<b>951.1.7580.00 ●</b>
Mounting plate	<b>951.1.1490.00 ●</b>
TS 32 mounting rail	<b>982.1.0020.00 ●</b>
TS 35 mounting rail	<b>982.2.0030.00 ●</b>
External hinges**	<b>980.1.0990.00 ●</b>
Internal hinges with lid guiding**	<b>980.1.0390.00 ●</b>
Frame gasket for extended temp. range (piece goods)**	<b>923.1.0060.00 ●</b>
Front plate gasket for extended temp. range (piece goods)***	<b>923.1.0060.00 ●</b>
Corner handles (C-B/D-B)**	-
Corner handles (B-D/A-D)**	-
Side handles (A/B)**	-
Side handles (C/D)**	-
Angled adaptor 15° (RAL 7035)	<b>101.6.6300.00</b> only side C/D
Angle adaptor 30° (RAL 7035)	-

Type	CC-290
Weight (g)	2300
External dimensions (mm)	260 x 160 x 105
<b>Complete enclosures</b>	<b>Part number</b>
coated, with gasket and lid screws	<b>129.3.0010.00 ●</b>
<b>Accessories</b> (separate or as a mounting set)	
Front plate	<b>951.1.7590.00 ●</b>
Mounting plate	<b>951.1.0490.00 ●</b>
TS 32 mounting rail	<b>982.1.0080.00 ●</b>
TS 35 mounting rail	<b>982.2.0110.00 ●</b>
External hinges**	<b>980.1.0990.00 ●</b>
Internal hinges with lid guiding**	<b>980.1.0390.00 ●</b>
Frame gasket for extended temp. range (piece goods)**	<b>923.1.0060.00 ●</b>
Front plate gasket for extended temp. range (piece goods)***	<b>923.1.0060.00 ●</b>
Corner handles (C-B/D-B)**	-
Corner handles (B-D/A-D)**	-
Side handles (A/B)**	-
Side handles (C/D)**	-
Angled adaptor 15° (RAL 7035)	<b>101.6.6300.00</b>
Angle adaptor 30° (RAL 7035)	<b>101.6.6310.00</b> only side A/B



A x B: 125.5 x 125.5 mm  
C x D: 115 x 115 mm

A x B: 225.5 x 125.5 mm  
C x D: 215 x 115 mm

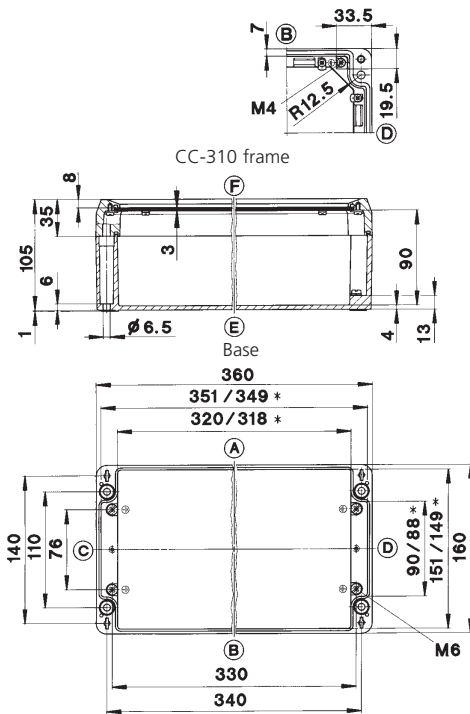
\*\* mechanical enclosure machining required  
\*\*\* piece goods

● = kept in stock

● = kept in stock

## 360 x 160 x 105 mm

CC-310 aluminium control enclosure



\* minimum dimensions at level of mounting plate support

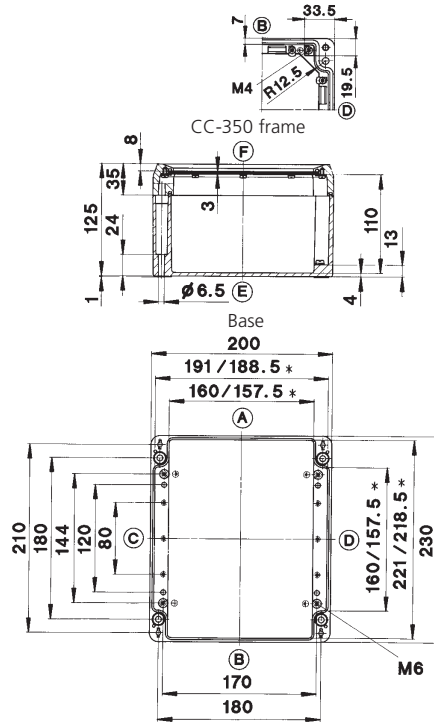
CC-310
2500
360 x 160 x 105
<b>Part number</b>
<b>131.3.0010.00 ●</b>
951.1.7600.00 ●
951.1.1750.00 ●
982.1.0120.00 ●
982.2.0150.00 ●
980.1.0990.00 ●
980.1.0390.00 ●
923.1.0060.00 ●
923.1.0060.00 ●
-
-
-
-
101.6.6300.00
101.6.6310.00

A x B: 325.5 x 125.5 mm  
C x D: 315 x 115 mm

● = kept in stock

## 200 x 230 x 125 mm

CC-350 aluminium control enclosure



\* minimum dimensions at level of mounting plate support

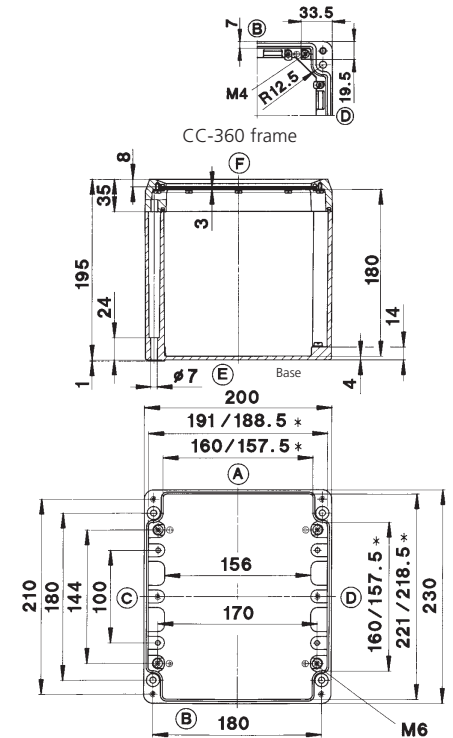
CC-350
2800
200 x 230 x 125
<b>Part number</b>
<b>135.3.0010.00 ●</b>
951.1.7610.00 ●
951.1.0150.00 ●
982.1.0030.00 ●
982.2.0050.00 ●
980.1.0990.00 ●
980.1.0390.00 ●
923.1.0060.00 ●
923.1.0060.00 ●
-
-
981.4.0920.00 ●
981.4.0920.00 ●
101.6.6300.00
101.6.6310.00

A x B: 165.5 x 195.5 mm  
C x D: 155 x 185 mm

● = kept in stock

## 200 x 230 x 195 mm

CC-360 aluminium control enclosure



\* minimum dimensions at level of mounting plate support

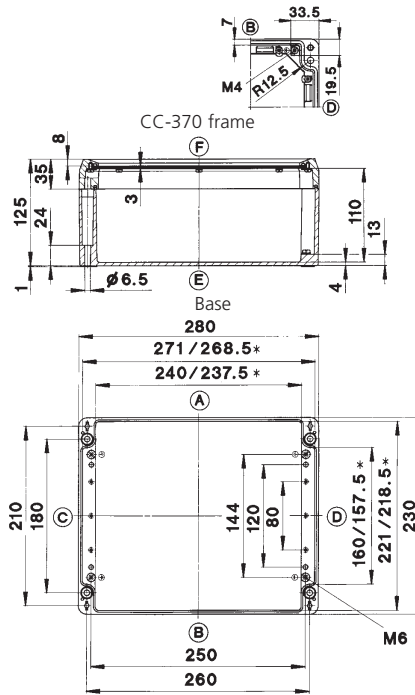
CC-360
4100
200 x 230 x 195
<b>Part number</b>
<b>136.3.0010.00 ●</b>
951.1.7610.00 ●
951.1.0150.00 ●
982.1.0030.00 ●
982.2.0050.00 ●
980.1.0990.00 ●
980.1.0390.00 ●
923.1.0060.00 ●
923.1.0060.00 ●
-
-
981.4.0920.00 ●
981.4.0920.00 ●
101.6.6300.00
101.6.6310.00

A x B: 165.5 x 195.5 mm  
C x D: 155 x 185 mm

● = kept in stock

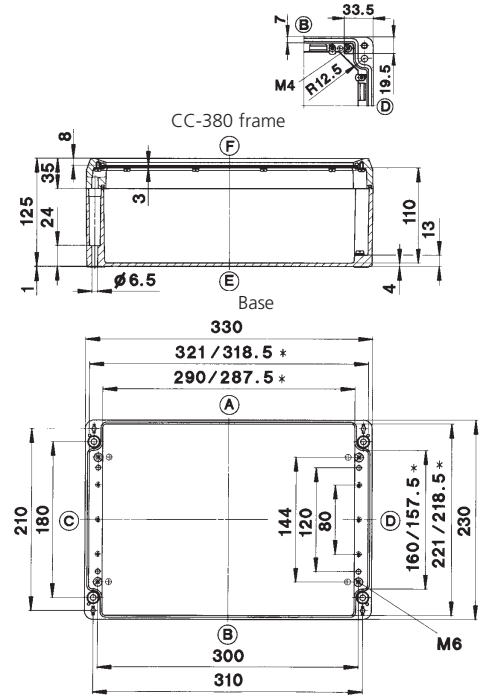
## 280 x 230 x 125 mm

CC-370 aluminium control enclosure

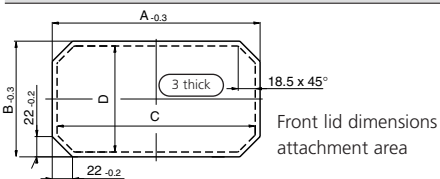


## 330 x 230 x 125 mm

CC-380 aluminium control enclosure



Type	CC-370
Weight (g)	3400
External dimensions (mm)	280 x 230 x 125
<b>Complete enclosures</b>	<b>Part number</b>
coated, with gasket and lid screws	<b>137.3.0010.00 ●</b>
<b>Accessories</b> (separate or as a mounting set)	
Front plate	<b>951.1.7620.00 ●</b>
Mounting plate	<b>951.1.0160.00 ●</b>
TS 32 mounting rail	<b>982.1.0090.00 ●</b>
TS 35 mounting rail	<b>982.2.0120.00 ●</b>
External hinges**	<b>980.1.0990.00 ●</b>
Internal hinges with lid guiding**	<b>980.1.0390.00 ●</b>
Frame gasket for extended temp. range (piece goods)**	<b>923.1.0060.00 ●</b>
Front plate gasket for extended temp. range (piece goods)***	<b>923.1.0060.00 ●</b>
Corner handles (C-B/D-B)**	-
Corner handles (B-D/A-D)**	-
Side handles (A/B)**	<b>981.4.0930.00 ●</b>
Side handles (C/D)**	<b>981.4.0920.00 ●</b>
Angled adaptor 15° (RAL 7035)	<b>101.6.6300.00 ●</b>
Angle adaptor 30° (RAL 7035)	<b>101.6.6310.00 ●</b>



\*\* mechanical enclosure machining required  
\*\*\* piece goods

\* minimum dimensions at level of mounting plate support

Type	CC-380
Weight (g)	3400
External dimensions (mm)	330 x 230 x 125
<b>Complete enclosures</b>	<b>Part number</b>
coated, with gasket and lid screws	<b>138.3.0010.00 ●</b>
<b>Accessories</b> (separate or as a mounting set)	
Front plate	<b>951.1.7630.00 ●</b>
Mounting plate	<b>951.1.0170.00 ●</b>
TS 32 mounting rail	<b>982.1.0110.00 ●</b>
TS 35 mounting rail	<b>982.2.0140.00 ●</b>
External hinges**	<b>980.1.0990.00 ●</b>
Internal hinges with lid guiding**	<b>980.1.0390.00 ●</b>
Frame gasket for extended temp. range (piece goods)**	<b>923.1.0060.00 ●</b>
Front plate gasket for extended temp. range (piece goods)***	<b>923.1.0060.00 ●</b>
Corner handles (C-B/D-B)**	-
Corner handles (B-D/A-D)**	-
Side handles (A/B)**	<b>981.4.0930.00 ●</b>
Side handles (C/D)**	<b>981.4.0920.00 ●</b>
Angled adaptor 15° (RAL 7035)	<b>101.6.6300.00 ●</b>
Angle adaptor 30° (RAL 7035)	<b>101.6.6310.00 ●</b>

\* minimum dimensions at level of mounting plate support

Type	CC-370
Weight (g)	3400
External dimensions (mm)	280 x 230 x 125
<b>Complete enclosures</b>	<b>Part number</b>
coated, with gasket and lid screws	<b>137.3.0010.00 ●</b>
<b>Accessories</b> (separate or as a mounting set)	
Front plate	<b>951.1.7630.00 ●</b>
Mounting plate	<b>951.1.0170.00 ●</b>
TS 32 mounting rail	<b>982.1.0110.00 ●</b>
TS 35 mounting rail	<b>982.2.0140.00 ●</b>
External hinges**	<b>980.1.0990.00 ●</b>
Internal hinges with lid guiding**	<b>980.1.0390.00 ●</b>
Frame gasket for extended temp. range (piece goods)**	<b>923.1.0060.00 ●</b>
Front plate gasket for extended temp. range (piece goods)***	<b>923.1.0060.00 ●</b>
Corner handles (C-B/D-B)**	-
Corner handles (B-D/A-D)**	-
Side handles (A/B)**	<b>981.4.0930.00 ●</b>
Side handles (C/D)**	<b>981.4.0920.00 ●</b>
Angled adaptor 15° (RAL 7035)	<b>101.6.6300.00 ●</b>
Angle adaptor 30° (RAL 7035)	<b>101.6.6310.00 ●</b>

A x B: 295.5 x 195.5 mm  
C x D: 285 x 185 mm

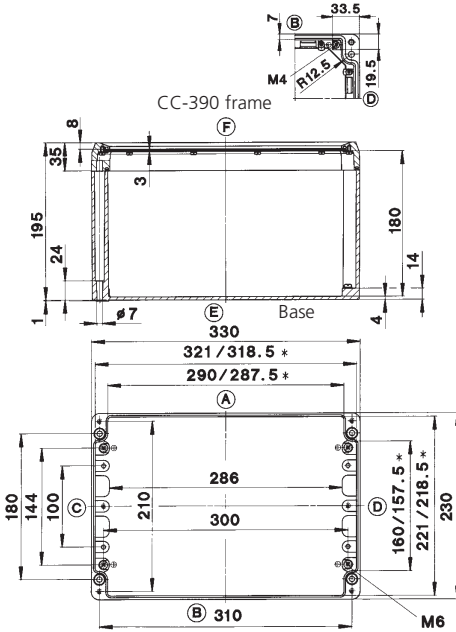
A x B: 245.5 x 195.5 mm  
C x D: 235 x 185 mm

● = kept in stock

● = kept in stock

### 330 x 230 x 195 mm

CC-390 aluminium control enclosure



\* minimum dimensions at level of mounting plate support

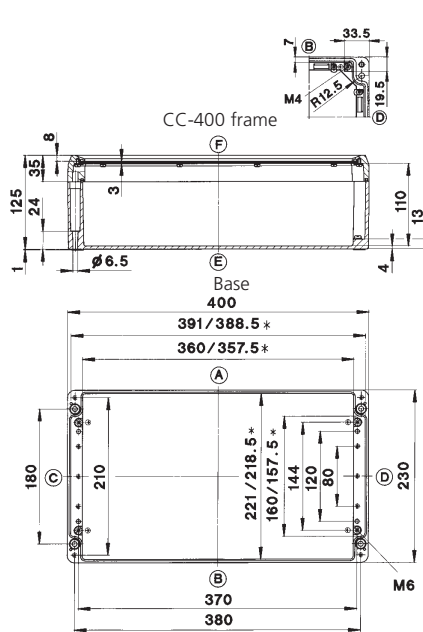
CC-390
5300
330 x 230 x 195
<b>Part number</b>
<b>139.3.0010.00 ●</b>
951.1.7630.00 ●
951.1.0170.00 ●
982.1.0110.00 ●
982.2.0140.00 ●
980.1.0990.00 ●
980.1.0390.00 ●
923.1.0060.00 ●
923.1.0060.00 ●
-
-
981.4.0930.00 ●
981.4.0920.00 ●
101.6.6300.00 ●
101.6.6310.00 ●

A x B: 295.5 x 195.5 mm  
C x D: 285 x 185 mm

● = kept in stock

### 400 x 230 x 125 mm

CC-400 aluminium control enclosure



\* minimum dimensions at level of mounting plate support

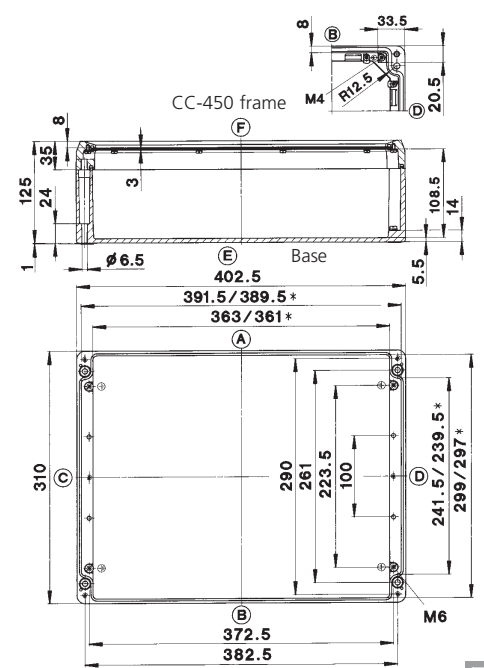
CC-400
4900
400 x 230 x 125
<b>Part number</b>
<b>140.3.0010.00 ●</b>
951.1.7640.00 ●
951.1.2940.00 ●
982.1.0140.00 ●
982.2.0170.00 ●
980.1.0990.00 ●
980.1.0390.00 ●
923.1.0060.00 ●
923.1.0060.00 ●
-
-
981.4.0930.00 ●
981.4.0920.00 ●
101.6.6300.00 ●
101.6.6310.00 ●

A x B: 365.5 x 195.5 mm  
C x D: 355 x 185 mm

● = kept in stock

### 402 x 310 x 125 mm

CC-450 aluminium control enclosure



\* minimum dimensions at level of mounting plate support

CC-450
5600
402 x 310 x 125
<b>Part number</b>
<b>145.3.0010.00 ●</b>
951.1.7650.00 ●
951.1.0200.00 ●
982.1.0140.00 ●
982.2.0170.00 ●
980.1.0990.00 ●
980.1.0390.00 ●
923.1.0060.00 ●
923.1.0060.00 ●
-
-
981.4.0930.00 ●
981.4.0930.00 ●
101.6.6300.00 ●
101.6.6310.00 ●

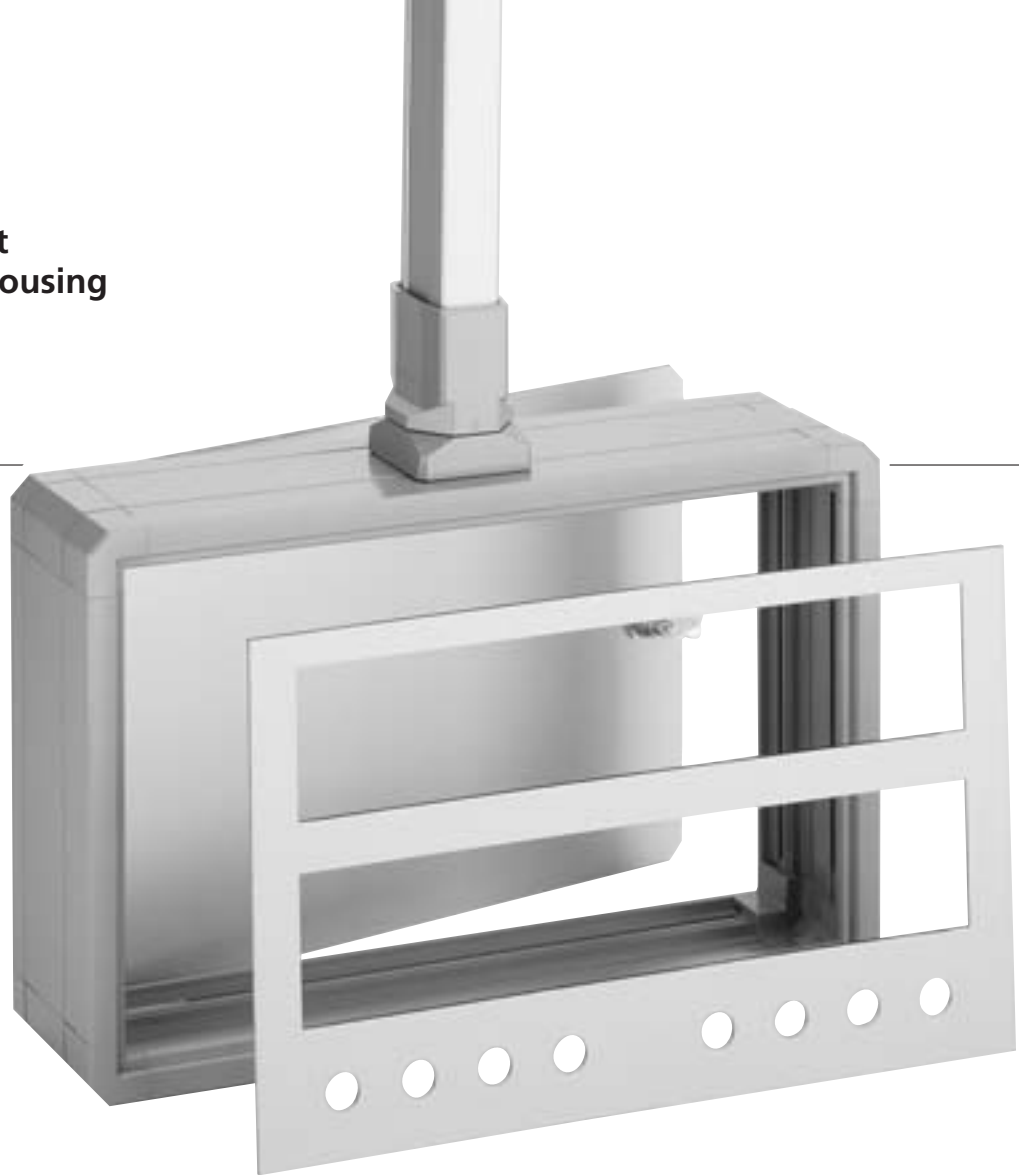
A x B: 365.7 x 273.2 mm  
C x D: 354.5 x 262 mm

● = kept in stock





## Modular lightweight operator interface housing CC-2000 SL



The BERNSTEIN Lightweight Operator Interface CC-2000 SL is a modular aluminium enclosure particularly suited for operator control station applications where the mounting of industrial computers, MMI, display and similar components is necessary. Its height and width are variable up to a recommended maximum size of approximate 600 x 600 mm. The depth is selected from the combination or individual use of the 200, 120 and 55 mm aluminium profiles available.

The front plate may be mounted through a specially developed quick and simple mounting system. Secured from the inside fastening clips replace both the requirement to machine the front plate and the time-consuming screw fitting during installation or servicing. The rear panel is secured using fixing screws or hinged using internal hinges that do not affect the usable depth. With the 55 mm deep extension profile, hinged as a door, there is a maximum usable depth of 244 mm when the 200 mm profile width is used.

The aluminium-extruded profile has grooves running the width and height of the enclosure, allowing components to be fitted and secured by means of simple spring nuts, again without additional enclosure machining. The profile is designed to create a cable duct around the inside of the housing to provide protection for cable looms and wiring entering from the suspension system.

### Product advantages

- Modular system – width and height of the housing are completely variable
- Standard rectangular front plates can be fitted directly (e. g. Displays, MMIs)
- Front plates can be internally or externally mounted and secured
- Front plate mounting from the inside is particularly quick and easy
- No external rubber gasket required
- IP 65 protection
- Rear panel secured by screws or mounted on integrated hinges
- No loss of usable depth due to hinges
- Internal grooves allow simple fastening with spring nuts
- Single-wall aluminium extruded profile incorporates a built-in cable channel
- Excellent heat dissipation
- Modern industrial design

### Materials

- |  |             |
|--|-------------|
| – Aluminium extruded profile:              | Al Mg Si 05 |
| – Aluminium die-cast corners:              | Al Si 12    |
| – Seals between profile and corner module: | CR          |
| – Seal for front plate and rear panel:     | CR          |
| – Hinge profile:                           | Al Mg Si 05 |
| – Front plate, rear panel:                 | Al Mg 3     |

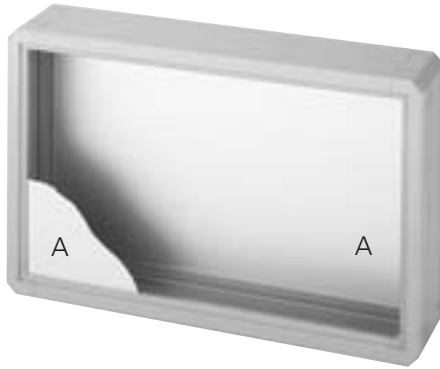
### Colour

- |                               |                           |
|-------------------------------|---------------------------|
| – Housing:                    | RAL 7035                  |
| – Front plate and rear panel: | Aluminium nature anodised |

### Availability

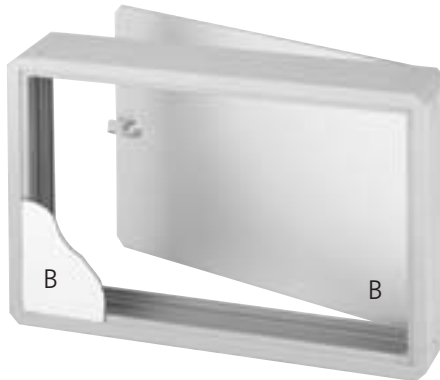
CC-2000 SL lightweight control housings in standard sizes are available with short delivery times or as custom versions built to order.

