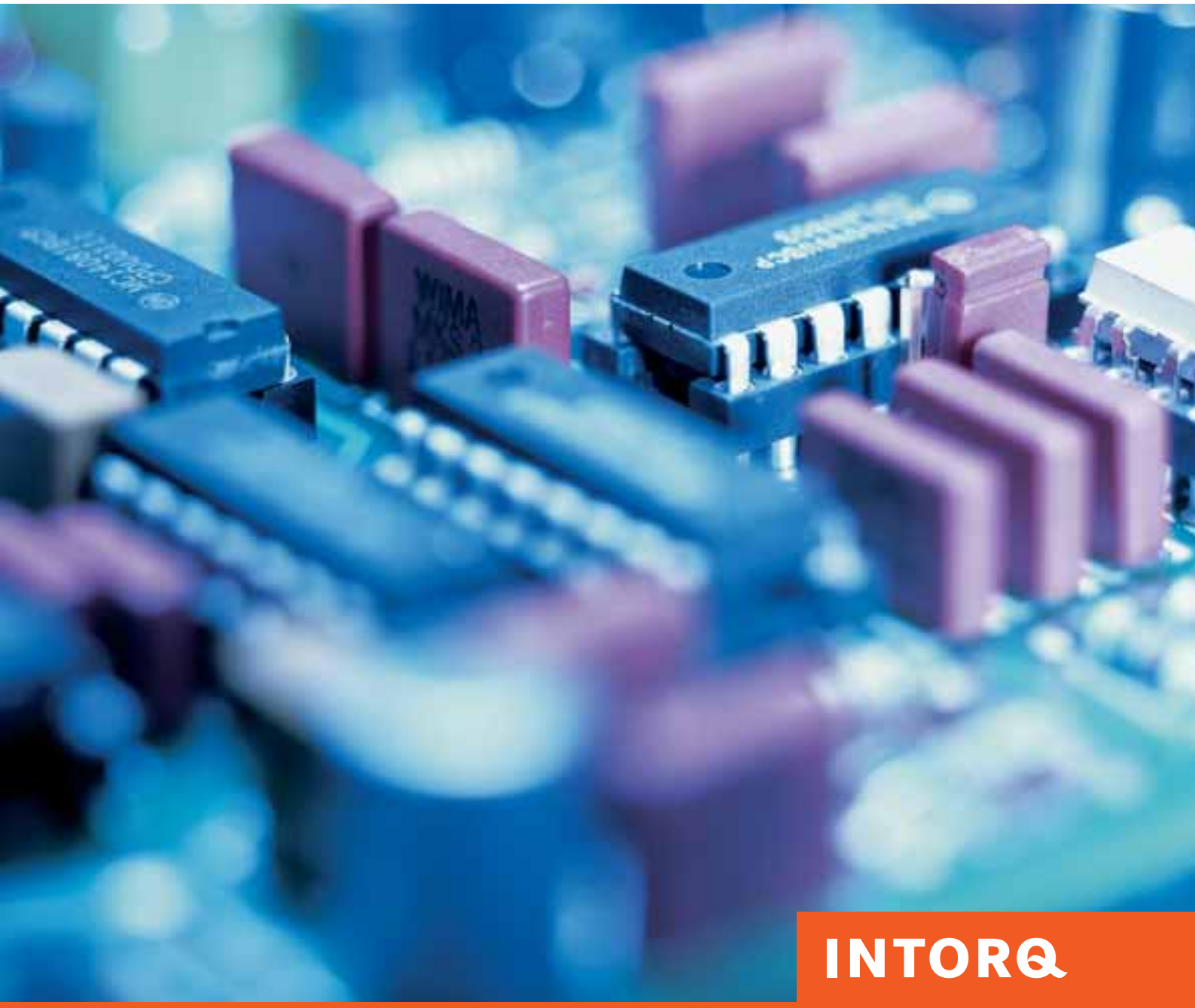
Electronic switchgear and accessories

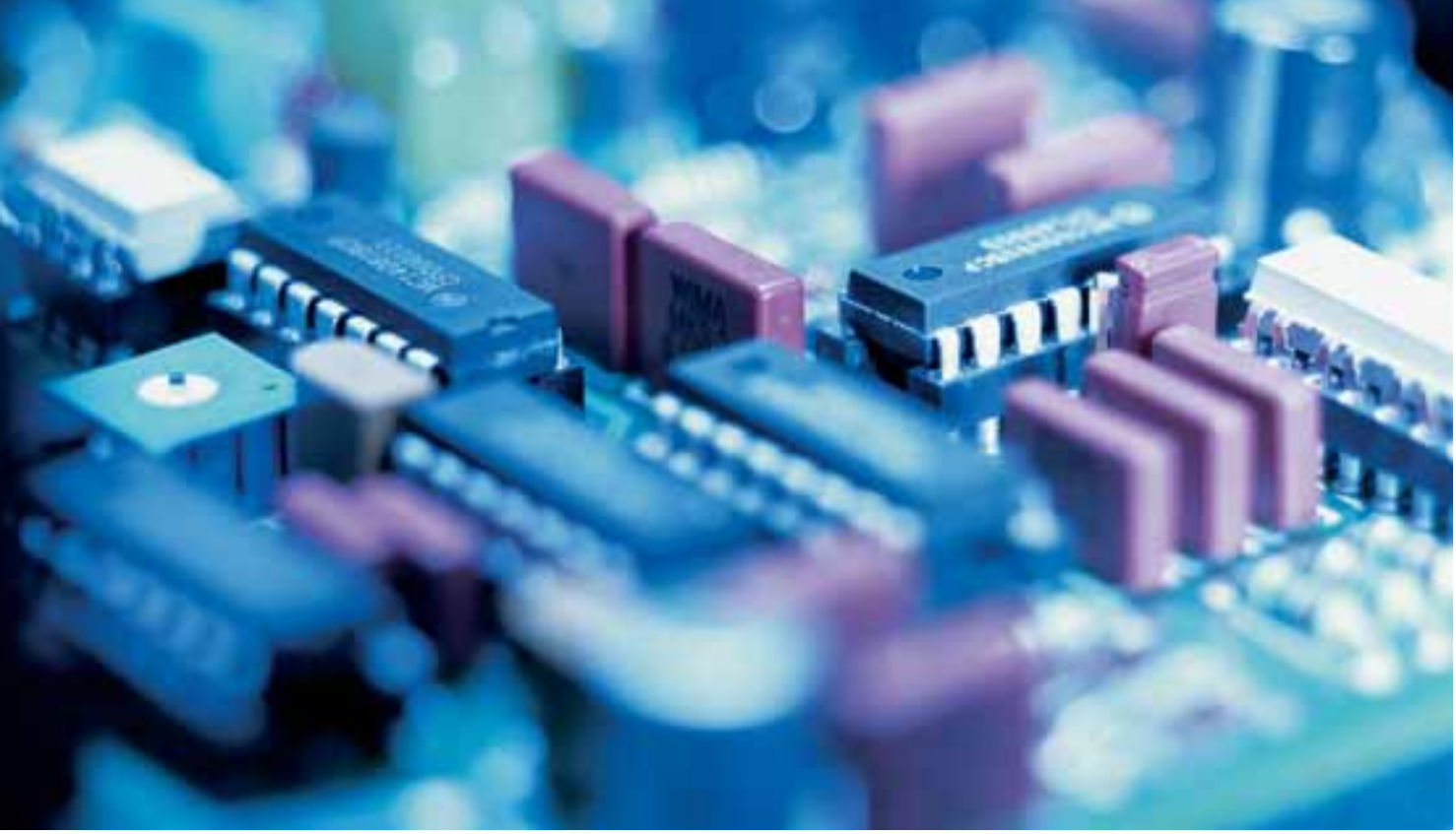
BEG rectifiers



INTORQ

setting the standard

www.intorq.de



The INTORQ switchgear range

In almost all application cases, the comprehensive range of INTORQ switchgear provides the ideal voltage supply solution for

- Electromagnetic clutches and brakes
- Spring-applied brakes
- Clutch/brake combinations
- Double clutches
- Solenoids and
- Solenoid valves

INTORQ switchgear types essentially differ in respect of the switching of the coil current:

- With contact (straightforward switching) or
- With transistor (wear free)

and the type of excitation:

- Normal excitation or
- High-speed excitation

Switchgear can be controlled by contacts, proximity switches, photoelectric barriers or control voltages (e.g. from a PLC). For some types of switchgear, short change-over pulses will suffice.

INTORQ high-speed switchgear

INTORQ high-speed switchgear can bring decisive advantages in respect of the control of:

1. Electromagnetic clutches and brakes and clutch/brake combinations: achieving
   - Considerably reduced operating times
   - Improved stopping accuracy
   - Increased operating frequency
2. Spring-applied brakes, achieving
   - Reduced engagement and disengagement times
   - Increased operating frequency
   - Reduced wear of friction linings
   - Increased reliability
   - Reduced amount of time and effort spent on maintenance
3. Brakes on brake motors, achieving
   - Improved stopping accuracy
   - Reduced motor temperature, even at increased operating frequency

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High-speed switchgear

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Electronic switchgear with normal excitation

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Overview of types

Rectifiers and switchgear

INTORQ	Description	Control of	Coil voltage in V =	Mains voltage in V =	Page
Rectifiers					
BEG-142 and 143	Bridge rectifier 4-pole	BFK	230	255	10
BEG 162 and 161	Bridge rectifier 6-pole	BFK	230	255	11
BEG 242 and 243	Half-wave rectifier 4-pole	BFK	215	555	10
BEG 261 and 262	Half-wave rectifier 6-pole	BFK	215	555	12
BEG 561	Bridge/half-wave rectifier 6-pole	BFK	230	440	16
High-speed switchgear					
14.611.30.□□□	SEGC-220 Contact	BFK BEM/KEM LK/HM/MV	24-215	100-240	25
14.611.38.□□□	SEGC-380 Contact	BFK	96-215	380-420	29
14.611.12.□□□	SEGC-Electronic	BFK BEM/KEM LK/HM/MV	24	220/230/240	35
14.611.14(16).□□□	SEGC-Europe	BFK BEM/KEM LK/HM/MV	24	220/230/240	33
14.621.14.□□.□	DEG double European device	KBK	2 x 24	220/230/240	42
14.621.13.□□.□	DOSS double high-speed switching device	KBK	2 x 24	220/230/240	38
Electronic switchgear					
14.610.11.048	Transformer switch TS 48	BFK BEM/KEM LK/HM/MV	24	230	18
14.640.10.048	Electronic dual switch EDS 48	KBK	2 x 24	230	19

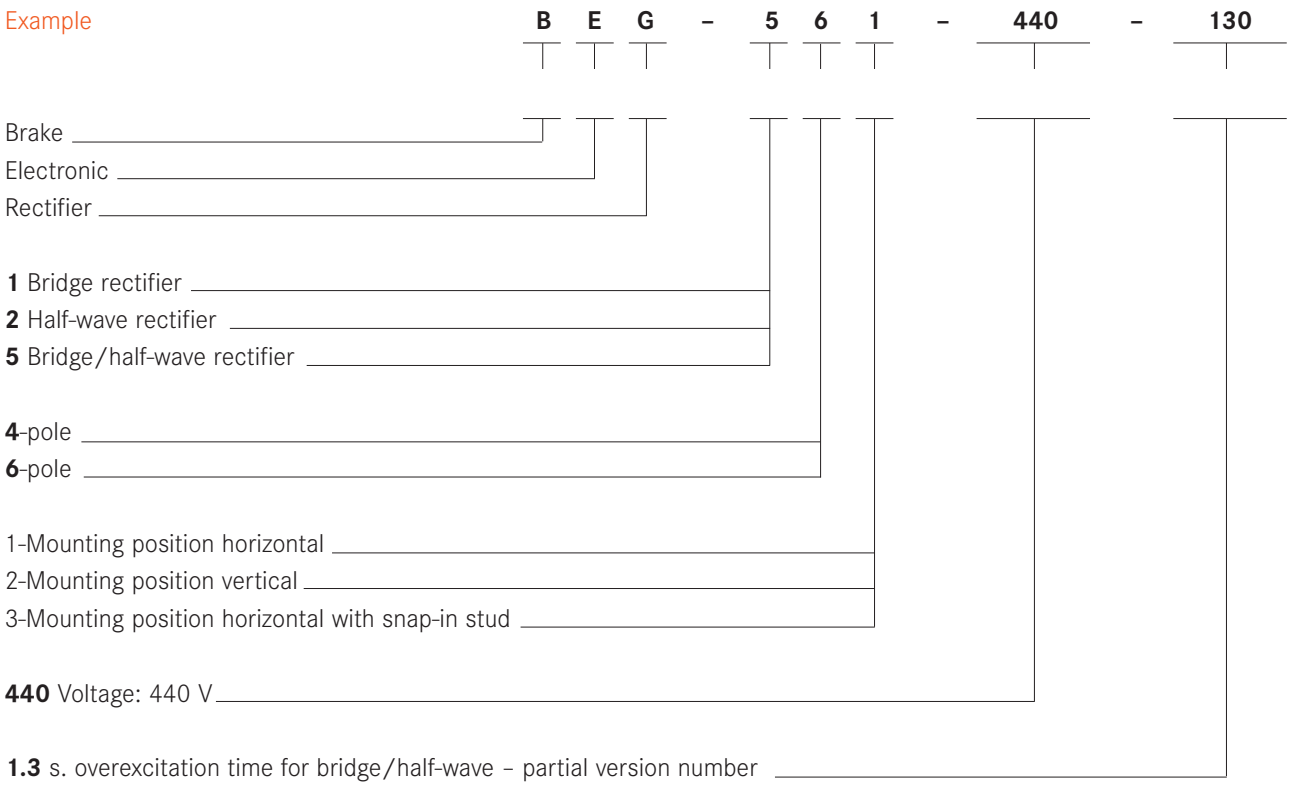
BFK = Spring-applied brakes
BEM/KEM = Electromagnetic brakes/clutches
LK = Multiple disc clutches

HM = Solenoids
MV = Solenoid valves
KBK = Clutch/brake combinations

INTORQ	Description	Max. mains voltage	For use in	Coil voltage in V =	Mains voltage in V =	Page
Accessories						
14.666.01.□□□	MP capacitor	Up to 240 V or Up to 400 V	All high-speed switchgear SEGC, DEG, DOSS	24-205 V	up to 240 V or Up to 400 V	46
14.666. offers 03.003	Plug-in rack	–	1 x SEGC-Europe	–	–	47
14.666.03.004	Plug-in rack	–	2 x SEGC-Europe	–	–	47
14.198.00.0□	Spark suppressor	60-555 V	All coils (not required for INTORQ high-speed switchgear, electronic switchgear and 6-pole rectifiers)	24-250 V	–	14

Type code

Bridge rectifiers and half-wave rectifiers



Type code

High-speed switchgear for 1 coil

14.611.14.100

Type
Design
Capacitor rating (x10)
Application area

Design
12 – SEGC-Electronic, up to 100 W
14 – SEGC-Europe, up to 40 W
16 – SEGC-Europe, up to 100 W
30 – SEGC – 220 Contact for 230 V mains
38 – SEGC – 380 Contact for 400 V mains

Capacitor rating
Multiply this value by 10 to obtain the mounted Capacitor rating.

Application area
0 = Normal operating frequency
1 = Increased operating frequency
With SEGC-Contact:
0 = For 230 V mains
1 = For 400 V mains

High-speed switchgear

DOSS double high-speed switching device

14.621.13.06.0

Type
Size
Application area

Size
Size of clutch/brake

Application area
0 = For electromagnetic clutch and electromagnetic brake

DEG double European device

14.621.14.06.0

Type
Size
Application area

Size
Size of clutch/brake

Application area
0 = Normal operating frequency for electromagnetic clutch and electromagnetic brake
1 = Increased operating frequency for electromagnetic clutch and electromagnetic brake

Theoretical basics

Calculating current, resistance and rated voltage

The rated coil voltage and coil load are always specified in the clutch and brake catalogues. The following fomulae can be used to calculate coil current, coil resistance and coil voltage.

