

Switchboard Instruments

Moving Iron

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Moving-Iron AC - Current

The instruments are suitable for measurement of AC current.
Moving-iron movement with spring-type oilfilled bearing, non-flammable plastic case according to UL 94-V1, class of accuracy 1.5.

Type	Continuous Overload	Frequency Hz	Consumption	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
144 LA	1,2	50	max. 0,5 VA 40A-100 A max. 2VA	144 x 144 x 120	136 x 136	mA A ct	400 ... 800 1 ... 100 x/5A or /1A
96 LA	1,2	50	max. 0,5 VA 40A-100 A max. 2VA	96 x 96 x 60	92 x 92	mA A ct	400 ... 800 1 ... 100 x/5A or /1A
72 LA	1,2	50	max. 0,5 VA 40A-100 A max. 2VA	72 x 72 x 60	68 x 68	mA A ct	400 ... 800 1 ... 100 x/5A or /1A
48 LA	1,2	50	max. 0,5 VA 40A max. 2 VA	48 x 48 x 60	45 x 45	mA A ct	400 ... 800 1 ... 40A x/5A or /1A



Moving-Iron AC - Voltage

The instruments are suitable for measurement of AC voltage.
Moving-iron movement with spring-type oilfilled bearing, non-flammable plastic case according to UL 94-V1, class of accuracy 1.5.

Type	Continuous Overload	Frequency Hz	Consumption	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
144 LV	1,2	50	max 3 VA	144 x 144 x 120	136 x 136	V vt	6 ... 600 x/100 or /110 V
96 LV	1,2	50	max 3 VA	96 x 96 x 60	92 x 92	V vt	6 ... 600 x/100 or /110 V
72 LV	1,2	50	max 3 VA	72 x 72 x 60	68 x 68	V vt	6 ... 600 x/100 or /110 V
48 LV	1,2	50	max 3 VA	48 x 48 x 60	45 x 45	V vt	6 ... 600 x/100 or /110 V



Moving-Iron Voltmeter with Change Over Switch

The instruments are suitable for measuring AC voltages in 4- or 3-wire networks by using a change over switch displayed on the front side of the instrument (**L1L2, L1L3, L2L3, L1N, L2N, L3N**). Moving-iron movement with spring-type oilfilled bearing, non-flammable plastic case according to UL 94-V1, class of accuracy 1.5.

Type	Continuous Overload	Frequency Hz	Consumption	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
144 Vs	1,2	50	max. 3 VA	144 x 144 x 60	136 x 136	V	60/100 ... 300/500
96 Vs	1,2	50	max. 3 VA	96 x 96 x 76	92 x 92	V	60/100 ... 300/500
72 Vs	1,2	50	max. 3 VA	72 x 72 x 76	68 x 68	V	60/100 ... 300/500

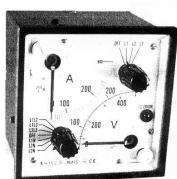
Please order terminal covers separately.



Moving-Iron Ammeter with Change Over Switch

The instruments is suitable for measuring of line current in 3-phase networks. Moving-iron movement with spring-type oilfilled bearing, non-flammable plastic case according to UL 94-V1, class of accuracy 1.5.

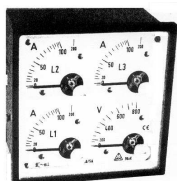
Type	Continuous Overload	Frequency Hz	Consumption	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
96 As	1,2	50	max. 3 VA	96 x 96 x 54	92 x 92	x/1 A or x/5 A (Wandler)	
72As	1,2	50	max. 3 VA	72 x 72 x 54	68 x 68	x/1 A or x/5 A (Wandler)	



Moving-Iron Am- and Voltmeter with Change Over Switches

This instrument is suitable for measuring of line- and phase voltage, as well as line current in 4-wire 3-phase networks. Moving-iron movement with spring-type oilfilled bearing, non-flammable plastic case according to UL 94-V1, class of accuracy 1.5.

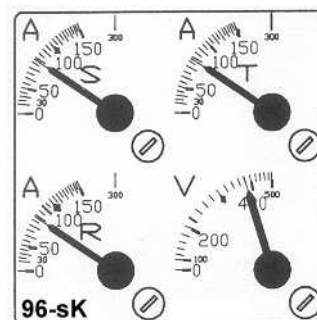
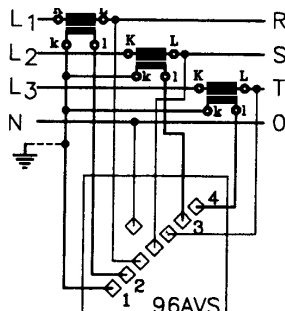
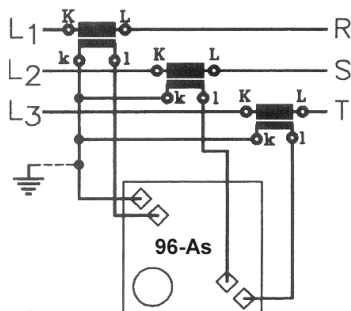
Type	Continuous Overload	Frequency Hz	Consumption	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
96 AVs	1,2	50	max. 3 VA	96 x 96 x 54	92 x 92	x/1 A or x/5 A (ct) + 300/500 V	



Moving-Iron Instruments with Four Systems

The instruments are suitable for simultaneous measurement of AC current and voltage in a 3-phase system (2x current and 1xvoltage). Voltage Measuring ranges are **100/150/250/400/500/600 V**. Moving-iron movement with spring-type oilfilled bearing, non-flammable plastic case according to UL 94-V1, class of accuracy 1.5.