(A)  
Front plate  
Fitted from inside



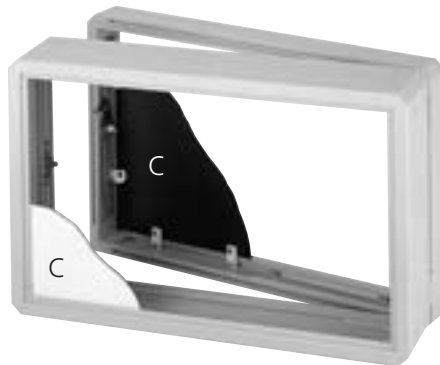
(A)  
Back plate  
Fixed or hinged

(B)  
Front plate  
Fitted from the outside



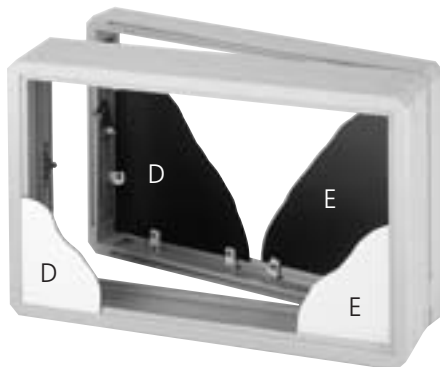
(B)  
Front plate  
Fitted from the outside

(C)  
Front plate  
Fitted from the inside



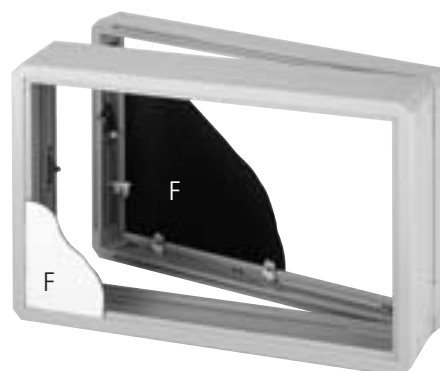
(C)  
Back plate  
Fitted from the inside

(D)  
Front plate  
Fitted from the outside



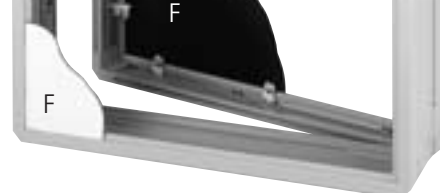
(D)  
Back plate  
Fitted from the inside

(E)  
Front plate  
Fitted from the inside



(E)  
Back plate  
Fitted from the outside

(F)  
Front plate  
Fitted from the outside



(F)  
Back plate  
Fitted from the outside

### System variations

As a result of the various fitting and profile combinations, usable depths between the front plate and the back plate (each 3 mm thick) vary between 101 and 244 mm:

Profile 120/Profile 200

Usable depth		Housing construction
Profile [mm]	Profile [mm]	
101	181	Front plate from the inside. Back plate fixed or hinged (A)
109	189	Front plate from the outside. Back plate fixed or hinged (B)

Profile 120 + 55 as a door extension  
Profile 200 + 55 as a door extension

Usable depth		Housing construction
Profile [mm]	Profile [mm]	
147	227	Front plate from the inside. Back plate from the inside (C)
155	235	Front plate from the outside. Back plate from the inside (D)
155	235	Front plate from the inside. Back plate from the outside (E)
164	244	Front plate from the outside. Back plate from the outside (F)





**Dimensions**

The BERNSTEIN CC-2000 SL is available with a selection of front and back plates and various combinations of profile width, including:

Profile widths

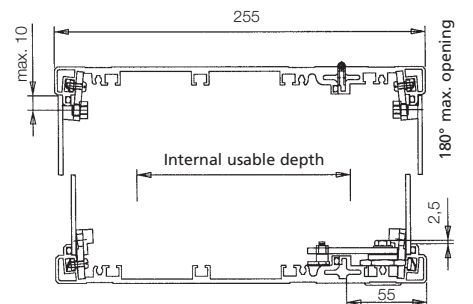
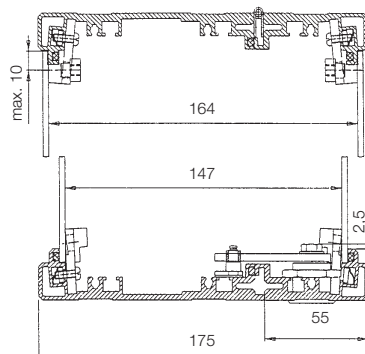
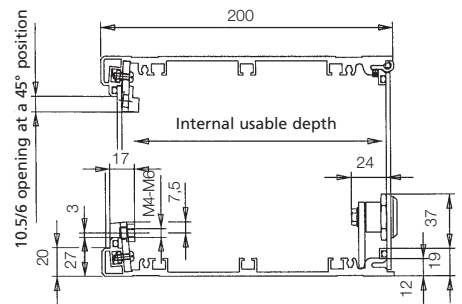
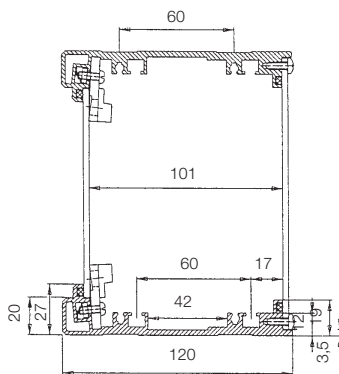
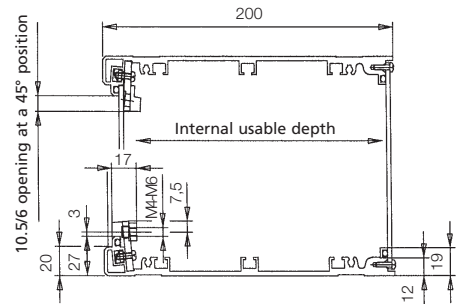
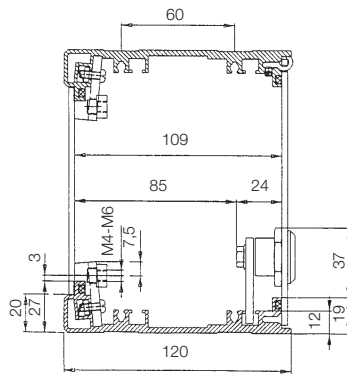
- 120 mm
- 175 mm (120 + 55 mm)
- 200 mm
- 255 mm (200 + 55 mm)

allowing the following different internal depths:

Internal usable depths

- 101 mm
- 109 mm
- 147 mm
- 155 mm
- 164 mm
- 181 mm
- 189 mm
- 227 mm
- 235 mm
- 244 mm

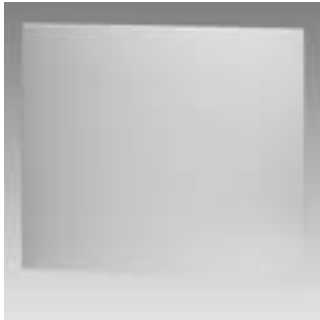
Width and height of the CC-2000 SL control interface housing are completely optional up to a recommended size of circa 600 x 600 mm.



# Enclosure components

## Light weight operator interface housing

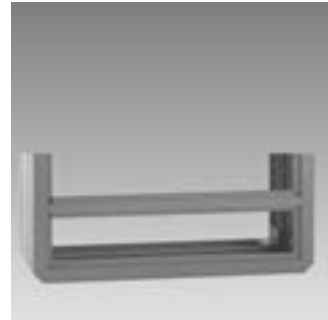
### CC-2000 SL



**Front plate**  
Clear (silver) anodised aluminium front plate, 3 mm thick, both sides anodised, protection film one side.



**Handles**  
Handle set, made from aluminium profile. Fixing without machining.



**Separator piece**  
Aluminium separator piece for direct mounting of control and other operating panels (for example emergency stop buttons and other operating-components). Is cut to size and machined to fit individual housing. Complete with fixing and sealing material. Order separately or via checklist.



**Spring nut set M4**  
(Part number 980.6.0060.00)  
**Spring nut set M5**  
(Part number 980.6.0070.00)  
10 off spring nuts with metric thread M4 or M5 for fixing units in the housing. The spring nuts are fitted in the fixing rails into the aluminium housing profile and can be pushed into position in the housing.



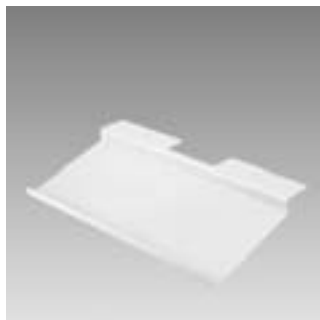
**19" fixing set**  
(Part number 980.6.1120.00)  
4 cage nuts M6 with screws and washers to fix 19" inserts of the fixing clips enclosed in the housing.



**CD-ROM-Cover**  
(Part number 980.6.2170.00)  
Dimensions (W x H x D):  
177 x 119 x 8 mm  
Surface: possible to paint.



**Keyboard holder (stirrup)**  
(Part number 980.6.1770.00)  
Metal frame for PC keyboards, which can be installed additionally. For assembly the machining of the housing is necessary. Fixings enclosed.



**Keyboard support**  
(Part number 980.6.1750.00)  
Steel plate keyboard support in RAL 7035 for additional mounting. Machining is necessary for assembly, including fixings.



**Floppy-Cover**  
(Part number 980.6.2190.00)  
Dimensions (W x H x D): 120 x 92 x 8 mm  
Surface: possible to paint.

# Standard dimensions

## CC-2000 SL light weight operator interface housing

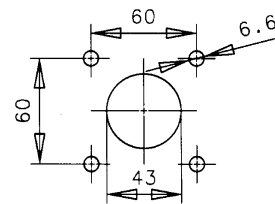
Part number	External housing dimensions  W x H x D (mm)	19" fitting dimensions	Front plate dimensions overall  (mm)	Front plate usable area  (mm)	Front plate Part number	Usable depth with 3 mm plate thickness min./max. (mm)	Back plate dimensions overall  e x f (mm)
114.5.2000.00	275 x 254 x 120	–	235 x 214	221 x 200	954.5.5410.00	101/109	268 x 247
114.5.2000.00	275 x 254 x 120	–	235 x 214	221 x 200	954.5.5410.00	101/109	266 x 245
114.5.2010.00	284 x 312 x 120	–	244 x 272	230 x 258	954.5.5420.00	101/109	277 x 305
114.5.2010.00	284 x 312 x 120	–	244 x 272	230 x 258	954.5.5420.00	101/109	275 x 303
114.5.2020.00	284 x 428 x 120	–	244 x 388	230 x 374	954.5.0120.00	101/109	277 x 421
114.5.2020.00	284 x 428 x 120	–	244 x 388	230 x 374	954.5.0120.00	101/109	275 x 419
116.5.2020.00	284 x 428 x 175	–	244 x 388	230 x 374	954.5.0120.00	147/164*	244 x 388
124.5.2020.00	284 x 428 x 200	–	244 x 388	230 x 374	954.5.0120.00	181/189	277 x 421
124.5.2020.00	284 x 428 x 200	–	244 x 388	230 x 374	954.5.0120.00	181/189	275 x 419
114.5.2030.00	395 x 345 x 120	–	355 x 305	341 x 291	954.5.0090.00	101/109	388 x 338
114.5.2030.00	395 x 345 x 120	–	355 x 305	341 x 291	954.5.0090.00	101/109	386 x 336
116.5.2030.00	395 x 345 x 175	–	355 x 305	341 x 291	954.5.0090.00	147/164*	355 x 305
124.5.2030.00	395 x 345 x 200	–	355 x 305	341 x 291	954.5.0090.00	181/189	388 x 338
124.5.2030.00	395 x 345 x 200	–	355 x 305	341 x 291	954.5.0090.00	181/189	386 x 336
114.5.2040.00	470 x 415 x 120	–	430 x 375	416 x 361	954.5.0150.00	101/109	463 x 408
114.5.2040.00	470 x 415 x 120	–	430 x 375	416 x 361	954.5.0150.00	101/109	461 x 406
116.5.2040.00	470 x 415 x 175	–	430 x 375	416 x 361	954.5.0150.00	147/164*	430 x 375
124.5.2040.00	470 x 415 x 200	–	430 x 375	416 x 361	954.5.0150.00	181/189	463 x 408
124.5.2040.00	470 x 415 x 200	–	430 x 375	416 x 361	954.5.0150.00	181/189	461 x 406
114.5.2050.00	525 x 309 x 120	84 TE x 6 HE	485 x 269	471 x 255	954.5.0060.00	101/109	518 x 302
114.5.2050.00	525 x 309 x 120	84 TE x 6 HE	485 x 269	471 x 255	954.5.0060.00	101/109	516 x 300
116.5.2050.00	525 x 309 x 175	84 TE x 6 HE	485 x 269	471 x 255	954.5.0060.00	147/164*	485 x 269
124.5.2050.00	525 x 309 x 200	84 TE x 6 HE	485 x 269	471 x 255	954.5.0060.00	181/189	518 x 302
124.5.2050.00	525 x 309 x 200	84 TE x 6 HE	485 x 269	471 x 255	954.5.0060.00	181/189	516 x 300
114.5.2060.00	525 x 354 x 120	84 TE x 7 HE	485 x 314	471 x 300	954.5.0000.00	101/109	518 x 347
114.5.2060.00	525 x 354 x 120	84 TE x 7 HE	485 x 314	471 x 300	954.5.0000.00	101/109	516 x 345
116.5.2060.00	525 x 354 x 175	84 TE x 7 HE	485 x 314	471 x 300	954.5.0000.00	147/164*	485 x 314
124.5.2060.00	525 x 354 x 200	84 TE x 7 HE	485 x 314	471 x 300	954.5.0000.00	181/189	518 x 347
124.5.2060.00	525 x 354 x 200	84 TE x 7 HE	485 x 314	471 x 300	954.5.0000.00	181/189	516 x 345
114.5.2070.00	525 x 398 x 120	84 TE x 8 HE	485 x 358	471 x 344	954.5.0030.00	101/109	518 x 391
114.5.2070.00	525 x 398 x 120	84 TE x 8 HE	485 x 358	471 x 344	954.5.0030.00	101/109	516 x 389
116.5.2070.00	525 x 398 x 175	84 TE x 8 HE	485 x 358	471 x 344	954.5.0030.00	147/164*	485 x 358
124.5.2070.00	525 x 398 x 200	84 TE x 8 HE	485 x 358	471 x 344	954.5.0030.00	181/189	518 x 391
124.5.2070.00	525 x 398 x 200	84 TE x 8 HE	485 x 358	471 x 344	954.5.0030.00	181/189	516 x 389
114.5.2080.00	356 x 377 x 120	–	316 x 337	302 x 323	954.5.3420.00	101/109	349 x 370
114.5.2080.00	356 x 377 x 120	–	316 x 337	302 x 323	954.5.3420.00	101/109	347 x 368
114.5.2090.00	542 x 495 x 120	–	502 x 455	488 x 441	954.5.5430.00	101/109	535 x 488
114.5.2090.00	542 x 495 x 120	–	502 x 455	488 x 441	954.5.5430.00	101/109	533 x 486
116.5.2090.00	542 x 495 x 175	–	502 x 455	488 x 441	954.5.5430.00	147/164*	502 x 455
124.5.2090.00	542 x 495 x 200	–	502 x 455	488 x 441	954.5.5430.00	181/189	535 x 488
124.5.2090.00	542 x 495 x 200	–	502 x 455	488 x 441	954.5.5430.00	181/189	533 x 486
124.5.2100.00	475 x 306 x 200	–	435 x 266	421 x 252	direct mounting	181/189	468 x 299
124.5.2100.00	475 x 306 x 200	–	435 x 266	421 x 252	direct mounting	181/189	466 x 297

### Delivery includes:

- Assembled enclosure, painted (RAL 7035 light grey) incl. quick fastening kit for front plate
- Standard 8 mm square lock on doors or hinged back plates, lock mounted in back plate
- Front plate, rear panel, handles (optional)

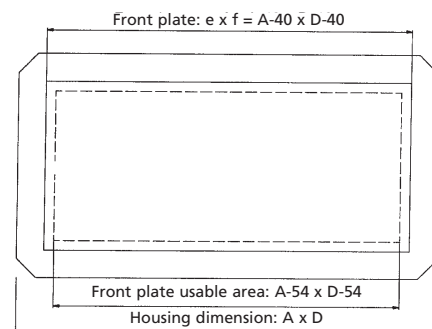
### Suspension system machining

- for
- CS-1000 mini support system
- CS-2000 SL light weight support system
- CS-2000 suspension system 50
- CS-2000 suspension system 60
- Inclination couplings of all systems

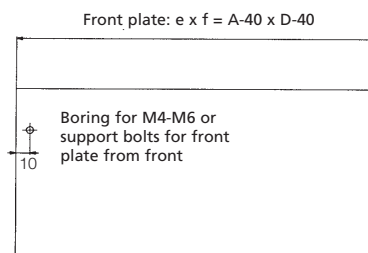


Back plate Features	Back plate Part number	Handles on side Part number	Handles at bottom Part number
screw mounted	954.5.0500.00	980.6.1420.00	-
hinged	980.6.1400.00	980.6.1420.00	-
screw mounted	954.5.1250.00	980.6.1430.00	-
hinged	980.6.1410.00	980.6.1430.00	-
screw mounted	954.5.0130.00	980.6.1310.00	-
hinged	980.6.1250.00	980.6.1310.00	-
from inside	954.5.0120.00	980.6.1310.00	-
screw mounted	954.5.0130.00	980.6.1310.00	-
hinged	980.6.1250.00	980.6.1310.00	-
screw mounted	954.5.0100.00	980.6.1320.00	-
hinged	980.6.1260.00	980.6.1320.00	-
from inside	954.5.0090.00	980.6.1320.00	-
screw mounted	954.5.0100.00	980.6.1320.00	-
hinged	980.6.1260.00	980.6.1320.00	-
screw mounted	954.5.0160.00	980.6.1330.00	-
hinged	980.6.1270.00	980.6.1330.00	-
from inside	954.5.0150.00	980.6.1330.00	-
screw mounted	954.5.0160.00	980.6.1330.00	-
hinged	980.6.1270.00	980.6.1330.00	-
screw mounted	954.5.0070.00	980.6.1340.00	-
hinged	980.6.1280.00	980.6.1340.00	-
from inside	954.5.0060.00	980.6.1340.00	-
screw mounted	954.5.0070.00	980.6.1340.00	-
hinged	980.6.1280.00	980.6.1340.00	-
screw mounted	954.5.0010.00	980.6.1350.00	-
hinged	980.6.1290.00	980.6.1350.00	-
from inside	954.5.0000.00	980.6.1350.00	-
screw mounted	954.5.0010.00	980.6.1350.00	-
hinged	980.6.1290.00	980.6.1350.00	-
screw mounted	954.5.0040.00	980.6.1360.00	-
hinged	980.6.1300.00	980.6.1360.00	-
from inside	954.5.0030.00	980.6.1360.00	-
screw mounted	954.5.0040.00	980.6.1360.00	-
hinged	980.6.1300.00	980.6.1360.00	-
screw mounted	954.5.4840.00	980.6.1600.00	-
hinged	980.6.1640.00	980.6.1600.00	-
screw mounted	954.5.4850.00	980.6.1660.00	-
hinged	980.6.1650.00	980.6.1660.00	-
from outside!	954.5.1210.00	980.6.1660.00	-
screw mounted	954.5.4850.00	980.6.1660.00	-
hinged	980.6.1650.00	980.6.1660.00	-
screw mounted	954.5.4810.00	-	980.6.1630.00
hinged	980.6.1620.00	-	980.6.1630.00

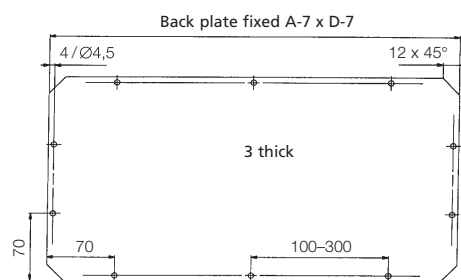
### Housing dimensions outline



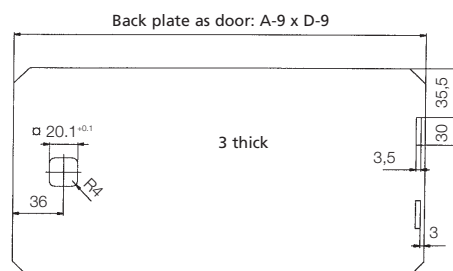
### Front plate dimensions



### Back plate dimensions (back plate screw fitted)



### Back plate dimensions (hinged back plate)



\*) 164 mm when drilling or screwing through the rear panel; otherwise 155 mm usable depth (clearance required for internal fixing)

# Check list

## Price enquiry, Order form Lightweight control housing CC-2000 SL

Please use copies of this form.  
Grey marked boxes are standard.

Client	Code	Part No.
Address		Cust. No.
Telephone	Telefax	Branch
Contact	Department	
<input type="checkbox"/> Price enquiry	Enquiry No.	Date
<input type="checkbox"/> Enquiry	Annual need	Qty.
<input type="checkbox"/> Order	Delivery date	Qty.

**1 Enclosure orientation**

Horizontal       Vertical

Square housing treat as horizontal

front

front

Weight of components  
 \_\_\_\_\_ kg

**2 Dimensions (mm)**

Housing dimensions overall: A x D       x

Front plate dimension: e x f       x

**3a Front plate – back plate**

none  with       none  with

Front plate      Back plate

Fixing accessories for customer's own plates

For plates mounted internally: gasket, clips etc.  
 For plates mounted externally: gasket/washers/nuts M5  
 19" fixing set (9806112000): screws and nuts M6

**3b Separating piece**

not mounted/standard  
 vertical       mounted right  
 horizontal       mounted left  
 mounted at bottom  
 mounted at top

Operating plate anodised (not mounted) s = 3 mm

Dimension: g x h       x

(g = width, h = height)

**4a Housing without door profile:**

Housing depth (overall):	Position of front plate:		Back plate	
		usable depth (mm)	fixed	or hinged with joint & lock
<input checked="" type="checkbox"/> 120 mm	<input checked="" type="checkbox"/> inside	101 mm	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> outside	109 mm	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> 200 mm	<input checked="" type="checkbox"/> inside	181 mm	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> outside	189 mm	<input type="checkbox"/>	<input type="checkbox"/>

**4b Housing with door profile:**  
(Door with internal hinges can only be used for its own weight)

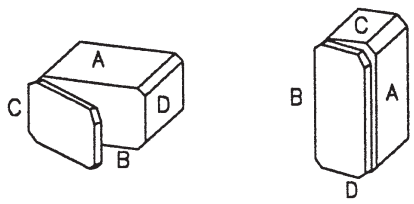
\* FP = Frontplatte  
RW = Rückwand

Door front	or Housing depth External (mm)	Door back	* FP internal and BP internal	* FP internal and BP external	* FP external and BP internal	* FP external and BP external
			Usable depth (mm)	Usable depth (mm)		Usable depth (mm)
External joint <input type="checkbox"/>	120 + 55	Internal joint <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> 147	<input type="checkbox"/> 155	<input type="checkbox"/>	<input type="checkbox"/> 164
External joint <input type="checkbox"/>	200 + 55	Internal joint <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> 227	<input type="checkbox"/> 235	<input type="checkbox"/>	<input type="checkbox"/> 244



**5 Door fixing front**

Standard  (as shown)

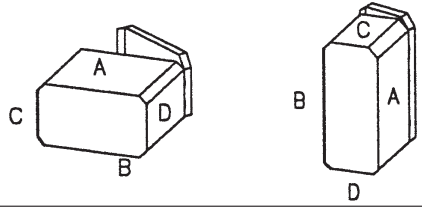


Variation to standard

A   B  
C   D

**Door fixing rear**

Standard  (as shown)



Variation to standard

A   B  
C   D

**6 Lock**

Square (mm)  6  7  8 Standard  
Triangular (mm)  7  8  
Double beard (mm)  3  5

Handle with lock  
 Daimler Benz  
 Special lock (customers specification)

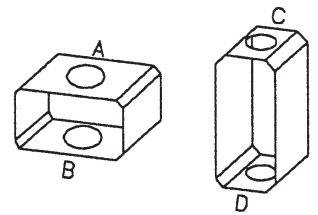
**7 Machining for support systems**

Side  
 A  
 B  
 C  
 D

Standard machining  
For swivel tilt coupling and  
flange coupling 50, 60, 45/60 (SL)

Flange coupling 80 (only profile 200)  
 Angle adapter (only profile 200)  
 Special machining to customers specifications

None



**8 Paint**

Main body:  
Doors:  
Front plates:  
Back plates:

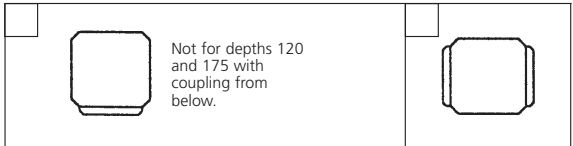
Standard  
 RAL 7035, light grey  
 RAL 7035, light grey  
 anodised, clear  
 anodised, clear

Customer specification  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**9 EMV (electro magnetic compatibility) version**

Conducting connections between housing main body, housing door and front plate and back plate.

**10 Handles**



None  
 Pre assembled – ready to fit Standard

**11 Accessories, note**

Included in delivery: key and earth-set

<input type="checkbox"/> Encl.	Sales	Techn. dept.	Planning dept.	Enquiry
<input type="checkbox"/> No encl.				Order



## Control housing CC-4000



The operator control panel is often the visual focus point of a machine. The new CC-4000 control housing from BERNSTEIN has a dynamic modern industrial design. Not only does this enhance the appearance of your system, machine, controller or operator panel, but provides functional advantages that both you and your customers will value.