Calculating the coil current

$$I = \frac{P}{U} \quad I = \frac{U}{R} \quad I = \sqrt{\frac{P}{r}}$$

Calculating the coil resistance

$$R = \frac{U^2}{P} \qquad R = \frac{U}{I}$$

Calculating the rated coil voltage

$$U = \sqrt{R \cdot P}$$

I = Coil current
R = Coil resistance
U = Rated coil voltage
P = Coil load

General switching operations

The electromagnets in the electromagnetic clutches, electromagnetic brakes and spring-applied brakes are designed for a DC voltage connection. The following formulae apply in respect of switching on and off:

Current characteristic for switching on

$$i = I \cdot \left(1 - e^{-t \cdot R/L}\right)$$

Current characteristic for switching off

$$i = I \cdot e^{-t \cdot R/L}$$

i = Current at time t (A)
I = End current (A)
t = Time after switching (s)
L = Coil inductance (H)
R = Coil resistance (Ω)

Notes

Suppressor circuit

Every time an inductance is switched off, the coil current continues to flow for a short time. In the case of contacts without a suppressor circuit, this leads to sparking and contact erosion.
Transistors must always be operated with a suppressor circuit matched to the respective reverse transistor voltage.

Operating times

Short switch off times can only be reached using high induced voltages. On INTORQ high-speed switchgear for 24 V coils, therefore, the induced voltage is around 500 V.
The operating times for DC switching listed in the catalogue can only be reached with an induced voltage of at least 100 V.

Theoretical basics

Loading limits of electromagnetic clutches and brakes and spring-applied brakes

Temperature rise on INTORQ electromagnetic clutches and brakes and INTORQ spring-applied brakes is determined by the respective operating conditions. The most important criteria are:

- Friction energy per switching cycle
- Operating frequency
- Installation conditions
- Ventilation
- Operating time
- Overexcitation time
- Ambient temperature
- Heat dissipation or input (adjacent machine parts)

The interplay between these factors determines temperature rise on the clutch or brake. In many cases, temperature rise is critical at very high operating frequencies.

Since the coil temperature can indicate temperature rise on a clutch or brake, we recommend that you determine this temperature by means of measurement resistance. Proceed as follows:

- Measure the coil resistance of the coil when cold
- Measure the room temperature (= coil temperature)
- Calculate the max. permissible coil resistance (see formula below)
- Operate the clutch/brake at max. load and if possible max. ambient temperature, and monitor the coil resistance/temperature.
- Measure the intermediate values of the coil resistance and check whether the max. permissible resistance value has already been reached.
- Continue to operate at full load until the steady-state temperature of the clutch and brake has been reached. If the max. permissible coil resistance has not yet been reached under these unfavourable conditions, the clutch or brake is not overloaded.

Caution

The coils on INTORQ electromagnetic clutches and brakes are designed for a max. temperature of 130°C as standard; that is, class “B” insulation. This max. coil temperature must not be exceeded.

Formula for the max. permissible coil resistance

$$R_{perm} = R_k \cdot \frac{365}{235 + \vartheta_R}$$

Calculating the actual coil temperature using the coil resistance

$$i_{sp} = \frac{R_W}{R_k} \cdot (235 + \vartheta_R) - 235$$

Key to symbols

R_{perm} = Max. permissible resistance in Ω
R_k = Ohmic resistance with cold coil in Ω (room temperature)
R_W = Resistance with warm coil in Ω
ϑ_R = Cold coil temperature in°C (room temperature)
ϑ_{sp} = Warm coil temperature in°C

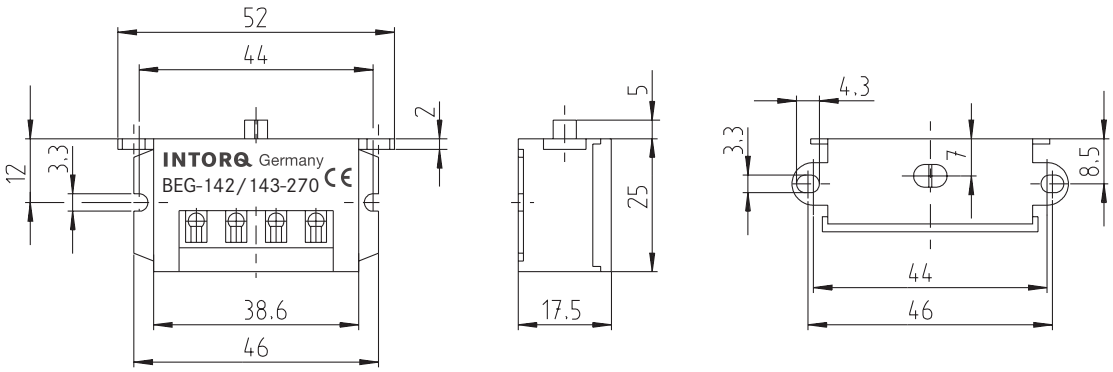
When operating clutches and brakes with high-speed excitation, checking the coil resistance using the method above can also help to determine whether excitation may be excessive.

Rectifiers

4-pole bridge rectifier and 4-pole half-wave rectifier

Dimensions

BEG-142/143-270
BEG-242/243-555



4-pole bridge rectifier

BEG-142-270
BEG-143-270

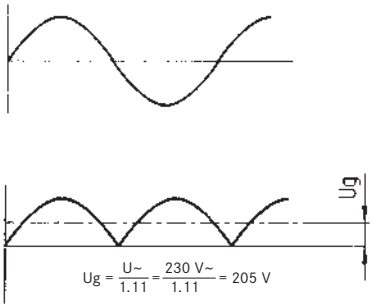
Application area

Current supply for spring-applied brakes from AC mains (normal excitation).
Example: 205 V coil on 230 V mains

Technical data

Max. mains voltage	270 V~
Max. DC current at 60°C	1.0 A
Max. ambient temperature	80°C

The rectifiers are protected against overvoltage by input and output varistors.



4-pole half-wave rectifier

BEG-242-555
BEG-243-555

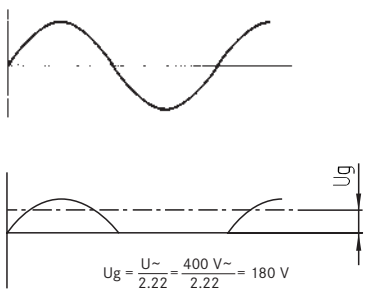
Application area

Current supply for spring-applied brakes from AC mains (normal excitation).
Example: 180 V coil on 400 V mains

Technical data

Max. mains voltage	555 V~
Max. DC current at 60°C	1.0 A
Max. ambient temperature	80°C

The rectifiers are protected against overvoltage by input and output varistors.

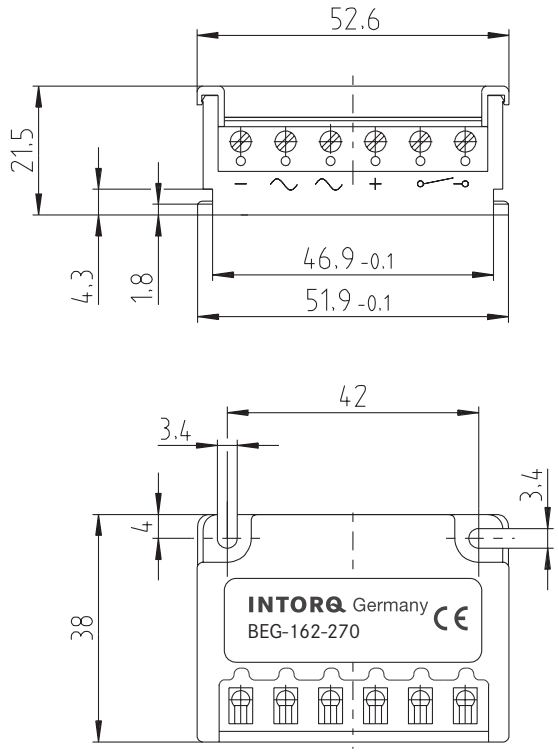


Rectifiers

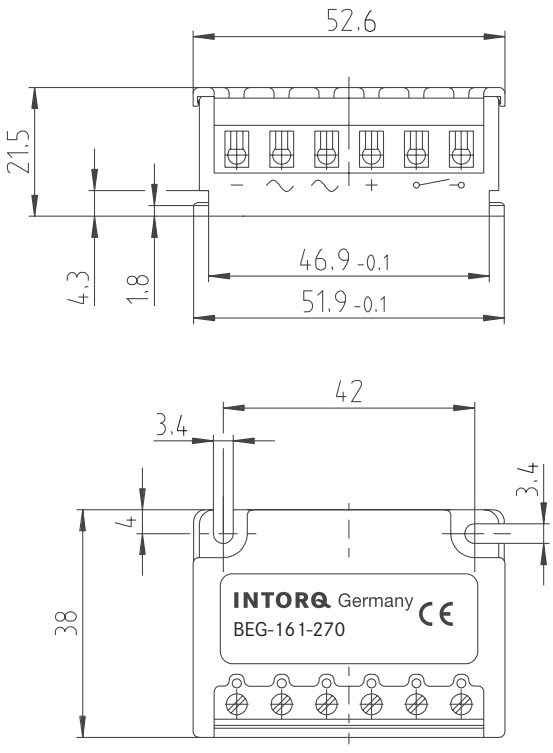
6-pole bridge rectifier

Dimensions

BEG-162-270



BEG-161-270



6-pole bridge rectifier

BEG-162-270
BEG-161-270

Application area

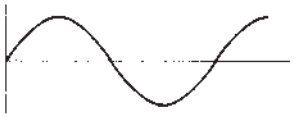
Current supply for spring-applied brakes from AC mains (normal excitation).
Example: 205 V coil on 230 V mains

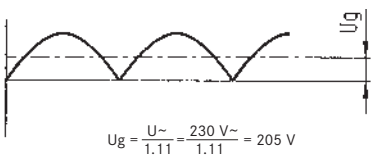
Technical data

Max. mains voltage	270 V~
Max. DC current at 60°C	0.75 A
Max. ambient temperature	80°C

The rectifiers are protected against overvoltage by input and output varistors.

BEG-162-270/161-270/262-460/261-460 rectifiers also contain the spark suppressors required by VDE 0580 Section 26.



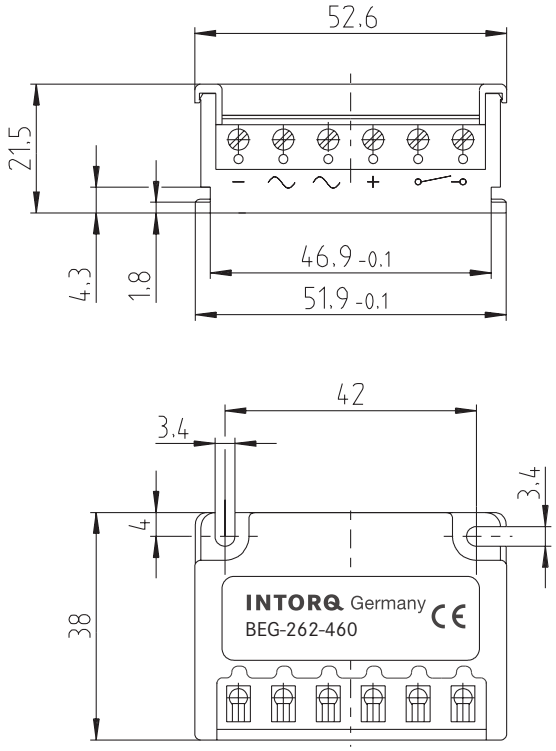


Rectifiers

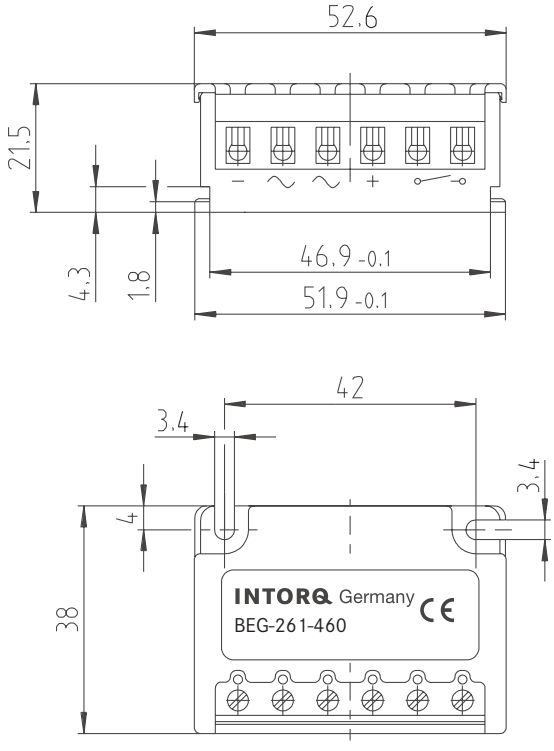
6-pole half-wave rectifier

Dimensions

BEG-262-460
BEG-262-555



BEG-261-460
BEG-261-555



6-pole half-wave rectifier

BEG-262-460
BEG-261-460
BEG-262-555
BEG-261-555

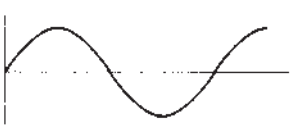
Application area

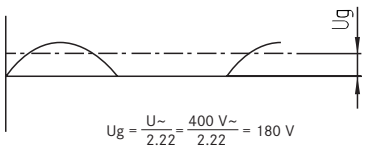
Current supply for spring-applied brakes from AC mains (normal excitation).
Example: 180 V coil on 400 V mains

Technical data

Max. mains voltage	555 V~
Max. DC current at 60°C	0.75 A
Max. ambient temperature	80°C

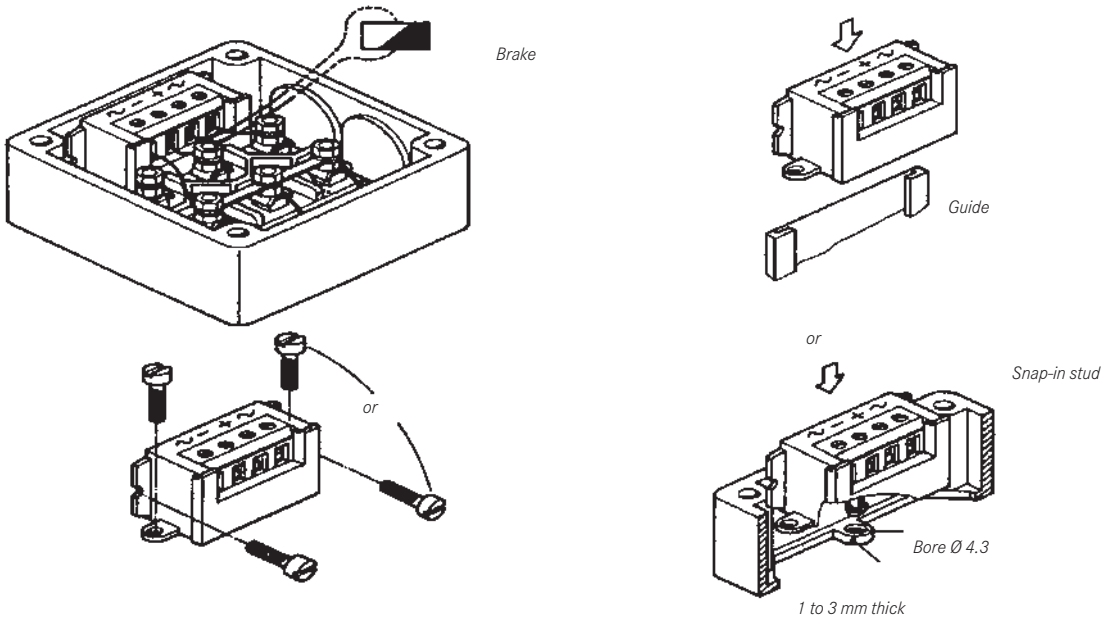
The rectifiers are protected against overvoltage by input and output varistors. BEG-162-270/161-270/262-460/261-460 rectifiers also contain the spark suppressor required by VDE 0580 Section 26.



