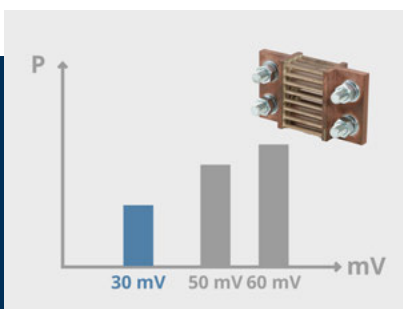
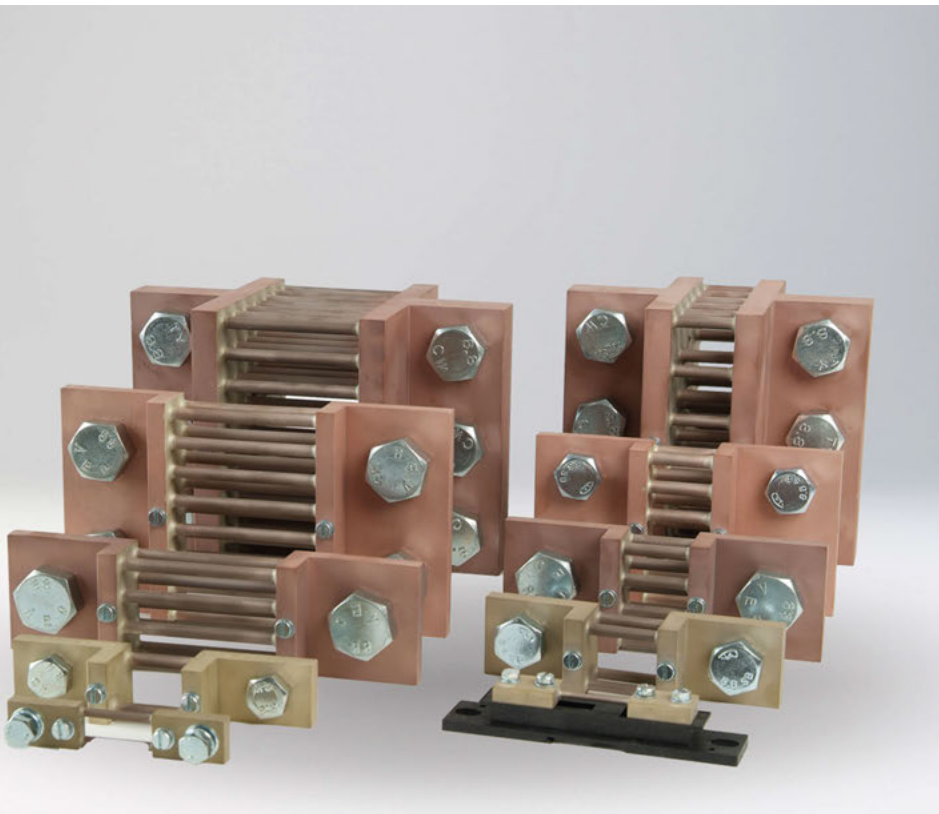


Shunt Resistors

Shunts for current measurement from 1 A to 20 kA

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

The resistor rods are made of manganin and feature both 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 lower heat dissipation, which reduces the effort required for control cabinet cooling. The undistorted measurement of the low shunt voltages, especially 30 mV, requires transducers with a higher common-mode rejection ratio. These include devices from Knick's P41000, P51000, P29000, P27000, and BL591 series.



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

- 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

Product Code

Shunt resistors	M	n	(X)	X	(-	X	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 = number 0 ... xxxxx

x = digit 0 ... 9

X = letter or digit

* On request

Accessories

Insulating base type E for shunt resistors in design A, dimensions without shunt resistor (length x width x height): 134 mm x 29 mm x 14 mm	ZU1235
Cover type E for insulating base type E (ZU1235), dimensions with insulating base type E (length x width x height): 137 mm x 33 mm x 31 mm	ZU1236