Type	Continuous Overload	Frequency Hz	Consumption	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
144sK	1,2	50	max. 3 VA	144 x144x76	138 x 138	x/1 A or x/5 A (ct) + V-range	
96sK	1,2	50	max. 3 VA	96 x 96 x 76	92 x 92	x/1 A or x/5 A (ct) + V-range	



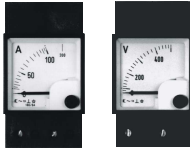
Please order terminal covers separately.



Change Over Switches

This switches are suitable for measuring of line- and phase voltage (6 or 7 positions)

Type		Dimensions W x H x D	Measuring range	List-price €
V30/6 V30/7	Panel mounting, central fixing 37 - 44 mm	48 x 48 x 80	6 or 7 positions	



Moving-Iron Am- and Voltmeter DIN-Rail Mounting

The instruments are suitable for measurement of AC current and voltage. Moving-iron movement with spring-type oilfilled bearing, non-flammable plastic case according to UL 94-V1, class of accuracy 1.5.

Type	Continuous Overload	Frequency Hz	Dimensions W x H x D	Mounting	Measuring range	List-price €
45 LA	1,2	50	45 x 85 x 59	DIN-Rail according to DIN 46277 and EN 50022	mA A A ct 400 ... 600 1 ... 15 20 ... 25 x/5A or /1A	
45 LV	1,2	50	45 x 85 x 59	DIN-Rail according to DIN 46277 and EN 50022	V vt 6 bis 600 x/100 V or /110 V	



Moving-Iron DIN Profile Ammeters

The instruments are suitable for measurement of AC current and voltage. DIN size, Scaling vertical or horizontal.

Type	Continuous Overload	Frequency Hz	Consumption	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
96 spLA	1,2	50	max. 0,5 VA	96 x 48 x 125	92 x 44	mA A Ct 400 ... 600 1 ... 15 x/5A or /1A	
72 spLA	1,2	50	max. 0,5 VA	72 x 36 x 105	68 x 33	mA A ct 400 ... 600 1 ... 15 x/5A or /1A	



Moving-Iron DIN Profile Voltmeters

The instruments are suitable for measurement of AC current and voltage. DIN size, Scaling vertical or horizontal.

Type	Continuous Overload	Frequency Hz	Consumption	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
96 spLV	1,2	50	max. 3 VA	96 x 48 x 125	92 x 44	V vt 6 ... 600 x/100 V or /110 V	
72 spLV	1,2	50	max. 3 VA	72 x 36 x 105	68 x 33	V vt 6 ... 600 x/100 V or /110 V	

Please order terminal covers separately.



Maximum Demand Bimetal + Moving-Iron Instruments

The bimetal instruments are suitable for measuring the mean value of a current flowing through the bimetal for a fixed time. The red slave pointer remains always deflected at the maximum value and may be reseted. The moving iron movement indicates the instantaneous current.

Type	Continuous Overload	Response Time	Consumption	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
96 BL	1,2	15 min. , 8 min on request	max. 3,5 VA	x/1A 96 x 96 x 52 x/5A 96 x 96 x 52	92 x 92	A ct	5 ... 4000 x/5A or /1A
72 BL	1,2	15 min. , 8 min on request	max. 3,5 VA	x/1A 72 x 72 x 60 x/5A 72 x 72 x 60	68 x 68	A ct	5 ... 4000 x/5A or /1A
48 BL	1,2	15 min. , 8 min on request	max. 3,5 VA	x/1A 48 x 48 x 105 x/5A 48 x 48 x 90	45 x 45	A ct	5 ... 4000 x/5A or /1A



Maximum Demand Bimetal Instruments

The bimetal instruments are suitable for measuring the mean value of a current flowing through the bimetal for a fixed time. The red slave pointer remains always deflected at the maximum value and may be reseted.

Type	Continuous Overload	Response Time	Consumption	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
96 B	1,2	15 min. , 8 min on request	max. 3 VA	x/1A 96 x 96 x 52 x/5A 96 x 96 x 52	92 x 92	A ct	5 ... 4000 x/5A or /1A
72 B	1,2	15 min. , 8 min on request	max.3 VA	x/1A 72 x 72 x 60 x/5A 72 x 72 x 60	68 x 68	A ct	5 ... 4000 x/5A or /1A
48 B	1,2	15 min. , 8 min on request	max. 3 VA	x/1A 48 x 48 x 100 x/5A 48 x 48 x 70	45 x 45	A ct	5 ... 4000 x/5A or /1A

Please order terminal covers separately.