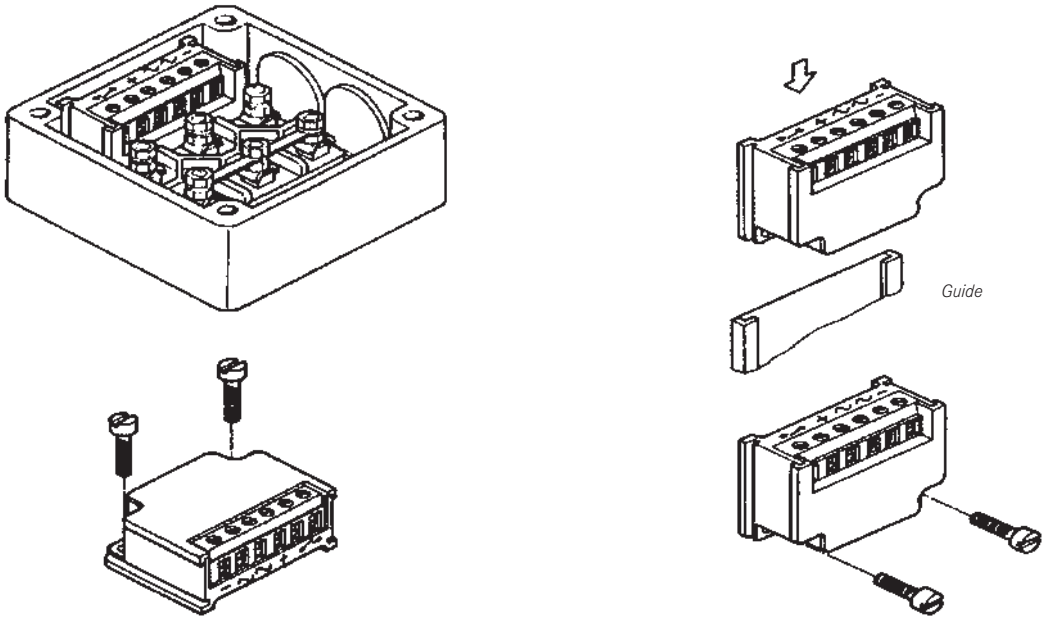


Rectifiers

Fastening options
4-pole rectifier



Fastening options
6-pole rectifier



Spark suppressor

INTORQ 14.198.00.0□

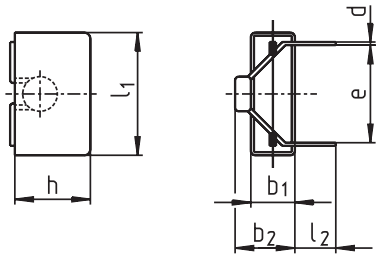
Application area

- Spark suppression at switching contacts
- Limitation of coil induced voltage
- Increase in service life of coils and contacts
- Additional protection for rectifiers operating on mains with extreme disturbance voltage peaks
- Compliance with VDE standard 0580 Section 26
- Reduction in switch off time of clutches, brakes and spring-applied brakes

Features

The INTORQ spark suppressor protects the coil and contact against impermissibly high induced voltages with switching on the DC side. It comprises a special induction-free pulse capacitor which immediately takes up the high-speed current peaks which occur during switching operations. This considerably reduces the amount of sparking at the contact (contact erosion). In the absence of a suppressor circuit, the spark, the induced voltage and the switch off time are all dependent on contact parting speed, air humidity, atmospheric pressure and other environmental factors. In all cases, increased contact erosion and varying switch off times should be expected. In the absence of a suppressor circuit, the induced voltage may exceed the values permitted by VDE 0580, which can lead to coil failures.

Dimensions



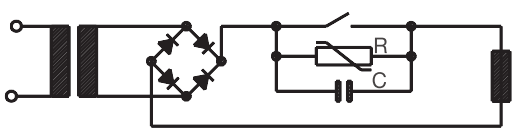
Technical data

Four versions of the INTORQ spark suppressor are available for the following voltage ranges:

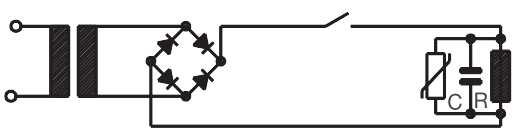
INTORQ	Coil voltage	Max. mains voltage	Max. coil power	Capacitor voltage	b_1	b_2 approx.	d	e approx.	h	l_1	l_2 approx.	m [g]
14.198.00.01	24 V – 50 V	60 V~	110 W	250 V-	8.5	12.5	0.7	22.5	18.5	26.5	25	7
14.198.00.02	50 V – 120 V	250 V~	110 W	630 V-	15	21	0.7	37.5	26	41.5	20	22
14.198.00.03	120 V – 200 V	400 V~	110 W	1000 V-	13	20	0.7	37.5	24	41.5	15	17
14.198.00.04	200 V – 250 V	555 V~	110 W	1000 V-	13	20	0.7	37.5	24	41.5	15	10

Wiring example

Parallel to contact



Parallel to coil



Rectifiers

Mains voltage selection table

Rectifier type and rated coil voltage for mains voltage

AC voltage [V]	Rectifier	Rectifier type 4-pole 1 A at 60°C	Spark suppressor INTORQ	Rectifier type 6-pole 0.75 A at 60°C	Coil rated voltage [V]
42 V	Half-wave	BEG-243/242-555	14.198.00.01	BEG-262/261-460	20 V
48 V	Bridge Half-wave	BEG-142/143-270 BEG-243/242-555	14.198.00.01 14.198.00.01	BEG-162/161-270 BEG-262/261-460	42 V 20 V
110 V	Bridge	BEG-142/143-270	14.198.00.02	BEG-162/161-270	103 V
220 V	Bridge Half-wave	BEG-142/143-270 BEG-243/242-555	14.198.00.04 14.198.00.02	BEG-162/161-270 BEG-262/261-460	205 V 103 V
230 V	Bridge Half-wave	BEG-142/143-270 BEG-243/242-555	14.198.00.04 14.198.00.02	BEG-162/161-270 BEG-262/261-460	205 V 103 V
240 V	Bridge Half-wave	BEG-142/143-270 BEG-243/242-555	14.198.00.04 14.198.00.02	BEG-162/161-270 BEG-262/261-460	215 V 103 V
255 V	Bridge	BEG-142/143-270	14.198.00.04	BEG-162/161-270	225 V
277 V	Half-wave	BEG-243/242-555	14.198.00.03	BEG-262/261-460	127 V
290 V	Half-wave	BEG-243/242-555	14.198.00.03	BEG-262/261-460	127 V
380 V	Half-wave	BEG-243/242-555	14.198.00.03	BEG-262/261-460	180 V
400 V	Half-wave	BEG-243/242-555	14.198.00.03	BEG-262/261-460	180 V
415 V	Half-wave	BEG-243/242-555	14.198.00.03	BEG-262/261-460	180 V
420 V	Half-wave	BEG-243/242-555	14.198.00.03	BEG-262/261-460	180 V
440 V	Half-wave	BEG-243/242-555	14.198.00.04	BEG-262/261-460	205 V
460 V	Half-wave	BEG-243/242-555	14.198.00.04	BEG-262/261-460	205 V
480 V	Half-wave	BEG-243/242-555	14.198.00.04	BEG-262/261-555*	215 V
500 V	Half-wave	BEG-243/242-555	14.198.00.04	BEG-262/261-555*	225 V
555 V	Half-wave	BEG-243/242-555	14.198.00.04	BEG-262/261-555*	250 V

* Spark suppressor without capacitor. For optimum spark suppression, we recommend the use of spark suppressor 14.198.00.04.

Max. rated coil voltage: 250 V

Standard rated voltages:

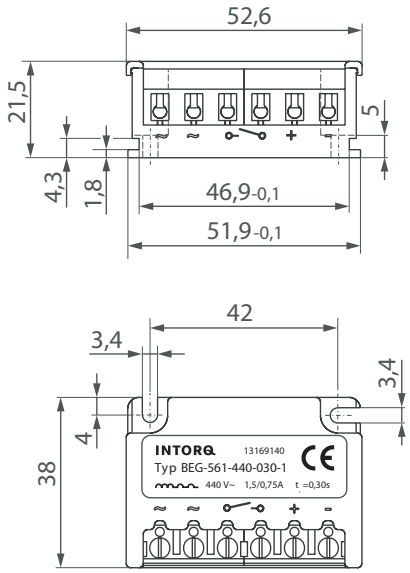
24, 96, 103, 170, 180, 190, 205 V

Bridge/half-wave rectifiers

BEG-561-□□□-□□□

Bridge/half-wave rectifiers are used to supply power to the electromagnetic DC current spring-applied brakes approved for operation with this type of rectifier. Any other use is subject to the approval of INTORQ.
Once a set overexcitation time has elapsed, the bridge/half-wave rectifiers switch from bridge rectification to half-wave rectification. This makes it possible to improve switching performance or reduce power in accordance with load dimensioning.
Terminals 3 and 4 are in the DC circuit of the brake.
With switching on the DC side, integrated overvoltage protection at terminals 5 and 6 limits the induced voltage peak (see “Reduced switch off times” diagram).

Dimensions



Technical data

Rectifier type	Bridge/half-wave rectifier
Output voltage with bridge rectification	0.9xU_1
Output voltage with half-wave rectification	0.45xU_1
Ambient temperature (storage/operation) [°C]	-25...+70

U_1 = Eingangsspannung (40...60 Hz)

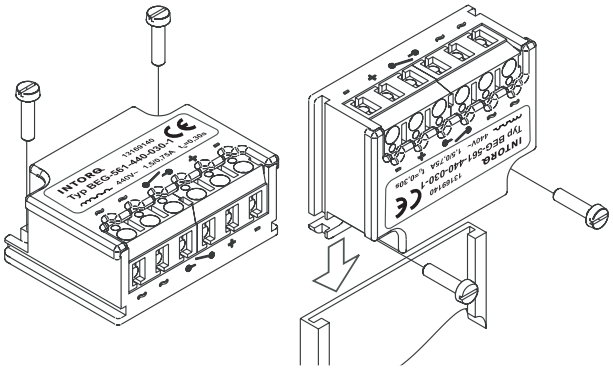
Type	Input voltage U_1 (40 Hz to 60 Hz)			Max. current load I_{max}		Overexcitation time $t_{ü}$ (±20%)		
	Min. [V~]	Rated [V~]	Max. [V~]	Bridge [A]	Half-wave [A]	at U_{1min} [s]	at U_{1rated} [s]	at U_{1max} [s]
BEG-561-255-030	160	230	255	3.0	1.5	0.430	0.300	0.270
BEG-561-255-130				3.0	1.5	1.870	1.300	1.170
BEG-561-440-006-1	230	400	440	1.5	0.75	0.110	0.060	0.060
BEG-561-440-030-1				1.5	0.75	0.500	0.300	0.270
BEG-561-440-130				3.0	1.5	2.300	1.300	1.200

Bridge/half-wave rectifiers

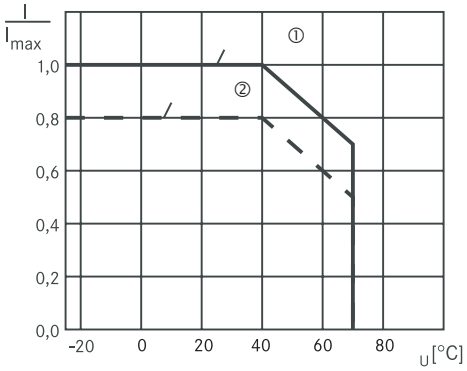
INTORQ

BEG-561-□□□-□□□

Fastening options



Permissible current load – ambient temperature



① Screw mounting with metal surface (good heat dissipation)
② Other mounting (e.g. adhesive)

Reduced switch off times

During switching on the DC side (shorter switch-off times) switching must also occur on the AC side! Otherwise, overexcitation will not occur on restarting.

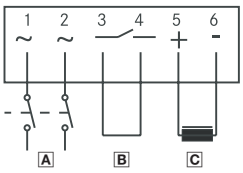
Coil voltage selection

Rated coil voltage	Function
U_{Sp} = 0.45xU_1	Maximum overexcitation No reduction in holding current
0.45xU_1 = < U_{Sp} < 0.90xU_1	Partial overexcitation Partial reduction in holding current
U_{Sp} = 0.90xU_1	No overexcitation Maximum reduction in holding current

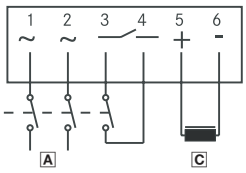
U_{Sp} = Rated coil voltage U_1 = Input voltage (40...60 Hz

Connection

Normal switch off times



Reduced switch off times



A Mains B Bridge C Coil

Electronic switchgear

Transformer switch TS 48 INTORQ 14.610.11.048

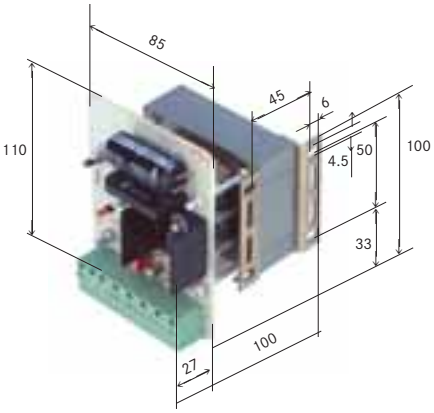
Features

- Transformer switch TS 48 contains the entire current supply for a 24 V DC coil with transformer, rectifier and switching transistor with suppressor circuit
- The transistor is used for switching; there is no contact erosion
- The high induced voltage enables the switch off times indicated in the catalogue for switching on the DC side to be achieved.

Applications

- Current supply for 24 V coils on AC mains
- Normal excitation with rated coil voltage
- Switching of coil current via PLC, proximity switch, contacts, control voltage 5 – 24 V

Dimensions

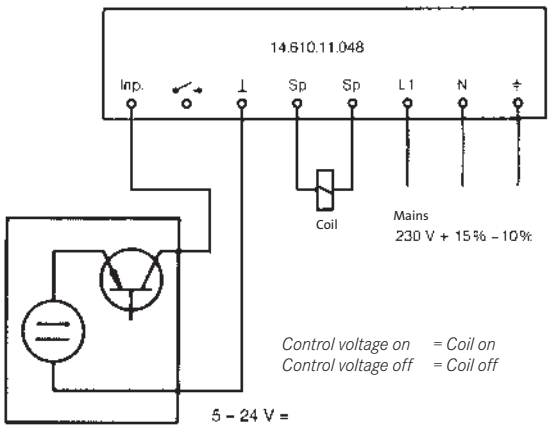


Technical data

Normal excitation	24 V
Mains voltage	230 V, 50/60 Hz
Coil voltage	24 V =
Max. coil load	50 W
Max. operating frequency:	
Up to 35 W	5 switching operations/s
Up to 50 W	2 switching operations/s
Connectable coils	1 x
Switching of coil current:	Transistor
The entire switching operation is potential-free.	
Control current at 24 V	approx. 1 mA
Weight:	1.5 kg

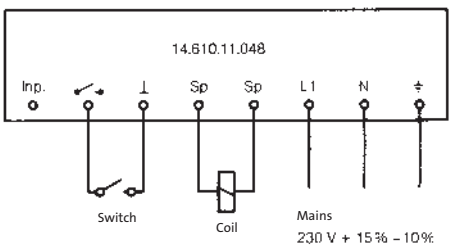
Connection examples

Control via PLC



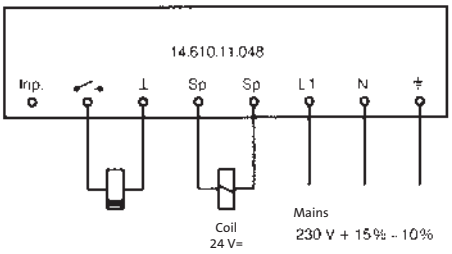
Control voltage on = Coil on
Control voltage off = Coil off

Control via contact



Switch closed = Coil on
Switch open = Coil off

Control via 2-wire proximity switch



Proximity switch closed = Coil on
Proximity switch free = Coil off

Electronic switchgear

INTORQ

INTORQ 14.640.10.048 EDS 48 electronic dual switch

Application area

Using 24 V standard excitation to switch:

- Clutch/brake combinations
- Other coils which are to be switched on the DC side in alternating or parallel operation

The EDS 48 electronic dual switch is ideal for controlling two coils.