30 mV Product Line

Rated current I_n	Rated voltage drop	Design	Weight	Dimensions							Terminal screws		Accuracy class	Product designation	
				a	b	c	d	e	f	g	h	Number on each side			Dimensions per screw
A	mV		kg	mm	mm	mm	mm	mm	mm	mm	m	m			
10	30	A	0.11	90	78	20	-	-	-	8	1	M5 × 12	0.5	M10L	
25	30	A	0.11	90	78	20	-	-	-	8	1	M5 × 12	0.5	M25L	
40	30	D	0.13	86	66	20	-	-	-	8	1	M8 × 16	0.5	M40L	
100	30	D	0.13	86	66	20	-	-	-	8	1	M8 × 16	0.5	M100L	
150	30	D	0.13	86	66	20	-	-	-	8	1	M8 × 16	0.5	M150L	
250	30	B	0.40	130	90	30	30	15	-	10	1	M12 × 40	0.5	M250L	
300	30	B	0.70	130	90	40	30	20	-	10	1	M16 × 45	0.5	M300L	
400	30	B	0.82	130	90	40	30	20	-	10	1	M16 × 45	0.5	M400L	
500	30	B	0.82	130	90	40	30	20	-	10	1	M16 × 45	0.5	M500L	
600	30	B	0.83	130	90	40	30	20	-	10	1	M16 × 45	0.5	M600L	
800	30	B	1.40	150	100	60	30	30	-	10	1	M20 × 50	0.5	M800L	
1000	30	B	1.48	150	100	60	30	30	-	10	1	M20 × 50	0.5	M1000L	
1200	30	B	1.50	150	100	60	30	30	-	10	1	M20 × 50	0.5	M1200L	
1500	30	B	1.95	150	100	90	30	21	48	10	2	M16 × 45	0.5	M1500L	
2000	30	B	2.00	150	100	90	30	21	48	10	2	M16 × 45	0.5	M2000L	
2500	30	B	3.00	150	100	120	30	30	60	10	2	M20 × 50	0.5	M2500L	
3000	30	C	4.20	150	100	120	60	30	60	15	2	M20 × 60	0.5	M3000L	
4000	30	C	4.25	150	100	120	60	30	60	15	2	M20 × 60	0.5	M4000L	
5000	30	C	10.90	160	110	154	130	25	52	25	3	M20 × 75	0.5	M5000L	
6000	30	C	10.90	160	110	154	130	25	52	25	3	M20 × 75	0.5	M6000L	
8000	30	C	20.90	170	120	206	170	25	52	30	4	M20 × 80	0.5	M8000L	
500	30	B	1.75	180	130	60	30	30	-	10	1	M20 × 50	0.2	M500HL	
1000	30	B	1.48	150	100	60	30	30	-	10	1	M16 × 45	0.2	M1000HL	
1500	30	B	1.95	150	100	90	30	21	48	10	2	M16 × 45	0.2	M1500HL	
2000	30	B	2.00	150	100	90	30	21	48	10	2	M16 × 45	0.2	M2000HL	
2500	30	C	8.00	182	132	154	130	25	52	25	3	M20 × 75	0.2	M2500HL	
4000	30	C	9.50	182	132	154	130	25	52	25	3	M20 × 75	0.2	M4000HL	
6000	30	C	20.00	192	142	206	170	25	52	30	4	M20 × 80	0.2	M6000HL	
8000	30	C	20.00	192	142	206	170	25	52	30	4	M20 × 80	0.2	M8000HL	