### What's in it for you?

- An ultra-modern design, combined with impressive functionality
- High quality aluminium casting with smooth surface finish
- Design enhancing coloured profiles, optionally available in your company livery
- Integrated handgrips – for easy handling, also enhance enclosure styling

### IP 65 protection – for peace of mind

- IP 65 ingress protection is provided as standard.

### You want it deeper, higher & wider? No problem!

Thanks to a flexible modular design, the housing depth can be matched to suit your controller. Aluminium frame profiles: 52, 80, 140, 200 & 290 mm deep, can be linked with extension profiles of 68, 128 & 228 to attain depths from 52 mm to 646 mm. The required width and height is precisely obtained by trimming sections to size.

### You specify the access

- Flush fitting hinged rear door
- Extension section as rear door
- Frame section as front door
- Demountable front or rear door when optional two part external hinge used – allows replacement of complete control module when servicing required

### You manage heat dissipation, with three profile versions

- Housing with smooth external surface
- Housing with external aluminium fins, for increased heat dissipation
- Housing with external aluminium fins and internal fans for maximum heat dissipation





Front opening of the CC-4000 housing using hinged frame section



Rear access to the CC-4000 with flush-fitting hinged door



Hinged and demountable front frame (also available for rear profile)



Ergonomically designed handles are integral to the front frame



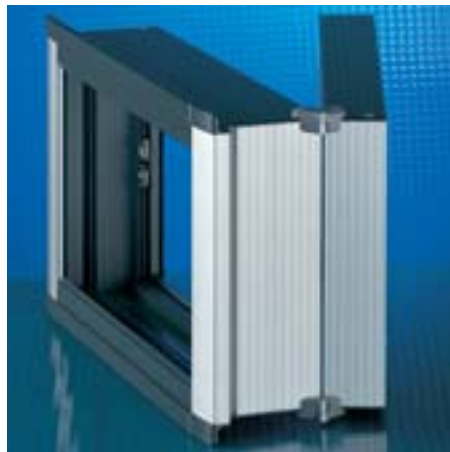
Different RAL colour can be applied to match your company livery



Externally finned aluminium extrusion provides excellent heat dissipation



Smooth finish aluminium profile



Combination of different frame and extension profile widths allow many enclosure depths to be realised



# Dimensions

Using a combination of extension widths the CC-4000 depth may be selected in the range 52–646 mm (see drawings below).

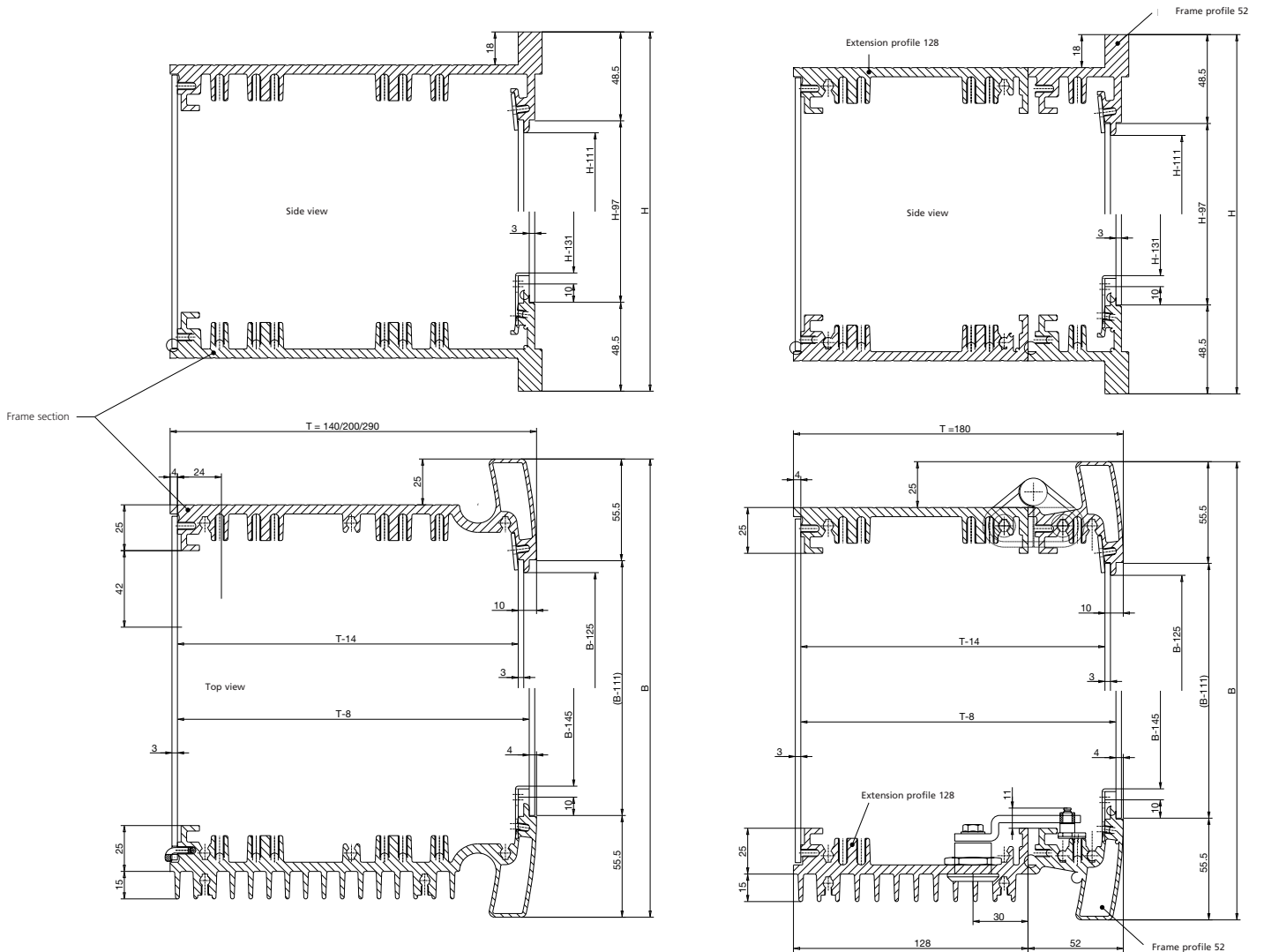
Height and width up to 800 x 800 mm may be freely chosen. Sizes outside of this range can be confirmed upon request.

If the front plate is installed in front then – for the profiles 52, 140, 200 and 290 the lay-on surface is 3.0 mm low

– for the profiles 52 and 80 the lay-on surface is 6.5 mm low

Frame profile  
52 mm  
80 mm  
140 mm  
200 mm  
290 mm

Extension profile  
68 mm  
128 mm  
228 mm



## Standard sizes

Part number	External dimensions enclosure W x H x D (mm)	19" component dimensions	Profile size frame/extension (mm)	Front plate dimensions (mm)	External mounted front plate mounting area dimensions (mm)	Front plate part number: cut to size, unmachined	Available mounting depth with 3 mm front plate min/max (mm)	Rear door configuration: s = hinged; f = fixed; suspension system machining
<b>114.4.0000.11</b>	596 x 364 x 140	84 TE x 6 HE	140/-	485 x 267	451 x 233	954.5.9820.00	132	s; 50/60 above
<b>124.4.0000.11</b>	596 x 364 x 200	84 TE x 6 HE	200/-	485 x 267	451 x 233	954.5.9820.00	192	s; 50/60 above
<b>134.4.0000.11</b>	596 x 364 x 290	84 TE x 6 HE	290/-	485 x 267	451 x 233	954.5.9820.00	282	s; 80 above
<b>156.4.0000.11</b>	596 x 364 x 180	84 TE x 6 HE	52/128	485 x 267	451 x 233	954.5.9820.00	172	f; 50/60 above
<b>114.4.0000.14</b>	596 x 453 x 140	84 TE x 8 HE	140/-	485 x 356	451 x 322	954.5.9830.00	132	s; 50/60 above
<b>114.4.0000.17</b>	596 x 542 x 140	84 TE x 10 HE	140/-	485 x 445	451 x 411	954.5.9840.00	132	s; 50/60 above

### Includes as standard

- Enclosures assembled and painted
  - horizontal profiles in RAL 7043 traffic grey B.
  - vertical profiles clear anodised
  - all profiles smooth without cooling fins
  - hinged rear door (hinge left)
  - with hinged front frame (hinge left)
  - fixed rear wall
- 19" mounting set (Part number 980.6.2320.00)
  - screws and captive nuts M6
- 8 mm square lock on all hinged doors
- Suspension system machining for BERNSTEIN CS-2000 (50, 60 or 80)

### Accessories

- Front plate, internal mounting
- Front plate mounting set (Part number 980.6.2330.00)
- Other accessories upon request

**Note:** Shorter lead times for standard sizes!

### Application samples:



Combination of front profile 200 and back door 68.

Directly mounted Industrial-PC with operator panel and keyboard drawer.

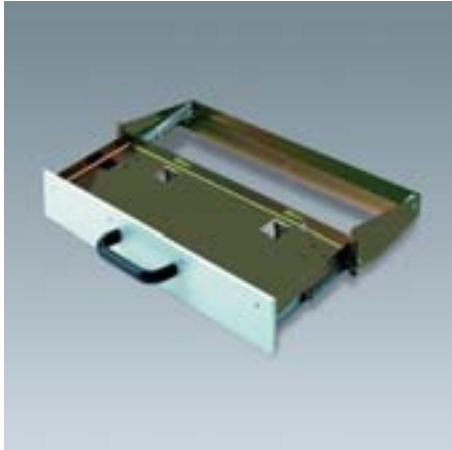


Front profile 80 with hinged back plate.

Directly mounted Industrial-PC with operator panel.

## Accessories enclosure

### CC-4000



**Keyboard drawer**  
**Part number 928.6.0500.00**  
Dimensions (W x H x D):  
500 x 77 x 170 mm  
Front plate: clear anodised  
Handle bar: black



**Keyboard drawer with keyboard**  
**Part number 928.6.0610.00**  
Dimensions (WxHxD): 483x88x218 mm  
Layout: IBM-AT (MF2) german with trackball  
Ingress protection: IP 65 if closed  
Front plate: 5 mm



**Fan 24 V DC**  
**Part number 942.1.2240.00**  
Flow rate 30 m<sup>3</sup>/h



**Locking belt without lock**  
**Part number 942.1.6420.00**



**Locking belt with E1-lock**  
**Part number 942.1.6430.00**



**Integrated-push socket**  
**Part number 942.1.2180.00**

## Accessories enclosure CC-4000



**CD-ROM-Cover**  
**Part number 980.6.2170.00**  
Dimensions (W x H x D):  
177 x 119 x 8 mm  
Surface: possible to paint



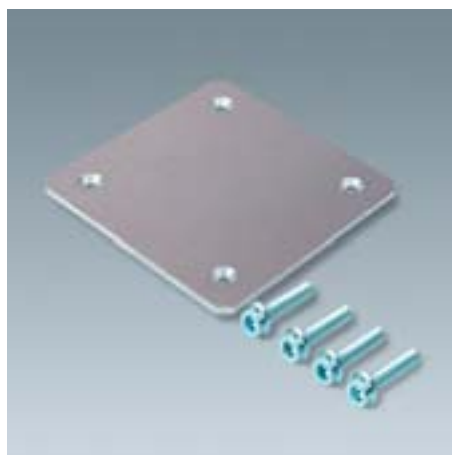
**Floppy-Cover**  
**Part number 980.6.2190.00**  
Dimensions (WxHxD): 120 x 92 x 8 mm  
Surface: possible to paint



**Door angle limitation**  
**Part number 980.6.2540.00**



**Cover for adapter flange**  
**Part number 951.1.7710.00**  
Suspension system CS-2000-80  
Surface: possible to paint



**Cover for coupling**  
**Part number 951.7.7810.00**  
Suspension system CS-2000-80  
Surface: possible to paint



**Ground strap 200 mm**  
**Part number 941.1.0480.00**  
Ribbon cable, copper

# Check list

## Price enquiry, Order form

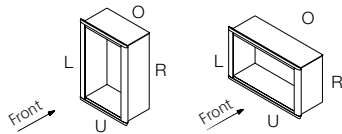
### Control enclosure CC-4000

Grey boxes with thick frame refer to standard design.

Customer	Code	Part.-No.
Address	Cust.-No.	
Telephone	Telefax	Branch
Contact	Department	
<input type="checkbox"/> Price enquiry	Date	Qty.
<input type="checkbox"/> Enquiry	Enquiry No.	Annual need
<input type="checkbox"/> Order	Delivery date	Qty.

#### 1 Enclosure orientation

- Standard
- Desk version, control enclosure
- Desk version, keyboard housing



- O = Profile top
- U = Profile bottom
- L = Profile left
- R = Profile right

Weight of mounted components

 kg

#### 2 Dimensions (mm)

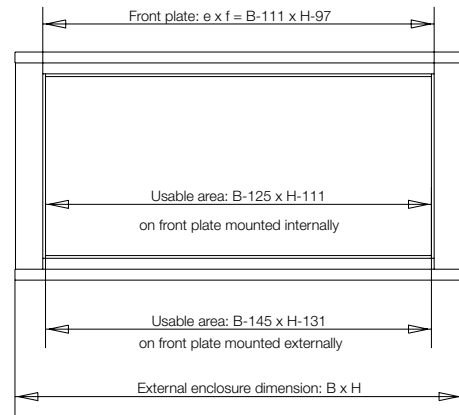
Enclosure dimensions overall:  
Width x Height (B x H)  x

**19"-Enclosure** B x H  x

$H = (n \times HE) + 97 - 1 \text{ HE} = 44.45$  HE =

**Front plate dimensions:**  
e x f = B-111 x H-97  x

**Back plate dimensions:** b x h  x   
 $b \times h = B-61 \times H-47$   
 $b \times h = B-63 \times H-47$  (hinged back plate)



#### 3 Profile

- Profile without fins
- Profile with fins

#### 4 Enclosure depth external

Front profile with mounted FP 3.0 mm deep

Extension

\* Internal depth by mounted FP 3.0 mm

→  52    140    200    290

68    128    228    128    68

For mounted FP 6.5 mm internal depth is reduced by 3.5 mm

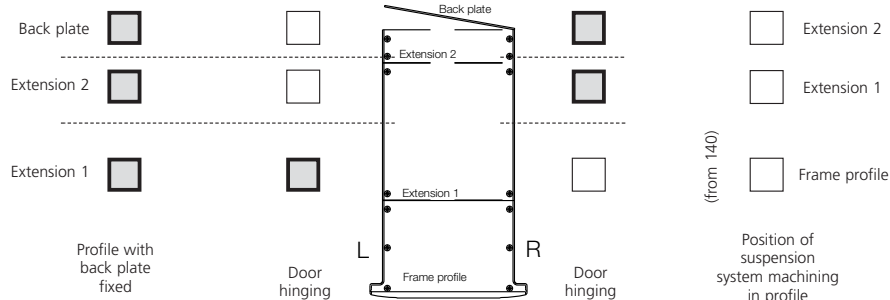
or  →  52    80    Front profile with FP 6.5 mm deep

68    128    228    128    68

	52	80	120	140	148	180	188	200	208	216	248	268	276	280	290	308	328	336	348	358	368	376	396	408	418	426	428	436	456	486	496	518	A			
Profile	38	66	106	126	134	166	174	186	194	202	234	254	262	266	276	294	314	322	334	344	354	362	382	394	404	412	414	422	442	472	482	504	I*			
52	●																																			
80		●																																		
140				●																																
200								●																												
290															●																					
68			●						●	●	●	●	●	●																						
68																																				
128																																				
128																																				
228																																				

A = External depth, I = Internal depth. With front plate mounted from the inside. Assembly from the outside – internal depth increases about 6 mm. ■◆ = alternatively combination

#### 5 Door hinging (suspension system position)

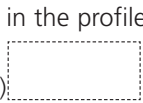
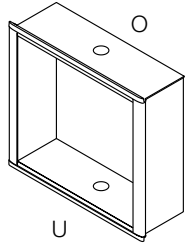


**6 Separating piece**  not mounted Standard  Operating plate anodised (not mounted), s = 3 mm  
 vertical Qty.   mounted right Dimension: g x h  
 mounted left (g = width, h = height)  
 horizontal Qty.   mounted at bottom Operating plate 1  x   
 mounted at top Operating plate 2  x   
**Attention!** Separating piece height for frame profile with mounted front plate 3.0 mm = 20 mm/front plate 6.5 mm = 25 mm

**7 Front plate**  none with  3 mm, from inside  3 mm, from outside  
**Back plate**  none with  3 mm, fixed from outside  3 mm, hinged

**Accessories (Front plate)**  For plates mounted internal: gasket and fixing material  
 For plates mounted external: gasket/washers/nuts M5  
 19"-fixing set (980.6.1120.00): Screws and nuts M6

**8 Lock** Square (mm):  6  7  8 Standard  Toggle without lock  
Triangular (mm):  7  8  Toggle with lock  
Double beard (mm):  3  5  Toggle with lock E1  
Daimler Chrysler:   Special lock/customer specific

**9 Machining for suspension system**  No  O  U  
**Coupling**  Swivel tilt coupling (from profile 128)  
 Flange (indicate profile size)  
 Angle adapter (from profile 200)  
 Special machining customer specific  
**System**  SL (only profile 80)  
 50 (from profile 128)  
 60 (from profile 128)  
 80 (from profile 128)  
 80/140 (from profile 290/228)  
in the profile:  

**10 Paints** **Standard** **Customised design**  
Profile horizontal:  RAL 7043, painted   
Profile vertical:  anodised, natural colour   
Separator piece:  RAL 7043, painted   
Front plates:  anodised, natural colour   
Back plates:  anodised, natural colour

**11 EMV (electro magnetic compatibility) version** (Protection degree IP 54)  
 Conducting connections between enclosure main body, enclosure door, front plate and back plate

**12 Accessories, notes** Included in delivery: key an earth-set

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<input type="checkbox"/> Encl.	Sales	Techn. dept.	Planning dept.	Enquiry
<input type="checkbox"/> No encl.				Order



## Pedestal/Desk version CC-4000

In addition to mounting the CC-4000 on the CS-2000 and CS-2000 SL suspension systems BERNSTEIN also offers the options of a simple free-standing pedestal and standing or hanging desk models.

With newly developed components this option offers a stylish and space saving workplace for industrial PC users. All models feature enclosure and keyboard tilt capabilities to facilitate an optimum user interface regardless of the individual's height or lighting conditions.



Cables may be run up the pedestal via a rear integrated cable channel which is hidden through a rubber seal. In the pedestals with integrated mounting drum cables with plugs can be through fed for direct connection to controllers or the keyboard.

All pedestal or desk models are available immediately ex-stock. Using the check list a fully configured CC-4000 complete with suspension system can be quickly configured. Accessories include roller sets which may be mounted without machining directly to the pedestal base. Height adjustable feet are also available.

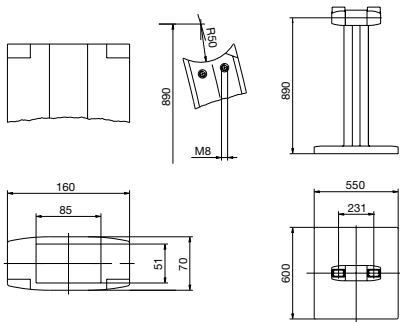
### Delivery includes

- Basic pedestal, desk pedestal, hanging desk, mounting feet and rollers are supplied with fixings and instructions
- Ex-stock availability
- Painted RAL 7035 finish
- Special colours upon request



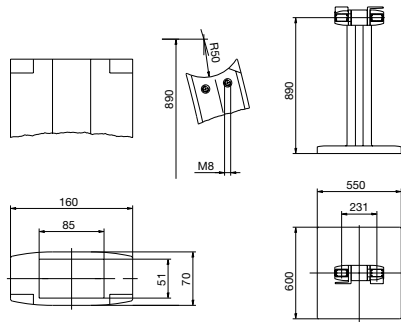
**Basic pedestal**  
Part number 101.6.7450.00

Free standing pedestal with integrated attachment for adjustable 0° to 30° mounting of CC-4000 and CC-2000 SL control enclosures. Colour RAL 7035. Complete with fixings and instructions. Mechanical preparation of enclosure necessary.



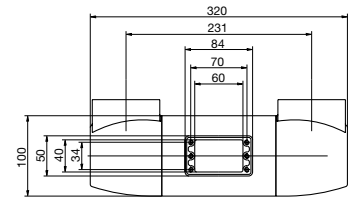
**Desk pedestal**  
Part number 101.6.7440.00

Free standing pedestal with integrated desk attachment for adjustable 0° to 30° mounting of CC-4000 and CC-2000 SL control enclosures and keyboard housings (0° to 20°). Colour RAL 7035. Complete with fixings and instructions. Mechanical preparation of enclosure and keyboard housing necessary.



**Hanging desk attachment**  
Part number 980.8.0131.00

Hanging desk attachment for all CC-4000 desk control enclosures attached to the CC-2000 suspension system. Keyboard housing may be tilted 0° to 30°. Colour RAL 7035. Complete with fixings and instructions.



**Rollers**  
Part number 980.8.0128.00

Rollers include 4 directional wheels for desk or pedestal models. Complete with fixings and instructions



**Adjustable feet**  
Part number 980.8.0129.00

Height adjustable feet (1 Set = 4 pieces) for desk or pedestal use. Complete with fixings and instructions



# Selection criteria for suspension systems

## Mechanical stress/load capacity

Differently assembled suspension systems can cope with different levels of stress (loads).

The mechanical stress (load) induced by the weight of the enclosure to be supported (with all internal components installed) combined with the desired length of the extension arm is an important consideration when selecting the correct suspension system.

System selection is made easier by using the opposite diagram. If a swivel tilt coupling is used to support the enclosure, a maximum load of 300N will apply.

To determine the force  $f$  (system stress/load) from the housing weight  $m$ :  
 $f \text{ (N)} = m \text{ (kg)} \times g \text{ (ms}^2\text{)}$   
 system stress/load  $f$  = enclosure weight  $m$  multiplied by the acceleration due to gravity  $g$   
 $f \text{ (N)} = m \text{ (kg)} \times 9.81 \text{ (ms}^2\text{)}$

**Heavy-duty suspension system CS-2000**

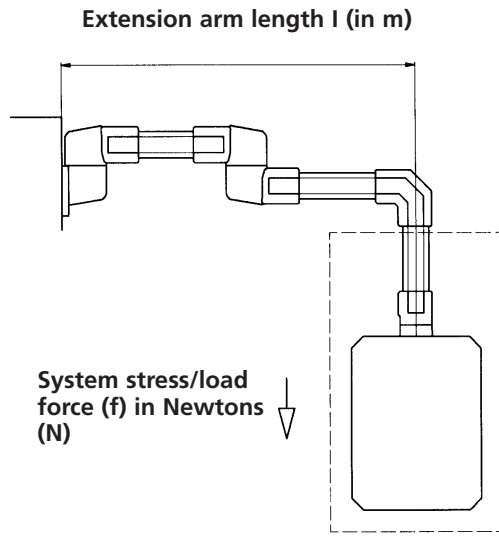
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**Suspension system for medium to heavy loads CS-2000**

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**Stainless steel suspension system CS-600 NR CS-480 NR**

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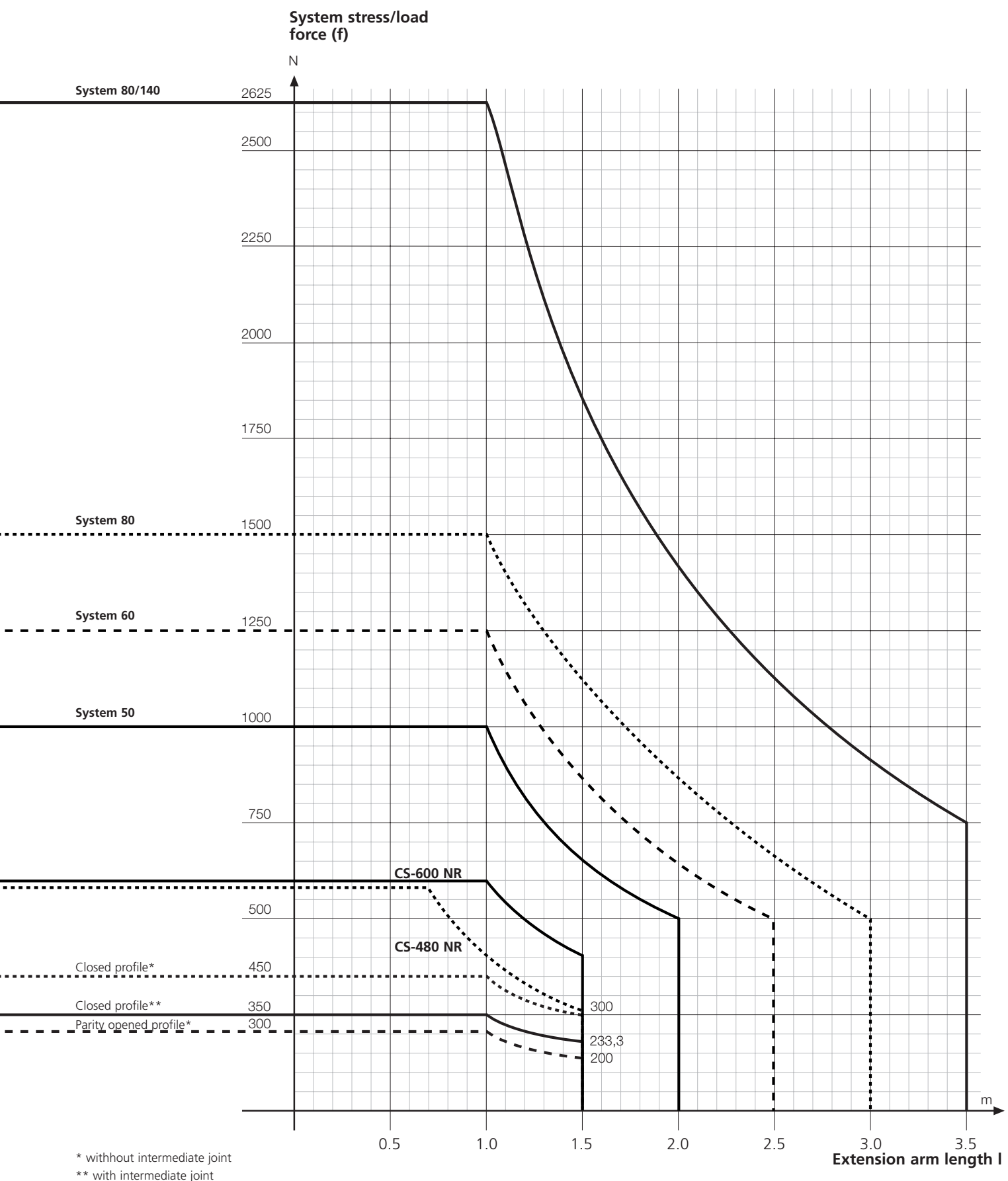
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**Light-weight suspension system CS-2000 SL**

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\* without intermediate joint  
\*\* with intermediate joint

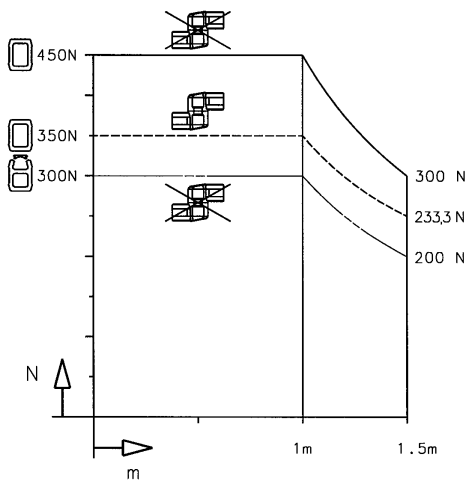
## Light weight system

### CS-2000 SL 45/60

The light weight system CS-2000 SL has been specially designed to support compact, light weight control housings over a short distance. Unlike other suspension systems currently on the market for similar purposes, it has a number of clear technical and economic benefits.