Features

The EDS 48 electronic dual switch contains the complete current supply for a 24 V DC voltage coil and can be operated using control voltages (e.g. from a PLC) or pulses. A pulse at the START input will engage the clutch until a pulse at the STOP input disengages the clutch and applies the brake. A program switch can be used to preselect the type of brake to be controlled (electromagnetic or spring-operated brake).

Note

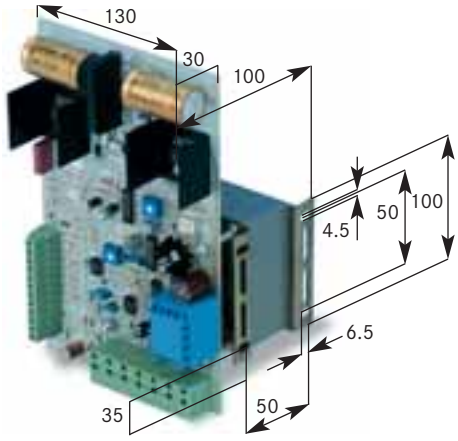
When using spring-operated brakes, the transformer power must be dimensioned for the sum of the clutch and braking powers.

Delay times can be set on two potentiometers to prevent clutches and brakes that do not have a common armature plate working in opposition. The input electronics are potential-free and isolated from the power section by an optocoupler.

For safety reasons, the clutch is always set to “Off” and the brake to “On” following mains connection or the closing of switch a1. The device is able to execute the first start command (clutch On) approximately one second later. If a start command is already present at the input before the mains connection is made, the brake remains switched on until a new start command is sent.

If required, switch a1 can serve as an “emergency-off” switch.

EDS 48 dimensions



Technical data

Normal excitation	24 V
Mains voltage	230 V, 50/60 Hz
Coil voltage	24 V
Max. coil load:	
with EDS 48 INTORQ 14.640.10.048	50 W
Max. operating frequency:	
up to 35 W	5 switching operations/s
up to 50 W	2 switching operations/s
Connectable coils	2
Max. control current at 24 V	10 mA approx.
Auxiliary supply at terminals 30+31	15 V
Max. current of the auxiliary supply	30 mA
Max. delay time	250 ms
Control pulses	≥ 3 ms
EDS 48 weight	1.8 kg

Control options

- PLC (programmable logic controller)
- Contacts
- NPN (PNP) proximity switches
- NPN (PNP) photoelectric barriers

Electronic switchgear

EDS 48 electronic dual switch
INTORQ 14.640.10.048

Connection examples

Control via continuous signals

Switching via contact

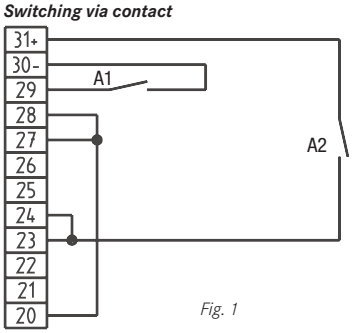


Fig. 1

Pressing switch A2 turns the brake “Off” and the clutch “On” (Start), if A1 is not closed. Opening A2 switches the clutch “Off” and the brake “On” (Stop). The first start command is executed no earlier than approximately 1 second after the mains voltage has been switched on or after A1 is opened.

Switching via optocoupler

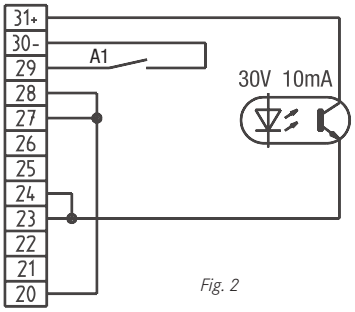


Fig. 2

This example is as Fig. 1, but an optocoupler or a transistor is used instead of a contact.

Switching via proximity switch

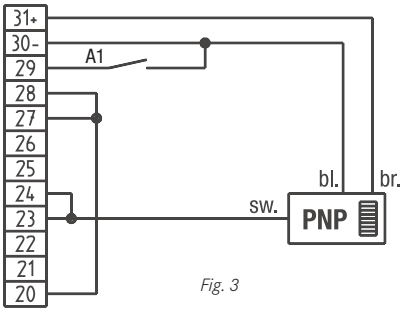


Fig. 3

This example is as Fig. 1, but a PNP proximity switch is used instead of a contact.
Colours: bk. = black/bl. = blue/br. = brown
Proximity switch damped = Clutch “on”/brake “off”
Proximity switch undamped = Brake “on”/clutch “off”

Switching via PLC

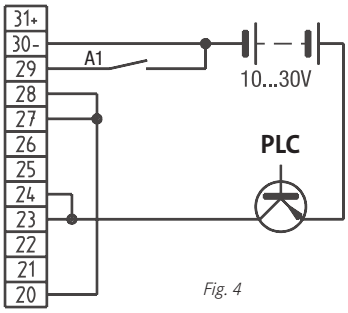


Fig. 4

In this example, a PLC with a control voltage of 10 to 30 V is used for control.
Control voltage “on” = clutch “on”/brake “off”
Control voltage “off” = brake “on”/clutch “off”

Caution

The cables to the coil must not short-circuit or have a conductive connection to earth (electrical bonding), the PEN conductor or other coils.

Electronic switchgear

EDS 48 electronic dual switch
INTORQ 14.640.10.048

Connection examples

Control via pulses

Switching via contacts

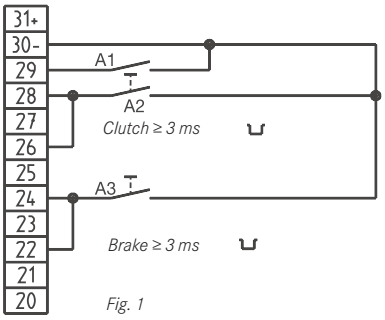


Fig. 1

Pressing switch A2 engages the clutch (Start), if A1 is not closed. The pulse must be ≥ 3 ms and is saved until switch A3 is closed for at least 3 ms (stop). If A3 remains closed and switch A2 gives the start command, the brake remains "On" and the clutch "Off".

Switching via optocoupler

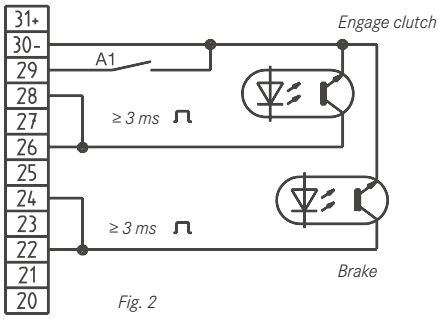


Fig. 2

This example is as Fig. 1, but an optocoupler or transistors are used instead of contacts.

Switching via proximity switch

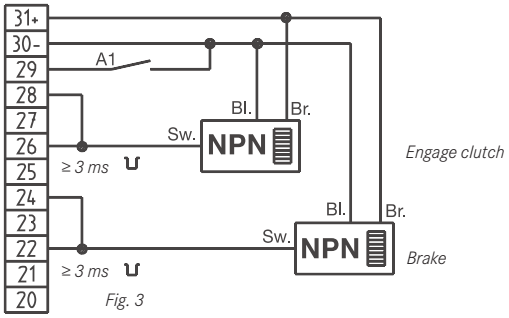


Fig. 3

This example is as Fig. 1, but NPN proximity switches (e.g. type 14.666.03.001, three-wire version) are used instead of contacts.
Colours: bk. = black/bl. = blue/br. = brown

Example of pulse control

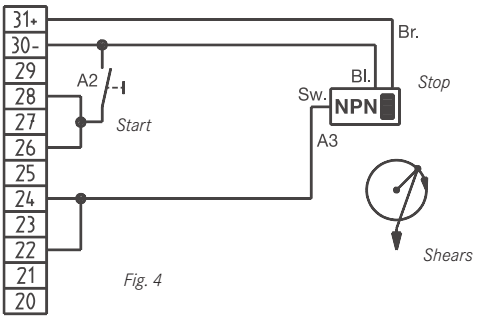


Fig. 4

A cutting blade is driven by a cam. Proximity switch A3 (type 14.666.03.001) should cause it to stop automatically after one revolution following the start pulse. The start command is issued via switch A2.

SEGC high-speed switchgear

Features

INTORQ SEGC high-speed switchgear are used for high-speed coil excitation at a rated voltage of 24 – 215 V. The operating voltage can be set to the desired values using appropriate MP capacitors (must be ordered separately).

Advantages

Use of electromagnetic clutches/brakes:

- Shorter acceleration/braking time
- Transient increase in torque during acceleration/braking
- Higher operating frequency

Since the devices are a constant source of current, the same current flows regardless of whether the coil is cold or warm; i.e., the torque is largely independent of the coil temperature.

Use of spring-applied brakes

- Faster brake release
- Reduced rotor wear (the motor now fights the brake for less time as it is being released)
- Minimum time and effort spent on maintenance, longer reset cycles
- Increased operating frequency
- Reduced motor temperature rise
- Increased motor switching frequency
- Reduction in brake motor starting current peaks

The spring force or torque can be increased by up to 40%, please contact us for more information.

In principle, operating frequency can be increased by using the SEGC switchgear. However, the max. permissible switching energy of the clutch or brake must not be exceeded.

Selection table

	SEGC-Europe 14.611.14(16).□□□	SEGC-Electronic 14.611.12.□□□	SEGC-220 Contact 14.611.30.□□□	SEGC-380 Contact 14.611.38.□□□
Mains voltage	220/230/240 V*	220/230/240 V*	110/220/230/240 V	380/400/420 V
Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Max. coil load	40/100 W **	100 W **	110 W	110 W
Rated coil voltage	24 V	24 V	24 – 96 V	96 – 215 V
Max. current	1.7/2.7 A	4.2 A	4.2 A	1.1 A
Switching of coil current by	Transistor	Transistor	Contact	Ext. contact
High-speed excitation factor	13	13	6 – 13	2.5 – 6
Mounting area	100 x 120 mm	220 x 150 mm	100 x 120 mm	100 x 120 mm
Height of devices	180 mm	70 mm	70 mm	70 mm
Optocoupler input	Yes	Yes	No	No

- * Other voltages on request
- ** Also 110 W for spring-applied brakes with a reduction in voltage

SEGC high-speed switchgear

Principle of operation

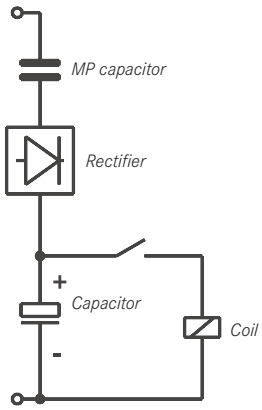


Fig. 1
Basic principle

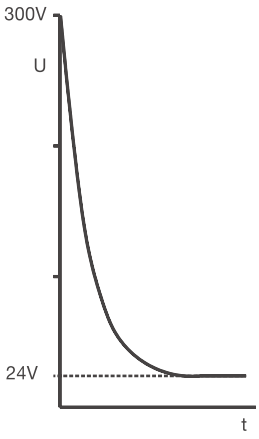


Fig. 2
Voltage characteristic with 24 V rated voltage

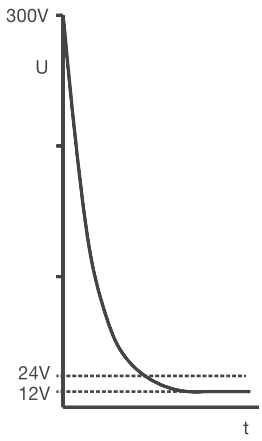


Fig. 3
Voltage characteristic with decrease in voltage

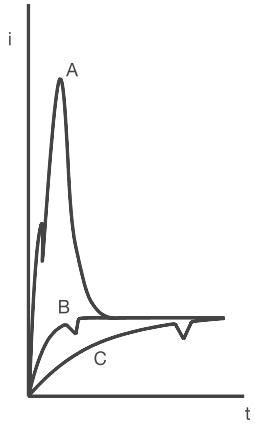


Fig. 4
Current characteristics for different capacitor ratings

All SEGC high-speed switchgear operate according to the same basic principle (see Fig. 1). Electronic switchgear have a transistor instead of a switch.
Once the mains connection has been made and with the switch open, the electrolytic capacitor charging current will flow via the MP capacitor and the rectifier, until the electrolytic capacitor has been charged to a value equal to 1.414 times the mains voltage (on a 230 V mains to approx. 325 V =).
Once the switch has closed, the coil is excited at high speed with the electrolytic capacitor voltage. During this process, the electrolytic capacitor will discharge and a current will flow via the MP capacitor and the rectifier. The MP capacitor acts as a capacitive, loss-free series resistor connected directly to the mains.

The MP capacitor adapts the coil power to the mains voltage and mains frequency, and sets the desired coil voltage.
This means:
A 50% reduction in the MP capacitor rating
≙ 50% of the coil voltage.
A 100% increase in the MP capacitor rating
≙ 100% increase in the coil voltage

By changing the electrolytic capacitor, it is possible to select the desired high-speed excitation current between characteristics A and B shown in Fig. 4, in order to optimise switching times. Curve C displays the current characteristic with normal excitation at 24 V.

SEGC high-speed switchgear

Selecting the rated coil voltage

If the mains and coil voltages can be freely selected, we recommend connecting the 24 V coil to a 220/230/240 V mains, since high-speed excitation with the SEGC-220 Contact switching device is then at its highest. If there is only a 380/400/420 V mains available, we recommend using the SEGC-380 Contact switching device with 96 V coils, since high-speed excitation will still occur with 5 times the coil voltage. Other rated coil voltages are possible, but the effect of high-speed excitation will be reduced accordingly. In all cases, the MP capacitor must be adapted to the mains voltage and frequency, as well as to the coil voltage and power.

Optimising the coil voltage

The capacity of the MP capacitor determines the coil voltage after high-speed excitation. With electromagnetic clutches and brakes, the coil voltage normally is set to its rated value. Since the switching device provides a constant source of current, the coil voltage of a cold coil will be between 20 and 24 V (as per the capacities in the tables), rising accordingly as the coil temperature increases.
However, in some cases the coil must be operated with overvoltage or undervoltage: with electromagnetic clutches and brakes, overvoltage, for instance, causes a small increase in torque (however, the max. permissible coil temperature must not exceed 130 °C). By contrast, undervoltage causes a reduction in torque. High-speed excitation pulls the armature plate over the working air gap on the friction lining. High-speed excitation is followed by braking with reduced torque or soft acceleration. With spring-applied brakes, undervoltage is recommended, since the holding voltage of the released brake is around half of the rated coil voltage. In this way, the power input and magnetic energy in the coil is reduced to 25 % of the rated value. The advantages? Shorter engagement time and improved positioning accuracy.

