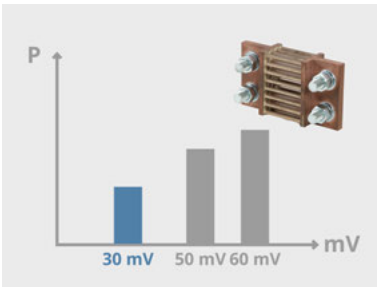
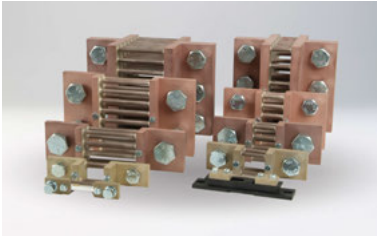


Shunt Resistor for Direct Current Measurements from 1 A to 20 kA

All versions are available with measuring voltages of 30 mV, 50 mV, and 60 mV and in the accuracy classes 0.2 and 0.5.

The meticulously produced shunt resistors feature resistor rods made of manganin with low self heating and an exceptionally low temperature coefficient. The variants with a rated voltage drop of 30 mV distinguish themselves from the 50 mV or 60 mV versions thanks to more compact dimensions and significantly lower power dissipation, which greatly reduces the effort required for electrical enclosure cooling. Knick's transducers and signal conditioners from the P41000, P51000, P29000, P27000, and BL591 series, which are adapted optimally to the shunt resistors, are available for current measurement.



30 mV versions

- Significantly less heat dissipation
- Lower space requirements



Robust measuring principle

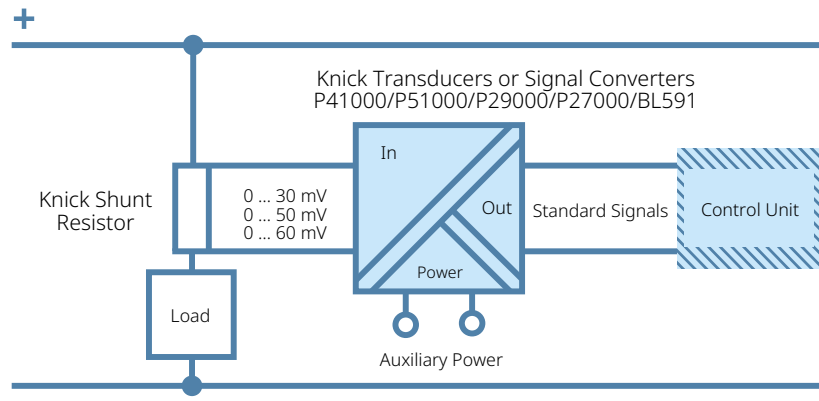
- Low temperature coefficient
- Not impacted by current peaks or neighboring cables



Precise and reliable measurement

- The combination with Knick's transducers ensures reliable signal isolation, short response times, and a high degree of measurement accuracy that is stable over the long term

Application Example



Product Code

| | | M | n | (H) | _ | (- | _ | x | x | x) |
|-------------------------------|-------------------------|---|---|-----|---|----|---|---|---|----|
| Rated current in A | | | n | | | | | | | |
| Accuracy class | 0.5 | | | | | | | | | |
| | 0.2 | | | H | | | | | | |
| Rated voltage drop | 30 mV | | | | L | | | | | |
| | 50 mV | | | | U | | | | | |
| | 60 mV | | | | S | | | | | |
| | 75 mV | | | | T | | | | | |
| | 100 mV | | | | V | | | | | |
| Certificates, special designs | Calibration certificate | | | | | | C | x | x | x |
| | Special design | | | | | | x | x | x | x |