#### System structure

To obtain the desired system configuration, components can be combined either with a closed or open top, aluminium link section. The large number of different components



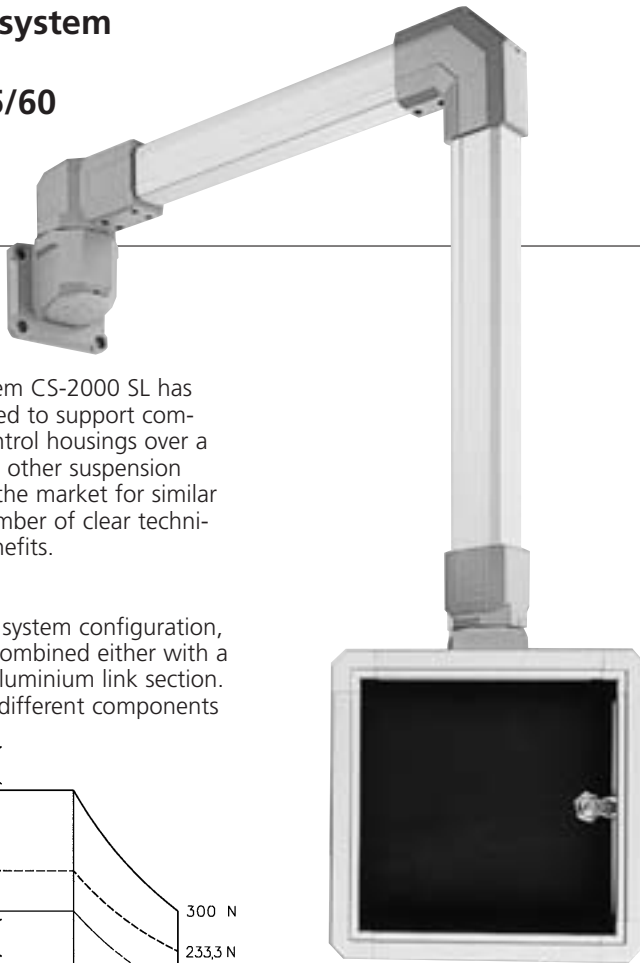
available, allows a great variety of system configurations. Construction should follow the specifications in the load diagram.

#### Materials

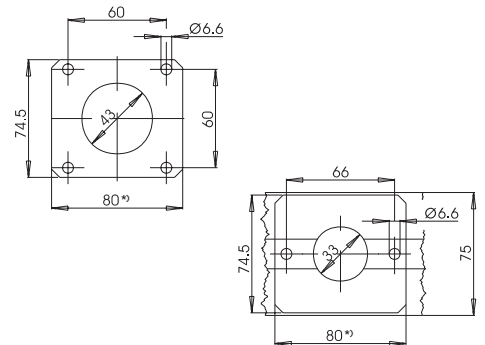
- Gravity-die-cast aluminium components: AlSi12 (Cu)
- Installation opening: POM
- Bearing: PA
- Seals: CR
- Aluminium link section: Al Mg Si 0.5
- Link section cover with open profile: EPDM

#### Colours

- Suspension system components: light grey, RAL 7035
- Link section: silver, clear anodised



#### Components for mounting housings



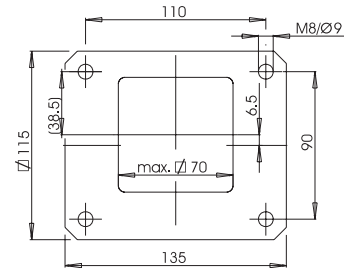
For	Part number
Coupling	101.5.1630.00
Elbow coupling	101.5.1650.00
Base bracket coupling	101.5.1670.00
Angled coupling	101.5.1640.00
Angled elbow coupling	101.5.1660.00
Angled base bracket coupling	101.5.1680.00
Adjustable angle coupling	101.5.1690.00
Adjustable angle elbow coupling	101.5.1700.00

\*) The CC-2000 section 75 has a bore diameter of 33 mm

#### System benefits

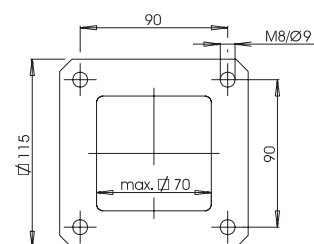
- Installation openings at elbow points
- Choice between the use of open and closed link sections
- Free cable passage area with closed system:  
dia. 40 mm = 12.5 cm<sup>2</sup> at the narrowest point (bearing passage)
- Free cable passage area with partially closed system:  
– 2.76 cm<sup>2</sup> at the narrowest point (where the section enters the component)  
– 7.40 cm<sup>2</sup> within an enclosed tube
- Simply added rotation limiter for couplings and joints
- Couplings have a small flange which can be fixed to very narrow housings
- "Overhead" installation of all components possible
- Modern industrial design
- Protection system IP 65

#### Machining drawing for wall joints



For	Part number
Wall joint with horizontal outlet	101.5.1750.00
Wall joint with vertical outlet	101.5.1770.00

#### Machining drawing for other elements

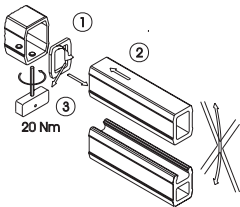


For	Part number
Base bracket coupling	101.5.1670.00
Angled base bracket coupling	101.5.1680.00
Base bracket, rotating	101.5.1780.00
Set-up joint	101.5.1750.00
Base bracket/wall flange	101.5.1790.00

# Link profile

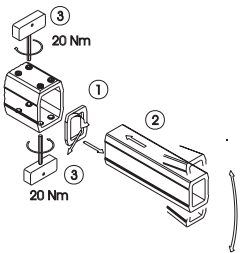
## CS-2000 SL 45/60

### Installation of the link profiles



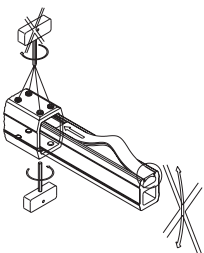
[A] Open or closed section in couplings and elbows:

Attach seal to link section (1), mount link section onto suspension system components (2, 3).



[B] Closed section in suspension system components with 8 fastening screws:

Attach seal to link section (1), mount link section into suspension system components (2, 3), making use of the adjustment facility.



[C] Open section in suspension system components with 8 fastening screws:

Attach seal to link section, mount link section into suspension system components, making sure, however, you only mount using the 4 fastening screws onto the closed part of the tube. Fit cover seal.

### Link sections

The link section is an extruded aluminium profile (Al Mg Si 0.5). The surface is clear anodised, so that it has a colour similar to RAL 9006. The link section can be used either with an open cable duct or with a completely closed one. The partially open section has a cover made from EPDM, similar to RAL 7042. This flexible plastic cover can easily be pulled out and pushed back in place.

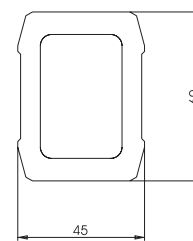
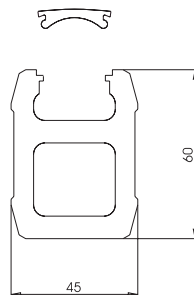
### Weight

Open profile: 3.76 kg/m  
Closed profile: 3.50 kg/m



Open profile	
Dimensions (mm)	Part number
45 x 60 x 250	952.4.0010.00
45 x 60 x 500	952.4.0020.00
45 x 60 x 750	952.4.0030.00
45 x 60 x 1000	952.4.0040.00
45 x 60 x 1250	952.4.0050.00
45 x 60 x 1500	952.4.0060.00
45 x 60 x 2000	952.4.0080.00

Closed profile	
Dimensions (mm)	Part number
45 x 60 x 250	952.4.3010.00
45 x 60 x 500	952.4.3020.00
45 x 60 x 750	952.4.3030.00
45 x 60 x 1000	952.4.3040.00
45 x 60 x 1250	952.4.3050.00
45 x 60 x 1500	952.4.3060.00
45 x 60 x 2000	952.4.3080.00



Turn to page 344 ff + to select  
– Loading capacity  
– Cable routing cross-section

## System components

### Light-weight suspension system for small loads

#### Type CS-2000 SL System size 45/60



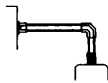
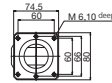
For enclosure mounting  
Coupling CS-2000 SL

Part	
Weight	(g)
Part number	

740  
**101.5.1630.00**

#### Dimensions in mm

Angle of rotation 300° with limiter  
Complete with installation fixings, seals and instructions for installation



980.5.1290.00

Detail  
**Accessories**, can be retro-fitted  
Rotation limiter (see page 426)

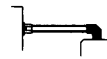
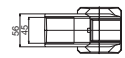
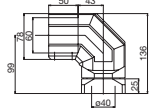
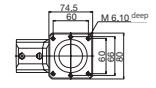


For enclosure mounting  
Elbow coupling CS-2000 SL

960  
**101.5.1650.00**

#### Dimensions in mm

Cable installation access with plastic clip-on cover  
Angle of rotation 300° with limiter.  
Complete with installation fixings, seals and instructions for installation



980.5.1290.00



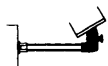
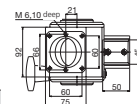
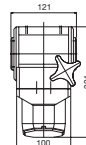
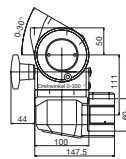
For enclosure mounting  
Adjustable angle elbow coupling CS-2000 SL

Part	
Weight	(g)
Part number	

3300  
**101.5.1700.00**

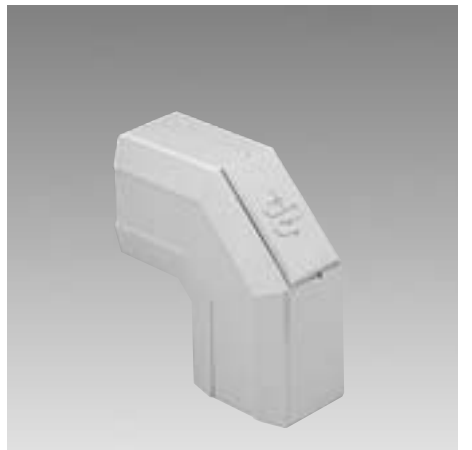
#### Dimensions in mm

Angle of rotation 300° with limiter  
Inclination angle infinitely adjustable 0–30°  
Complete with installation fixings and seals  
Housing max. 300N



980.5.1300.00

Detail  
**Accessories**, can be retro-fitted  
Rotation limiter (see page 426)

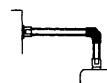
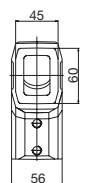
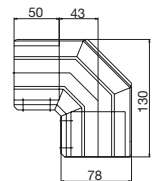


Elbow CS-2000 SL

590  
**101.5.1710.00**

#### Dimensions in mm

Cable installation access with plastic clip-on cover  
Complete with seals and instructions for installation



—



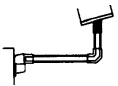
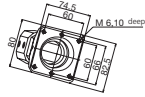
For enclosure mounting  
Angled coupling CS-2000 SL

1100

**101.5.1640.00**

Inclined angle 15°.  
Angle of rotation 300°  
with limiter  
Complete with installation  
fixings, seals and  
instructions for installa-  
tion

**Dimensions** in mm



980.5.1290.00



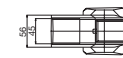
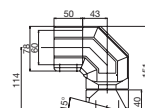
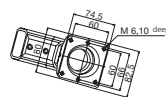
For enclosure mounting  
Angled elbow coupling CS-2000 SL

1400

**101.5.1660.00**

Inclined angle 15°  
Cable installation access  
with plastic clip-on cover  
Angle of rotation 300°  
with limiter  
Complete with installa-  
tion fixings, seals and  
instructions for installa-  
tion

**Dimensions** in mm



980.5.1290.00



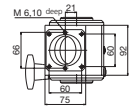
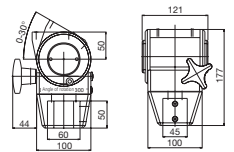
For enclosure mounting  
Swivel tilt coupling CS-2000 SL

3000

**101.5.1690.00**

Angle of rotation 300°  
with limiter  
Inclination angle infinite-  
ly adjustable 0–30°  
Complete with installa-  
tion fixings and seals  
Housing max. 300 N

**Dimensions** in mm



980.5.1300.00



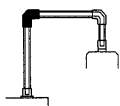
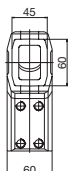
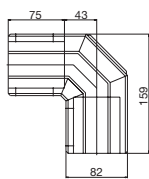
Elbow for moment load CS-2000 SL

1000

**101.5.1720.00**

Elbow with reinforced  
wall strength  
Link section adjustment  
Cable installation access  
with plastic clip-on cover  
Complete with seals and  
instructions for installation

**Dimensions** in mm



-



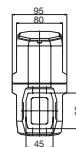
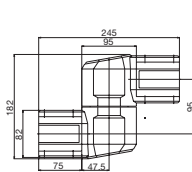
Intermediate join CS-2000 SL

2130

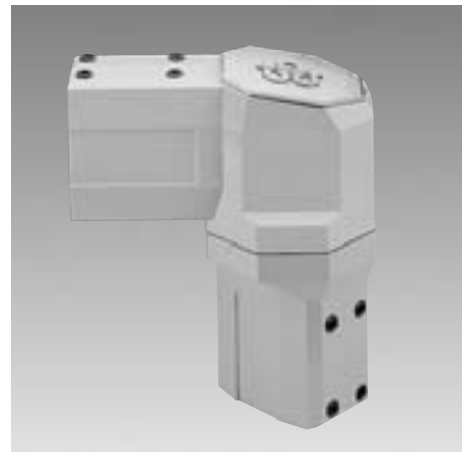
**101.5.1740.00**

Pivoting angle 360° with  
limiter  
Cable installation access  
on both sides  
Link section adjustment  
Complete with seals and  
instructions for installa-  
tion

**Dimensions** in mm



980.5.1320.00



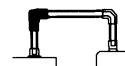
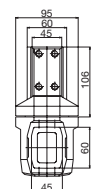
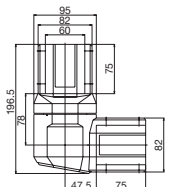
Rotation elbow CS-2000 SL

1850

**101.5.1730.00**

Rotation angle 300° with  
limiter  
Link section adjustment  
Cable installation access  
with clip-on plastic cover  
Complete with seals and  
instructions for installa-  
tion

**Dimensions** in mm



980.5.1320.00


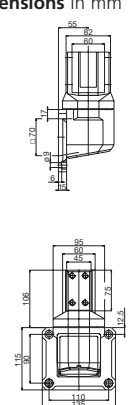
## System components

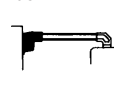
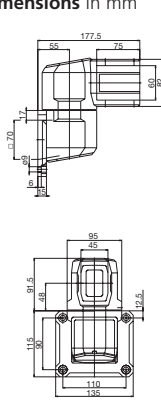
### Light-weight suspension system for small loads

#### Type CS-2000 SL System size 45/60

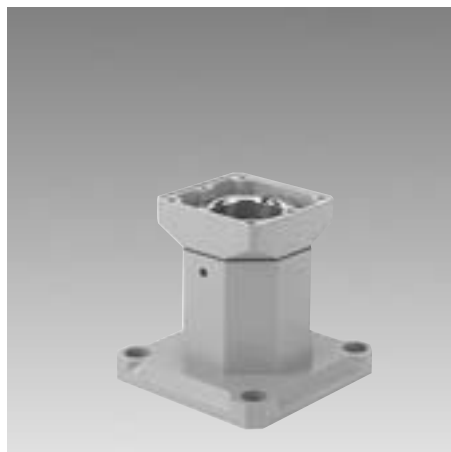


Part	
Weight	(g)
Part number	


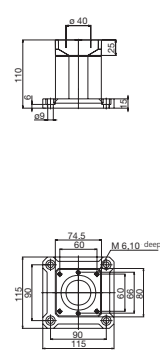
Wall joint with vertical outlet CS-2000 SL	
1840	<b>Dimensions</b> in mm
<b>101.5.1770.00</b>	
Pivoting angle 300° with limiter	
Link section adjustment	
Cable installation access with clip-on plastic cover	
Complete with seals and instructions for installation	
	
	980.5.1320.00


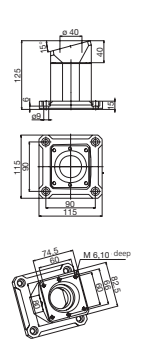
Wall joint with horizontal outlet CS-2000 SL	
2090	<b>Dimensions</b> in mm
<b>101.5.1760.00</b>	
Pivoting angle 300° with limiter	
Link section adjustment	
Cable installation access with clip-on plastic cover	
Complete with seals and instructions for installation	
	
	980.5.1320.00

Detail	
<b>Accessories</b> , can be retro-fitted	
Rotation limiter (see page 426)	



Part	
Weight	(g)
Part number	

Base bracket coupling CS-2000 SL	
1180	<b>Dimensions</b> in mm
<b>101.5.1670.00</b>	
Integrated component	
Pivoting angle 300° with limiter	
Complete with installation fixings, seals and instructions for installation	
	
	980.5.1290.00

Angled base bracket coupling CS-2000 SL	
1200	<b>Dimensions</b> in mm
<b>101.5.1680.00</b>	
Pivoting angle of 300° with limiter	
Fixed incline of 15°	
Complete with installation fixings, seals and instructions for installation	
	
	980.5.1290.00

Detail	
<b>Accessories</b> , can be retro-fitted	
Rotation limiter (see page 426)	



Set-up joint CS-2000 SL

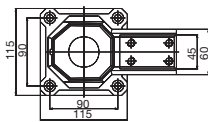
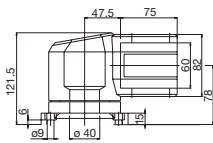
1720

**101.5.1750.00**

Pivoting angle 300° with limiter

Link section adjustment  
Cable installation access with clip-on plastic cover  
Complete with seals and instructions for installation

**Dimensions in mm**



980.5.1320.00



Base bracket, turnable, CS-2000 SL

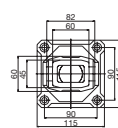
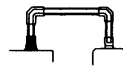
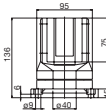
1460

**101.5.1780.00**

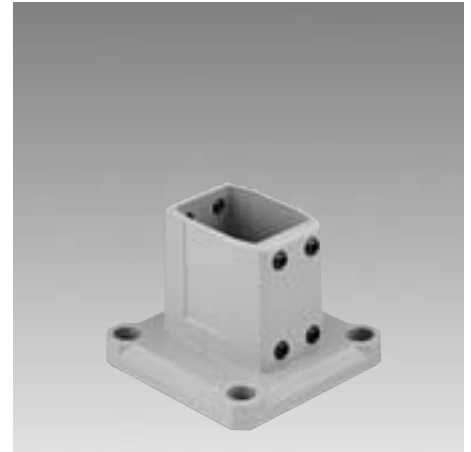
Pivoting angle 300° with limiter

Link section adjustment  
Complete with seals and instructions for installation

**Dimensions in mm**



980.5.1320.00



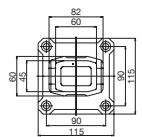
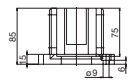
Base/wall flange CS-2000 SL

690

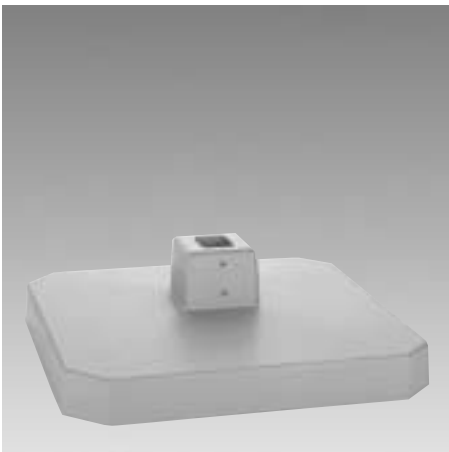
**101.5.1790.00**

Link section adjustment  
Complete with seals and instructions for installation

**Dimensions in mm**



-



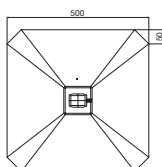
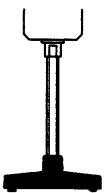
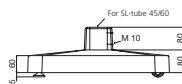
Free standing base CS-2000 SL

11820

**101.5.1800.00**

Large surface foot for stable, free standing applications

**Dimensions in mm**



-



# Leight-weight suspension system CS-2000 SL

## Panel components



### Application areas

In many industrial applications a trend to decentralised operate and visualisation units can be observed. The used terminals usually show a flat shape, because control intelligence is no longer integrated. Flat terminals often cannot be used close to a machine by a suspension system, because the building depth does not permit an attachment of the suspension system from top or bottom. In this case a connection over the rear wall is necessary.

### Variety of configurations

The panel components allow a rear connection and have the advantage of being integrated into the conventional light-weight suspension system CS-2000 SL. For the user the complete configuration variety of an approved suspension system is so available also for this application.

### Variations:

- Panel coupling with vertical connection
- Panel elbow coupling with horizontal connection
- Panel-swivel tilt coupling horizontal
- Panel-swivel tilt coupling vertical

### Quality and availability

BERNSTEIN provides a high quality standard. All panel components are available from stock.

### Panel components



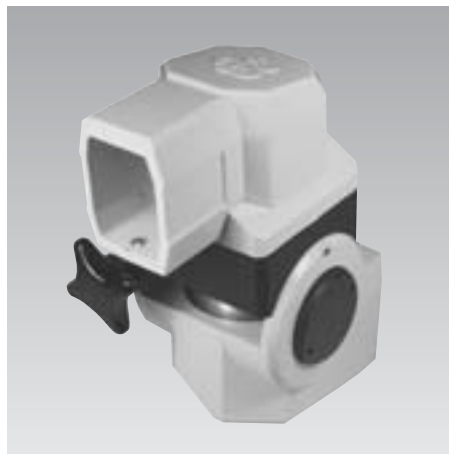
**Panel coupling**

Part number 101.5.2320.00 (Standard)  
Part number 101.5.2510.00 (Beckhoff)



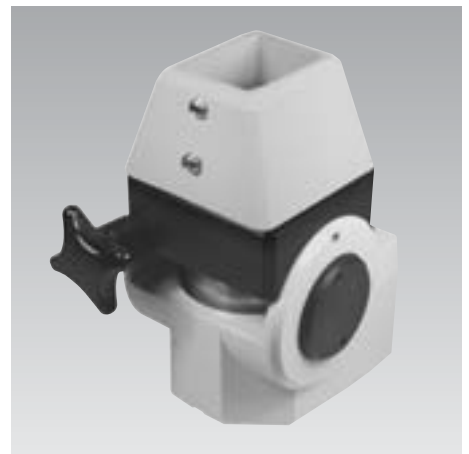
**Panel elbow coupling**

Part number 101.5.2330.00 (Standard)  
Part number 101.5.2520.00 (Beckhoff)



**Panel swivel tilt coupling V/H**

Part number 101.5.2360.00 (Standard)  
Part number 101.5.2540.00 (Beckhoff)

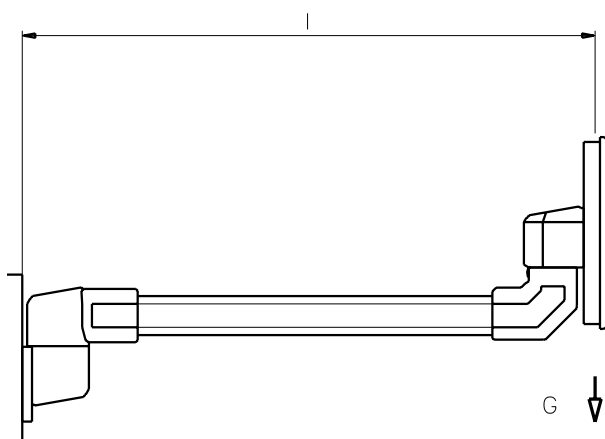


**Panel swivel tilt coupling V**

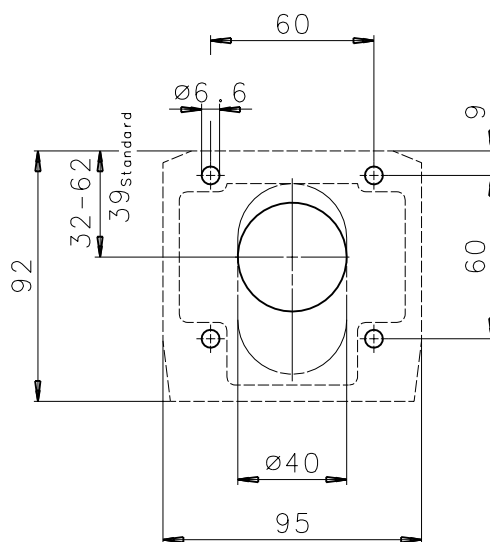
Part number 101.5.2350.00 (Standard)  
Part number 101.5.2530.00 (Beckhoff)

## Technical data

### Load capacity



### Machining drawing for enclosure rear wall



### Mechanical characteristics

Max. load capacity G	250 N
Max. system length	1500 mm

### Materials

Components	AlSi12 (Cu) - Chilled casting
Installation opening	POM
Bearing	PA
Gaskets	CR

### Operating and ambient conditions

Protection class	IP 54 according EN 60529
Temperature range	-25 °C ... + 80 °C

### Scope of services

Scope of supply	Panel components incl. gasket and mounting instruction
Colouring	RAL 7035 (Standard) / RAL 7012 (Beckhoff)
Availability	from stock

## Suspension systems

### CS-2000 50/60/80

With its large variety of components and different system sizes (50<sup>□</sup>, 60<sup>□</sup> and 80<sup>□</sup>), the BERNSTEIN range of suspension systems CS-2000 provides a technically mature solution for numerous applications.