Universal spare parts service

The PCBs for switchgear of the same type and power class are identical. The only differences between charging capacitors are in the coil load, operating frequency and operating conditions. The devices are supplied with all components fitted. However, if desired, PCBs and electrolytic capacitor can also be supplied separately. The charging electrolytic capacitor can then be soldered as appropriate for the prevailing operating conditions in accordance with our operation and mounting instructions.

Caution

Switchgear must never be operated without charging capacitors.

Load of an upstream transformer:

$$P_{transformer} = 0.9 \cdot \frac{P_{coil}}{U_{coil}} \cdot U_{mains}$$

SEGC high-speed switchgear

SEGC-220 Contact
INTORQ 14.611.30.□□□

Application area

Complete, straightforward and cost-effective current supply for clutches, brakes and spring-applied brakes for switching 24 - 215 V coils with high-speed excitation on 110/220/230/240 V mains.

Features

With the exception of the MP capacitor, the PCB has the same current supply throughout, including for spark suppression. The coil current is switched via a power contact which is connected externally to an 8-pole terminal. On a brake motor, this can be the fourth contact of the motor contactor, for example.

Advantages

- Straightforward switching with contacts
- Integrated spark suppression
- Improved stopping accuracy
- Possibility of reducing the supply voltage to the holding voltage
- Reduced wear on the brake motors
- Reduced time and effort spent on maintenance
- In the case of motors with multi-range voltages, the same 24 V spring-applied brake coil can be connected to various mains voltages and frequencies with the same capacitor.
- Reduced engagement and disengagement time

With 24 V coils, on 220/230/240 V mains, the engagement times of electromagnetic clutches and brakes are reduced to around 10 % of the values specified in the catalogue.

With spring-applied brakes, the engagement time is reduced to around 50 % of the values specified in the catalogue.
Using a brass sheet between the stator and armature plate can even reduce the engagement time to 25 %.
Using 96 V coils reduces disengagement times for spring-applied brakes on a 220/230/240 V mains to around 30 %.

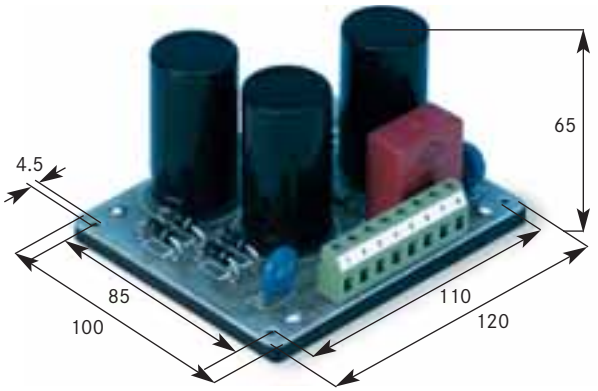
For a complete device, you will need:

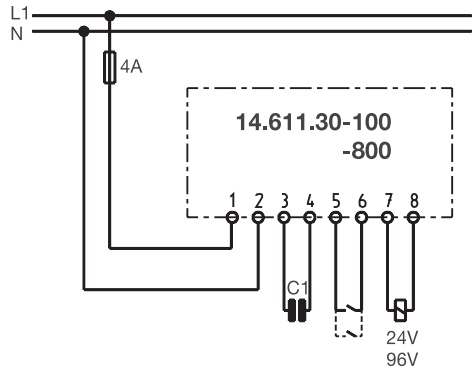
- SEGC-220 Contact INTORQ 14.611.30.□□□
- MP capacitors.

SEGC high-speed switchgear

SEGC-220 Contact
INTORQ 14.611.30.□□□

Dimensions





Caution

The cables to the coil must not short-circuit or have a conductive connection to earth (electrical bonding), the PEN conductor or other coils.

Technical data

High-speed excitation voltage	> 300 V
Mains voltage	100 – 240 V/50/60 Hz
Rated coil voltage	24 V – 103 V
Max. coil load	110 W
Max. rated coil current	4.2 A
Connectable coils	1 unit
Switching of coil current	1 potential-free external contact
Weight	0.4 kg

Control option

Via external contact

SEGC high-speed switchgear

INTORQ

SEGC-220 Contact
INTORQ 14.611.30.□□□

24 V coil selection table

Brake/clutch INTORQ	Coil power	MP capacitor for mains		Max. Operating frequency	Capacitor	SEGC type
		230 V/50 Hz	230 V/60 Hz			
	[W]	[µF]	[µF]	[rpm]	[µF]	
14.105.06	15	8	6	120	100	14.611.30.100
14.105.08	20	10	9	120	100	14.611.30.100
14.105.10	28	16	12	60	220	14.611.30.220
14.105.12	35	18	16	60	440	14.611.30.440
14.105.16	50	25	20	60	440	14.611.30.440
14.105.20	68	36	30	60	660	14.611.30.660
14.105.25	85	43	36	60	660	14.611.30.660
14.115.06	11.5	6	5	120	100	14.611.30.100
14.115.08	16	8	7	120	100	14.611.30.100
14.115.10	21	10	9	120	100	14.611.30.100
14.115.12	28	13.5	12	60	220	14.611.30.220
14.115.16	38	20	16	60	440	14.611.30.440
14.115.20	45	25	18	60	440	14.611.30.440
14.115.25	70	36	30	60	660	14.611.30.660
BFK458-06	20	6 (5.5 – 10)	5 (4.4 – 8)	120	100	14.611.30.100
BFK458-08	25	6 (5.5 – 13)	5 (4.4 – 10)	60	220	14.611.30.220
BFK458-10	30	7 (6.5 – 16)	6 (5.1 – 12)	60	220	14.611.30.220
BFK458-12	40	10 (9 – 21)	8 (6.8 – 17)	60	220	14.611.30.220
BFK458-14	50	12 (10 – 26)	10 (8.5 – 20)	60	440	14.611.30.440
BFK458-16	55	13.5 (12 – 29)	10 (9.4 – 23)	60	440	14.611.30.440
BFK458-18	85	20 (18 – 45)	16 (14.5 – 35)	60	660	14.611.30.660
BFK458-20	100	25 (22 – 50)	20 (17 – 42)	60	880	14.611.30.880
BFK458-25	110	25 (24 – 50)	20 (19 – 45)	60	880	14.611.30.880

We recommend:

- Low µF values for short switch off times
- Higher µF values for quick engagement

SEGC high-speed switchgear

SEGC-220 Contact
INTORQ 14.611.30.□□□

103 V coil selection table

Brake/clutch INTORQ	Coil power	MP capacitor for mains		Max. Operating frequency	Capacitor	SEGC type
		230 V/50 Hz	230 V/60 Hz			
	[W]	[µF]	[µF]	[rpm]	[µF]	
14.105.06	15	2.7	2	120	100	14.611.30.100
14.105.08	20	3	2.7	120	100	14.611.30.100
14.105.10	28	5	4	60	220	14.611.30.220
14.105.12	35	6	5	60	440	14.611.30.440
14.105.16	50	8	7	60	440	14.611.30.440
14.105.20	68	12	9	60	660	14.611.30.660
14.105.25	85	13.5	12	60	660	14.611.30.660
14.115.06	11.5	2	1.5	120	100	14.611.30.100
14.115.08	16	2.7	2	120	100	14.611.30.100
14.115.10	21	3	2.7	120	100	14.611.30.100
14.115.12	28	5	4	60	220	14.611.30.220
14.115.16	38	6	5	60	440	14.611.30.440
14.115.20	45	7	6	60	440	14.611.30.440
14.115.25	70	12	9	60	660	14.611.30.660
BFK458-06	20	2 (1.7 – 3.3)	1.5 (1.3 – 2.5)	120	100	14.611.30.100
BFK458-08	25	2 (1.7 – 4.2)	1.5 (1.3 – 3.2)	60	220	14.611.30.220
BFK458-10	30	2.7 (2 – 5)	2 (1.6 – 3.8)	60	220	14.611.30.220
BFK458-12	40	3 (2.7 – 6.8)	2.7 (2.1 – 5)	60	220	14.611.30.220
BFK458-14	50	4 (3.4 – 8.3)	3 (2.7 – 6.3)	60	440	14.611.30.440
BFK458-16	55	4 (3.7 – 9.1)	3 (2.9 – 7.0)	60	440	14.611.30.440
BFK458-18	85	7 (5.7 – 14)	5 (4.4 – 10.5)	60	660	14.611.30.660
BFK458-20	100	8 (6.7 – 16.5)	6 (5.5 – 13)	60	880	14.611.30.880
BFK458-25	110	8 (7.0 – 18)	7 (5.7 – 13.5)	60	880	14.611.30.880

We recommend:

- Low µF values for short switch off times
- Higher µF values for quick engagement

SEGC high-speed switchgear

SEGC-380 Contact
INTORQ 14.611.38.□□□

Application area

Complete current supply for spring-applied brakes with rated coil voltages from 103 – 215 V on 380/400/420 V mains. Can also be upgraded if the desired operating times are not being achieved with 103, 180 or 205 V coils with normal excitation.

Features

The voltage supply can be adapted to the rated coil voltage using MP capacitors (must be ordered separately). If only one MP capacitor is connected (capacity and mains voltage as per selection table), terminals 5 and 6 must be short-circuited to terminals 3 and 4. If two inexpensive 220 V capacitors are used at terminals 3 and 4, as well as 5 and 6, twice the capacitor capacity must be selected, as the capacitors are connected in series.

Example

According to the selection table, a capacity of 3 µF is required.
On a 400 V mains there are then two possibilities:

1. One 3 µF/400 V capacitor at terminals 3 and 4 and a wire jumper between terminals 5 and 6
2. One 6 µMF/230 V capacitor at each of terminals 3 and 4, as well as 5 and 6

Advantages

- Straightforward switching with contacts
- Improved stopping accuracy
- Increased operating frequency
- Reduced wear
- Possibility of reducing the supply voltage to the holding voltage
- Reduced time and effort spent on maintenance; longer reset cycles for spring-applied brakes
- In the case of motors with multi-range voltages, the same 103 V or 205 V coil can be used with the same MP capacitor on a 380/400 or 420 V mains.

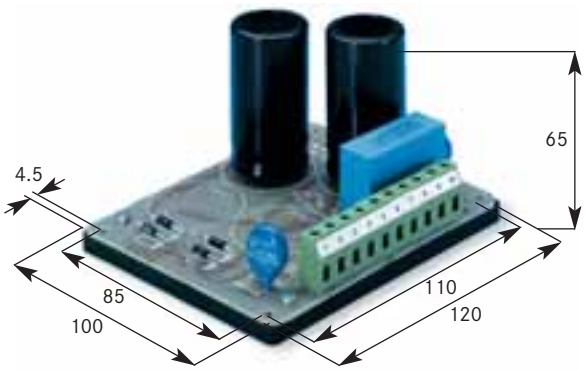
For a complete device, you will need:

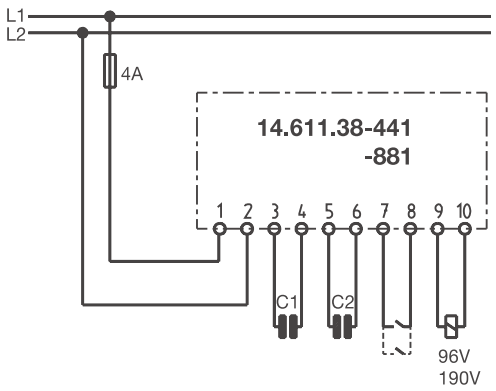
SEGC-380 Contact, INTORQ 14.611.38.□□□.

SEGC high-speed switchgear

SEGC-380 Contact
INTORQ 14.611.38.□□□

Dimensions





Caution

The cables to the coil must not short-circuit or have a conductive connection to earth (electrical bonding), the PEN conductor or other coils.

Technical data	
High-speed excitation voltage	> 500 V
Mains voltage	380/420 V, 50/60 Hz
Rated coil voltage	103 V – 215 V
Max. coil load	110 W
Max. rated coil current	1.1 A
Connectable coils	1
Switching of coil current	1 potential-free external contact
Weight	0.4 kg

Control option

Via external contact

SEGC high-speed switchgear

INTORQ

SEGC-380 Contact
INTORQ 14.611.38.□□□

103 V coil selection table

Brake/clutch INTORQ	Coil power	MP capacitor for mains		Max. Operating frequency	Capacitor	SEGC type
		400 V/50 Hz	400 V/60 Hz			
	[W]	[µF]	[µF]	[rpm]	[µF]	
14.105.06	15	1.5	1.0	120	220 + 220	14.611.38.441
14.105.08	20	1.5	1.5	120	220 + 220	14.611.38.441
14.105.10	28	2.7	2.0	120	220 + 220	14.611.38.441
14.105.12	35	3.0	2.7	120	220 + 220	14.611.38.441
14.105.16	50	4.4	3.4	120	220 + 220	14.611.38.441
14.105.20	68	5.5	4.4	120	220 + 220	14.611.38.441
14.105.25	85	7.2	6.0	120	440 + 440	14.611.38.881
14.115.06	11.5	1.0	1.0	120	220 + 220	14.611.38.441
14.115.08	16	1.5	1.0	120	220 + 220	14.611.38.441
14.115.10	21	1.5	1.5	120	220 + 220	14.611.38.441
14.115.12	28	2.0	2.0	120	220 + 220	14.611.38.441
14.115.16	38	3.0	2.7	120	220 + 220	14.611.38.441
14.115.20	45	3.4	3.0	120	220 + 220	14.611.38.441
14.115.25	70	5.5	4.4	120	440 + 440	14.611.38.881
BFK458-06	20	1.0 (0.8 – 1.6)	1.0 (0.7 – 1.2)	120	220 + 220	14.611.38.441
BFK458-08	25	1.0 (0.8 – 2.0)	1.0 (0.7 – 1.5)	120	220 + 220	14.611.38.441
BFK458-10	30	1.0 (1.0 – 2.0)	1.0 (0.9 – 2.0)	120	220 + 220	14.611.38.441
BFK458-12	40	1.5 (1.3 – 3.0)	1.5 (1.2 – 2.5)	120	220 + 220	14.611.38.441
BFK458-14	50	2.0 (1.6 – 4.0)	1.5 (1.4 – 3.4)	120	220 + 220	14.611.38.441
BFK458-16	55	2.0 (1.8 – 4.0)	2.0 (1.6 – 3.5)	120	220 + 220	14.611.38.441
BFK458-18	85	3.0 (2.8 – 6.8)	2.7 (2.4 – 5.7)	120	220 + 220	14.611.38.441
BFK458-20	100	4.4 (3.3 – 8.0)	3.0 (2.8 – 6.8)	120	440 + 440	14.611.38.881
BFK458-25	110	4.4 (3.6 – 8.5)	3.4 (3.1 – 7.5)	120	440 + 440	14.611.38.881

We recommend:

- Low µF values for short switch off times
- Higher µF values for quick engagement

SEGC high-speed switchgear

SEGC-380 Contact
INTORQ 14.611.38.□□□

205 V coil selection table

Brake/clutch INTORQ	Coil power	MP capacitor for mains		Max. Operating frequency	Capacitor	SEGC type
		400 V/50 Hz	400 V/60 Hz			
	[W]	[µF]	[µF]	[rpm]	[µF]	
14.105.06	15	1.0	0.5	120	220 + 220	14.611.38.441
14.105.08	20	1.0	1.0	120	220 + 220	14.611.38.441
14.105.10	28	1.5	1.0	120	220 + 220	14.611.38.441
14.105.12	35	2.0	1.5	120	220 + 220	14.611.38.441
14.105.16	50	2.7	2.0	120	220 + 220	14.611.38.441
14.105.20	68	3.0	3.4	120	440 + 440	14.611.38.881
14.105.25	85	4.4	3.4	120	440 + 440	14.611.38.881
14.115.06	11.5	0.5	0.5	120	220 + 220	14.611.38.441
14.115.08	16	1.0	0.5	120	220 + 220	14.611.38.441
14.115.10	21	1.0	1.0	120	220 + 220	14.611.38.441
14.115.12	28	1.5	1.0	120	220 + 220	14.611.38.441
14.115.16	30	2.0	1.5	120	220 + 220	14.611.38.441
14.115.20	45	2.0	2.0	120	220 + 220	14.611.38.441
14.115.25	70	2.7	3.4	120	440 + 440	14.611.38.881
BFK458-06	20	0.5 (0.5 – 1.0)	0.5 (0.4 – 0.8)	120	220 + 220	14.611.38.441
BFK458-08	25	0.5 (0.5 – 1.1)	0.5 (0.4 – 1.0)	120	220 + 220	14.611.38.441
BFK458-10	30	1.0 (0.8 – 1.5)	1.0 (0.6 – 1.2)	120	220 + 220	14.611.38.441
BFK458-12	40	1.0 (0.8 – 2.0)	1.0 (0.7 – 1.6)	120	220 + 220	14.611.38.441
BFK458-14	50	1.0 (1.0 – 2.5)	1.0 (0.8 – 2.1)	120	220 + 220	14.611.38.441
BFK458-16	55	1.5 (1.1 – 2.6)	1.0 (0.9 – 2.3)	120	220 + 220	14.611.38.441
BFK458-18	2.0	85 (1.7 – 4.0)	1.5 (1.5 – 3.5)	120	220 + 220	14.611.38.441
BFK458-20	2.0	100 (2.0 – 4.5)	2.0 (1.7 – 4.0)	120	440 + 440	14.611.38.881
BFK458-25	110	2.7 (2.2 – 5.0)	2.0 (1.9 – 4.5)	120	440 + 440	14.611.38.881

We recommend:

- Low µF values for short switch off times
- Higher µF values for quick engagement

SEGC high-speed switchgear

SEGC-Europe
INTORQ 14.611.14(16).□□□

Application area

Complete current supply for a 24 V coil with high-speed excitation.

