Low-voltage current transformers

Product range overview

	Primary conductor	Primary current	Classes
Window-type current transformers	20 mm x 10 mm – 4x 120 mm x 10 mm	40 A – 5000 A	1 / 0.5
Window-type current transformers	20 mm x 10 mm – 4x 120 mm x 10 mm	75 A – 3000 A	0.5 / 0.2 / 0.5S / 0.2S
Tube-type current transformer	Ø 21 mm – Ø 30 mm	50 A – 600 A	1 / 0.5
Tube-type current transformer	Ø 21 mm – Ø 30 mm	75 A – 600 A	0.5 / 0.5S
Wound-primary current transformers	–	5 A – 200 A	0.5 / 0.2 / 0.5S / 0.2S
Summation current transformers	**2 – 10** circuits	2 x 5 A - 10 x 5 A	1 / 0.5
Summation current transformer	**2 – 10** circuits	2 x 1 A - 10 x 1 A	0.2

.

Overview of PSA window-type current transformers

Transformer type	PSA 213	PSA 215	PSA 113	PSA 115	PSA 313	PSA 315	PSA 413	PSA 415
Transformer dimensions height x width x depth	78 x 60 x 30	85 x 60 x 55	70 x 50 x 30	70 x 50 x 50	78 x 60 x 30	85 x 60 x 55	78 x 60 x 30	85 x 60 x 55
Primary busbar	20 x 10	20 x 10	30 x 10	30 x 10	30 x 10	30 x 10	40 x 12	40 x 12
Maximum primary round conductor dimensions	20	20	–	–	28	28	28	32

Secondary rated current 5 A or 1 A:

Accuracy classes	0,5	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5	1
Min. primary current	75	50	100	40	150	60	100	50	100	100	75	75	200	150	600	150
Maximum primary current	300	300	150	150	600	600	600	600	600	600	400	400	800	800	300	800

Transformer type	PSA 513	PSA 613	PSA 633	PSA 814	PSA 1034	PSA 1254	PSA 1274
Transformer dimensions Height x width x depth	108 x 85 x 30	108 x 85 x 30	108,5 x 89,5 x 30	122 x 100 x 40	160 x 135 x 40	189 x 159,5 x 40	198 x 159,5 x 40
Primary busbar	50 x 12	60 x 10	60 x 30	80 x 10	3 x 100 x 10*	3 x 120 x 10*	4 x 120 x 10*
Maximum primary round conductor dimensions	45	45	–	60	85	98	–

Secondary rated current 5 A or 1 A:

Accuracy classes	0,5	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5	1
Min. primary current	250	200	400	400	800	800	400	400	400	400	1000	800	1600	800
Maximum primary current	1250	1250	1600	1600	1600	1600	2000	2000	4000	4000	5000	5000	4000	4000

* Busbars can be spaced at 10 mm.

Overview of PSR tube-type current transformers

Transformer type	PSR 200	PSR 200.1	PSR 203	PSR 205	PSR 253	PSR 253/30
Transformer dimensions height x width x depth	65 x 44 x 30	65 x 44 x 30	70 x 50 x 30	70 x 50 x 50	78 x 60 x 30	78 x 60 x 30
Maximum primary round conductor dimensions	21	21	21	21	22,5	30

Secondary rated current 5 A or 1 A:

Accuracy classes	0,5	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5	1
Min. primary current	100	50	100	50	80	75	50	50	75	50	125	100
Maximum primary current	300	300	300	300	300	300	300	300	600	600	1000	1000

Low-voltage current transformers

Technical data acc. to VDE 0414 T 44-1 / IEC/EN 60044-1

Primary rated current I_{1N}	Window-type current transformer	40 A – 5000 A
	Wound-primary current transformer	5 A – 200 A
	Tube-type current transformer	50 A – 600 A
	Summation current transformer	1 A and 5 A, up to 10 circuits
Secondary rated current I_{2N}	1 A, 5 A	
Rated frequency	50 – 60 Hz (special variants 162/3 – 400 Hz available on request)	
Maximum voltage at equipment U_m	720 V (special variants up to 1200 V available on request)	
Rated power-frequency withstand current (impulse-withstand voltage)	3 kV (special variants up to 6 kV available on request)	
Overcurrent limiting factor (FS)	FS 5	
Thermal rated uninterrupted current	$1{,}2 * I_{1N}$	
Current rating	120 %	
Thermal rated short-time current	$I_{th} = 60 * I_{1N}$ max. 50 kA	
Rated dynamic current	$I_{dyn} = 2{,}5* I_{th}$ max.120 kA	
Permissible ambient temperature	-40 °C to + 40 °C	
Insulating material class acc. to IEC 60085	E (B and F on request)	
Degree of protection acc. to DIN/EN 60529/VDE 0470 T1	IP 20	
Tightening torque of secondary terminals	1.5 to 2 Nm	
Secondary terminal cross-section	1,5-6 mm^2	

Information on current transformer selection

Current transformers must primarily be selected according to the mechanical configuration and dimensions of the copper busbars.