60 mV Product Line

Rated current I_n	Rated voltage drop	Design	Weight	Dimensions							Terminal screws		Accuracy class	Product designation	
				a	b	c	d	e	f	g	h	Number on each side			Dimensions per screw
A	mV		kg	mm	mm	mm	mm	mm	mm	mm	m	mm			
10	60	A	0.13	90	78	20	-	-	-	8	1	M5 × 12	0.5	M10S	
25	60	A	0.13	90	78	20	-	-	-	8	1	M5 × 12	0.5	M25S	
40	60	D	0.13	100	80	20	-	-	-	8	1	M8 × 16	0.5	M40S	
100	60	D	0.13	100	80	20	-	-	-	8	1	M8 × 16	0.5	M100S	
150	60	D	0.13	100	80	20	-	-	-	8	1	M8 × 16	0.5	M150S	
250	60	B	0.61	145	105	30	30	15	-	-	1	M12 × 40	0.5	M250S	
300	60	B	0.79	145	105	40	30	20	-	-	1	M16 × 45	0.5	M300S	
400	60	B	0.83	145	105	40	30	20	-	-	1	M16 × 45	0.5	M400S	
500	60	B	0.83	145	105	40	30	20	-	-	1	M16 × 45	0.5	M500S	
600	60	B	0.85	145	105	40	30	20	-	-	1	M16 × 45	0.5	M600S	
800	60	B	1.45	145	105	40	30	20	-	-	1	M16 × 45	0.5	M800S	
1000	60	B	1.45	165	115	60	30	30	-	-	1	M20 × 50	0.5	M1000S	
1200	60	B	1.98	165	115	90	30	21	48	-	2	M16 × 45	0.5	M1200S	
1500	60	B	1.98	165	115	90	30	21	48	-	2	M16 × 45	0.5	M1500S	
2000	60	B	2.01	165	115	90	30	21	48	-	2	M16 × 45	0.5	M2000S	
2500	60	B	2.90	165	115	120	30	30	60	-	2	M20 × 50	0.5	M2500S	
3000	60	B	3.00	165	115	120	30	30	60	-	2	M20 × 50	0.5	M3000S	
4000	60	C	4.25	165	115	120	60	30	60	15	2	M20 × 60	0.5	M4000S	
5000	60	C	4.30	165	115	120	60	30	60	15	2	M20 × 60	0.5	M5000S	
6000	60	C	11.00	175	125	154	130	25	52	25	3	M20 × 75	0.5	M6000S	
8000	60	C	11.10	175	125	154	130	25	52	25	3	M20 × 75	0.5	M8000S	
500	60	B	2.00	210	160	60	30	30	-	-	1	M20 × 50	0.2	M500HS	
1000	60	B	2.50	210	160	60	30	30	-	-	1	M20 × 50	0.2	M1000HS	
1500	60	B	1.98	165	115	90	30	21	48	10	2	M16 × 45	0.2	M1500HS	
2000	60	C	3.20	210	160	120	60	30	60	15	2	M20 × 60	0.2	M2000HS	
2500	60	C	6.00	220	170	120	130	30	60	25	2	M20 × 75	0.2	M2500HS	
4000	60	C	12.00	220	170	154	130	25	52	25	3	M20 × 75	0.2	M4000HS	
6000	60	C	23.00	230	180	206	170	25	52	30	4	M20 × 80	0.2	M6000HS	
8000	60	C	25.00	230	180	206	170	25	52	30	4	M20 × 80	0.2	M8000HS	

Specifications

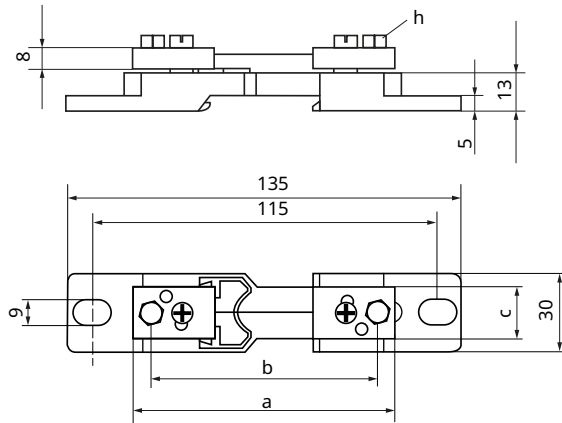
Reference temperature	23 °C (73.4 °F)	In accordance with IEC 60051-8	
Accuracy at reference temperature	Accuracy class 0.5	0.5%	
	Accuracy class 0.2	0.2%	
Temperature coefficient	Accuracy class 0.5	0.25 %/10 K	
	Accuracy class 0.2	0.1 %/10 K	
Rated current I_n	→ 30 mV Product Line, → 60 mV Product Line		
Permanent overload max. 2 h	1.2 I_n in accordance with IEC 60051-8		
Short-term overload max. 5 s	Accuracy class 0.5	Rated current $I_n \leq 250$ A	10 I_n in accordance with IEC 60051-8
		Rated current $250 \text{ A} < I_n \leq 2000$ A	5 I_n in accordance with IEC 60051-8
		Rated current $2000 \text{ A} < I_n \leq 10000$ A	2 I_n in accordance with IEC 60051-8
		Rated current $I_n > 10000$ A	On request
	Accuracy class 0.2	Rated current $I_n \leq 2500$ A	2 I_n in accordance with IEC 60051-8
		Rated current $I_n > 2500$ A	On request
Ambient conditions	Climate suitability	Class 3K6	In accordance with IEC 60051-1
	Ambient temperature	Operation	-25 ... 55 °C (-13 ... 131 °F) in accordance with IEC 60051-8
		Transport and storage	-40 ... 70 °C (-40 ... 158 °F) in accordance with IEC 60051-8
	Relative humidity	25 ... 95%	In accordance with IEC 60051-8
Assembly	Design A with insulating base type A	35 mm DIN rail for snap-on mounting in accordance with EN 60715 or wall mounting, screws max. M8	
	Design B	Joining pieces L profiles with terminal screws → 30 mV Product Line, → 60 mV Product Line	
	Design C	Joining pieces T profiles with terminal screws → 30 mV Product Line, → 60 mV Product Line	
	Design D	Joining pieces with terminal screws → 30 mV Product Line, → 60 mV Product Line	
Material	Resistor rods	Manganin	
	Joining pieces	Design A	Brass
		Design B	Brass/copper
		Design C	Copper
		Design D	Brass
	Insulating base	Type A	Noryl GFN1-SE1-701
		Type E	Lexan 500R
Cover	Type E	PC-GF10 FR	
Connections	Electrical connection	Terminal screws → 30 mV Product Line, → 60 mV Product Line	
	Voltage tap	M5 × 8	
Degree of protection	IP00		
Dimensions	→ 30 mV Product Line, → 60 mV Product Line and → Dimension Drawings		
Weight	→ 30 mV Product Line, → 60 mV Product Line and → Dimension Drawings		