Features

The device is built with European standard board dimensions (100 x 160 mm) and only requires a small mounting surface in the control cabinet. The connection is made via a 31-pole DIN terminal strip. A plug-in rack with a 10-pole terminal can be supplied as an accessory. If you are using other plug-in devices, the terminals should be connected according to the illustration below. A high level of contact safety can be achieved by connecting multiple contact pins with the same function in parallel in the device and in the plug-in rack.
For the high-speed excitation of clutch/brake combinations, it is possible to connect two SEGC-Europe types of switchgear together.

Advantages

- Improved stopping accuracy
- Increased operating frequency
- Reduced wear
- Possibility of reducing the supply voltage to the holding voltage
- Plug-in card for space-saving, straightforward mounting

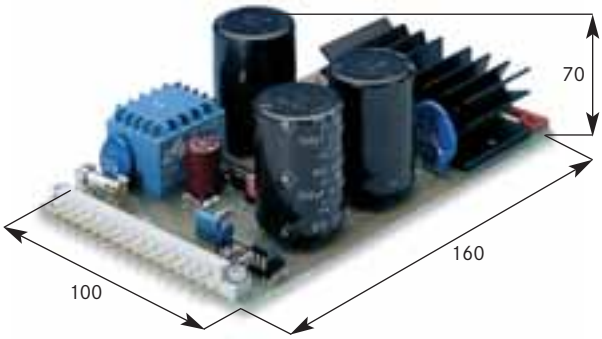
For a complete device, you will need:

- SEGC-Europe INTORQ 14.611.14(16).□□□
- Plug-in rack INTORQ 14.666.03.003
- MP capacitor

SEGC high-speed switchgear

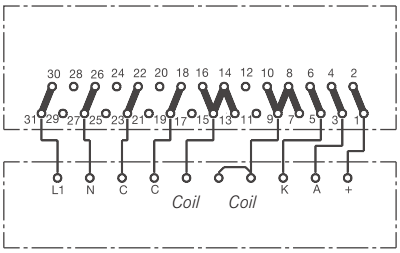
SEGC-Europe
INTORQ 14.611.14(16).□□□

Dimensions



SEGC-Europe INTORQ 14.611.14(16).□□□

Pin assignment



Connection plan as for SEGC-Electronic

Technical data

High-speed excitation voltage		> 300 V
Mains voltage		220/230/240 V – 50/60 Hz
Mains voltage range		198 to 264 V
Rated coil voltage		24 V
Max. coil power:	For 14.611.14.□□□	40 W
	For 14.611.16.□□□	100 W
(also 110 W for spring-applied brakes with a reduction in voltage)		
Max. current:	For 14.611.14.□□□	1.7 A
	For 14.611.16.□□□	4.2 A
Normal operating frequency		
Increased operating frequency		
Connectable coils		1 unit
Switching of coil current:		Transistor

An optocoupler in the input ensures that switching is potential-free.

Control current	approx. 20 mA
Control voltage	12 – 24 V ± 15%
Max. current of the auxiliary supply	40 mA
Weight	0.5 kg

Control options

- Via PLC using 520 ohm series resistor
- Via control voltage
- Via contact
- Via NPN or PNP proximity switch

Laying control cables

We recommend shielding both long control cables and control cables laid in the vicinity of strong sources of interference voltage (e.g. power contactors). The shield must be connected to the machine earth.

SEGC high-speed switchgear

SEGC-Electronic
INTORQ 14.611.12.□□□

Application area

As SEGC-Europe, but for different installation dimensions.

Features

The design of the SEGC-Electronic is virtually identical to that of the SEGC-Europe in terms of electronics. It can switch coils up to 100 W. The connection is made via a 10-pole terminal strip. The device is extremely slim and is frequently used on control cabinet doors or interiors.

Advantages

- Improved stopping accuracy
- Increased operating frequency
- Reduced wear
- Possibility of reducing the supply voltage to the holding voltage
- Low installation height

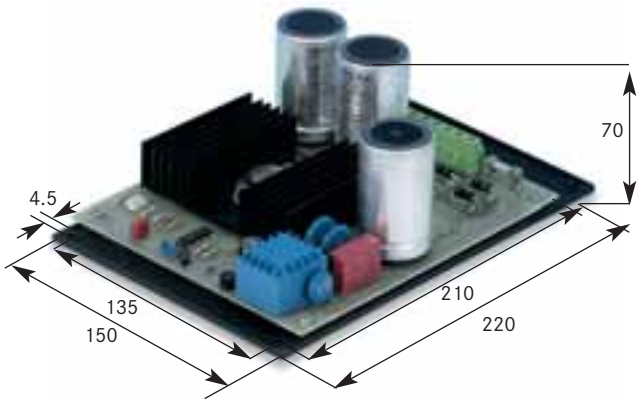
For a complete device, you will need:

- SEGC-Electronic INTORQ 14.611.12.□□□
- MP capacitor

Technical data

High-speed excitation voltage	> 300 V
Mains voltage	220/230/240 V – 50/60 Hz
Mains voltage range	198 to 264 V
Rated coil voltage	24 V
Current	4.2 A
Max. coil load	100 W
(also 110 W for spring-applied brakes with a reduction in voltage)	
Normal operating frequency	
Increased operating frequency	
Connectable coils	1 unit
Switching of coil current:	Transistor
An optocoupler in the input ensures that switching is potential-free.	
Control current	approx. 20 mA
Control voltage	12 V ± 15%
Max. current of the auxiliary supply	40 mA
External series resistor at	
24 V control voltage (PLC)	520 ohms
Weight	0.8 kg

Dimensions



Control options

- Via PLC using 520 ohm series resistor
- Via control voltage
- Via contact
- Via NPN or PNP proximity switch

Laying control cables

We recommend shielding both long control cables and control cables laid in the vicinity of strong sources of interference voltage (e.g. power contactors). The shield must be connected to the machine earth.

SEGC high-speed switchgear

SEGC-Europe and SEGC-Electronic
INTORQ 14.611

Selection table

Max. operating frequency with 24 V/coil and 230 V/mains

	INTORQ	Power	Normal operating frequency		Max. operating frequency	Increased operating frequency		Max. operating frequency
		[W]	SEGC Europe	SEGC Electronic	[rpm]	SEGC Europe	SEGC Electronic	[rpm]
Electromagnetic-clutch	**14.105.06**	15	14.611.14.150	14.611.12.150	300	14.611.14.201	14.611.12.201	600
	14.105.08	20	14.611.14.150	14.611.12.150	300	14.611.14.441	14.611.12.441	600
	14.105.10	28	14.611.14.200	14.611.12.200	200	14.611.14.661	14.611.12.661	300
	14.105.12	35	14.611.14.300	14.611.12.300	150	14.611.14.661	14.611.12.661	300
	14.105.16	50	14.611.16.440	14.611.12.440	120	14.611.16.661	14.611.12.661	180
	14.105.20	68	14.611.16.660	14.611.12.660	100/80*	14.611.16.661	14.611.12.661	90
	14.105.25	85	14.611.16.660	14.611.12.660	80/60*	14.611.16.661	14.611.12.661	90
Electromagnetic brake	**14.115.06**	11.5	14.611.14.100	14.611.12.100	120	14.611.14.201	14.611.12.201	600
	14.115.08	16	14.611.14.150	14.611.12.150	120	14.611.14.441	14.611.12.441	600
	14.115.10	21	14.611.14.150	14.611.12.150	120	14.611.14.441	14.611.12.661	600
	14.115.12	28	14.611.14.200	14.611.12.200	120	14.611.14.661	14.611.12.661	300
	14.115.16	38	14.611.14.300	14.611.12.300	120	14.611.14.661	14.611.12.661	300
	14.115.20	45	14.611.16.440	14.611.12.440	120	14.611.16.661	14.611.12.661	220
	14.115.25	70	14.611.16.660	14.611.12.660	100	14.611.16.661	14.611.12.661	110/100*
Spring-applied brake	**BFK458-06**	20	14.611.14.150	14.611.12.150	200	14.611.14.441	14.611.12.441	600
	BFK458-08	25	14.611.14.200	14.611.12.200	200	14.611.14.661	14.611.12.661	300
	BFK458-10	30	14.611.14.300	14.611.12.300	200	14.611.14.661	14.611.12.661	300
	BFK458-12	40	14.611.14.300	14.611.12.300	150	14.611.14.661	14.611.12.661	300
	BFK458-14	50	14.611.16.440	14.611.12.440	150/120*	14.611.16.661	14.611.12.661	180
	BFK458-16	55	14.611.16.440	14.611.12.440	120/100*	14.611.16.661	14.611.12.661	150
	BFK458-18	85	14.611.16.660	14.611.12.660	100/80*	14.611.16.661	14.611.12.661	100/90*
	BFK458-20	100	14.611.16.990	14.611.12.660	60	14.611.16.661	14.611.12.661	80/60*
	BFK458-25	110	14.611.16.990	14.611.12.660	60/50*	14.611.16.661	14.611.12.661	60/50*

* SEGC-Electronic max. permissible operating frequency

Ordering example

A high-speed switching device is required for electromagnetic clutch INTORQ 14.105.08.1.1-20 W, 24 V, 230 V/50 Hz, 80 switching operations/min.

Ordering example for a complete SEGC-Europe
1 SEGC-Europe
INTORQ 14.611.14.150
1 MP capacitor, ID no. 078768, 10µF
1 plug-in rack for 1 SEGC-Europe
INTORQ 14.666.03.003

Ordering example for a complete SEGC-Electronic
1 SEGC-Electronic
INTORQ 14.611.12.150
1 MP capacitor, ID no. 078768, 1µF

SEGC-Europe pin comparison table

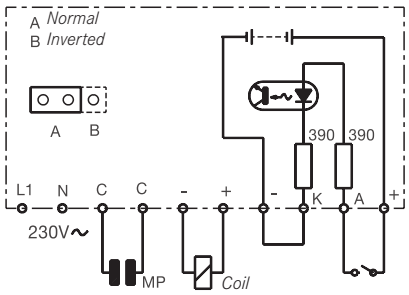
Pin SEGC-Europe	Terminal SEGC-Electronic
31 + 30	L1
27 + 26	N
23 + 22	C
19 + 18	C
16 + 15 + 14 + 13	Coil +
10 + 9 + 8 + 7	Coil and “–” of the auxiliary supply
6 + 5	K
4 + 3	A
2 + 1	“+” of the auxiliary supply

SEGC high-speed switchgear

SEGC-Europe and SEGC-Electronic
INTORQ 14.611 (wiring example)

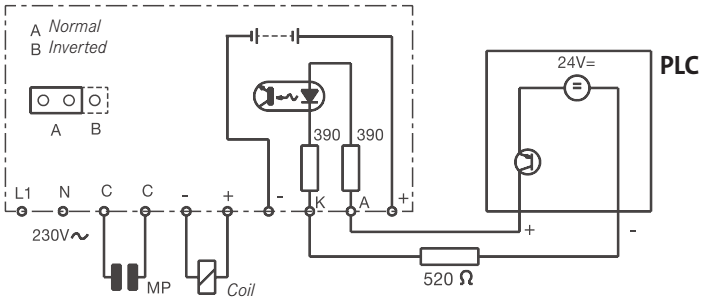
Control via switch

A switch controls a switching device for a clutch or brake coil. If the setting of the selector switch is “Normal”, this means that the coil is energised when the switch is closed. If the setting of the selector switch is “Inverted”, the coil is energised when the switch is open.



Control via PLC

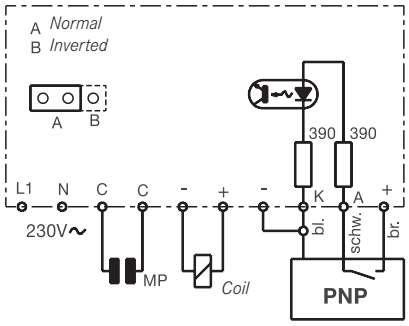
A PLC or a control voltage controls a switching device for a clutch or brake coil. If the setting of the selector switch is “Normal”, this means that the coil is energised when the control voltage is applied. If the setting of the selector switch is “Inverted”, the coil is de-energised when the control voltage is applied.

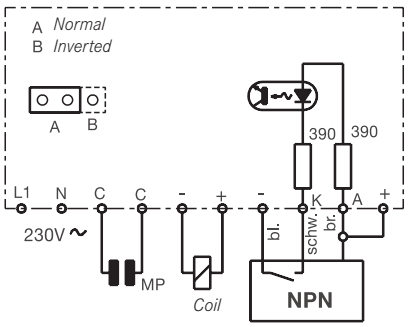


SEGC-Europe INTORQ 14.611.14(16).xxx can have this resistance.

Control via PNP or NPN proximity switch

A proximity switch controls a switching device for a clutch or brake coil. If the setting of the selector switch is “Normal”, this means that the coil is energised when the proximity switch is damped. If the setting of the selector switch is “Inverted”, the coil is energised when the proximity switch is not damped. Photoelectric barriers can also be used instead of proximity switches.
Colours: bk. = black/bl. = blue/br. = brown





SEGC high-speed switchgear

DOSS double high-speed switching device
INTORQ 14.621.13.□□□

Application area

Complete current supply with high-speed excitation for clutch/brake combinations with electromagnetic brakes.

Advantages

- Control with Start/Stop pulses and continuous signal possible
- Delay time setting, so that clutches and brakes without a connected armature plate do not work in opposition
- "Emergency stop function". The "Initial state" signal is sent to switch the clutch "Off" and the brake "On" immediately, regardless of the other control inputs.
- The "Output block" signal deenergises the outputs so that the driven shaft can be turned manually.