Permissible measurement range Current transformers can be operated at up to 1.2-times the primary rated current, thereby complying with class accuracy. For a 630-A busbar system, a current transformer with a primary rated current of 600 A can be selected. This transformer complies with class accuracy for up to 720 A.

Current transformer burden The accuracy of current transformer measurements is ensured if the transformer is operated between the full rated output (burden), e.g. 10 VA, and 1/4 of the burden. At half of the burden, transformers with a rated output of 2.5 VA or less still comply with class accuracy.

Earthing of secondary circuit Earthing of the secondary circuit of EFEN low-voltage current transformers is not necessary as these transformers have no large exposed metal housing parts.

Power demand The output required from a transformer depends on the lines and measurement equipment connected to it. Current measuring instruments can be connected in series, thereby increasing the power demand.
Due to Ohm's law, 1-A current transformers require considerably less power than 5-A transformers. Consequently, transformers with a secondary current of 1 A should be selected if connection lines are longer than 10 m.

PTB-compliant current transformers for billing purposes complying with German law

Manufacturer's declaration

Device:
Low-voltage current transformer EPSA with design certification and assessment of conformity

Module D

Module F

Approval:
According to the "Act on the Re-organisation of Statutory Metrology" entered into force on 25 April 2013 and the ensuing regulation establishing new rules for statutory metrology and for harmonising it with European legislation entered into force on 11 December 2014, the initial calibration of summary current transformers in its current form e.g. by a state-approved testing bodies is abolished.
Compliance of summary current transformers with applicable statutory regulations as well as technical standards and requirements is ensured either by certified production and final inspection (module D) or by an external testing body (module F). A compliance check according to module F must be commissioned directly by the manufacturer.
Retroactive calibration of suitable transformers is not provided for by law. Consequently, the terms "suitable for calibration" or "suitable for certification" may no longer be used.
As of 2015, EFEN therefore offers PTB-compliant low-voltage current transformers according to module D or F.

Low-voltage current transformers

Power demand of a double-strand line in VA for secondary currents of 1 A

Conductor cross-section	Power demand in VA depending on cable length									
	10 m	20 m	30 m	40 m	50 m	60 m	70 m	80 m	90 m	100 m
1 mm²	0,36	0,71	1,07	1,43	1,79	2,14	2,50	2,86	3,21	3,57
1,5 mm²	0,24	0,48	0,71	0,95	1,19	1,43	1,67	1,90	2,14	2,38
2,5 mm²	0,14	0,29	0,43	0,57	0,71	0,86	1,00	1,14	1,29	1,43
4 mm²	0,09	0,18	0,27	0,36	0,45	0,54	0,63	0,71	0,80	0,89
6 mm²	0,06	0,12	0,18	0,24	0,30	0,36	0,42	0,48	0,54	0,60
10 mm²	0,04	0,07	0,11	0,14	0,18	0,21	0,25	0,29	0,32	0,36

Power demand of a double-strand line in VA for secondary currents of 5 A

Conductor cross-section	Power demand in VA depending on cable length									
	1 m	2 m	4 m	6 m	8 m	10 m	15 m	20 m	30 m	40 m
1,5 mm²	0,60	1,19	2,38	3,57	4,76	5,95	8,93	11,90	17,86	23,81
2,5 mm²	0,36	0,71	1,43	2,14	2,86	3,57	5,36	7,14	10,71	14,29
4 mm²	0,22	0,45	0,89	1,34	1,79	2,23	3,35	4,46	6,70	8,93
6 mm²	0,15	0,30	0,60	0,89	1,19	1,49	2,23	2,98	4,46	5,95
10 mm²	0,09	0,18	0,36	0,54	0,71	0,89	1,34	1,79	2,68	3,57

Generally, the power demand of the measurement device and measuring line should be less than the total rated output (rated burden) and more than ¼ of the rated output of the current transformer. This ensures accurate measurements within the specified accuracy range.

$S_{CT} > 2,5$ VA	$S_{CT} > S_{Cable} + S_{Meter} > ¼\ S_{CT}$
$S_{CT} \leq 2,5$ VA	$S_{CT} > S_{Cable} + S_{Meter} > ½\ S_{CT}$

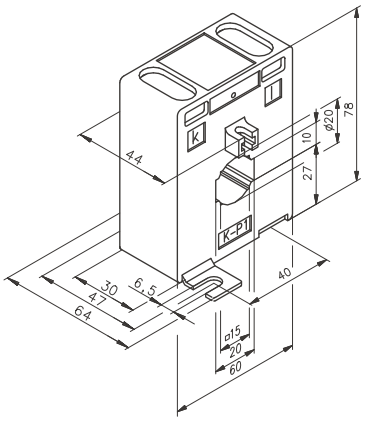
S_{CT} Rated output of the transformer (rated burden)
S_{Cable} Power demand of the line
S_{Meter} Power demand of the measurement device