#### System structure

The following conditions are important for your choice of system:

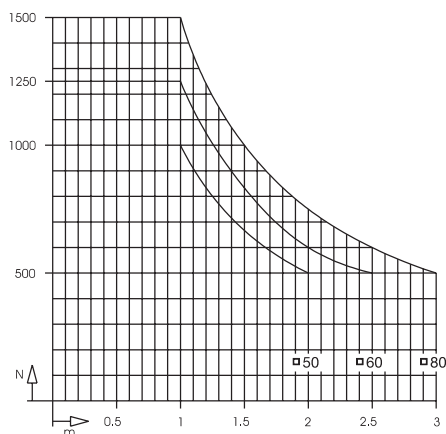
- Load-bearing capacity of the overall system
- Free passage for cables
- Design
- System configuration

Having decided on the right size of the system, you need to select the necessary components and tubes, so that you can put together the desired configuration.

#### System sizes

This concerns the suspension systems of the sizes 50<sup>□</sup>, 60<sup>□</sup> and 80<sup>□</sup>. The figures refer to the dimensions of steel tubes that link up the components.

- System 50<sup>□</sup> – steel tube 50 x 50 mm
- System 60<sup>□</sup> – steel tube 60 x 60 mm
- System 80<sup>□</sup> – steel tube 80 x 80 mm



Selection support for different load capacities are presented on pages 400/401.



#### Materials

- Gravity-die-cast aluminium components: AlSi12 (Cu)
- Steel-cast components: GGG 40
- Steel welded constructions: St 37
- Suspension tubes: St 37
- Bearings: St/PTFE
- Seals: CR
- Installation opening: AlSi12 (Cu)
- Expansion bellows: PVC

#### Colours

- Suspension system components: light grey, RAL 7035
- Expansion bellows: light grey, RAL 7035
- Tubes: light grey, RAL 7035

#### System benefits

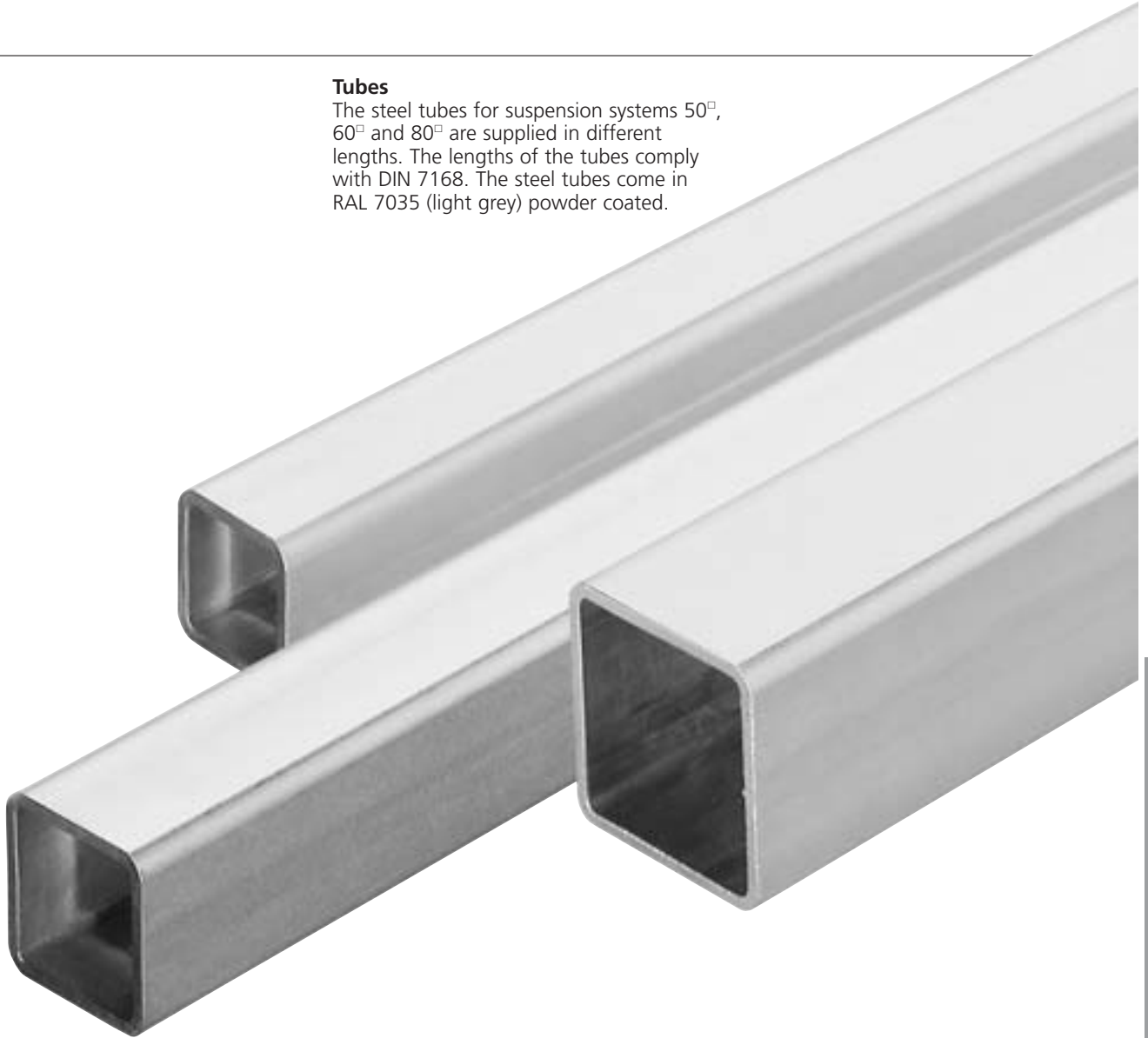
- Cable installation openings at all joints to simplify the installation of cables
- Integrated strain relief to ease the strain on cables
- High variability through the large number of available components
- Broad spectrum of applications through systems with different load-bearing capacities
- Flange coupling with clamping lever at operator face and selectable rotation limiter
- Maintenance-free friction bearings in all joints and couplings
- Adjustment options for the exact adjustment of suspension tubes
- Wall and intermediate joints with clamping lever at operator face and optional rotation limiter (available as accessories).

## Connecting tubes

### CS-2000 50/60/80

#### Tubes

The steel tubes for suspension systems 50<sup>□</sup>, 60<sup>□</sup> and 80<sup>□</sup> are supplied in different lengths. The lengths of the tubes comply with DIN 7168. The steel tubes come in RAL 7035 (light grey) powder coated.



#### Weights

System 50 <sup>□</sup>	6.3 kg/m
System 60 <sup>□</sup>	8.1 kg/m
System 80 <sup>□</sup>	11.0 kg/m

#### Available lengths of tubes

Length (mm)	System 50 <sup>□</sup> Part number	System 60 <sup>□</sup> Part number	System 80 <sup>□</sup> Part number
250	952.5.0520.00	952.6.0390.00	952.7.1140.00
500	952.5.0530.00	952.6.0400.00	952.7.1150.00
750	952.5.0540.00	952.6.0410.00	952.7.1160.00
1000	952.5.0550.00	952.6.0420.00	952.7.1170.00
1250	952.5.0560.00	952.6.0430.00	952.7.1180.00
1500	952.5.0570.00	952.6.0440.00	952.7.1190.00
2000	952.5.0590.00	952.6.0460.00	952.7.1210.00
3000	952.5.0610.00	952.6.0480.00	952.7.1230.00





## System components

### Suspension system for medium loads

Type CS-2000  
System size 50<sup>□</sup>

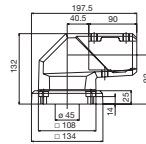


Part	
Weight	(g)
Material	
<b>Part number</b>	RAL 7035 light grey

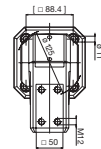
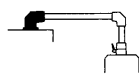
#### Set-up joint CS-2000

9240
GGG
<b>101.6.7120.00</b>
Angle of rotation 306° with limiter
Complete with seals

#### Dimensions in mm



Detail



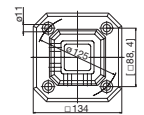
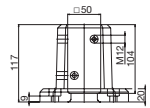
#### Accessories, can be retro-fitted

Rotation limiter (see page 426)	980.5.1770.00
Light adapter (see page 426)	980.5.1870.00

#### Base bracket CS-2000

4320
GGG
<b>101.6.4580.00</b>
Complete with seals

#### Dimensions in mm







## System components

### Suspension system for medium loads

#### Type CS-2000 System size 60<sup>□</sup>

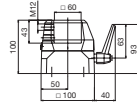


Part	
Weight	(g)
Material	
<b>Part number</b>	RAL 7035 light grey

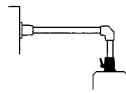
For enclosure mounting  
Standard coupling, flange CS-2000

2380	<b>Dimensions</b> in mm
Aluminium	
<b>101.6.7010.00</b>	

Angle of rotation 320°  
with limiter  
Clamping lever at  
operator face  
Complete with gaskets  
and fixing screws



Detail



<b>Accessories</b> , can be retro-fitted	
Rotation limiter (see page 426)	
Light adapter (see page 426)	

980.5.1760.00	
-	

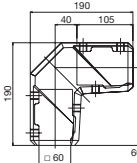


Part	
Weight	(g)
Material	
<b>Part number</b>	RAL 7035 light grey

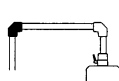
Elbow for momentum load/stress CS-2000

6000	<b>Dimensions</b> in mm
GGG	
<b>101.6.7100.00</b>	

Higher density  
Unscrewable mounting  
opening  
Complete with gaskets

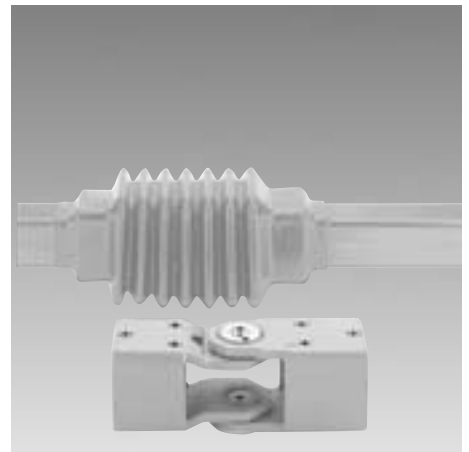


Detail



<b>Accessories</b> , can be retro-fitted	
Rotation limiter (see page 427)	
Light adapter (see page 426)	

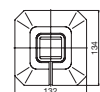
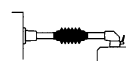
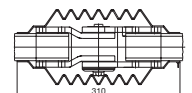
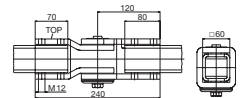
-	
980.5.1880.00	



Intermediate joint CS-2000

5920	<b>Dimensions</b> in mm
Steel	
<b>101.6.4640.00</b>	

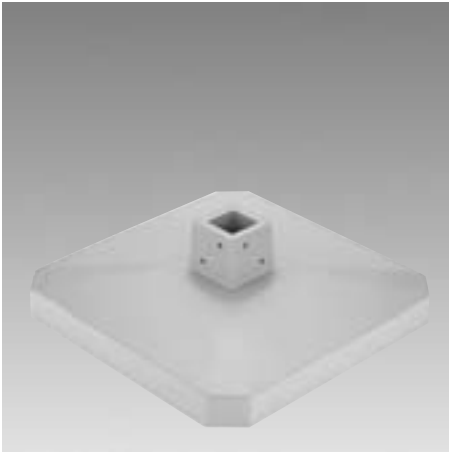
Expansion bellows can  
be zipped on at a later  
stage  
Pivotal angle 180° with  
limiter on either side  
Rotation moment setting



980.5.0630.00	
-	







Self-supporting base bracket CS-2000

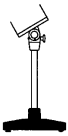
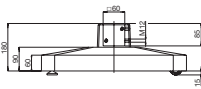
14000

Aluminium

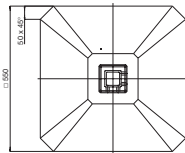
**101.6.3220.00**

Large-surface foot for self-supporting applications

**Dimensions** in mm



Fixed rollers, guide rolls,  
Feet see page 427



Indication adapter CS-2000

15° = 460

30° = 600

60° = 800

Aluminium

**15° = 101.6.4590.00**

**30° = 101.6.4600.00**

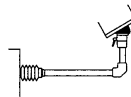
**60° = 101.6.4610.00**

The indication adapter is fixed firmly onto the flange or flange angle coupling  
Complete with seals and fixing screws

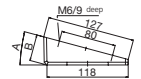
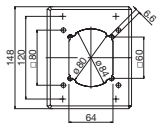
**101.6.4590.00:** A = 15°, B = 39

**101.6.4600.00:** A = 30°, B = 66

**101.6.4610.00:** A = 60°, B = 111



**Dimensions** in mm



## System components

### Suspension system for medium loads

#### Type CS-2000 System size 80<sup>□</sup>

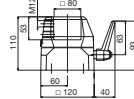


Part	
Weight	(g)
Material	
<b>Part number</b>	RAL 7035 light grey

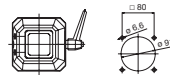
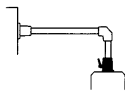
For enclosure mounting  
Standard coupling, flange CS-2000

3270	<b>Dimensions</b> in mm
Aluminium	
<b>101.6.7020.00</b>	

Angle of rotation 320° with limiter  
Clamping lever at operator face  
Complete with seals and fixing screws



Detail



**Accessories**, can be retro-fitted

Rotation limiter (see page 426)

Light adapter (see page 426)

980.5.1760.00

-

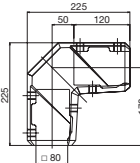


Part	
Weight	(g)
Material	
<b>Part number</b>	RAL 7035 light grey

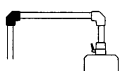
Elbow formomentum stress CS-2000

8500	<b>Dimensions</b> in mm
GGG	
<b>101.6.7110.00</b>	

High density  
Unscrewable mounting opening  
Complete with gaskets



Detail



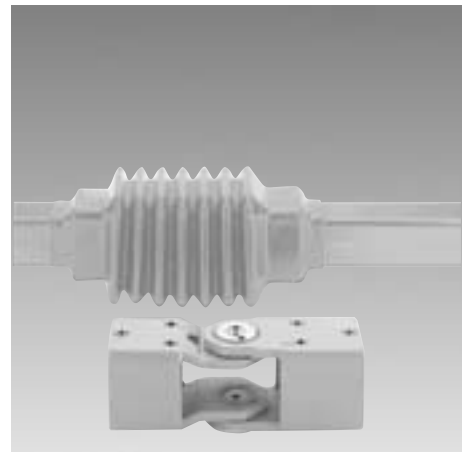
**Accessories**, can be retro-fitted

Rotation limiter (see page 426/427)

Light adapter (see page 426)

980.5.1890.00

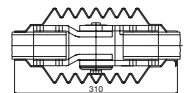
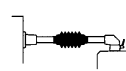
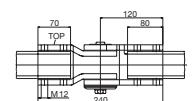
-



Intermediate joint CS-2000

9700	<b>Dimensions</b> in mm
Steel	
<b>101.6.4710.00</b>	

Expansion bellows can be zipped on at a later stage  
Pivotal angle 180° with limiter on either side  
Rotation moment setting



980.5.0620.00

-



For enclosure mounting  
Elbow coupling, flange CS-2000

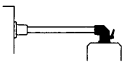
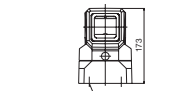
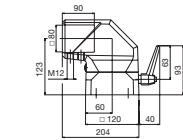
4100

Aluminium

**101.6.7050.00**

Angle of rotation 320°  
with limiter  
Clamping lever at  
operator face  
Complete with seals and  
fixing screws

**Dimensions in mm**



980.5.1760.00

980.5.1890.00



Elbow CS-2000

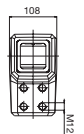
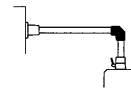
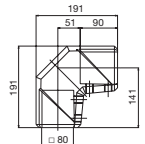
2900

Aluminium

**101.6.7080.00**

Installation opening  
Complete with gaskets

**Dimensions in mm (inch)**



980.5.1890.00



Wall flange CS-2000

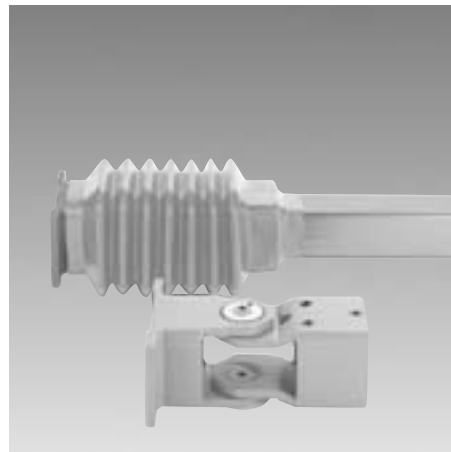
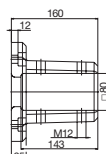
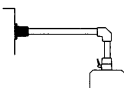
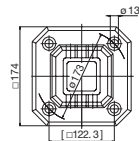
9100

GGG

**101.6.4720.00**

Complete with gaskets

**Dimensions in mm**



Wall joint CS-2000

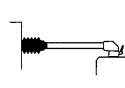
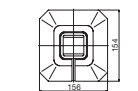
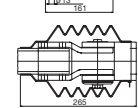
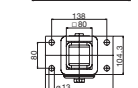
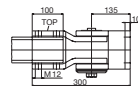
9250

Steel

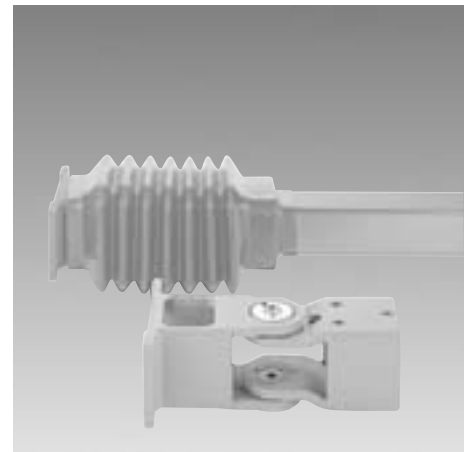
**101.6.4730.00**

Expansion bellows can  
be zipped on at a later  
stage  
Pivotal angle 180° with  
limiter on either side  
Rotation moment setting

**Dimensions in mm**



980.5.0620.00



Wall joint for cable inlet CS-2000

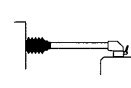
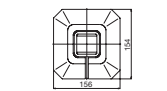
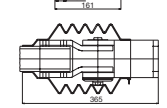
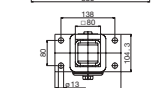
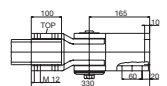
9500

Steel

**101.6.4740.00**

Expansion bellows can  
be zipped on at a later  
stage  
Pivotal angle 180° with  
limiter on either side  
Rotation moment setting

**Dimensions in mm**



980.5.0620.00

## System components

### Suspension system for medium loads

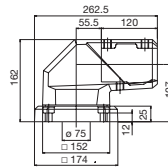
#### Type CS-2000 System size 80<sup>□</sup>



Part	
Weight	(g)
Material	
<b>Part number</b>	RAL 7035 light grey

Slip-on joint CS-2000  
20620  
GGG  
**101.6.7140.00**  
Pivotal angle 306° with limiter on either side

#### Dimensions in mm

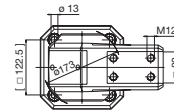


Detail



**Accessories**, can be retro-fitted  
Rotation limiter (see page 426)  
Light adapter (see page 426)

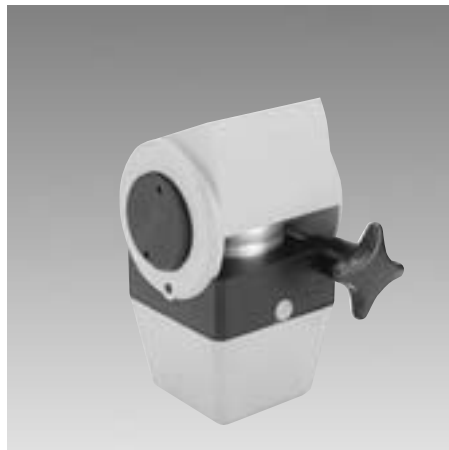
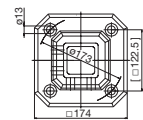
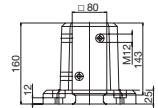
980.5.1770.00  
980.5.1880.00



Base bracket CS-2000  
9240  
GGG  
**101.6.4750.00**

Complete with seals

#### Dimensions in mm

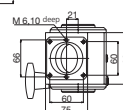
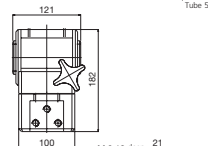
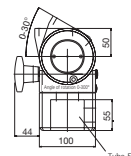


Part	
Weight	(g)
Material	
<b>Part number</b>	RAL 7035 light grey

Swivel tilt coupling CS-2000  
2900  
Aluminium and PA  
**101.6.3210.00**

Pivotal angle 300° with buffer  
Inclination continuously adjustable 0–30°  
Complete with gaskets, mounting screws

#### Dimensions in mm



Detail

**Accessories**, can be retro-fitted  
Rotation limiter (see page 426)

980.5.1300.00



Self-supporting base bracket CS-2000

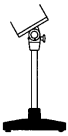
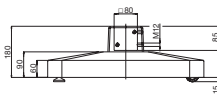
14300

Aluminium

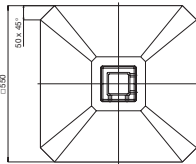
**101.6.3230.00**

Large-surface foot for self-supporting applications

**Dimensions** in mm



Fixed rollers, guide rolls,  
Feet see oage 427



Inclination adapter CS-2000

15° = 460

30° = 600

60° = 800

Aluminium

**15° = 101.6.4590.00**

**30° = 101.6.4600.00**

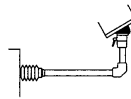
**60° = 101.6.4610.00**

The inclination adapter is fixed firmly onto the flange or flange angle-coupling  
Complete withseals and fixing screws

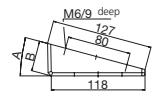
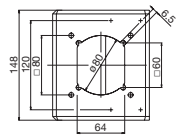
**101.6.4590.00:** A = 15°, B = 39

**101.6.4600.00:** A = 30°, B = 66

**101.6.4610.00:** A = 60°, B = 111



**Dimensions** in mm





# Heavy-duty suspension system

## CS-2000 80/140

The BERNSTEIN heavy-duty suspension system, 80/140 from the CS-2000 range of suspension systems provides the right solution for even the highest loads and large cable looms with ready-made connectors.

### System structure

The following conditions are important for your choice of system:

- Load-bearing capacity of the overall system
- Free passage area for cables
- Design
- System configuration

Having decided on the right size of system, you need to select the necessary components and tubes, so that you can put together the desired configuration.

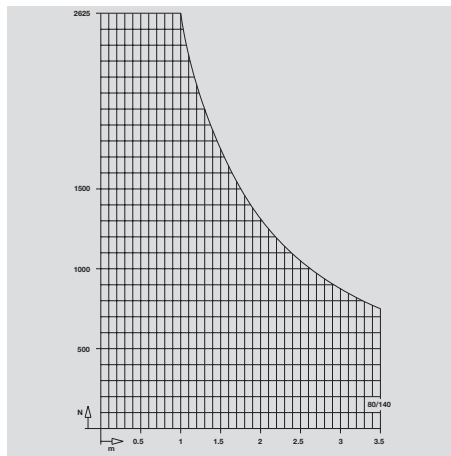
### System benefits

- Installation openings  
Generously dimensioned cable installation access points at all corners allow the easy installation of cables/wiring looms.
- Full use of cable ducts  
within the entire suspension system without reduction of the rated diameter.
- Cable fixtures  
Fixing points in each angle to clamp cables.
- Rotation angle limiters  
can simply be added to joints at a later stage.
- High load-bearing capacity  
Extremely high overall load-bearing capacity for applications with the highest loads.
- Divided expansion bellows  
Expansion bellows for wall and intermediate joints can be installed at a later stage.
- Ready-made connections  
Option of inserting ready-made connections with heavy-duty industrial plugs.