Features

The entire DOSS double high-speed switching device is constructed on a single PCB and has two terminal strips. The mains, MP capacitors, coils and (if required) electrolytic capacitors are connected to the power terminal strip. A 15 V auxiliary supply source is located on the control terminal strip, and a 24 V supply is available for control via contacts, transistors, proximity switches or photocells.
Optocouplers are used to deenergise the four inputs (Start, Stop, Initial state and Output block); they can be controlled by means of control voltages from 5 to 24 V. Three more terminals are located on the PCB, which can be tapped for counters or PLC 15 V control commands, for instance.
Along with the coil outputs, these outputs also conduct voltage. After the mains voltage is connected, for safety reasons the clutch is always "Off" and the brake "On". When controlling the device using PLC controls, it is often wise to have the Start signal come from the PLC control and the Stop signal applied directly to the Stop input by the machine (e.g. via proximity switches or photocells). This will improve stopping accuracy.

In normal application cases, the electrolytic capacity mounted on the device is sufficient. If stronger excitation is required (e.g. to improve stopping accuracy at low operating frequency), more electrolytic capacity can be connected to the appropriate terminals on the power terminal strip. If the device is being used to control a clutch/brake combination with electromagnetic brake, the selector switch must be set to "Working current". With an electromagnetic clutch or spring-applied brake, it must be set to "Closed-circuit current".
If the coded plug is set to "Normal", control will be via pulses using the Start and Stop inputs. With the "Start only" setting, control is achieved by means of continuous signals (e.g. from a PLC) via the Start input.

Technical data

High-speed excitation voltage	> 300 V
Mains voltage	220/230/240 V – 50/60 Hz
Mains voltage range	190 to 265 V
Rated coil voltage	24 V
Max. coil load	2 x 70 W
Max. MP capacitor	35 µF
Mains voltage range	5 to 24 V
Residual ripple	< 5%
Start or stop pulses	> 0.6 ms
Current load of the auxiliary supply	Max. 100 mA
Max. operating frequency:	
Coil size 06 to 12	300/min
Coil size 16 to 20	100/min
Adjustable deceleration of brake/clutch	2.7 – 100 ms
Ambient temperature	0 to 45°C
Mounting position	Any
Weight	Max. 1150 g
Control voltage inputs via optocoupler:	Potential-free

SEGC high-speed switchgear

INTORQ

DOSS double high-speed switching device
INTORQ 14.621.13.□□□

Selection table

For 24 V clutch/brake combinations with electromagnetic brake

Size of Clutch/brake combination	DOSS type	Operating frequency (rpm)	Capacitor clutch (µF)	Capacitor brake (µF)	ID no.
06	14.621.13.06.0	300	100	100	117130
08	14.621.13.08.0	300	150	100	117131
10	14.621.13.10.0	300	200	150	117132
12	14.621.13.12.0	300	200	200	117133
16	14.621.13.16.0	120	440	320	117134
20	14.621.13.20.0	100	440	440	117135
25 *	14.621.13.20.0	80	440	440	117135

* Only one or two brakes can be connected, but no clutch.

Ordering example for a complete device

For clutch/brake combinations with electromagnetic brake
INTORQ 14.800.08.11.1 – 24 V on 230 V/50 Hz mains:
1 unit double high-speed switching device
INTORQ 14.621.13.08.0
1 unit MP capacitor (for clutch)
ID no. 078768 – 10 µF
1 unit MP capacitor (for brake)
ID no. 078767 – 8 µF

Note

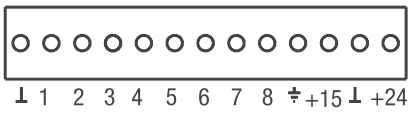
The larger MP capacitor is always for the clutch and the smaller for the brake.

SEGC high-speed switchgear

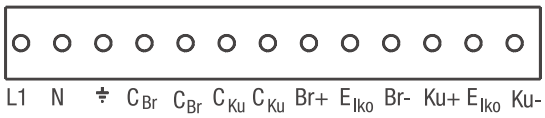
DOSS double high-speed switching device
INTORQ 14.621.13.□□□

Connection examples

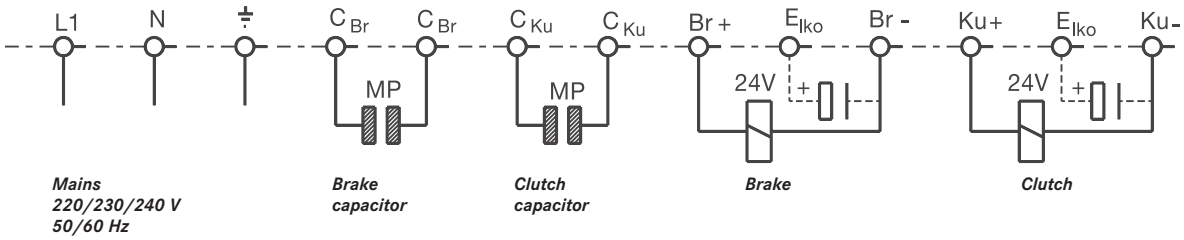
Control terminal



Power terminal strip



Power terminal strip connection



Mains 220/230/240 V 50/60 Hz

Brake capacitor

Clutch capacitor

Brake

Clutch

Signal/time diagram for coil voltage

for electromagnetic brake and clutch

Brake output

Clutch output

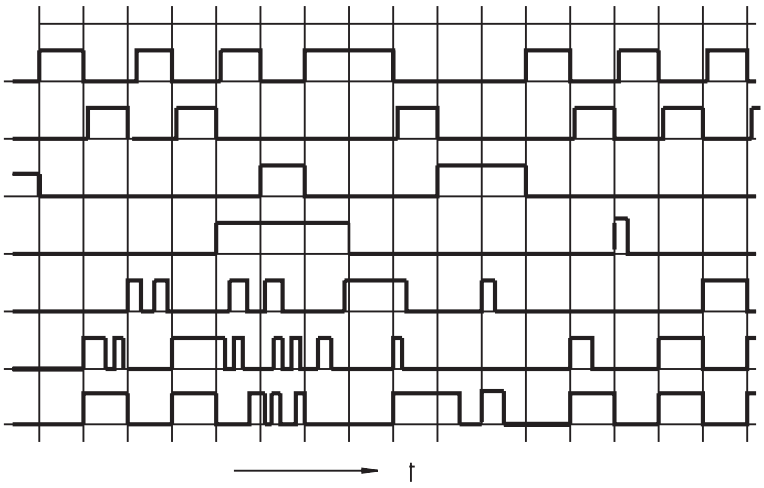
Output block

Initial state

Stop

Start

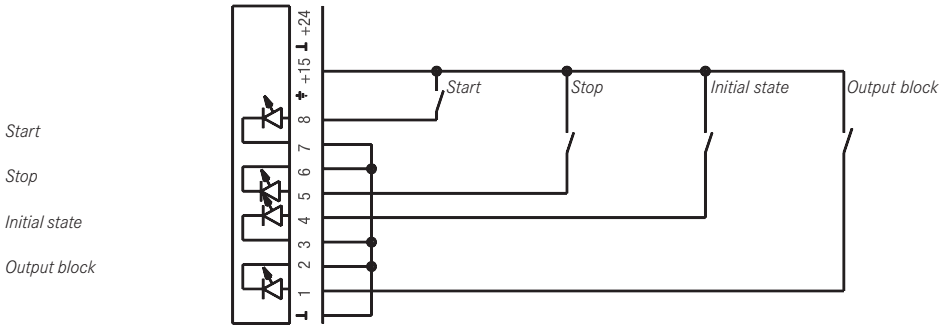
Start only



SEGC high-speed switchgear

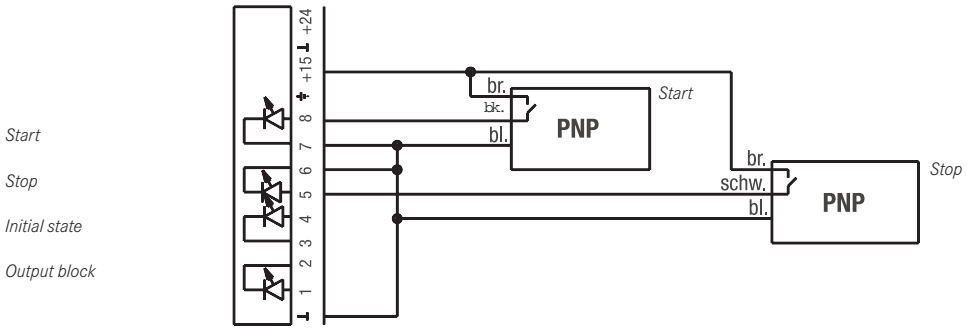
DOSS double high-speed switching device
INTORQ 14.621.13.□□□ (wiring example)

Control via contacts



Coded plug
"Normal"

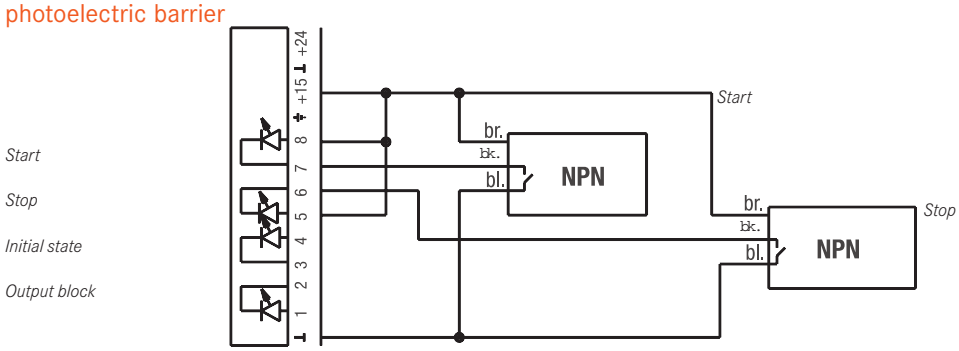
Control via PNP proximity switch or photoelectric barrier



br. ***= brown***
bk. ***= black***
bl. ***= blue***

Coded plug
"Normal"

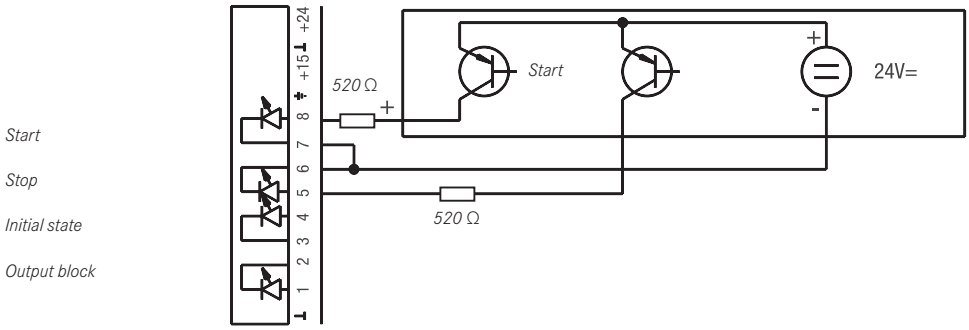
Control via NPN proximity switch or photoelectric barrier



br. ***= brown***
bk. ***= black***
bl. ***= blue***

Coded plug
"Normal"

Control via PLC



Coded plug
"Normal"

SEGC high-speed switchgear

DEG double European device
INTORQ 14.621.14.(16)□□□

Application area

Complete current supply for two 24 V coils with high-speed excitation.

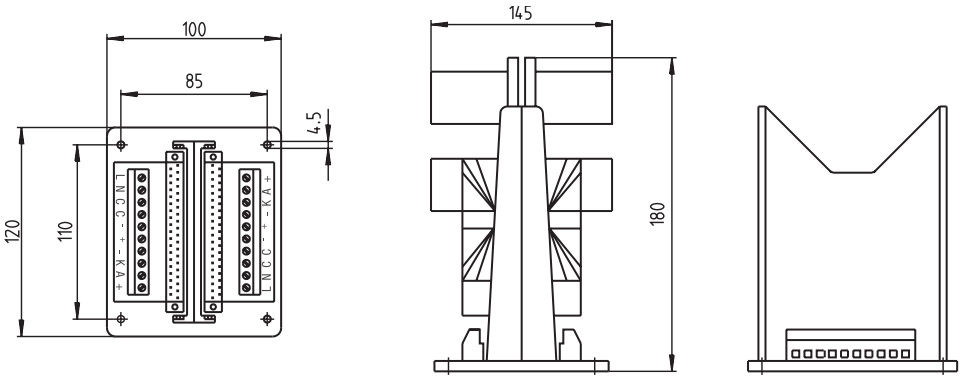
Advantages

- A cost-effective solution for controlling clutch/brake combinations with high-speed excitation
- The two coils can be switched at the same time, alternately or independently
- Possibility of reducing the supply voltage to the holding voltage

Scope of supply

The DEG double European device consists of:
2 units SEGC-Europe switchgear
INTORQ 14.611.14(16).□□□
1 unit double plug-in rack INTORQ 14.666.03.004
The MP capacitors must be ordered separately as appropriate for the mains voltage and frequency.

Dimensions



Technical data

High-speed excitation voltage	> 300 V
Mains voltage	220/230/240 V – 50/60 Hz
Mains voltage range	198 to 264 V
Rated coil voltage	24 V
Max. coil load	(40 W) 100 W
Normal operating frequency	see SEGC-Europe
Increased operating frequency	see SEGC-Europe
Connectable coils	Two units
Switching of coil current:	Transistor
An optocoupler in the input ensures that switching is potential-free.	
Control current	approx. 20 mA
Control voltage	12 – 24 V ± 15%
Control voltage with both inputs connected in series	24 V
Max. current of the auxiliary supply	40 mA
Weight	1.1 kg

Control options

- Via PLC 520 ohm series resistor
- Via control voltage
- Via contact
- Via NPN or PNP proximity switch

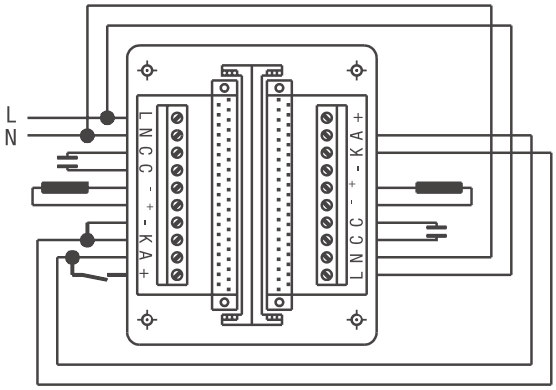
SEGC high-speed switchgear

INTORQ

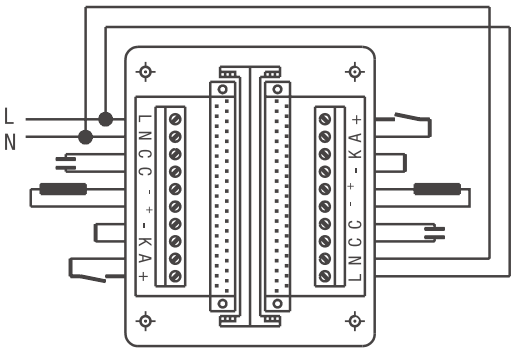
DEG double European device
INTORQ 14.621.14.□□□