EFEN low-voltage current transformers

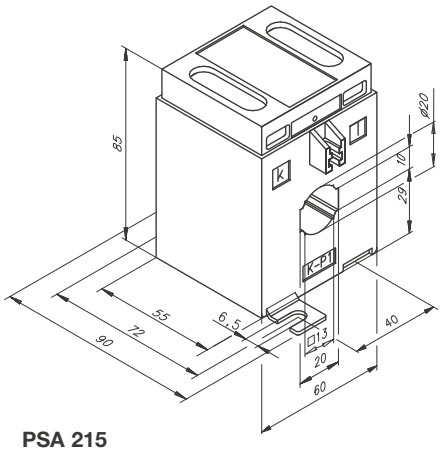
Product features
- Robust and cost-effective design
- High-quality, flame-resistant plastics made of glass-fibre reinforced polycarbonate
- Excellent technical data
- Applications for various busbar sizes
- Easy installation on the busbar
- Accuracy classes acc. to VDE 0414 T 44-1 / IEC/EN 60044-1 and IEC 185 (1987)
- Fasteners for busbar and baseplate mounting

Low-voltage current transformers
PSA 213 – 315

Window-type current transformers
Primary currents from 50 to 300 A, for busbars of 20 x 10 mm and base-plates, according to VDE 0414 T44-1 / IEC/EN 60044-1

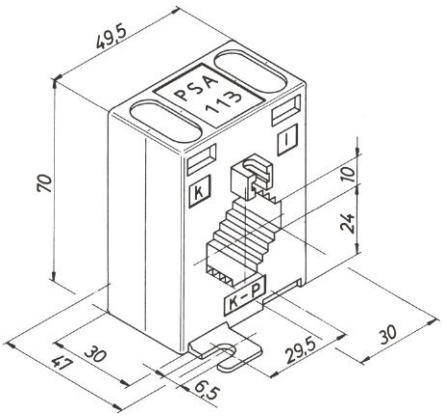


PSA 213
Primary busbar 20 x 10 mm, 15 x 15 mm
Max. round cable Ø 20 mm

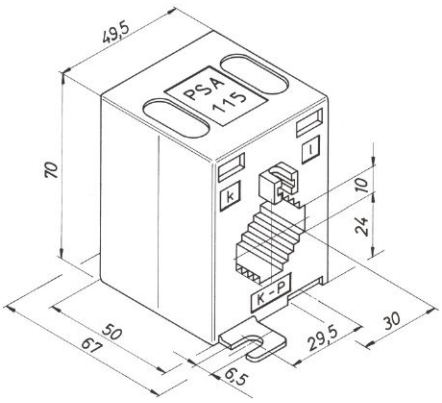


PSA 215
Primary busbar 20 x 10 mm, 15 x 15 mm
Max. round cable Ø 20 mm

Window-type current transformers
Primary currents from 50 to 600 A, for busbars of 30 x 10 mm and base-plates, according to VDE 0414 T44-1 / IEC/EN 60044-1

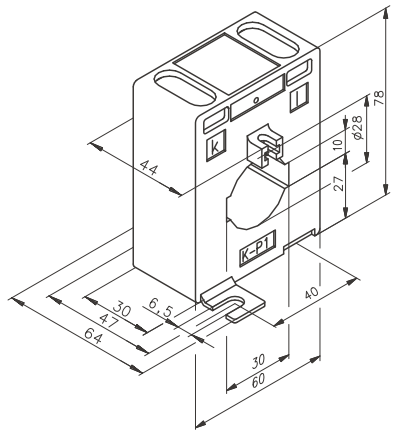


PSA 113
Primary busbar 30 x 10 mm, 25 x 15 mm, 20 x 20 mm

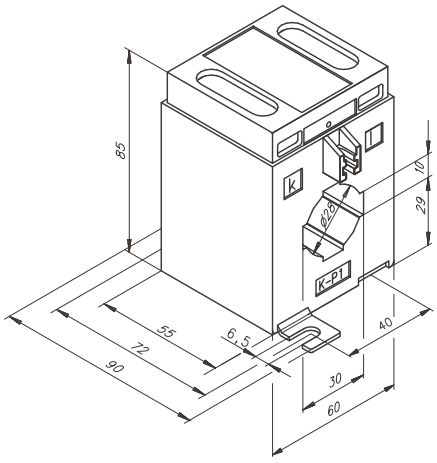


PSA 115
Primary busbar 30 x 10 mm, 25 x 15 mm, 20 x 20 mm

Window-type current transformers
Primary currents from 75 to 600 A, for busbars 30 x 10 mm and base-plates, according to VDE 0414 T44-1 / IEC/EN 60044-1