# Connecting tubes

## CS-2000 80/140



### Load diagram

The load diagram illustrates the maximum load-bearing capacity for the chosen length of suspension system. If for a brief period of time (i.e. 5 seconds), a load of 75 kg is added, then this does not lead to dimensional deformation or destruction of the system.

### Free cable passage area in the system

Suspension tube	80/140
Outside (mm)	80/140
Cross section (cm <sup>2</sup> )	91
Wall thickness (mm)	5

### Materials

- Gravity-die-cast aluminium components: AISi12 (Cu)
- Cast-iron components: GGG 40
- Steel welding constructions: St 37
- Suspension tubes: St 37
- Bearings: St/PTFE
- Seals: CR
- Cable access covers: AISi12 (Cu)
- Expansion bellows: PVC

### Tubes

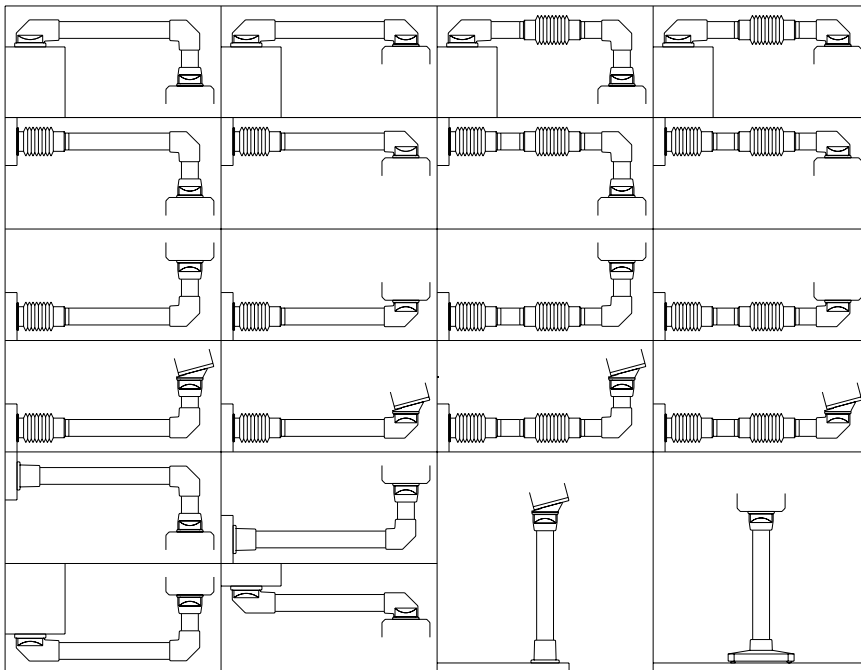
The steel tube for the suspension system 80/140 is available in a variety of different lengths. Tube lengths comply with DIN 7168. The steel tubes are supplied in RAL 7035 (light grey) powder coated.

### Weight

per metre of tube 15 kg

### Colours

- Suspension system components: light grey, RAL 7035
- Cable access covers: light grey, RAL 7035
- Expansion bellows: black, RAL 9005
- Tubes: light grey, RAL 7035



### Available lengths of tube

Length (mm)	System 80/140 Part number
250	952.8.0460.00
500	952.8.0470.00
750	952.8.0480.00
1000	952.8.0490.00
1250	952.8.0500.00
1500	952.8.0510.00
2000	952.8.0530.00
3000	952.8.0550.00

# Heavy-duty suspension system

## CS-2000 System size 80/140

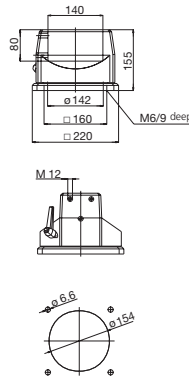


For enclosure mounting  
Standard coupling CS-2000

Part	
Weight	(g)
Material	
<b>Part number</b>	RAL 7035 light grey

4600  
Aluminium  
**101.6.4760.00**  
Angle of rotation 300° with limiter  
Complete with seals and fixing screws

### Dimensions in mm



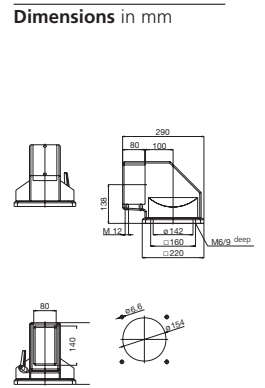
Detail	
<b>Accessories</b> , can be retro-fitted	
Pivoting angle limit stop (see page 427)	



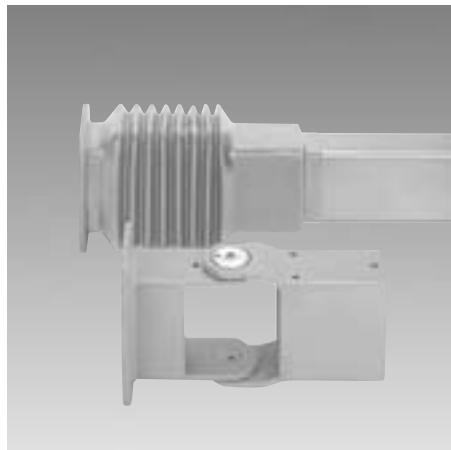
For enclosure mounting  
Elbow coupling, flange, CS-2000

Part	
Weight	(g)
Material	
<b>Part number</b>	RAL 7035 light grey

6900  
Aluminium  
**101.6.4770.00**  
Angle of rotation 300° with limiter  
Access cover  
Complete with seals and fixing screws



Detail	
<b>Accessories</b> , can be retro-fitted	
Pivoting angle limit stop (see page 427)	

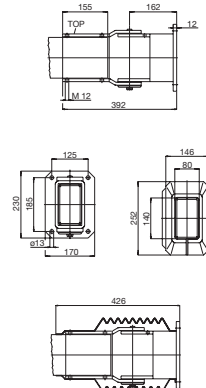


Wall joint CS-2000

Part	
Weight	(g)
Material	
<b>Part number</b>	RAL 7035 light grey

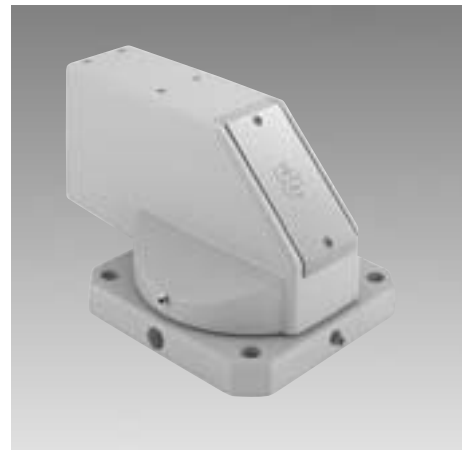
17180  
Steel  
**101.6.4810.00**  
Expansion bellows can be zipped on at a later stage  
Rotation angle 180° with limiter on either side  
Suspension tube adjustment

### Dimensions in mm



Detail	
<b>Accessories</b> , can be retro-fitted	
Pivoting angle limit stop (see page 427)	

980.5.0620.00

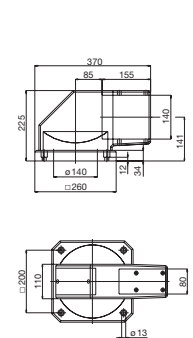


Set-up CS-2000

Part	
Weight	(g)
Material	
<b>Part number</b>	RAL 7035 light grey

28560  
GGG  
**101.6.4820.00**  
Rotation angle 300°  
Access cover

### Dimensions in mm



Available request



Elbow CS-2000

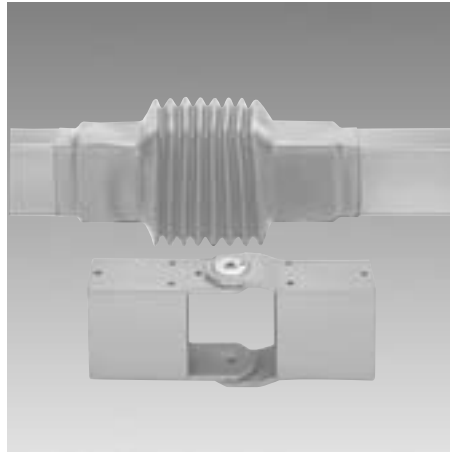
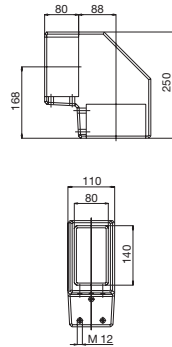
5400

Aluminium

**101.6.4780.00**

Access cover  
Complete with seals.

**Dimensions in mm**



Intermediate joint CS-2000

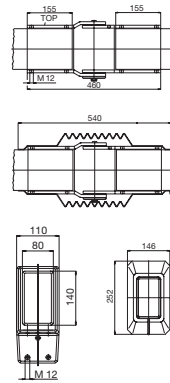
18080

Steel

**101.6.4790.00**

Expansion bellows can be zipped on at a later stage  
Rotation angle 180° with limiter on either side  
Suspension tube adjustment

**Dimensions in mm**



980.5.0620.00



Wall flange CS-2000

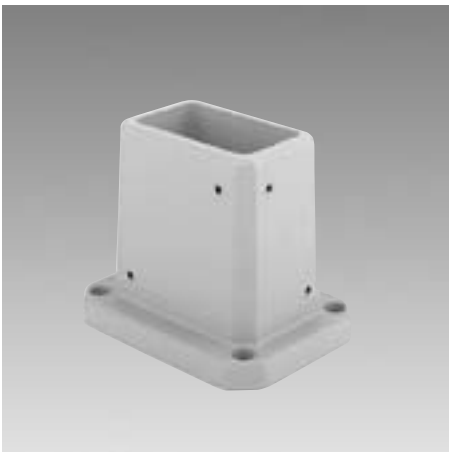
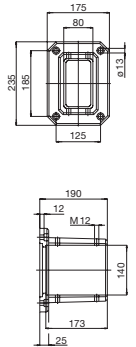
12920

GGG

**101.6.4800.00**

Suspension tube adjustment  
Complete with seals

**Dimensions in mm**



Base bracket CS-2000

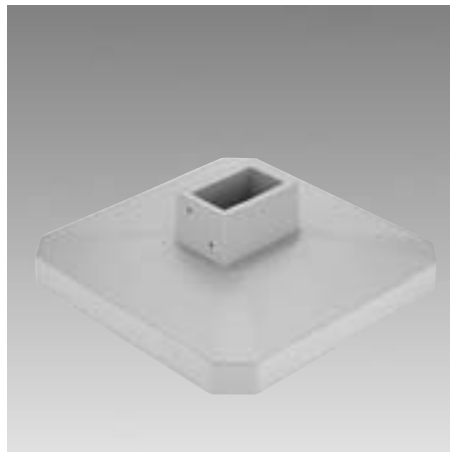
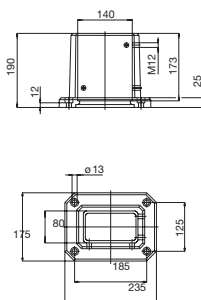
12900

GGG

**101.6.4830.00**

Complete with seals

**Dimensions in mm**



Self-supporting base bracket CS-2000

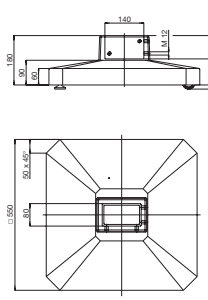
14800

Aluminium

**101.6.3240.00**

Large surface area foot for self-supporting applications

**Dimensions in mm**



Angle adapter, 15° CS-2000

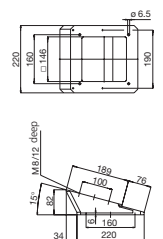
1650

Aluminium

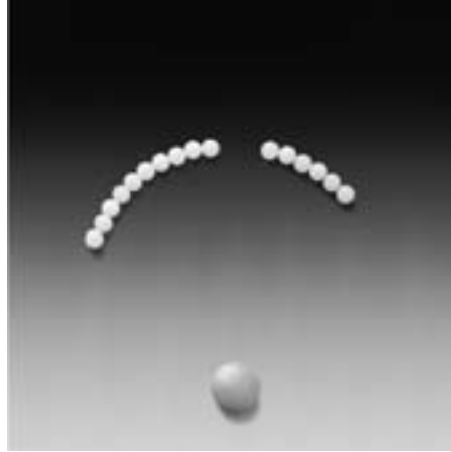
**101.6.4840.00**

For a 15° angle  
Fixed firmly onto the flange or angle flange coupling  
Complete with seals and fixing screws

**Dimensions in mm**



## Accessories Suspension systems



Part	Rotation limiter for coupling components		Rotation limiter for joint components															
<b>Part number</b>	<b>Systems 45/60</b> 980.5.1290.00	<b>Systems 50<sup>□</sup>, 60<sup>□</sup>, 80<sup>□</sup></b> 980.5.1760.00	<b>Systems 45/60</b> 980.5.1320.00	<b>Systems 50<sup>□</sup>, 60<sup>□</sup>, 80<sup>□</sup></b> 980.5.1770.00														
<b>Material</b>	PA		PA															
<b>Details</b>	Rotation limiter for coupling components in the CS-2000 SL system or CS-2000 system. Can easily be added at a later stage. After simple installation the balls limit the rotation angle. Adjustable in increments of <table border="0" style="display: inline-table; vertical-align: middle;"> <tr> <td style="padding-right: 10px;">8.5°</td> <td>(CS-2000 SL)</td> </tr> <tr> <td>11°</td> <td>(CS-2000 50, 60)</td> </tr> <tr> <td>9°</td> <td>(CS-2000)</td> </tr> </table>		8.5°	(CS-2000 SL)	11°	(CS-2000 50, 60)	9°	(CS-2000)	Rotation limiter for joint components in the CS-2000 SL system or CS-2000 system. Can easily be added at a later stage. After simple installation the balls limit the rotation angle. Adjustable in increments of <table border="0" style="display: inline-table; vertical-align: middle;"> <tr> <td style="padding-right: 10px;">14°</td> <td>(CS-2000 SL)</td> </tr> <tr> <td>12°</td> <td>(CS 2000 50)</td> </tr> <tr> <td>11.5°</td> <td>(CS-2000 60)</td> </tr> <tr> <td>8.5°</td> <td>(CS-2000 80)</td> </tr> </table>		14°	(CS-2000 SL)	12°	(CS 2000 50)	11.5°	(CS-2000 60)	8.5°	(CS-2000 80)
8.5°	(CS-2000 SL)																	
11°	(CS-2000 50, 60)																	
9°	(CS-2000)																	
14°	(CS-2000 SL)																	
12°	(CS 2000 50)																	
11.5°	(CS-2000 60)																	
8.5°	(CS-2000 80)																	



Part	Rotation limiter for rotating angle couplings			Light adapter		
<b>Part number</b>	<b>Systems 45/60, 50<sup>□</sup>, 60<sup>□</sup>, 80<sup>□</sup></b> 980.5.1300.00			<b>System 50</b> 980.5.1870.00	<b>System 60</b> 980.5.1880.00	<b>System 80</b> 980.5.1890.00
<b>Material</b>	PA			Aluminium	Aluminium	
<b>Details</b>	Rotation limiter for rotating angle couplings in the CS-2000 SL system and CS-2000. Can easily be added at a later stage. After simple installation the balls limit the rotation angle. Adjustable in increments of 8.5°.			Easy to apply light adapter. Entry opening for light tubes with outside diameter of 25 mm, fixing by headless screw. Colour RAL 7035.		

## Accessories Suspension systems



Part	Rotation limiters		Rotation limiters	
<b>Part number</b>	<b>System 50<sup>□</sup></b> <b>980.5.0630.00</b>	<b>System 60<sup>□</sup></b> <b>980.5.0630.00</b>	<b>System 80<sup>□</sup></b> <b>980.5.0620.00</b>	<b>System 80/140</b> <b>980.5.0620.00</b>
Material	Steel	Steel	Steel	Steel
Details	Rotation limiters as a set of accessories for wall and intermediate joints can be retro-fitted. For systems 50 and 60. Can be set in 7.5° increments. Rotation angle range can be fixed in a given position.		Rotation limiters as a set of accessories for wall and intermediate joints can be retro-fitted. For systems 80 and 80/140. Can be set in a 15° increments. Rotation angle range can be fixed in a given position.	



Part	Fixed rollers (1 set = 2 rollers) for the large support foot in systems 60, 80, 80 x 140 and 45/60	Guide rolls (1 set = 2 rolls) for the large support foot in systems 60, 80, 80 x 140 and 45/60
<b>Part number</b>	<b>980.6.0430.00</b>	<b>980.6.0440.00</b>
Notes	Complete with installation fixings and instructions for the large support foot.	Complete with installation fixings and instructions for the large support foot.



Part	Adjustment feet (1 set = 2 feet) for the large support foot in systems 60, 80, 80 x 140 and 45/60
<b>Part number</b>	<b>980.6.0450.00</b>
Notes	Complete with installation fixings and instructions for the large support foot.

## Front-door control enclosures CC-480 NR



The standard line of stainless steel CC-480 NR front-door control enclosures is ideal for use in hygiene environments in the food and pharmaceutical industry.

Customised apertures in the front door can be provided by the BERNSTEIN customising service. The aperture in the front door can thus be dimensioned exactly to suit the installation of operating and control units.

Integral foam gaskets guarantee protection to IP 66. The CC-480 NR comes conveniently pre-configured as standard for the user to attach to the suspension system.

### Product features

- Various standard sizes
- Modern design
- Front door hinged on right as standard - at top where pre-configured for suspension system attachment
- Foamed gaskets
- Facilities for installing mounting plates
- IP 66 protection rating
- Stainless steel lock mounted at side, away from protected space

### Materials

- Enclosure 1.5 mm sheet steel stainless steel B.S.I. 304 S15 / AISI 304
- Front door 1.5 mm sheet steel stainless steel B.S.I. 304 S15 / AISI 304
- Gaskets PU foam
- Lock 1.5 mm sheet steel stainless steel B.S.I. 304 S15 / AISI 304

### Surfaces

Enclosure	240 grain brushed finish
Front door	240 grain brushed finish

CC-480 NR front-door control enclosures are supplied in the form of standard enclosures or with customised front door. Enclosure is pre-configured as standard for attachment to BERNSTEIN suspension systems. Delivery time as agreed.

Special sizes on request

### Components supplied

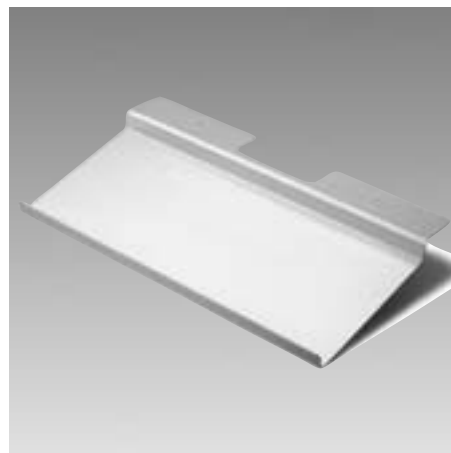
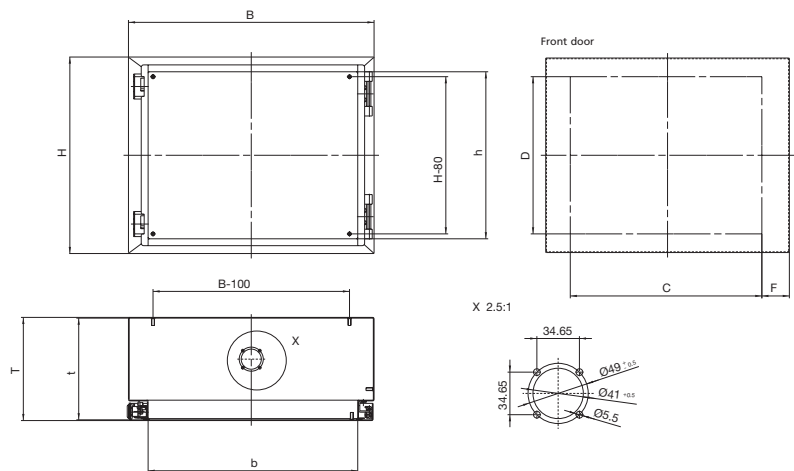
- Cabinet body with hinged front door
- 5 mm two-way key safety lock as standard

## Dimensions

Part number	External enclosure dimensions W x H x D (mm)	Internal enclosure dimensions w x h x d (mm)	Mounting area on front door C x D x F (mm)	Side handles Part number	Mounting plates Part number
<b>180.3.0000.01</b>	250x300x130	176.75x240x124.5	140x220x56	<b>980.8.0119.00</b>	<b>982.3.1040.00</b>
<b>180.3.0000.02</b>	350x300x130	276.75x240x124.5	240x220x56	<b>980.8.0119.00</b>	<b>982.3.1050.00</b>
<b>180.3.0000.03</b>	400x350x160	326.75x290x154.5	290x270x56	<b>980.8.0119.00</b>	<b>982.3.1060.00</b>
<b>180.3.0000.04</b>	400x400x160	326.75x340x154.5	290x320x56	<b>980.8.0119.00</b>	<b>982.3.1070.00</b>
<b>180.3.0000.05</b>	500x400x210	426.75x340x204.5	390x320x56	<b>980.8.0120.00</b>	<b>982.3.1080.00</b>
<b>180.3.0000.06</b>	550x450x210	476.75x390x204.5	440x370x56	<b>980.8.0120.00</b>	<b>982.3.1090.00</b>
<b>180.3.0000.07</b>	550x500x210	476.75x440x204.5	440x420x56	<b>980.8.0120.00</b>	<b>982.3.1100.00</b>
<b>180.3.0000.08</b>	550x600x210	476.75x540x204.5	440x520x56	<b>980.8.0120.00</b>	<b>982.3.1110.00</b>

### Pre-configuration for suspension system

The CC-480 NR front-door control enclosure comes pre-configured as standard for attachment to the suspension system. The holes provided for the suspension system are shown in the diagram on the right. This level of pre-configuration is designed to ensure maximum user-friendliness, making the enclosure simple to attach to the suspension system by one person only.



#### Keyboard shelf

(Part number 980.6.1760.00)  
from 500 mm enclosure width; in stainless steel. For retrofitting, sloping at an angle of 10°. Fixing material included. Enclosure machining required.



#### Handles

in stainless steel for retrofitting to enclosure sides. Fixing material included. Enclosure machining required.



## Control enclosures CC-600/CC-600 NR



### Product benefits

- Various standard sizes available from stock
- Door as standard
- Foamed gaskets
- Equipment mounted inside enclosure body can be infinitely adjusted in height and depth on mounting rails
- IP 65/IP 66 (CC-600 NR)  
Ingress protection
- Enclosure can be mounted to suspension system by one person
- Clamping bar for mounting control equipment can be moved to any position in all-round mounting groove
- Clamping bar groove outside protected space
- Additional profiled sealing strip to close off space between studded front plates and enclosure (only CC-600 NR)

### Materials + Coating CC-600

- Enclosures: 1.5 mm sheet steel
- Back plates: 1.5 mm sheet steel
- Front plates: 3 mm aluminium
- Gaskets: PU foam
- Enclosure and door – RAL 7035, light grey
- Back plate – RAL 7035, light grey
- Front plate – natural (silver), anodised

### Materials + Surfaces CC-600 NR

- Enclosures: 1.5 mm sheet steel stainless steel B.S.I. 304 S15
- Front plates: 2 mm sheet steel stainless steel B.S.I. 304 S15
- Gaskets: PU foam
- Enclosures and doors: 240 grain brushed finish
- Front plates: 240 grain brushed finish

### Front plate attachment (CC-600)

The attachment of front plates with visible screw holes is performed using the enclosed freely positioned locking mechanisms. These locking mechanisms are fitted in a enclosure groove which is not externally visible. The attachment screws are screwed into the locking mechanisms.

Front plates with welded studs are clamped into place using clamping brackets in the interior of the enclosure. These front plates have studs welded on the rear, and provide a smooth front surface without visible screw heads.

### Application samples





**Keyboard shelf**  
(Part number 980.6.1750.00 painted sheet steel)  
(Part number 980.6.1760.00 VA 1.4301)  
sheet steel keyboard support for subsequent mounting, RAL 7035, light grey, 10° inclination; mechanical machining is required for mounting. Attachment material is included.



**Keyboard rail**  
(Part number 980.6.1770.00)  
metal frame with attachment elements for accommodation of PC keyboards. Adjustable inclination. Mechanical machining is required for mounting. Attachment material is included.



**M4 cage nuts (8 off)**  
(Part number 980.8.0041.00)  
**M5 cage nuts (8 off)**  
(Part number 980.8.0042.00 )  
for attaching equipment to the attachment rails. The cage nuts are simply slid into the required position.



**Profiled sealing strip**  
(Part number 980.8.0099.00)  
Profiled strip made of silicone for sealing gap between front plate and enclosure. Simple to cut to the required length and fit before mounting front plate.