Connection examples

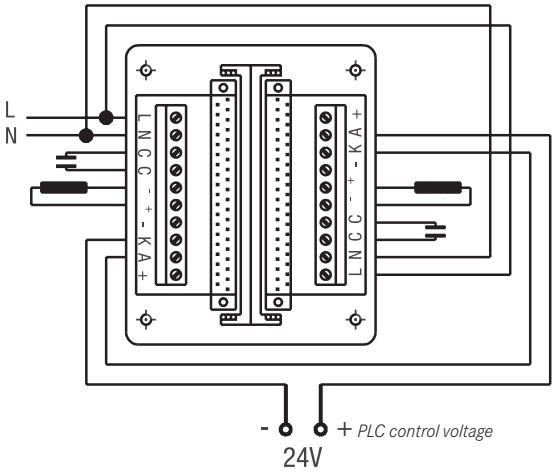
Control with one contact



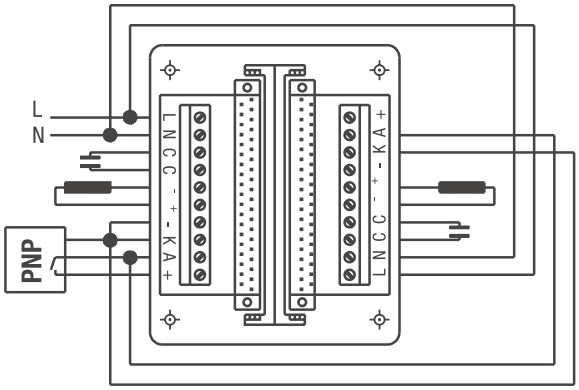
Control with two contacts



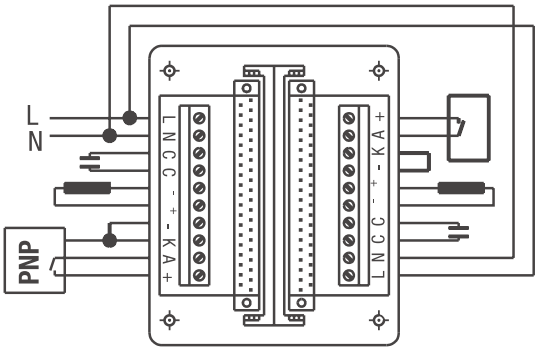
Control with PLC or control voltage



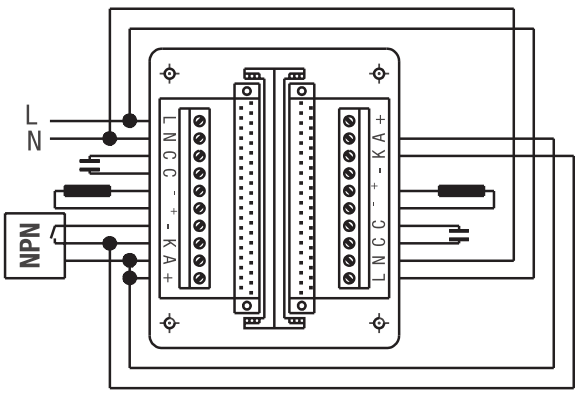
Control with a 3-wire PNP proximity switch



Control with a 3-wire proximity switch and a 2-wire proximity switch



Control with a 3-wire NPN proximity switch



SEGC high-speed switchgear

DEG double European device
INTORQ 14.621.14.□□□

Selection table

Application case	Assignment of DEG switching device/ clutch/brake combinations (with electromagnetic brake)	Max. operating frequency rpm	Scope of supply of entire device:	ID no.
Normal operating frequency	14.621.14.06.0 for 14.□□□.06.□□/24 V	120	1 unit SEGC-Europe 14.611.14.150 1 unit SEGC-Europe 14.611.14.100 1 double plug-in rack 14.666.03.004	126092
	14.621.14.08.0 for 14.□□□.08.□□□/24 V	120	2 units SEGC-Europe 14.611.14.150 1 double plug-in rack 14.666.03.004	126093
	14.621.14.10.0 for 14.□□□.10.□□/24 V	120	1 unit SEGC-Europe 14.611.14.200 1 unit SEGC-Europe 14.611.14.150 1 double plug-in rack 14.666.03.004	126094
	14.621.14.12.0 for 14.□□□.12.□□/24 V	120	1 unit SEGC-Europe 14.611.14.300 1 unit SEGC-Europe 14.611.14.200 1 double plug-in rack 14.666.03.004	126095
	14.621.14.16.0 for 14.□□□.16.□□/24 V	60	1 unit SEGC-Europe 14.611.15.660 1 unit SEGC-Europe 14.611.14.300 1 double plug-in rack 14.666.03.004	126096
Increased operating frequency	14.621.14.06.1 for 14.□□□.06.□□/24 V	600	2 units SEGC-Europe 14.611.14.201 1 double plug-in rack 14.666.03.004	126097
	14.621.14.08.1 for 14.□□□.08.□□/24 V	600	2 units SEGC-Europe 14.611.14.441 1 double plug-in rack 14.666.03.004	126098
	14.621.14.10.1 for 14.□□□.10.□□/24 V	300	2 units SEGC-Europe 14.611.14.661 1 double plug-in rack 14.666.03.004	126099
	14.621.14.12.1 for 14.□□□.-12.□□/24 V	300	2 units SEGC-Europe 14.611.15.661 1 double plug-in rack 14.666.03.004	126100
	14.621.14.16.1 for 14.□□□.16.□□/24 V	180	2 units SEGC-Europe 14.611.15.661 1 double plug-in rack 14.666.03.004	126101

Ordering example for a complete device

For clutch/brake combinations with electromagnetic brake INTORQ 14.800.06.11.1 – 24 V on 230 V/50 Hz mains:

1 unit DEG INTORQ 14.621.14.06.0 – ID no. 126092

1 unit MP capacitor 8 µF – ID no. 078767
(for clutch)

1 unit MP capacitor 6 µF – ID no. 078765
(for brake)

Note

The larger MP capacitor is always for the clutch, and the smaller for the brake.

Accessories

Selection table for MP capacitor high-speed switchgear

INTORQ 14.666.01.□□□ with 24 V coils

MP Capacitor for	Type of clutch/ brake	Coil power	Mains voltage							
			220 V/50 Hz		20 V/60 Hz		230 V/50 Hz		230 V/60 Hz	
			MP capacitor							
		[W]	µF	ID no.	µF	ID no.	µF	ID no.	µF	ID No.
Electro-magnetic clutch	14.105.06	15	8	078767	7	078766	8	078767	6	078765
	14.105.08	20	12	078769	9	165796	10	078768	9	165796
	14.105.10	28	16	078771	12	078769	16	078771	12	078769
	14.105.12	35	20	078773	16	078771	18	078772	16	078771
	14.105.16	50	30	113548	20	078773	25	078774	20	078773
	14.105.20	68	38 * (20+18)	078773 078772	30	113548	36 * (18+18)	078772 078772	30	113548
	14.105.25	85	43 * (18+25)	078772 078774	38 * (20+18)	078773 078772	43 * (18+25)	078772 078774	36 * (18+18)	078772 078772
Electro-magnetic brake	14.115.06	11.5	6	078765	5	113168	6	078765	5	113168
	14.115.08	16	9	165796	7	078766	8	078767	7	078766
	14.115.10	21	12	078769	9	165796	10	078768	9	165796
	14.115.12	28	16	078771	12	078769	13.5	078770	12	078769
	14.115.16	38	20	078773	16	078771	20	078773	16	078771
	14.115.20	45	25	078774	20	078773	25	078774	18	078772
	14.115.25	70	38 * (18+20)	078772 078773	30	113548	36 * (18+18)	078772 078772	30	113548
Spring-applied brake	BFK458-06	20	6 (6-11)	078765	5 (4.5-8.5)	113168	6 (5.5-10)	078765	5 (4.5-8)	113168
	BFK458-08	25	6 (6-13.5)	078765	5 (4.5-11)	113168	6 (5.5-13)	078765	5 (4.5-10)	113168
	BFK458-10	30	8 (7-16)	078767	6 (5.5-13)	078765	7 (6-15)	078766	6 (5.5-12)	078765
	BFK458-12	40	10 (9-22)	078768	8 (7-17)	078767	10 (9-21)	078768	8 (7-16)	078767
	BFK458-14	50	13.5 (12-27)	078770	10 (9-22)	078768	12 (11-26)	078769	8 (7-16)	078767
	BFK458-16	55	13.5 (13-30)	078770	12 (10-24)	078769	13.5 (12-29)	078770	10 (9-21)	078768
	BFK458-18	85	20 (19-43)	078773	18 (15-37)	078772	20 (18-43)	078773	16 (15-35)	078771
	BFK458-20	100	25 (23-43)	078774	20 (18-43)	078773	25 (22-43)	078774	20 (17-42)	078773
	BFK458-25	110	30 (25-43)	113548	20 (20-43)	078773	25 (24-43)	078774	20 (19-43)	078773

- * Connected in parallel
- The values in brackets are possible.
  Smallest value = shortest switch off time
  Largest value = ready to switch on quickly
- Type code of MP capacitors
  e.g.: 14.666.01.012
  Capacity 12 µF

Ordering example

5 units MP capacitors
ID. no. 078769 – 12 µF

Accessories

MP capacitors INTORQ 14.666.01.□□□

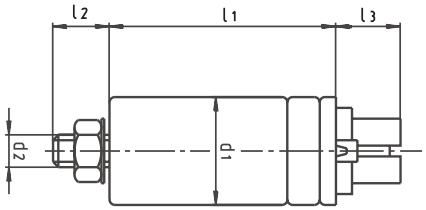
Dimensions

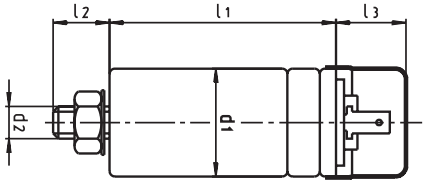
Rated voltage 230 V, 50/60 Hz

INTORQ	Capacity [µF] ± 10%	ID no.	d_1 [mm] ± 0.5	l_1 [mm] ± 2	d_2 [mm]	l_2 [mm] ± 1	l_3 [mm]	Weight [kg]
14.666.01.005	5	113168	30	69	M8	8	18	0.040
14.666.01.006	6	078765	30	69	M8	8	18	0.043
14.666.01.007	7	078766	30	74	M8	8	20	0.052
14.666.01.008	8	078767	30	82	M8	8	18	0.052
14.666.01.009	9	165796	30	82	M8	8	21	0.061
14.666.01.010	10	078768	30	119	M8	8	18	0.069
14.666.01.012	12	078769	30	119	M8	8	18	0.075
14.666.01.013	13.5	078770	30	119	M8	8	18	0.081
14.666.01.016	16	078771	35	94	M8	8	18	0.078
14.666.01.018	18	078772	35	94	M8	8	18	0.083
14.666.01.020	20	078773	35	119	M8	8	18	0.096
14.666.21.025	25	078774	35	119	M8	8	18	0.108
14.666.01.030	30	113548	40	119	M8	8	18	0.129
14.666.01.035	35	078775	40	145	M8	8	22	0.260

Rated voltage 420 V, 50/60 Hz

INTORQ	Capacity [µF] ± 10%	ID no.	d_1 [mm] ± 0.5	l_1 [mm] ± 2	d_2 [mm]	l_2 [mm] ± 1	l_3 [mm]	Weight [kg]
14.666.01.0005	0.5	165815	25	60	M8	10	18	0.040
14.666.01.0010	1	165816	25	60	M8	10	18	0.040
14.666.01.0010	1.5	034937	25	60	M8	10	18	0.040
14.666.01.0010	2	034938	25	60	M8	8	18	0.040
14.666.01.0027	2.7	138203	25	74	M8	8	18	0.041
14.666.01.0030	3	138204	25	74	M8	8	18	0.042
14.666.01.0034	3.4	138205	25	74	M8	8	18	0.044
14.666.01.0044	4.4	138206	30	74	M8	8	18	0.059
14.666.01.0055	5.5	138207	30	74	M8	8	18	0.059
14.666.01.0057	5.7	138208	30	74	M8	8	18	0.061
14.666.01.0068	6.8	138209	30	94	M8	8	18	0.074
14.666.01.0072	7.2	138210	30	94	M8	8	18	0.078





Accessories

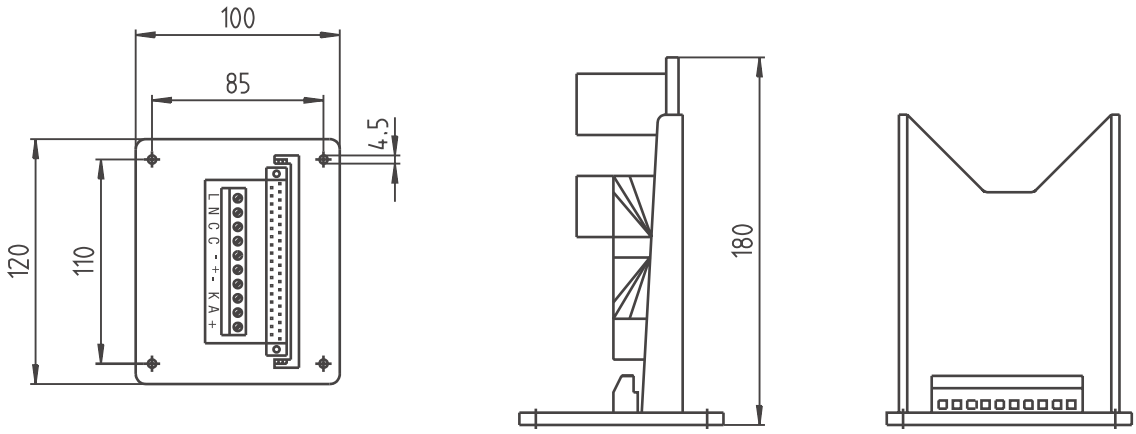
Plug-in rack for SEGC-Europe high-speed switchgear

Plug-in rack for an SEGC-Europe
INTORQ 14.666.03.003
ID no. 083267

Features

The plug-in rack for an SEGC-Europe routes the required pins from the 31-pole plug connector on the SEGC-Europe to a 10-pole terminal strip. The terminal assignments of the plug-in rack and the SEGC-Electronic switching device are the same.
Weight: 0.2 kg

Dimensions

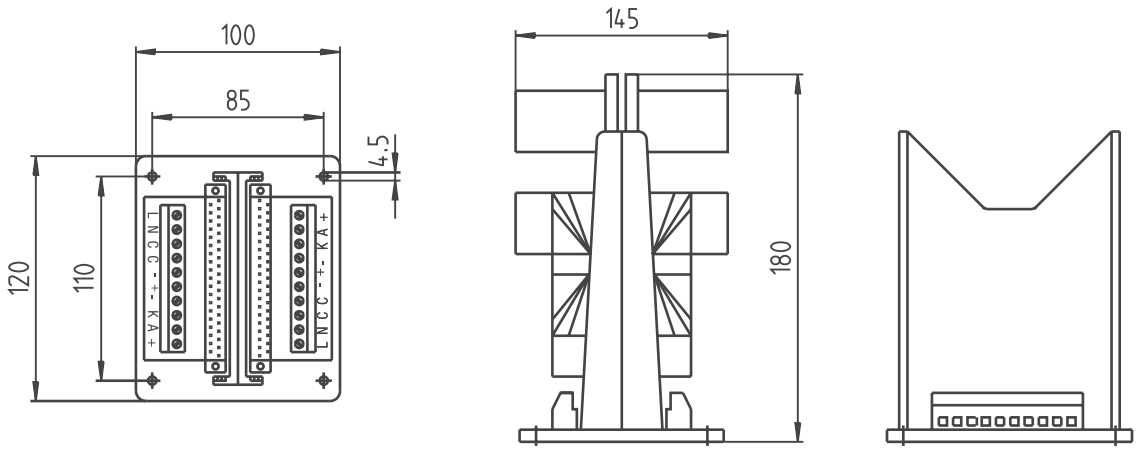


Double plug-in rack for two SEGC-Europe devices
INTORQ 14.666.03.004
ID no. 120731

Features

With this plug-in rack, two SEGC-Europe devices can be connected via terminals. For more information, please see page 42 (DEG double European device). Weight: 0.3 kg

Dimensions



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