n = real number 0...xxxxx

x = digit 0...9

30 mV Product Line

| Rated current | Rated voltage drop | Type | Weight | Dimensions | | | | | | | Terminal screws | | Accuracy class | Order no. |
|---------------|--------------------|------|--------|------------|-----|-----|-----|----|----|----|---------------------|----------------------|----------------|-----------|
| | | | | a | b | c | d | e | f | g | h | | | |
| A | mV | | kg | mm | mm | mm | mm | mm | mm | mm | Number on each side | Dimensions per screw | | |
| 10.0 | 30 | A | 0.11 | 90 | 78 | 20 | - | - | - | 8 | 1 | M2×12 | 0.5 | M10L |
| 25.0 | 30 | A | 0.11 | 90 | 78 | 20 | - | - | - | 8 | 1 | M2×12 | 0.5 | M25L |
| 40.0 | 30 | D | 0.13 | 86 | 66 | 20 | - | - | - | 8 | 1 | M2×16 | 0.5 | M40L |
| 100.0 | 30 | D | 0.13 | 86 | 66 | 20 | - | - | - | 8 | 1 | M2×16 | 0.5 | M100L |
| 150.0 | 30 | D | 0.13 | 86 | 66 | 20 | - | - | - | 8 | 1 | M2×16 | 0.5 | M150L |
| 250.0 | 30 | B | 0.40 | 130 | 90 | 30 | 30 | 15 | - | 10 | 1 | M12×40 | 0.5 | M250L |
| 300.0 | 30 | B | 0.70 | 130 | 90 | 40 | 30 | 20 | - | 10 | 1 | M16×45 | 0.5 | M300L |
| 400.0 | 30 | B | 0.82 | 130 | 90 | 40 | 30 | 20 | - | 10 | 1 | M16×45 | 0.5 | M400L |
| 500.0 | 30 | B | 0.82 | 130 | 90 | 40 | 30 | 20 | - | 10 | 1 | M16×45 | 0.5 | M500L |
| 600.0 | 30 | B | 0.83 | 130 | 90 | 40 | 30 | 20 | - | 10 | 1 | M16×45 | 0.5 | M600L |
| 800.0 | 30 | B | 1.40 | 150 | 100 | 60 | 30 | 30 | - | 10 | 1 | M20×50 | 0.5 | M800L |
| 1000.0 | 30 | B | 1.48 | 150 | 100 | 60 | 30 | 30 | - | 10 | 1 | M20×50 | 0.5 | M1000L |
| 1200.0 | 30 | B | 1.50 | 150 | 100 | 60 | 30 | 30 | - | 10 | 1 | M20×50 | 0.5 | M1200L |
| 1500.0 | 30 | B | 1.95 | 150 | 100 | 90 | 30 | 21 | 48 | 10 | 2 | M16×45 | 0.5 | M1500L |
| 2000.0 | 30 | B | 2.00 | 150 | 100 | 90 | 30 | 21 | 48 | 10 | 2 | M16×45 | 0.5 | M2000L |
| 2500.0 | 30 | B | 3.00 | 150 | 100 | 120 | 30 | 30 | 60 | 10 | 2 | M20×50 | 0.5 | M2500L |
| 3000.0 | 30 | C | 4.20 | 150 | 100 | 120 | 60 | 30 | 60 | 15 | 2 | M20×60 | 0.5 | M3000L |
| 4000.0 | 30 | C | 4.25 | 150 | 100 | 120 | 60 | 30 | 60 | 15 | 2 | M20×60 | 0.5 | M4000L |
| 5000.0 | 30 | C | 10.90 | 160 | 110 | 154 | 130 | 25 | 52 | 25 | 3 | M20×75 | 0.5 | M5000L |
| 6000.0 | 30 | C | 10.90 | 160 | 110 | 154 | 130 | 25 | 52 | 25 | 3 | M20×75 | 0.5 | M6000L |
| 8000.0 | 30 | C | 20.90 | 170 | 120 | 206 | 170 | 25 | 52 | 30 | 4 | M20×80 | 0.5 | M8000L |
| 500.0 | 30 | B | 1.75 | 180 | 130 | 60 | 30 | 30 | - | 10 | 1 | M20×50 | 0.2 | M500HL |
| 1000.0 | 30 | B | 1.48 | 150 | 100 | 60 | 30 | 30 | - | 10 | 1 | M16×45 | 0.2 | M1000HL |
| 1500.0 | 30 | B | 1.95 | 150 | 100 | 90 | 30 | 21 | 48 | 10 | 2 | M16×45 | 0.2 | M1500HL |
| 2000.0 | 30 | B | 2.00 | 150 | 100 | 90 | 30 | 21 | 48 | 10 | 2 | M16×45 | 0.2 | M2000HL |
| 2500.0 | 30 | C | 8.00 | 182 | 132 | 154 | 130 | 25 | 52 | 25 | 3 | M20×75 | 0.2 | M2500HL |
| 4000.0 | 30 | C | 9.50 | 182 | 132 | 154 | 130 | 25 | 52 | 25 | 3 | M20×75 | 0.2 | M4000HL |
| 6000.0 | 30 | C | 20.00 | 192 | 142 | 206 | 170 | 25 | 52 | 30 | 4 | M20×80 | 0.2 | M6000HL |
| 8000.0 | 30 | C | 20.00 | 192 | 142 | 206 | 170 | 25 | 52 | 30 | 4 | M20×80 | 0.2 | M8000HL |