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

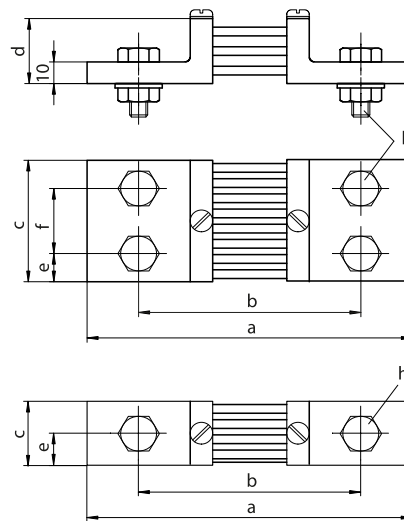
Humidity class	EN 50125-1: T3		
Altitude classes	EN 50125-1: A1, AX		
Pollution degree	EN 50124-1: PD3		
Protective measures	In accordance with EN 50153 WARNING Voltages dangerous to touch! Shunt resistor without insulation. Implement suitable protective measures against directly touching dangerous live parts.		
Mechanical stress (shock and vibration)	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)
A 120 % temperature increase at the copper connection points compared to the ambient temperature is an 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 nominal voltages 750 V to 3000 V DC (for M500HS: $I_{CMF,dyn} = 50$ kA for 100 ms, suitable for systems with nominal voltage 3000 V DC)		
Resistance to increased in-rush 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

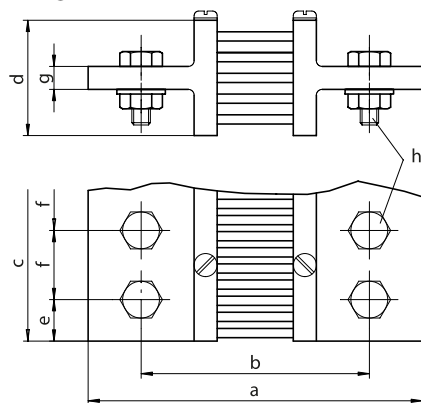
Design A with insulating base type A



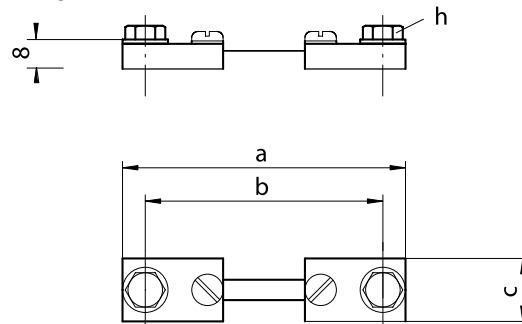
Design B



Design C



Design D



Note: All dimensions are given in millimeters.

Application Example