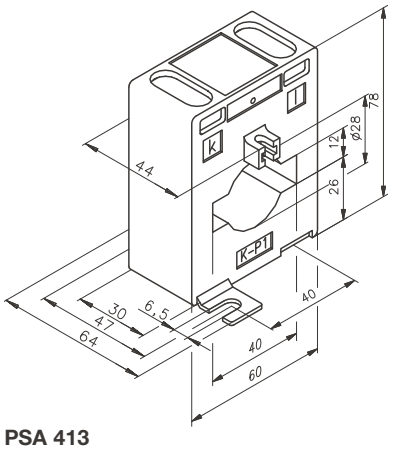
PSA 313
Primary busbar 30 x 10 mm
Max. round cable Ø 28 mm



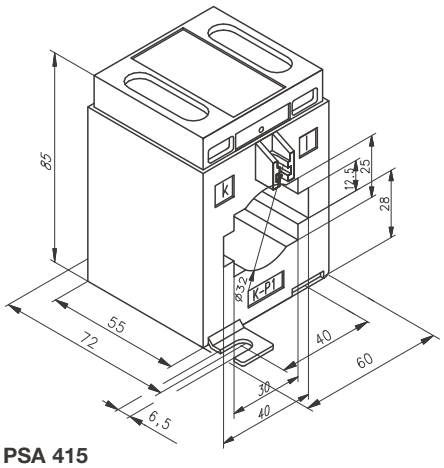
PSA 315
Primary busbar 30 x 10 mm
Max. round cable Ø 28 mm

Low-voltage current transformers
PSA 413 – 633

Window-type current transformers
Primary currents from 150 to 800 A, for busbars 40 x 12 mm and base-plates, according to VDE 0414 T44-1 / IEC/EN 60044-1

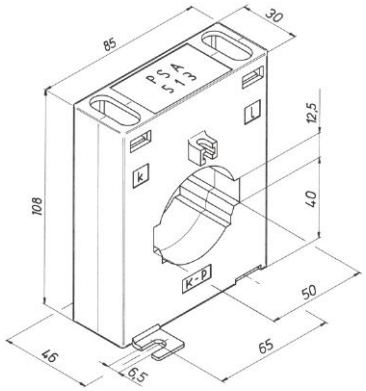


PSA 413
Primary busbar 40 x 12 mm
Max. round cable Ø 28 mm



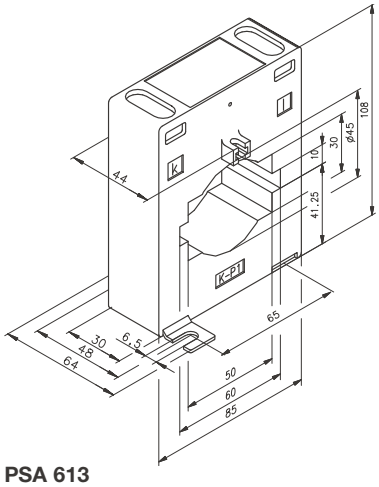
PSA 415
Primary busbar 40 x 12 mm, 30 x 25 mm
Max. round cable Ø 32 mm

Window-type current transformers
Primary currents from 200 to 1250 A, for busbars 50 x 12 mm and base-plates, according to VDE 0414 T44-1 / IEC/EN 60044-1

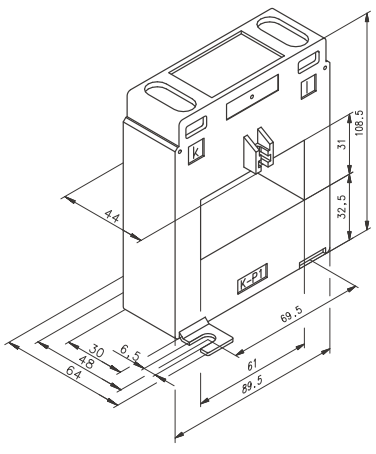


PSA 513
Primary busbar 50 x 12 mm, 40 x 23 mm
Max. round cable Ø 45 mm

Window-type current transformers
Primary currents from 400 to 1600 A, for busbars 60 x 10 (-30) mm and base-plates, according to VDE 0414 T44-1 / IEC/EN 60044-1



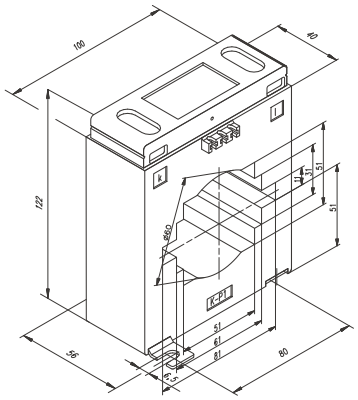
PSA 613
Primary busbar 60 x 10 mm; 50 x 30 mm
Max. round cable Ø 45 mm