60 mV Product Line

| Rated current | Rated voltage drop | Type | Weight | Dimensions | | | | | | | Terminal screws | Accuracy class | Order no. | |
|---------------|--------------------|------|--------|------------|-----|-----|-----|----|----|----|---------------------|----------------------|-----------|---------|
| | | | | a | b | c | d | e | f | g | | | | h |
| A | mV | | kg | mm | mm | mm | mm | mm | mm | mm | Number on each side | Dimensions per screw | | |
| 10.0 | 60 | A | 0.13 | 90 | 78 | 20 | - | - | - | - | 1 | M5×12 | 0.5 | M10S |
| 25.0 | 60 | A | 0.13 | 90 | 78 | 20 | - | - | - | - | 1 | M5×12 | 0.5 | M25S |
| 40.0 | 60 | A | 0.13 | 100 | 80 | 20 | - | - | - | - | 1 | M8×16 | 0.5 | M40S |
| 100.0 | 60 | A | 0.13 | 100 | 80 | 20 | - | - | - | - | 1 | M8×16 | 0.5 | M100S |
| 150.0 | 60 | A | 0.13 | 100 | 80 | 20 | - | - | - | - | 1 | M8×16 | 0.5 | M150S |
| 250.0 | 60 | B | 0.61 | 145 | 105 | 30 | 30 | 15 | - | - | 1 | M12×40 | 0.5 | M250S |
| 300.0 | 60 | B | 0.61 | 145 | 105 | 40 | 30 | 20 | - | - | 1 | M16×45 | 0.5 | M300S |
| 400.0 | 60 | B | 0.83 | 145 | 105 | 40 | 30 | 20 | - | - | 1 | M16×45 | 0.5 | M400S |
| 500.0 | 60 | B | 0.83 | 145 | 105 | 40 | 30 | 20 | - | - | 1 | M16×45 | 0.5 | M500S |
| 600.0 | 60 | B | 0.85 | 145 | 105 | 40 | 30 | 20 | - | - | 1 | M16×45 | 0.5 | M600S |
| 800.0 | 60 | B | 0.90 | 145 | 105 | 40 | 30 | 20 | - | - | 1 | M16×45 | 0.5 | M800S |
| 1000.0 | 60 | B | 1.45 | 165 | 115 | 60 | 30 | 30 | - | - | 1 | M20×50 | 0.5 | M1000S |
| 1200.0 | 60 | B | 1.45 | 165 | 115 | 90 | 30 | 21 | - | - | 2 | M16×45 | 0.5 | M1200S |
| 1500.0 | 60 | B | 1.96 | 165 | 115 | 90 | 30 | 21 | 48 | - | 2 | M16×45 | 0.5 | M1500S |
| 2000.0 | 60 | B | 2.30 | 165 | 115 | 90 | 30 | 21 | 48 | - | 2 | M16×45 | 0.5 | M2000S |
| 2500.0 | 60 | B | 2.90 | 165 | 115 | 120 | 30 | 30 | 60 | - | 2 | M20×50 | 0.5 | M2500S |
| 3000.0 | 60 | B | 3.00 | 165 | 115 | 120 | 30 | 30 | 60 | - | 2 | M20×50 | 0.5 | M3000S |
| 4000.0 | 60 | C | 4.25 | 165 | 115 | 120 | 60 | 30 | 60 | 15 | 2 | M20×60 | 0.5 | M4000S |
| 5000.0 | 60 | C | 4.30 | 165 | 115 | 120 | 60 | 30 | 60 | 15 | 2 | M20×60 | 0.5 | M5000S |
| 6000.0 | 60 | C | 10.50 | 175 | 125 | 154 | 130 | 25 | 52 | 25 | 3 | M20×75 | 0.5 | M6000S |
| 8000.0 | 60 | C | 12.00 | 175 | 125 | 154 | 130 | 25 | 52 | 25 | 3 | M20×75 | 0.5 | M8000S |
| 500.0 | 60 | B | 1.50 | 210 | 160 | 60 | 30 | 30 | - | - | 1 | M20×50 | 0.2 | M500HS |
| 1000.0 | 60 | B | 1.50 | 210 | 160 | 60 | 30 | 30 | - | - | 1 | M20×50 | 0.2 | M1000HS |
| 2000.0 | 60 | C | 4.80 | 210 | 160 | 120 | 60 | 30 | 60 | 15 | 2 | M20×60 | 0.2 | M2000HS |
| 2500.0 | 60 | C | 9.10 | 220 | 170 | 120 | 130 | 30 | 60 | 25 | 2 | M20×75 | 0.2 | M2500HS |
| 4000.0 | 60 | C | 9.50 | 220 | 170 | 154 | 130 | 25 | 52 | 25 | 3 | M20×75 | 0.2 | M4000HS |
| 6000.0 | 60 | C | 20.00 | 230 | 142 | 206 | 170 | 25 | 52 | 30 | 4 | M20×80 | 0.2 | M6000HS |
| 8000.0 | 60 | C | 20.00 | 230 | 142 | 206 | 170 | 25 | 52 | 30 | 4 | M20×80 | 0.2 | M8000HS |