Application sample CC-600 NRF  
Directly mounted Industrial-PC with hygiene front

## Dimensions CC-600

Empty enclosure	Enclosure-ext. dimensions	Enclosure-int. dimensions	Attachment area on front plate with welded studs	External dimensions of front plate with welded studs	Front plate with welded studs	Attachment area on front plate with screw holes
Part number	W x H x D (mm)	W x H x D (mm)	W x H (mm)	W x H (mm)	Part number	W x H (mm)
<b>180.0.0001.00</b>	370x500x150	290x420x145	250x380	318x448	<b>980.8.0002.00</b>	290x420
<b>180.0.0002.00</b>	430x380x150	350x300x145	310x260	378x328	<b>980.8.0004.00</b>	350x300
<b>180.0.0003.00</b>	430x630x150	350x550x145	310x510	378x578	<b>980.8.0006.00</b>	350x550
<b>180.0.0004.00</b>	480x430x150	400x350x145	360x310	428x378	<b>980.8.0008.00</b>	400x350
<b>180.0.0005.00</b>	480x580x220	400x500x215	360x460	428x528	<b>980.8.0010.00</b>	400x500
<b>180.0.0006.00</b>	580x380x220	500x300x215	460x260	528x328	<b>980.8.0012.00</b>	500x300
<b>180.0.0007.00</b>	580x430x300	500x350x295	460x310	528x378	<b>980.8.0014.00</b>	500x350
<b>180.0.0008.00</b>	580x500x300	500x420x295	460x380	528x448	<b>980.8.0016.00</b>	500x420

## Dimensions CC-600 NR

Empty enclosure	Enclosure-ext. dimensions	Enclosure-int. dimensions	Attachment area on front plate with welded studs	External dimensions of front plate with welded studs	Front plate with welded studs	Attachment area of mounting plate
Part number	W x H x D (mm)	W x H x D (mm)	W x H (mm)	W x H (mm)	Part number	W x H (mm)
<b>180.1.0001.00</b>	380 x 380 x 150	300 x 300 x 145	260 x 260	328 x 328	<b>980.8.0053.00</b>	220 x 220
<b>180.1.0002.00</b>	430 x 380 x 150	350 x 300 x 145	310 x 260	378 x 328	<b>980.8.0055.00</b>	270 x 220
<b>180.1.0003.00</b>	430 x 480 x 180	350 x 400 x 175	310 x 360	378 x 428	<b>980.8.0057.00</b>	270 x 320
<b>180.1.0004.00</b>	480 x 430 x 180	400 x 350 x 175	360 x 310	428 x 378	<b>980.8.0057.00</b>	320 x 270
<b>180.1.0005.00</b>	480 x 480 x 220	400 x 400 x 215	360 x 360	428 x 428	<b>980.8.0059.00</b>	320 x 320
<b>180.1.0020.00</b>	530 x 480 x 220	450 x 400 x 215	410 x 360	478 x 428	<b>980.8.0061.00</b>	370 x 220
<b>180.1.0021.00</b>	580 x 530 x 300	500 x 450 x 295	460 x 410	528 x 478	<b>980.8.0063.00</b>	420 x 370
<b>180.1.0022.00</b>	630 x 580 x 300	550 x 500 x 295	510 x 460	578 x 528	<b>980.8.0065.00</b>	470 x 420

### Components supplied CC-600

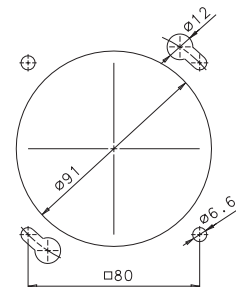
- Main body with mounted door, coated (RAL 7035, light grey)
- 8 mm square lock as standard
- Attachment material for front plate with screws (locking mechanism)

### Components supplied CC-600 NR

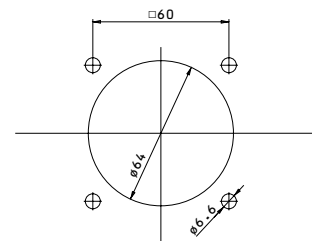
- Enclosure body with door mounted
- 5 mm two-way key safety lock as standard
- Front plate

### Suspension system machining

The CC-600 and CC-600 NR control enclosures have suspension system machining as standard. The hole pattern of the suspension system machining for CC-600 enclosures with a depth of 300 mm is compatible with the BERNSTEIN CS-2000 system 80. The suspension system machining for CC-600 enclosures with a depth of 150 mm and 220 mm matches the CS-2000 systems 50 and 60 as well as the CS-2000 SL system. The hole pattern for CC-600 NR enclosures is compatible with the stainless suspension system CS-600 NR.



Machining pattern for CS-2000 couplings from system 80



Machining pattern for CS-2000 couplings from system 50 and 60, and CS-2000 SL

External dimensions on front plate with screw holes W x H (mm)	Front plate screw holes	Mounting plate set	Attachment area of mounting plate	Mounting rails TS 35	Attachment rails for main body	Handles side
	Part number	Part number	W x H (mm)	Part number	Part number	Part number
320x450	<b>980.8.0001.00</b>	<b>980.8.0112.00</b>	210x340	<b>980.8.0031.00</b>	<b>980.8.0038.00</b>	<b>980.8.0025.00</b>
380x330	<b>980.8.0003.00</b>	<b>980.8.0105.00</b>	270x220	<b>980.8.0033.00</b>	<b>980.8.0038.00</b>	<b>980.8.0026.00</b>
380x580	<b>980.8.0005.00</b>	<b>980.8.0113.00</b>	270x470	<b>980.8.0033.00</b>	<b>980.8.0038.00</b>	<b>980.8.0027.00</b>
430x380	<b>980.8.0007.00</b>	<b>980.8.0107.00</b>	320x270	<b>980.8.0035.00</b>	<b>980.8.0038.00</b>	<b>980.8.0028.00</b>
430x530	<b>980.8.0009.00</b>	<b>980.8.0114.00</b>	320x420	<b>980.8.0035.00</b>	<b>980.8.0039.00</b>	<b>980.8.0029.00</b>
530x330	<b>980.8.0011.00</b>	<b>980.8.0115.00</b>	420x220	<b>980.8.0037.00</b>	<b>980.8.0039.00</b>	<b>980.8.0026.00</b>
530x380	<b>980.8.0013.00</b>	<b>980.8.0116.00</b>	420x270	<b>980.8.0037.00</b>	<b>980.8.0040.00</b>	<b>980.8.0028.00</b>
530x450	<b>980.8.0015.00</b>	<b>980.8.0117.00</b>	420x340	<b>980.8.0037.00</b>	<b>980.8.0040.00</b>	<b>980.8.0025.00</b>

Mounting plate kit with fixing material and hinges Part number	Mounting rails TS 35 Part number	Attachment rails for main body Part number	Stainless steel handle kit Part number
<b>980.8.0104.00</b>	<b>980.8.0079.00</b>	<b>980.8.0088.00</b>	<b>980.8.0095.00</b>
<b>980.8.0105.00</b>	<b>980.8.0081.00</b>	<b>980.8.0088.00</b>	<b>980.8.0095.00</b>
<b>980.8.0106.00</b>	<b>980.8.0081.00</b>	<b>980.8.0089.00</b>	<b>980.8.0096.00</b>
<b>980.8.0107.00</b>	<b>980.8.0083.00</b>	<b>980.8.0089.00</b>	<b>980.8.0095.00</b>
<b>980.8.0108.00</b>	<b>980.8.0083.00</b>	<b>980.8.0090.00</b>	<b>980.8.0096.00</b>
<b>980.8.0109.00</b>	<b>980.8.0083.00</b>	<b>980.8.0090.00</b>	<b>980.8.0096.00</b>
<b>980.8.0110.00</b>	<b>980.8.0085.00</b>	<b>980.8.0091.00</b>	<b>980.8.0096.00</b>
<b>980.8.0111.00</b>	<b>980.8.0087.00</b>	<b>980.8.0091.00</b>	<b>980.8.0096.00</b>



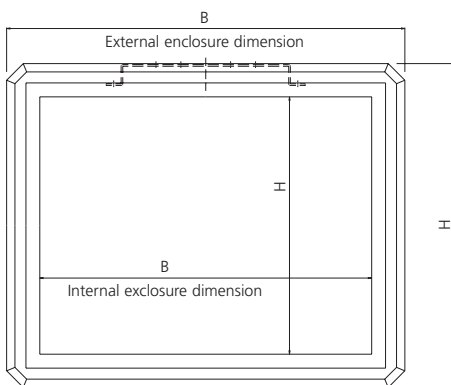
Handles CC-600



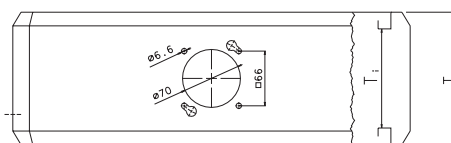
Handles in stainless steel CC-600 NR



Mounting plate CC-600 and CC-600 NR



CC-600/CC-600 NR



CS-600 NR

## Suspension system CS-480 NR



### Product description

The CS-480 NR system has been developed specifically for suspending control enclosures in hygiene environments in the food and pharmaceutical industry.

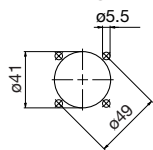
The CS-480 NR is extremely flexible thanks to the wide range of variants in which it is available. You have the choice between a combination of customised pre-formed tubing and suspension system components or, if time is scarce, you can combine the pre-formed tubings and coupling sleeves ex-stock with components from the suspension system.

### System features

- Assembly apertures on bearing components
- Tubing simply clamped in position
- Loading capacity 400 N/m
- IP 65 protection rating
- Material X10 CrNiS18 9
- Factory-set torque
- Wide selection of components for a particularly large number of combination options

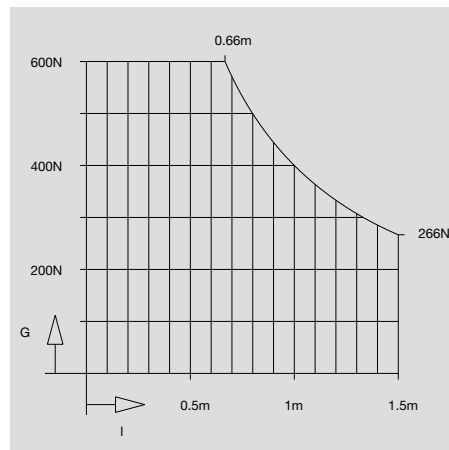
### Machining of enclosures for mounting couplings

The coupling hole dimensions for enclosure machining are shown in the diagram below.



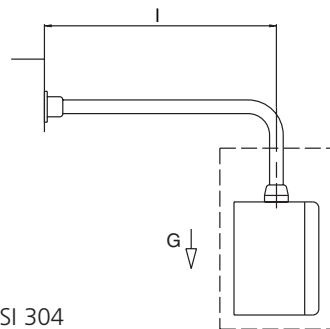
### Materials and surfaces

Stainless steel tubings	B.S.I. 304 S15/ AISI 304
Stainless steel components	X10 CrNiS18 9
Bearings	POM
O rings	NBR



### Load diagram

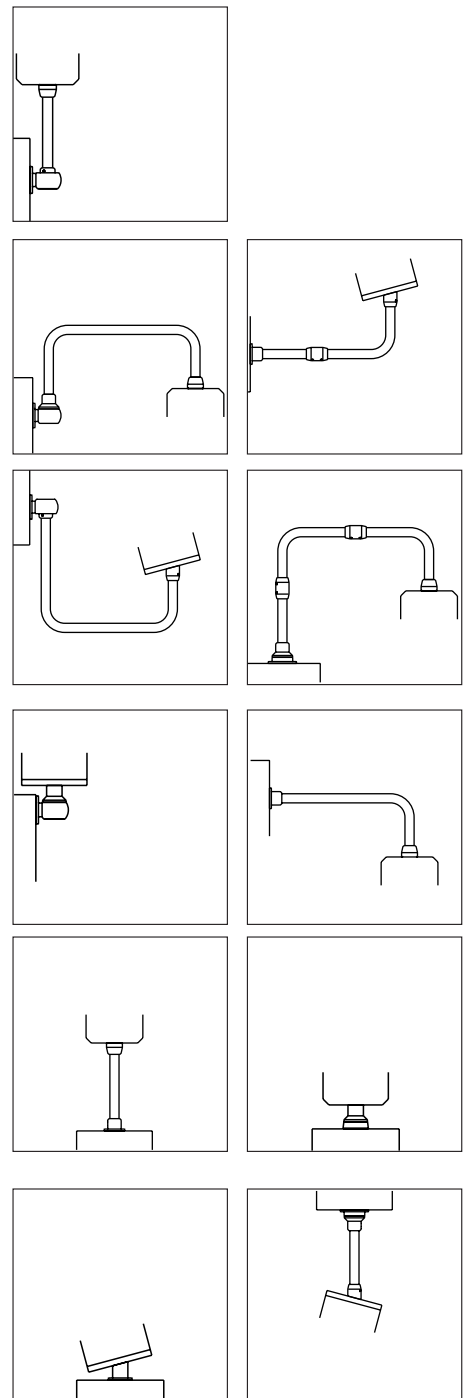
The loading capacity of the CS-480 NR suspension system product line is shown in the diagram. Separate approval must be requested for higher loads. In the following description, system length  $l$  refers to the length shown in the diagram.

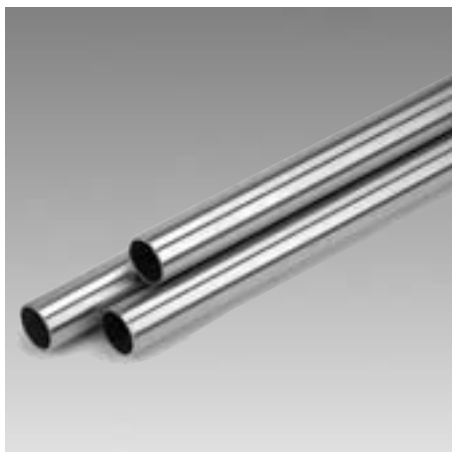


Selection support for different load capacities are presented on pages 400/401.

### System combinations

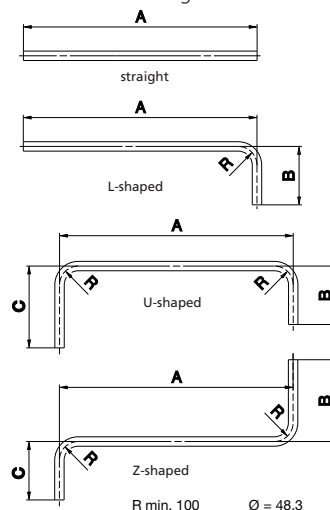
The wide range of components permits a high level of flexibility in configuring the suspension system. A selection of possible combinations is shown here.





### Customised tubings

On request, pre-formed tubing is available in different variants for BERNSTEIN's CS-480 NR suspension system. The three different variants are L-shaped, U-shaped and Z-shaped. Straight tubing can also be supplied in customer-specific lengths. To order customised tubing, simply indicate the shape you require when ordering (e.g. straight, L-, U- or Z-shaped) together with dimensions. The letters used to denote the various dimensions are shown in the drawings below.



Note: Dimensions B and C at least 220 mm; dimension A in U- and Z-shaped version at least 320 mm

### Tubings

The 48.3 mm outer diameter tubings are made from 3.6 mm gauge stainless steel and are available in the following standard sizes.

Tubing, straight

250 mm	Art.-Nr. 952.3.5010.00
500 mm	Art.-Nr. 952.3.5020.00
750 mm	Art.-Nr. 952.3.5030.00
1000 mm	Art.-Nr. 952.3.5040.00
1250 mm	Art.-Nr. 952.3.5050.00
1500 mm	Art.-Nr. 952.3.5060.00

### Flexibility enhanced by L-shaped tubes and coupling sleeves

Using L-shaped tubes and coupling sleeves in conjunction with straight tubes, it is possible to dispense with the time-consuming process of making customised tubings. Straight tubing, L-shaped tubing and coupling sleeves are available from stock and are perfect for configuring a flexible suspension system in next to no time. Tubing, L-shaped  
 250x250 mm Part number 952.3.5000.01  
 500x500 mm Part number 952.3.5000.11  
 Coupling sleeve Part number: 101.3.0512.00

## System components Type CS-480 NR

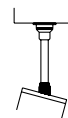
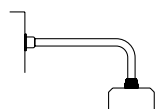


Article  
**Part number**  
 Weight

Coupling (for enclosure mounting)  
**101.3.0501.00**  
 1.4 kg

Angle coupling (for enclosure mounting)  
**101.3.0503.00**  
 1.0 kg

Example application

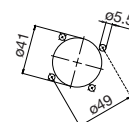
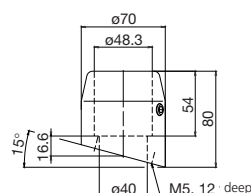
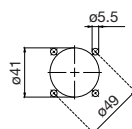
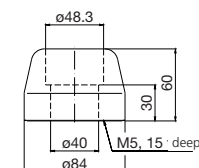


Version

Flange coupling for attaching enclosures.  
 Turns through 340° with rotation limiter.  
 Pre-set torque. Maintenance-free bearings.  
 Complete with gaskets and fixing material.

Rigid flange coupling with 15° angle of inclination for attaching enclosures.  
 Complete with gaskets and fixing material.

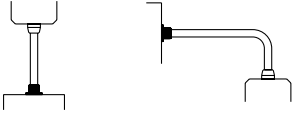
Dimensional drawings  
 (dimensions in mm)







Base bracket/wall flange  
**101.3.0502.00**  
1.4 kg



Base bracket or wall flange for attachment to horizontal and vertical surfaces. Complete with gaskets.



Base bracket angle coupling  
**101.3.0504.00**  
1.9 kg



Rigid, 15° angle coupling for direct attachment of enclosures to horizontal and vertical surfaces. Complete with gaskets and fixing material.

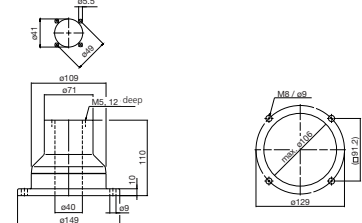
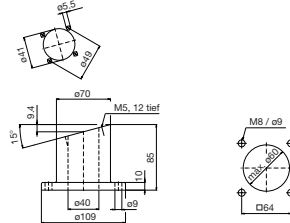
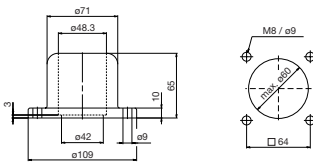


Rotational base bracket coupling, external  
**101.3.0507.00**  
4.5 kg



Rotational base bracket coupling (external attachment) for directly attaching enclosures to machine or floor. Turns through 340° with rotation limiter. Pre-set torque. Maintenance-free bearings. Complete with gaskets and fixing material.

Dimensional drawings (dimensions in mm)



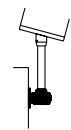
Wall coupling S  
**101.3.0510.00**  
7.3 kg



Rotational wall coupling for direct attachment to vertical machine surfaces. Turns through 340° with rotation limiter. Cover to facilitate wiring. Maintenance-free bearings. Complete with gaskets and fixing material.



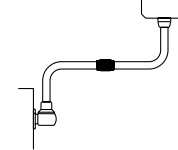
Wall bracket S  
**101.3.0511.00**  
7.7 kg



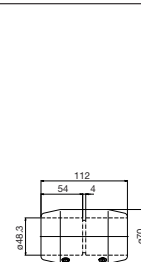
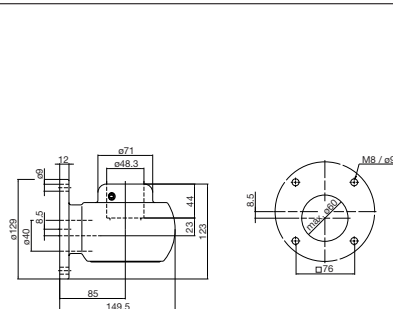
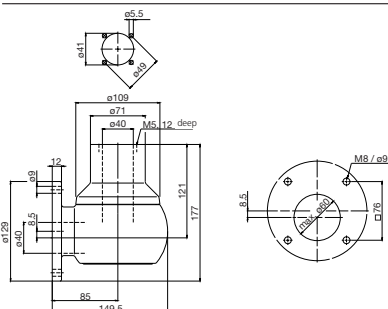
Wall bracket with vertical socket for attachment to vertical surfaces. Cover to facilitate wiring. Complete with gaskets.



Coupling sleeve  
**101.3.0512.00**  
1.5 kg



Coupling sleeve to facilitate assembly and disassembly of tubing configurations. Complete with gaskets.





## Suspension system CS-600 NR



### Product description

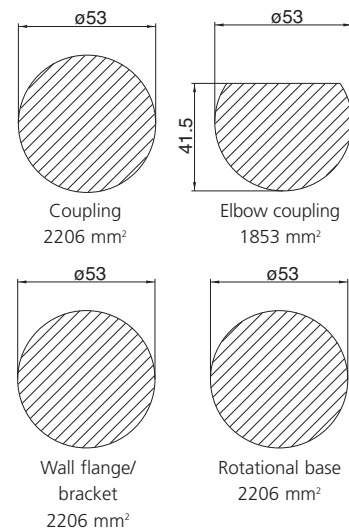
The CS-600 NR suspension system has been developed specifically for suspending control enclosures in hygiene environments in the food and pharmaceutical industry. Compared with suspension products, hitherto familiar, this system is distinguished by its particular suitability for hygiene environments and its fully modular design. The CS-600 NR enables the user to configure angled systems without the need for pre-formed tubing. This dispenses with the time-consuming process of procuring specially pre-formed tubing. The modular suspension system is flexible and versatile, and can be assembled with ease by the user from components that are available ex stock.

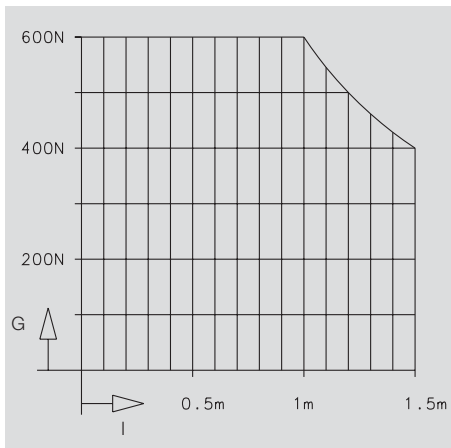
### System benefits

- Assembly apertures on bearing components with horizontal socket
- No external screws or dirt traps - ideal to clean
- Tubing simply clamped in position
- Anti-vibration capability for all components
- Loading capacity 600 N/m
- IP 66 protection rating
- Factory-set torque
- Modern design
- Wide choice of components for a particularly large number of combination options
- Choice of materials for components  
Stainless steel X10 CrNiS18 9 or anodised aluminium

### Cable entry

The various suspension system components offer differing amounts of space through which to insert cables. The diagrams below show the dimensions at the narrowest point of apertures inside the components.

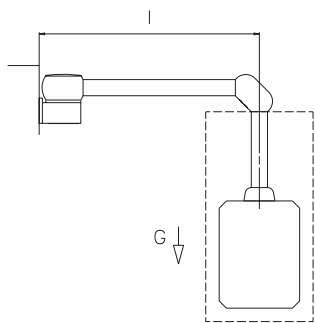




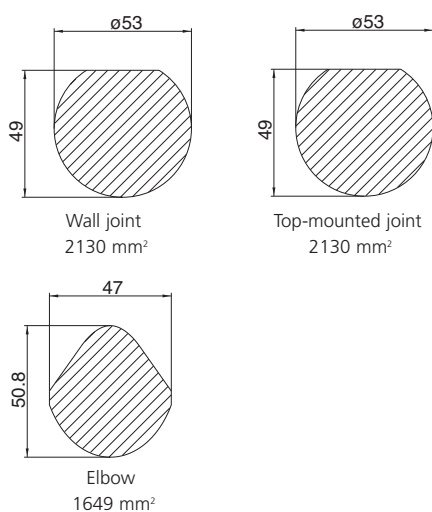
### Load diagram

The loading capacity of the CS-600 NR suspension system product line is shown in the diagram.

In the following description, system length *l* refers to the length shown in the diagram.



Selection support for different load capacities are presented on pages 400/401.

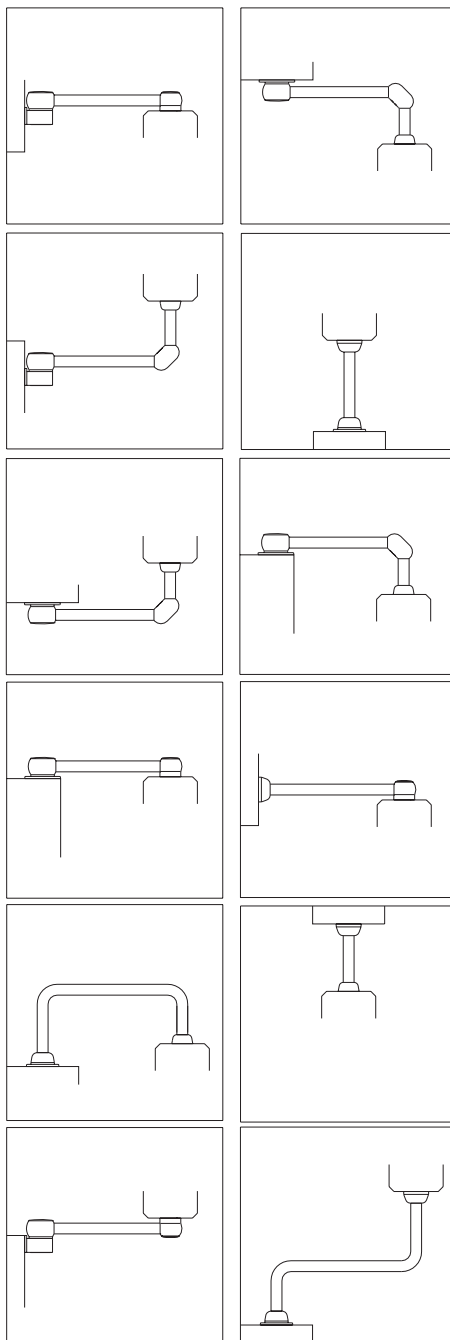


### Materials and surfaces

Stainless steel tubings	1.4301
Aluminium components	AlMgSi 1
Stainless steel components	1.4305
Bearings	POM
O rings	NBR

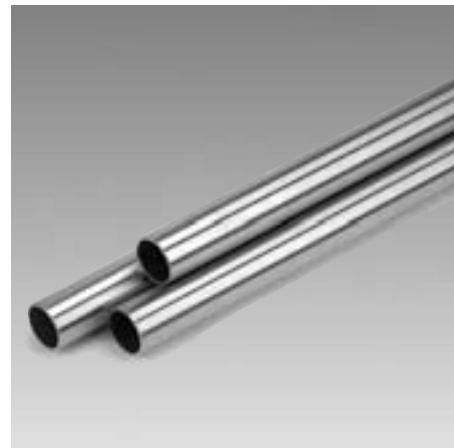
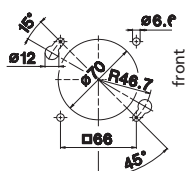
### System combinations

The wide range of components permits a high level of flexibility in configuring suspension systems. A selection of possible combinations is shown here.