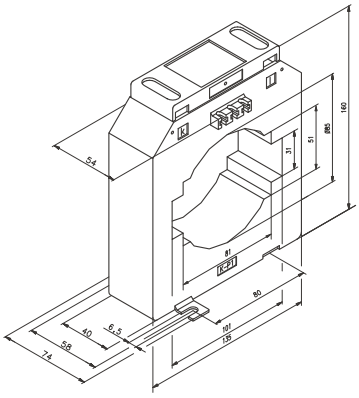
PSA 633
Primary busbar 60 x 30 mm

Low-voltage current transformers
PSA 814 – 1274

Window-type current transformers
Primary current from 400 to 4000 A, for busbars 80 x 10 / 2 x 100 x 10 mm and base-plates, according to VDE 0414 T44-1 / IEC/EN 60044-1

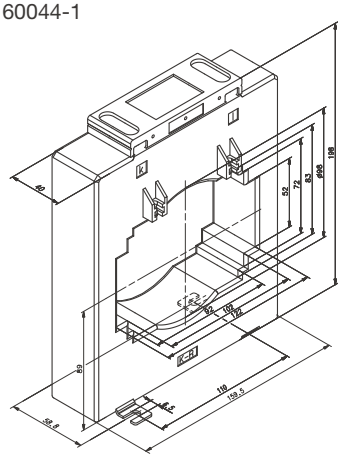


PSA 814
Primary busbar 80 x 10 mm; 60 x 30 mm
Max. round cable Ø 60 mm

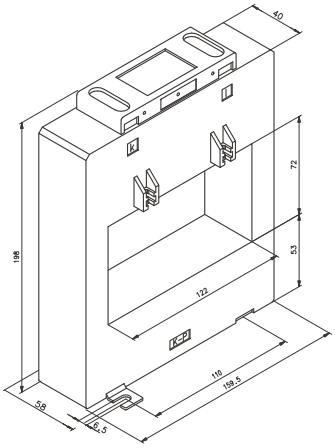


PSA 1034
Primary busbar 2 x 100 x 10 mm; 80 x 50 mm
Max. round cable Ø 85 mm

Window-type current transformers
Primary current from 1800 to 5000 A, for busbars 3 x 120 x 10 / 4 x 120 x 10 mm and base-plates, according to VDE 0414 T44-1 / IEC/EN 60044-1



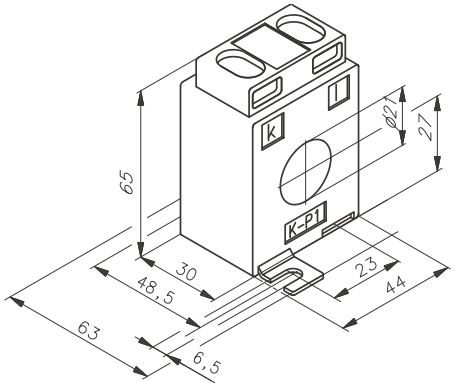
PSA 1254
Primary busbar 3 x 120 x 10 mm
Max. round cable Ø 98 mm



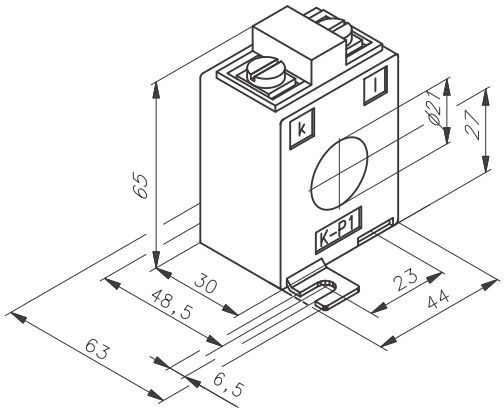
PSA 1274
Primary busbar 4 x 120 x 10 mm

Low-voltage current transformers
Tube-type current transformers PSR 200 – PSR 253/30

Tube-type current transformers
Primary currents from 50 to 300 A; acc. to VDE 0414 T44-1 / IEC/EN 60044-1