Accessories

| | |
|---|--------|
| Type E cover for type E insulating base (ZU1235); dimensions with type E insulating base [mm]: Length 137 x width 33 x height 31 | ZU1236 |
| Type E insulating base for type A shunt resistors; dimensions without shunt [mm]: Length 134 x width 29 x height 14 | ZU1235 |

Specifications

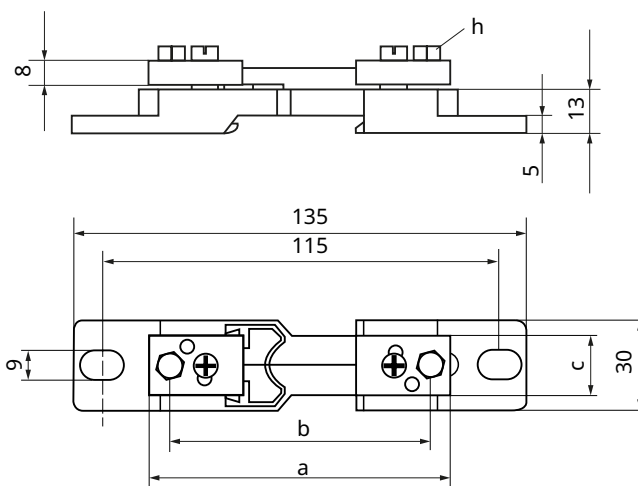
| | | | | |
|---|---|--|---------------------------------|--|
| Accuracy under rated operating conditions | Class 0.5 or Class 0.2 | | | |
| Overload capacity | Continuous | 120 % full scale | | |
| | Max. 5 s | Nominal \leq 2000 A | 500 % full scale | |
| | | Nominal > 2000... 10000 A | 200 % full scale | |
| Nominal operating conditions | 23 °C (73.4 °F) \pm 1 K | | | |
| Ambient conditions | Climate suitability | Climatic class 3 in accordance with VDE/VDI 3540 | | |
| | Ambient temperature | Operation | -45... 70 °C (-49... 158 °F) | |
| | | Transport and storage | -50... 80 °C (-58... 176 °F) | |
| | Relative humidity (operation, storage, and transport) in accordance with EN 50125 | Yearly average | \leq 75 % | |
| | | On 30 days in the year continuously | between 75 % and 95 % | |
| On the other days occasionally | | between 95 % and 100 % | | |
| Assembly | Type A with insulating base type A | Snap-on mounting for DIN rail 35 mm in accordance with EN 60715 or wall mounting, screws max. M8 | | |
| | Type B | L-profiles | | |
| | Type C | T-profiles | | |
| | Type D | | | |
| Material | Resistor rods | Manganin | | |
| | Connection pieces | Type A | Brass | |
| | | Type B | Brass/copper | |
| | | Type C | Copper | |
| | | Type D | Brass | |
| | Insulating base | Insulating base type A | Noryl GFN1-SE1-701 | |
| | | Insulating base type E | Lexan 500R | |
| Cover type E | | PC-GF10 FR | | |
| Connections | Electrical connection | Threaded bolts, see table | | |
| | Voltage tap | M5 \times 8 | | |
| Protection class | IP00 | | | |
| Dimensions | See dimension drawings and product line | | | |
| Weight | See dimension drawings and product line | | | |

Additional specifications for shunt resistors M500HS, M1000HS, M2000HS, M2500HS, M4000HS, M6000HS, M8000HS for applications on rail vehicles and in energy measurement systems in accordance with EN 50463