### Machining enclosures for mounting couplings

The coupling hole geometries for enclosure machining are shown in the diagram below.



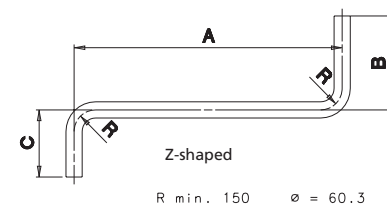
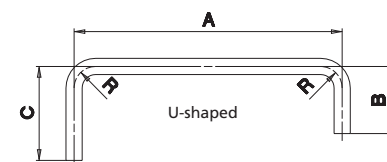
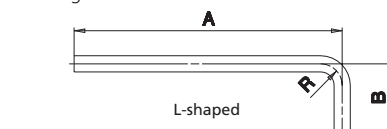
### Tubings

The 60.3 mm outer diameter tubes are made from 3.6 mm gauge stainless steel and are available in the following standard sizes.

250 mm	Part. number 952.3.0010.00
500 mm	Part. number 952.3.0020.00
750 mm	Part. number 952.3.0030.00
1000 mm	Part. number 952.3.0040.00
1250 mm	Part. number 952.3.0050.00
1500 mm	Part. number 952.3.0060.00

### Customised tubings

On request, pre-formed tubings are available in different variants for BERNSTEIN's CS-600 NR suspension system. The three different variants are L-shaped, U-shaped and Z-shaped. Straight tubings can also be supplied in customer-specific lengths. To order customised tubings, simple indicate the shape you require when ordering (e.g. straight, L, U or Z-shaped) together with dimensions. The letters used to denote the various dimensions are shown in the drawings below.



Note: Dimensions B and C at least 300 mm; dimension A in U and Z-shaped version at least 450 mm.

# System components

## Type CS-600 NR



For enclosure mounting



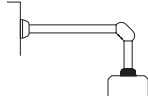
For enclosure mounting

Article  
**Part number**      Stainless steel

Coupling  
**101.4.0501.00**

Elbow coupling  
**101.4.0502.00**

Example application

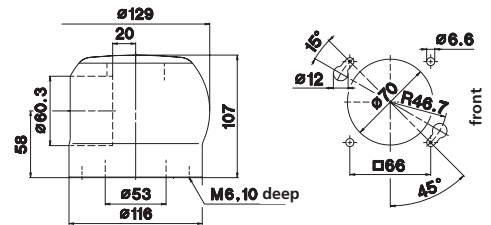
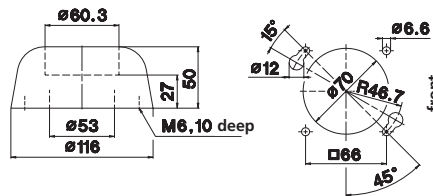


Version  
 Flange coupling for attaching enclosures. Turns through 300° with rotation limiter. Pre-set torque. Maintenance-free bearings. Complete with gaskets and fixing material.

Flange elbow coupling for attaching enclosures. Assembly aperture cover conceals screws for perfect hygiene. Turns through 300° with rotation limiter. Pre-set torque. Maintenance-free bearings. Complete with gaskets and fixing material.

### Drawings

(dimensions in mm)



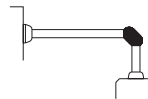
Elbow  
**101.4.0507.00**



Rotational base, attachment from outside  
**101.4.0504.00**

Article  
**Part number**      Stainless steel

Example application

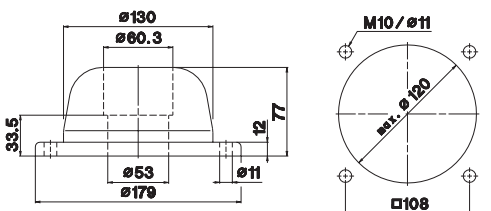
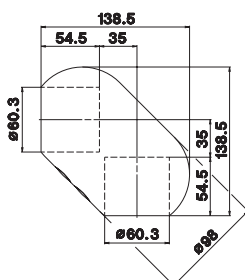


Version  
 Elbow for connecting two tubes at 90°. Includes screw cover and gaskets.

Rotational base for attachment to machine or floor. Turns through 300° with rotation limiter. Pre-set torque. Maintenance-free bearings. Complete with gaskets.

### Drawings

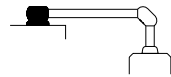
(dimensions in mm)





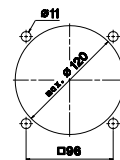
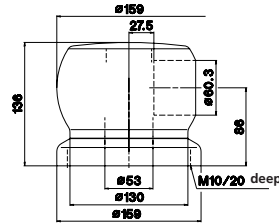
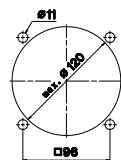
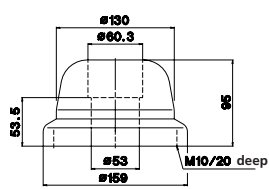
Rotational base, attachment from inside  
101.4.0515.00

Top-mounted joint, attachment from inside  
101.4.0516.00



Rotational base for attachment to machine or floor. Turns through 300° with rotation limiter. Pre-set torque. Maintenance-free bearings. Complete with gaskets.

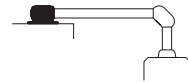
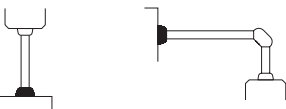
Top-mounted joint for attachment to horizontal surfaces. Assembly aperture cover conceals screws for perfect hygiene. Turns through 300° with rotation limiter. Pre-set torque. Maintenance-free bearings. Complete with gaskets.



Wall flange/base bracket  
101.4.0503.00

Top-mounted, attachment from outside  
101.4.0506.00

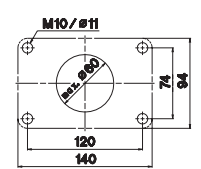
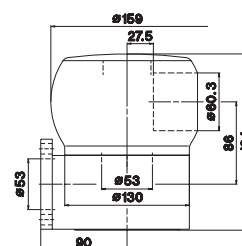
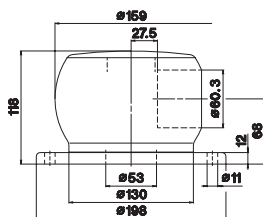
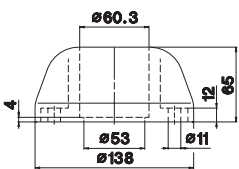
Wall joint  
101.4.0505.00



Wall flange or base bracket for attachment to horizontal and vertical surfaces. Complete with gaskets.

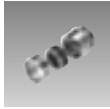
Top-mounted joint for attachment to horizontal surfaces. Assembly aperture cover conceals screws for perfect hygiene. Turns through 300° with rotation limiter. Pre-set torque. Maintenance-free bearings. Complete with gaskets.

Wall joint for attachment to vertical surfaces. Assembly aperture cover conceals screws for perfect hygiene. Turns through 300° with rotation limiter. Pre-set torque. Maintenance-free bearings. Complete with gaskets.



# Cable glands metal

## Accessories for cable glands



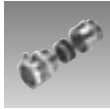
### Standard cable gland

Material: brass, nickel-plated  
 Temperature: -20 °C to +60 °C or +80 °C  
 Gasket: soft rubber + Neoprene and 2 iron thrust collars  
 Protection: IP 55, with O ring IP 65  
 Standard: DIN 46320/C4  
 Information: with base for screws on intermediate connection piece



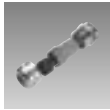
### Hexagonal lock-nut

Material: brass, nickel-plated  
 Standard: 46320



### Cable gland with strain-relief

Material: brass, nickel-plated  
 Temperature: -30 °C to +90 °C  
 Dichtung: Neoprene gasket and 2 galvanised iron thrust collars  
 Protection: IP 54, with O ring IP 65  
 Information: with centrally operating strain-relief



### "Perfect" cable gland

Material: brass, nickel-plated  
 Temperature: -40 °C to +120 °C, for short periods +150 °C  
 Gasket: Neoprene  
 Protection: IP 68/5 bar  
 Information: excellent strain-relief, fully insulated, large terminal space, O ring on connection thread



### O ring

Material: Perburnan, oil-resistant



### "Perfect" cable gland with metric thread

Material: brass, nickel-plated  
 Temperature: -40 °C to +120 °C, for short periods +150 °C  
 Gasket: Neoprene  
 Protection: IP 68/5 bar  
 Information: excellent strain-relief, fully insulated, large terminal space, O ring on connection thread



### Lock-nut with metric thread

Material: brass, nickel-plated  
 Standard: 46319



### Filler plug

Brass, galvanised, nickel-plated, with metric thread  
 excellent seal with assembled O ring  
 Standard: 46320

Thread size	Cable Ø mm			Part number Screw fitting		mm	Part number Lock nut
Pg 7	5... 7	14	13	<b>943.1.0070.00</b>		15	<b>943.1.0330.00</b>
Pg 9	6... 8	17	15	<b>943.1.0080.00</b>		18	<b>943.1.0340.00</b>
Pg 11	8...10	20	18	<b>943.1.0090.00</b>		21	<b>943.1.0350.00</b>
Pg 13.5	10...12	22	20	<b>943.1.0100.00</b>		23	<b>943.1.0360.00</b>
Pg 16	12...14	24	22	<b>943.1.0110.00</b>		26	<b>943.1.0370.00</b>
Pg 21	15...17	30	28	<b>943.1.0120.00</b>		32	<b>943.1.0380.00</b>
Pg 29	24...26	40	37	<b>943.1.0130.00</b>		41	<b>943.1.0390.00</b>
Pg 36	31...33	50	47	<b>943.1.0730.00</b>			
Pg 42	39...41	57	54	<b>943.1.0740.00</b>			
Pg 48	45...47	64	60	<b>943.1.0750.00</b>			
Thread size	Cable Ø mm			Part number Screw fitting			
Pg 9	4... 9.5	19	17	<b>943.1.0210.00</b>			
Pg 11	6...11.5	22	20	<b>943.1.0220.00</b>			
Pg 13.5	6...13.5	24	22	<b>943.1.0230.00</b>			
Pg 16	6...15.5	27	24	<b>943.1.0240.00</b>			
Pg 21	9...21.5	34	30	<b>943.1.0250.00</b>			
Pg 29	17...29.5	42	40	<b>943.1.0260.00</b>			
Pg 36	23...36.5	52	50	<b>943.1.0510.00</b>			
Pg 42	29...42.5	62	57	<b>943.1.0550.00</b>			
Thread size	Cable Ø mm		Part number Screw fitting	Outer Ø	Inner Ø mm	Part number O ring	
Pg 7	3... 6.5	14	<b>943.1.1650.00</b>	13/10		<b>943.0.0380.00</b>	
Pg 9	4... 8	17	<b>943.1.1660.00</b>	17/13		<b>943.0.0380.00</b>	
Pg 11	5...10	20	<b>943.1.1670.00</b>	20/16		<b>943.0.0340.00</b>	
Pg 13.5	6...12	22	<b>943.1.1680.00</b>	22/18		<b>943.0.0370.00</b>	
Pg 16	10...14	24	<b>943.1.1690.00</b>	24/20		<b>943.0.0220.00</b>	
Pg 21	13...18	30	<b>943.1.1700.00</b>	28/24		<b>943.0.0250.00</b>	
Pg 29	18...25	40	<b>943.1.1710.00</b>	37/33		<b>943.0.0390.00</b>	
Pg 36	22...32	50	<b>943.1.1720.00</b>	47/42		<b>943.0.0290.00</b>	
Pg 42	30...38	57	<b>943.1.1730.00</b>	53/48		<b>943.0.0400.00</b>	
Pg 46	34...44	64	<b>943.1.1740.00</b>	60/54		<b>943.0.0410.00</b>	
Thread size	Cable Ø mm		Part number Screw fitting	Thread length	Head Ø mm	Part number Lock nut	
M 12 x 1.5	3... 6	14	<b>943.1.2800.00</b>	3.0	13.0	<b>943.1.2880.00</b>	
M 16 x 1.5	5...10	17	<b>943.1.2810.00</b>	6.0	20.0	<b>943.1.2890.00</b>	
M 20 x 1.5	8...13	22	<b>943.1.2820.00</b>	6.5	22.0	<b>943.1.2900.00</b>	
M 25 x 1.5	1...17	27	<b>943.1.2830.00</b>	7.0	28.0	<b>943.1.2910.00</b>	
M 32 x 1.5	15...21	34	<b>943.1.2840.00</b>	8.0	35.0	<b>943.1.2920.00</b>	
M 40 x 1.5	19...28	43	<b>943.1.2850.00</b>	8.0	45.0	<b>943.1.2930.00</b>	
M 50 x 1.5	26...35	55	<b>943.1.2860.00</b>	9.0	55.0	<b>943.1.2940.00</b>	
M 63 x 1.5	32...42	65	<b>943.1.2870.00</b>	10.0	68.0	<b>943.1.2950.00</b>	
Thread size		mm	Part number				
M 12 x 1.5		15	<b>943.1.2960.00</b>				
M 16 x 1.5		19	<b>943.1.2970.00</b>				
M 20 x 1.5		24	<b>943.1.2980.00</b>				
M 25 x 1.5		30	<b>943.1.2990.00</b>				
M 32 x 1.5		36	<b>943.1.3000.00</b>				
M 40 x 1.5		46	<b>943.1.3010.00</b>				
M 50 x 1.5		60	<b>943.1.3020.00</b>				
M 63 x 1.5		70	<b>943.0.3030.00</b>				

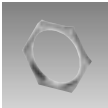
Width across corners (mm)

Head width (mm)

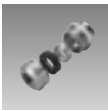


#### Cable glands for HF/EMC shielding

Material: brass, nickel-plated  
 Gasket: Neoprene  
 Temperature: -20 °C to +130 °C  
 Protection: IP 68  
 Information: with connection thread gasket ring, IP 68/20 bar



**Hexagon nut**  
 for earthing, nickel-plated brass, with cutting edges for optimum contact through protective or powder coatings.




#### Cable gland for HF/EMC with metric thread


Material: brass, nickel-plated  
 Gasket: Neoprene  
 Temperature: -20 °C to +130 °C  
 Protection: IP 68  
 with connection thread gasket ring, IP 68/20 bar




#### Filler plug

Material: galvanised brass, nickel-plated with assembled Perburnan O ring, excellent sealing  
 Standard: DIN 46 320

Thread size	Cable Ø mm		Part number
Pg 7	4 ... 8	18	<b>943.1.3040.00</b>
Pg 9	6 ...11	22	<b>943.1.3050.00</b>
Pg 11	6 ...11	22	<b>943.1.3060.00</b>
Pg 13.5	7.5...13	24	<b>943.1.3080.00</b>
Pg 16	12.5...18	30	<b>943.1.3090.00</b>
Pg 21	12.5...18	30	<b>943.1.3100.00</b>
Pg 21	17.5...23.5	41	<b>943.1.3110.00</b>
Pg 29	17.5...25	41	<b>943.1.3120.00</b>
Pg 29	24.5...31.5	52	<b>943.1.3130.00</b>
Pg 36	24.5...33.5	52	<b>943.1.3140.00</b>
Pg 36	33 ...40.5	63	<b>943.1.3150.00</b>
Pg 42	33 ...43	63	<b>943.1.3160.00</b>



Thread size		Thickness		Part number
		L 1	L 2	
Pg 7	15.0	4.7	3.7	<b>943.1.3500.00</b>
Pg 9	18.0	4.7	3.7	<b>943.1.3510.00</b>
Pg 11	21.0	4.7	3.7	<b>943.1.3520.00</b>
Pg 13.5	23.0	4.7	3.7	<b>943.1.3530.00</b>
Pg 16	26.0	4.7	3.7	<b>943.1.3540.00</b>
Pg 21	32.0	5.2	4.2	<b>943.1.3550.00</b>
Pg 29	41.0	5.7	4.7	<b>943.1.3560.00</b>
Pg 36	51.0	6.0	5.0	<b>943.1.3570.00</b>
Pg 42	60.0	6.0	5.0	<b>943.1.3580.00</b>
Pg 48	64.0	6.5	5.5	<b>943.1.3590.00</b>

Thread size	Head Ø mm		Part number
M 12 x 1.5	4 ... 8	18	<b>943.1.3170.00</b>
M 16 x 1.5	6 ...11	22	<b>943.1.3180.00</b>
M 20 x 1.5	7.5...13	24	<b>943.1.3190.00</b>
M 25 x 1.5	12.5...18	30	<b>943.1.3200.00</b>
M 32 x 1.5	17.5...25	42	<b>943.1.3210.00</b>
M 40 x 1.5	24.5...33.5	52	<b>943.1.3220.00</b>
M 50 x 1.5	33 ...43	63	<b>943.1.3230.00</b>
M 63 x 1.5	42.5...55	77	<b>943.1.3240.00</b>

Thread size	Head Ø mm	Thread length	Part number
Pg 7	14	4.5	<b>943.1.0400.00</b>
Pg 9	17	4.5	<b>943.1.0410.00</b>
Pg 11	20	4.5	<b>943.1.0420.00</b>
Pg 13.5	22	6.0	<b>943.1.0430.00</b>
Pg 16	24	6.0	<b>943.1.0440.00</b>
Pg 21	30	6.0	<b>943.1.0450.00</b>
Pg 29	39	8.0	<b>943.1.0460.00</b>
Pg 36	50	9.0	<b>943.1.0930.00</b>
Pg 42	57	10.0	<b>943.1.0770.00</b>
Pg 48	64	10.0	<b>943.1.0810.00</b>

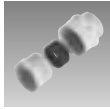
#### Note!

On 1. 1. 2000 EN 50 262 came into force prescribing metric threaded cable glands as standard.

 Width across corners (mm)  
 Head width (mm)

# Cable glands plastic

## Accessories for cable glands



### Compression gland with nut collar

Material: Polyamide, glass-fibre reinforced  
 Gasket: acrylonitrile rubber  
 Temperature: -20 °C to +80 °C  
 Protection: IP 65 with connection thread, gasket ring (see below)  
 Standard: DIN46320  
 Colour: RAL 7035  
 RAL 9005 on request



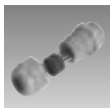
### Compression gland with nut collar, bending protection and strain-relief

Material: Polyamide, glass-fibre reinforced  
 Gasket: soft rubber  
 Temperature: -20 °C to +80 °C  
 Protection: IP 65 with connection thread, gasket ring (see below)  
 Accessory: terminal compartment of hostaform C  
 Colour: RAL 7035  
 RAL 9005 on request



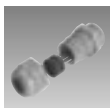
### Euro 2000 cable gland

Material: Polyamide  
 Gasket: Neoprene  
 Temperature: -40 °C to +120 °C  
 Protection: IP 66; IP 68 with connection thread, gasket ring  
 Information: VDE-tested, halogen-free certification test according to VDE 0619  
 Colour: RAL 7035, RAL 9005 on request



### "Perfect" cable gland

Material: Polyamide  
 Gasket: Neoprene  
 Temperature: -40 °C to +100 °C (up to +120 °C for short periods)  
 Protection: IP 68/5 bar in specified terminal space  
 Information: halogen-free, use of multiple gaskets possible (UL testing on request)  
 Colour: RAL 7001



### "Perfect" cable gland with metric thread

Material: Polyamide  
 Gasket: Neoprene  
 Temperature: -40 °C to +100 °C (up to +120 °C for short periods)  
 Protection: IP 68/5 bar in specified terminal space  
 Information: halogen-free, use of multiple gaskets possible  
 Colour: RAL 7001






### Euro 2000 cable gland with metric thread on request





### Connection thread, gasket ring

Material: Polyethylene  
 Temperature: -50 °C to +170 °C  
 Colour: transparent

Thread size	Cable Ø mm			Part number for RAL 7035
Pg 7	5... 7	15	13	943.2.0330.00
Pg 9	6... 8	19	16	943.2.0340.00
Pg 11	8...10	22	19	943.2.0350.00
Pg 13.5	10...12	24	21	943.2.0360.00
Pg 16	12...14	27	23	943.2.0370.00
Pg 21	15...17	32	30	943.2.0380.00
Pg 29	24...26	42	40	943.2.0390.00
Pg 36	31...33	53	50	943.2.0400.00
Pg 42	39...41	60	55	943.2.0500.00
Pg 48	45...47	65	60	943.2.1010.00


Thread size	Cable Ø mm		Part number for RAL 7035
Pg 7	4... 6	15	943.2.0080.00
Pg 9	6... 8	19	943.2.0090.00
Pg 11	8...10	22	943.2.0100.00
Pg 13.5	10...12	24	943.2.0110.00
Pg 16	12...14	27	943.2.0120.00
Pg 21	14...18	32	943.2.0130.00
Pg 29	18...24	42	943.2.0140.00

Thread size	Cable Ø mm		Part number Euro 2000 for RAL 7035	Cable Ø mm	Part number Perfect for RAL 7001
Pg 7	3 ... 6.5	15	943.2.4450.00	3... 6.5	943.2.2910.00
Pg 9	5.5 ... 8	19	943.2.4460.00	4... 8	943.2.2920.00
Pg 11	6 ...10	22	943.2.4470.00	5...10	943.2.2930.00
Pg 13.5	7 ...12	24	943.2.4480.00	6...12	943.2.2940.00
Pg 16	9 ...14	27	943.2.4490.00	10...14	943.2.2950.00
Pg 21	13 ...18	33	943.2.4500.00	13...18	943.2.2960.00
Pg 29	18 ...25	42	943.2.4510.00	18...25	943.2.2970.00
Pg 36		53		22...32	943.2.2980.00
Pg 42		60		30...38	943.2.2990.00
Pg 48		65		34...44	943.2.3000.00

Thread size	Cable Ø mm		Part number for RAL 7001
M 12 x 1.5	4... 7	15	943.2.4620.00
M 16 x 1.5	5...10	20	943.2.4630.00
M 20 x 1.5	8...13	24	943.2.4640.00
M 25 x 1.5	11...17	29	943.2.4650.00
M 32 x 1.5	15...21	36	943.2.4660.00
M 40 x 1.5	19...28	46	943.2.4670.00
M 50 x 1.5	27...35	55	943.2.4680.00
M 63 x 1.5	35...48	68	943.2.4690.00

Thread size	Part number Gasket ring
Pg 7	943.0.002
Pg 9	943.0.003
Pg 11	943.0.004
Pg 13.5	943.0.005
Pg 16	943.0.006
Pg 21	943.0.007
Pg 29	943.0.008
Pg 36	943.0.009
Pg 42	943.0.010
Pg 48	943.0.011

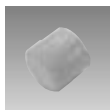
 Width across corners (mm)

 Head width (mm)



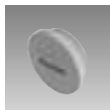
#### Filler plug

Material: Polyamide, glass-fibre reinforced  
 Temperature: -40 °C to +100 °C  
 Standard: DIN 46 320  
 DIN 40 430  
 Colour: RAL 7035  
 Protection: IP 65 with connection thread, gasket ring



#### Blanking plug

brass and plastic for seal up to IP 68.  
 Used for Euro 2000 and Perfect cable glands  
 Colour: RAL 7035  
 Material: Polyamide



#### Filler plug with metric thread (on request)

Material: Polyamide, glass-fibre reinforced  
 Temperature: -40 °C to +100 °C  
 Standard: DIN 46 320  
 DIN 40 430



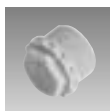
#### Lock-nut

Material: Polyamide, glass-fibre reinforced  
 Temperature: -40 °C to +100 °C  
 Standard: DIN 46 320



#### Lock-nut with metric thread

Material: brass  
 Temperature: -40 °C to +100 °C  
 Standard: DIN 46 320



#### Sealing plug with piercing diaphragm

Material: Polyethylene  
 Temperature: -20 °C to +70 °C  
 Colour: RAL 7035

Thread size	Head Ø mm	Part number*) Filler plug	Part number*) Blanking plug
Pg 7	15	943.2.1140.00	943.2.4720.00
Pg 9	19	943.2.1150.00	943.2.4730.00
Pg 11	22	943.2.1160.00	943.2.4740.00
Pg 13.5	25	943.2.1170.00	943.2.4750.00
Pg 16	27	943.2.1180.00	943.2.4760.00
Pg 21	33	943.2.1190.00	943.2.4770.00
Pg 29	44	943.2.1200.00	943.2.4780.00
Pg 36	55	943.2.1080.00	943.2.4790.00
Pg 42	62	943.2.1360.00	943.2.4800.00
Pg 48	69	943.2.1370.00	943.2.4810.00

Thread size	Head Ø mm	Part number
M 12 x 1.5		
M 16 x 1.5		
M 20 x 1.5		
M 25 x 1.5		
M 32 x 1.5		
M 40 x 1.5		

Thread size	Head Ø mm	Part number*)
Pg 7	19	943.2.3100.00
Pg 9	22	943.2.3110.00
Pg 11	24	943.2.3120.00
Pg 13.5	27	943.2.1960.00
Pg 16	30	943.2.1970.00
Pg 21	36	943.2.1980.00
Pg 29	46	943.2.1990.00
Pg 36	60	943.2.2000.00
Pg 42	65	943.2.2010.00
Pg 48	70	943.2.2020.00

Thread size	Head width mm	Part number
M 12 x 1.5	15	943.1.2880.00
M 16 x 1.5	19	943.1.2890.00
M 20 x 1.5	24	943.1.2900.00
M 25 x 1.5	30	943.1.2910.00
M 32 x 1.5	36	943.1.2920.00
M 40 x 1.5	46	943.1.2930.00
M 50 x 1.5	60	943.1.2940.00
M 63 x 1.5	70	943.1.2950.00

Thread size	Part number*)
Pg 9	943.2.0290.00
Pg 11	943.2.0300.00
Pg 13.5	943.2.0310.00
Pg 16	943.2.0320.00
Pg 21	943.2.0410.00
Pg 29**)	943.2.0420.00

closed type \* = for RAL 7035 \*\* = open type

#### Note!

On 1. 1. 2000 EN 50 262 came into force prescribing metric threaded cable glands as standard.

Width across corners (mm)  
 Head width (mm)





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