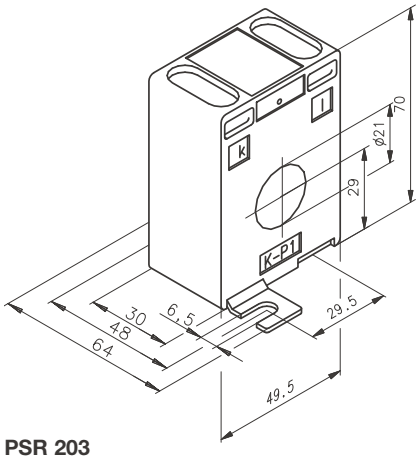


PSR 200
Max. round cable Ø 21 mm
I_{1N} = 50 A – 300 A

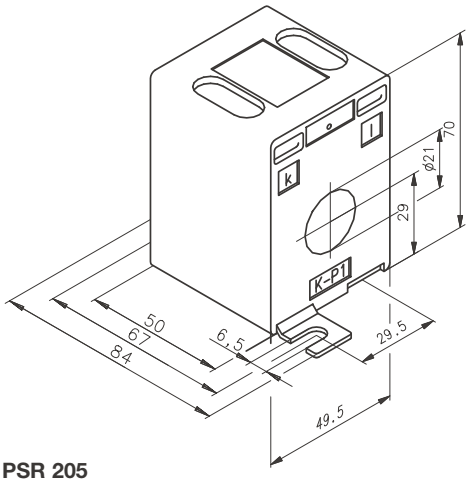


PSR 200.1
Max. round cable Ø 21 mm
I_{1N} = 50 A – 300 A

Tube-type current transformers
Primary currents from 50 to 300 A, acc. to VDE 0414 T44-1 / IEC/EN 60044-1

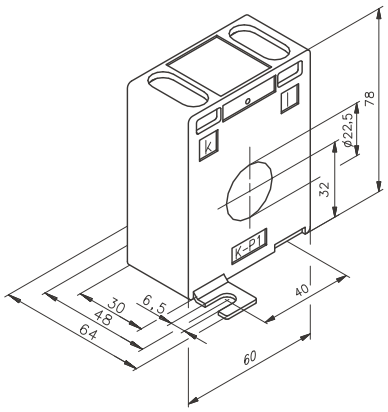


PSR 203
Max. round cable Ø 21 mm
I_{1N} = 75 A – 300 A

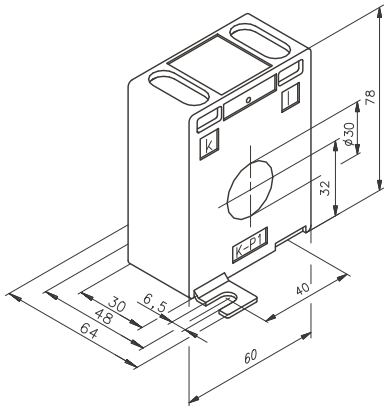


PSR 205
Max. round cable Ø 21 mm
I_{1N} = 50 A – 300 A

Tube-type current transformers
Primary currents from 50 to 600 A, acc. to VDE 0414 T44-1 / IEC/EN 60044-1



PSR 253
Max. round cable Ø 22.5 mm
I_{1N} = 50 A – 600 A

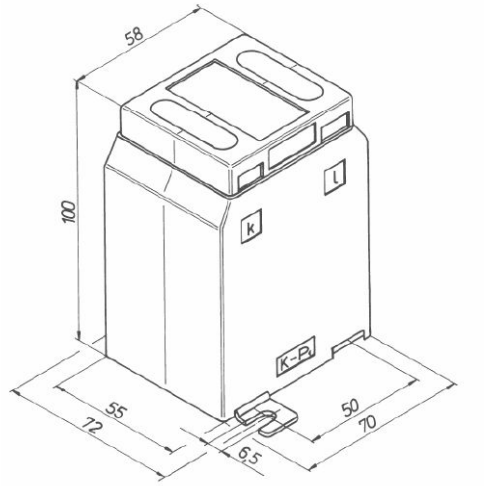


PSR 253/30
Max. round cable Ø 30 mm
I_{1N} = 125 A – 600 A

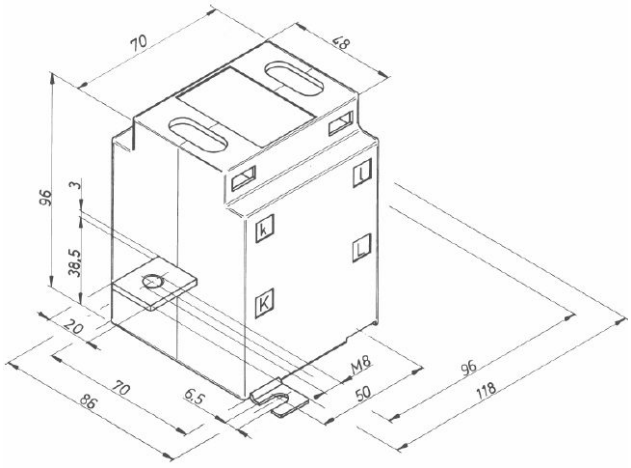
Low-voltage current transformers
Wound-primary current transformers PSW 55, PSW 70

Wound-primary current transformers
5 to 200 A, acc. to VDE 0414 T44-1 / IEC/EN 60044-1

At low current transformer ratios, window-type current transformers can only achieve lower power outputs and accuracy classes. Therefore, the use of wound-primary current transformers is recommended if higher power outputs and accuracy classes are required.
In wound-primary current transformers, the primary conductor is wound several times on the magnetic core of the current transformer.