| | | | |
|--|---|--|---|
| Height classes | EN 50125-1: A1, AX | | |
| Pollution degree | EN 50124-1: PD3 WARNING! Shock potential! Shunt resistor without insulation. Implement suitable protective measures against directly touching dangerous live parts, e.g., in accordance with EN 50153. | | |
| Mechanical stress (vibrations and shocks) | EN 61373 | Category 1 | Class B |
| Permanent overload | EN 50463-2 | Thermal rated constant current | $I_{CMF,cth} = 1.2 \times I_n$ |
| Ambient conditions | Ambient temperature | Operation | -45 °C... 70 °C (-49 °F... 158 °F) |
| | | Transport and storage | -50 °C... 80 °C (-58 °F... 176 °F) |
| Temperature increase at the copper connection points compared to ambient temperature at 120 % overload | + 50 K (M2500HS to M8000HS) + 60 K (M1000HS, M2000HS) | | |
| Resistance to short circuit currents | EN 50463-2, EN 50388 | Rated surge current | 125 kA for 100 ms |
| | Suitable for systems with rated voltages 750 V to 3000 V DC (for M500HS: $I_{CMF,dyn} = 50$ kA for 100 ms, suitable for systems with rated voltage 3000 V DC) | | |
| Resistance to increased inrush current | EN 50463-2 | Thermal rated short-time withstand current | $I_{CMF,th} = I_{CMF,dyn}$ or $3 \times 1.2 I_n$ for 125 ms |
| Fire protection | EN 45545-2 | Outdoor applications up to HL3 | |

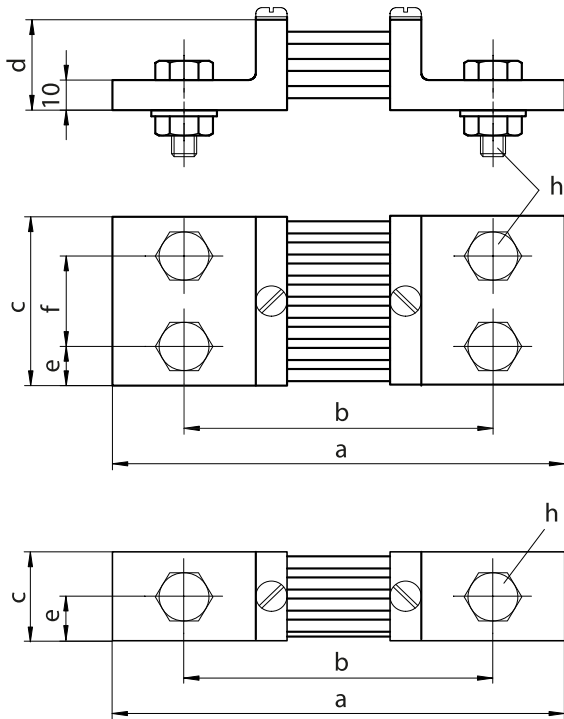
Dimension Drawings

Type A with insulating base type A

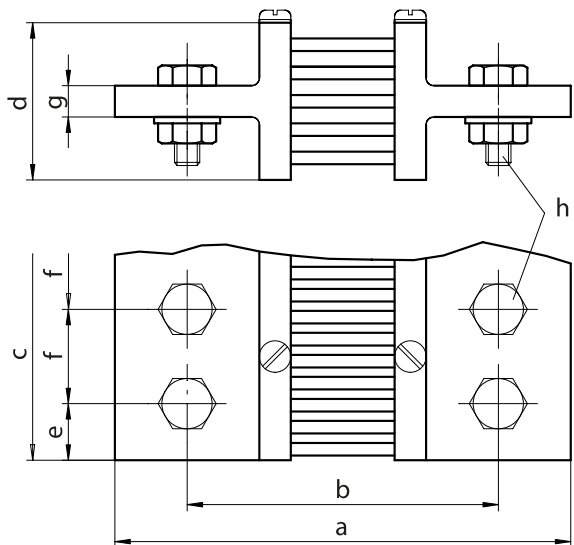


Note: All dimensions are given in millimeters.

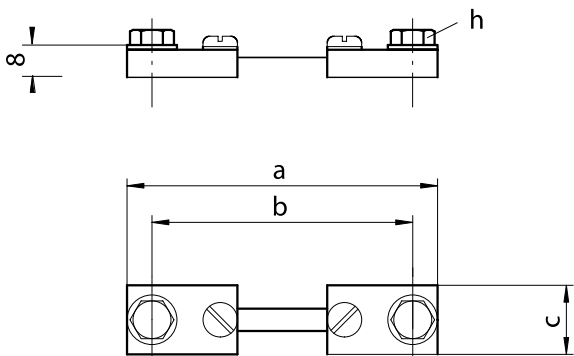
Type B



Type C



Type D



Knick
Elektronische Messgeräte
GmbH & Co. KG

Beuckestraße 22 ,14163 Berlin
Germany

Phone: +49 30 80191-0

Fax: +49 30 80191-200

info@knick.de • www.knick-international.com

Subject to change.