PSW 55
I_{1N} = 5 A – 40 A



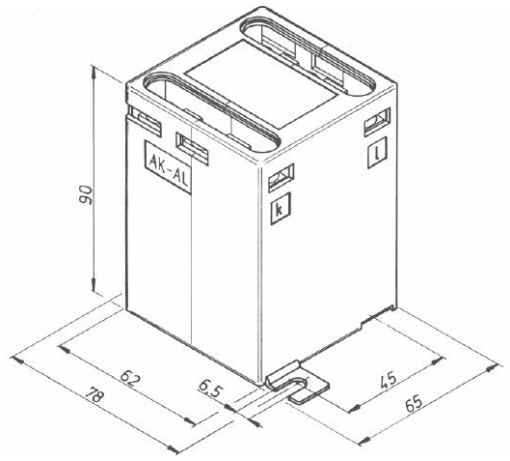
PSW 70
I_{1N} = 50 A – 200 A

Low-voltage current transformers
Summation current transformers PSS 2, PGSU

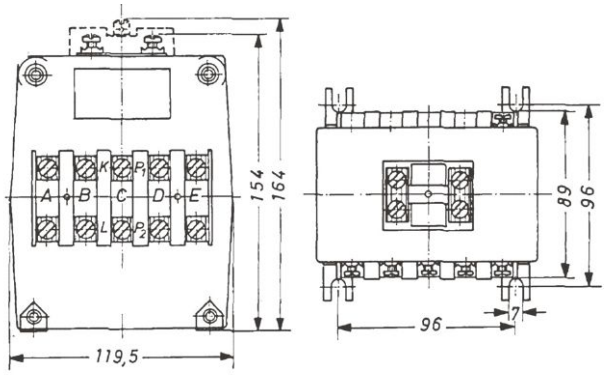
Summation current transformers
2 – 10 circuits, acc. to VDE 0414 T44-1 / IEC/EN 60044-1

Summation current transformers are used if several window-type current transformers shall be combined into one measurement unit. Here, it must be ensured that window-type current transformers of the same phase are combined with the summation current transformer.

EFEN summation current transformers allow up to 10 power feeders with different window-type current transformers to be combined into one current measurement unit.



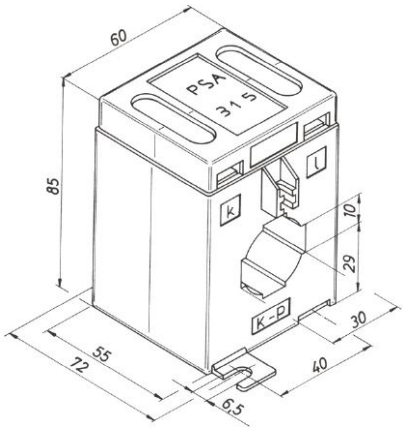
PSS 2
I_{1N} = 1 A + 1 A / 5 A + 5 A
2 x 5 A / 2 x 1 A



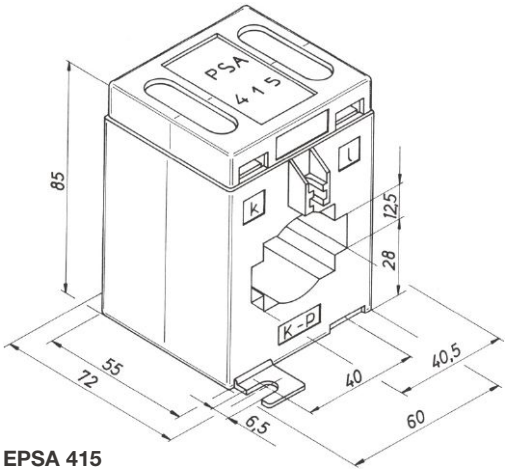
PGSU
I_{1N} = 3 x 5 A – 10 x 5 A

PTB-compliant current transformers for billing purposes
EPSA 315 – EPSA 417.2

Current transformers for billing purposes
For busbars 30 x 10 / 40 x 10 mm and base-plates, acc. to VDE 0414 T44-1 / IEC/EN 60044-1

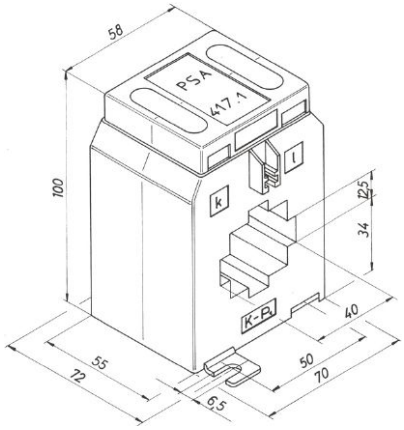


EPSA 315
Primary busbar 30 x 10 mm
Max. round cable Ø 28 mm



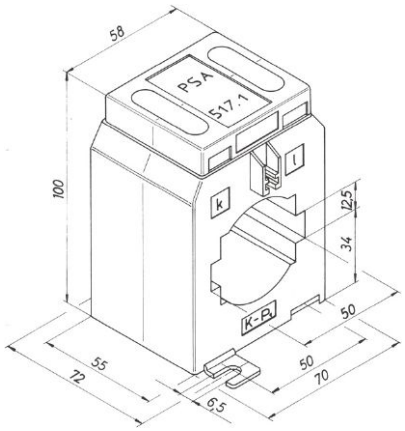
EPSA 415
Primary busbar 40 x 12 mm, 30 x 25 mm
Max. round cable Ø 32 mm

Current transformers for billing purposes
Busbar 40 x 12 mm, acc. to VDE 0414 T44-1 / IEC/EN 60044-1



EPSA 417.1
Primary busbar 40 x 12 mm, 30 x 30 mm

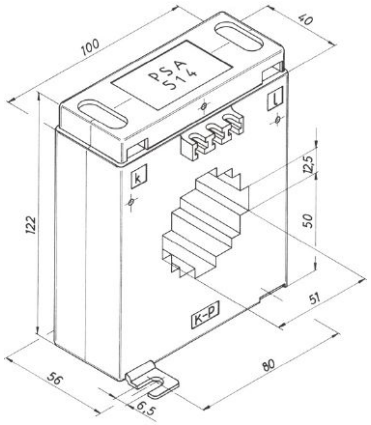
Current transformers for billing purposes
Busbar 50 x 12 mm, acc. to VDE 0414 T44-1 / IEC/EN 60044-1



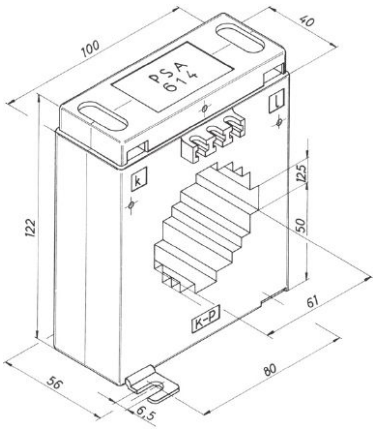
EPSA 517.1
Primary busbar 50 x 12 mm, 40 x 30 mm
Max. round cable Ø 43 mm

PTB-compliant current transformers for billing purposes
EPSA 517.1 – EPSA 1034

Current transformers for billing purposes
Busbars 50 x 12 / 60 x 10 mm, acc. to VDE 0414 T44-1 / IEC 60044-1

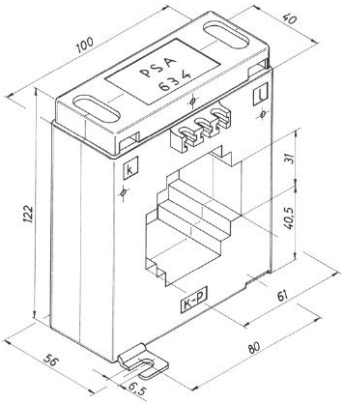


EPSA 514
Primary busbar 50 x 12 mm, 40 x 30 mm
Max. round cable Ø 46 mm

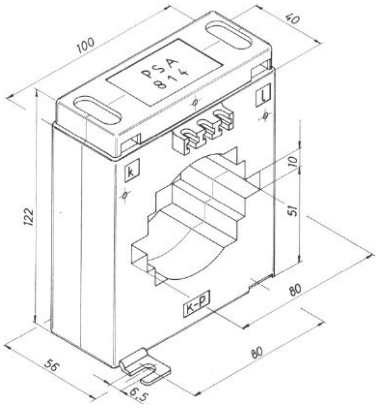


EPSA 614
Primary busbar 60 x 12 mm, 50 x 30 mm, 40 x 40 mm

Current transformers for billing purposes
Busbar 60 x 30 / 80 x 10 mm, acc. to VDE 0414 T44-1/IEC/EN 60044-1

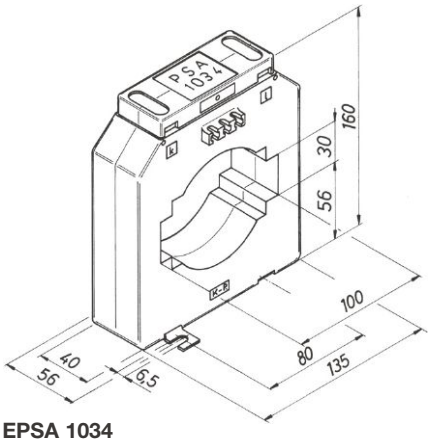


EPSA 634
Primary busbar 60 x 30 mm,
50 x 40 mm



EPSA 814
Primary busbar 80 x 10 mm, 60 x 30 mm,
50 x 50 mm
Max. round cable Ø 60 mm

Current transformers for billing purposes
Busbar 2 x 100 x 10 mm, acc. to VDE 0414 T44-1 / IEC/EN 60044-1



EPSA 1034
Primary busbar 2 x 100 x 10 mm, 80 x 50 mm
Max. round cable Ø 85 mm