Moving-Coil Ammeters

The instruments are suitable for measurement of DC current. Magnet core, moving-coil movement with pivot spring-type bearing, non-flammable plastic case according to UL 94-V1, class of accuracy 1.5.

Type	Continuous Overload	Dimensions W x H x D	Panel Cutout mm	Measuring range	List- price €
144 DA	1,2	< = 6A 144 x 144 x 62 > = 10A 144 x 144 x 74	136 x 136	μA 50 ... 800 mA 1 ... 800 mA 4-20 A 1 ... 40	
96 DA	1,2	< = 6A 96 x 96 x 53 > = 10A 96 x 96 x 68	92 x 92	μA 50 ... 800 mA 1 ... 800 mA 0-20 mA 4-20 A 1 ... 15 A 20 ... 100	
72 DA	1,2	< = 6A 72 x 72 x 53 > = 10A 72 x 72 x 68	68 x 68	μA 50 ... 800 mA 1 ... 800 mA 0-20 mA 4-20 A 1 ... 15 A 20 ... 60	
48 DA	1,2	< = 6A 48 x 48 x 53 > = 10A 48 x 48 x 68	45 x 45	μA 50 ... 800 mA 1 ... 800 mA 0-20 mA 4-20 A 1 ... 15 A 20 ... 40	



Moving-Coil Voltmeters

The instruments are suitable for measurement of DC voltage. Magnet core, moving-coil movement with pivot spring-type bearing, non-flammable plastic case according to UL 94-V1, class of accuracy 1.5.

Type	Continuous Overload	Dimensions W x H x D	Panel Cutout mm	Measuring range	List- price €
144 DV	1,2	< = 6 V 144 x 144 x 62 > = 10V 144 x 144 x 74	136 x 136	mV 60 ... 600 V 1 ... 600 Shunt x/60 mV or /150	
96 DV	1,2	< = 6 V 96 x 96 x 53 > = 10V 96 x 96 x 68	92 x 92	mV 60 ... 600 V 1 ... 600 Shunt x/60 mV or /150	
72 DV	1,2	< = 6 V 72 x 72 x 53 > = 10V 72 x 72 x 68	68 x 68	mV 60 ... 600 V 1 ... 600 Shunt x/60 mV or /150	
48 DV	1,2	< = 6 V 48 x 48 x 53 > = 10V 48 x 48 x 68	45 x 45	mV 60 ... 600 V 1 ... 600 Shunt x/60 mV or /150	

Please order terminal covers separately.



Moving-Coil Ammeters 240° Scale

The instruments are suitable for measurement of DC current.

Magnet core, moving-coil movement with pivot spring-type bearing, non-flammable plastic case according to UL 94-V1, class of accuracy 1.5.

Type	Continuous Overload	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
144 cDA	1,2	144 x 144 x 120	136 x 136	μA 100 ... 600 mA 1 ... 800 mA 4 - 20 A 1 ... 10	
96 cDA	1,2	96 x 96 x 60	92 x 92	μA 100 ... 600 mA 1 ... 800 mA 4 - 20 A 1 ... 10	
72 cDA	1,2	72 x 72 x 60	68 x 68	μA 100 ... 600 mA 1 ... 800 mA 4 - 20 A 1 ... 10	

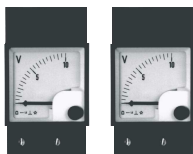


Moving-Coil Voltmeter 240° Scale

The instruments are suitable for measurement of DC voltage.

Magnet core, moving-coil movement with pivot spring-type bearing, non-flammable plastic case according to UL 94-V1, class of accuracy 1.5.

Type	Continuous Overload	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
144 cDV	1,2	144 x 144 x 120	136 x 136	mV 60 ... 600 V 1 ... 600	
96 cDV	1,2	96 x 96 x 60	92 x 92	mV 60 ... 600 V 1 ... 600	
72 cDV	1,2	72 x 72 x 60	68 x 68	mV 60 ... 600 V 1 ... 600	



Moving-Coil Am- and Voltmeter DIN-Rail Mounting

The instruments are suitable for measurement of DC voltage.

Magnet core, moving-coil movement with pivot spring-type bearing, non-flammable plastic case according to UL 94-V1, class of accuracy 1.5.

Type	Continuous Overload	Mounting	Dimensions W x H x D	Measuring range	List-price €
45 DA	1,2	DIN-Rail according to DIN 46277 and EN 50022	45 x 85 x 59	μA 100 ... 600 mA 1 ... 600 mA 4 - 20 A 1 ... 10	
45 DV	1,2	DIN-Rail according to DIN 46277 and EN 50022	45 x 85 x 59	V 6 ... 600 Shunt x/60 mV or /150	

Please order terminal covers separately.



Moving-Coil DIN Profile Ammeters DC

The instruments are suitable for measurement of DC current.
DIN size, Scaling vertical or horizontal.

Type	Continuous Overload		Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
144 spDA	1,2h		144 x 72 x 170	138 x 68	μA 100 ... 600 mA 1 ... 600 mA 4 - 20 A 1 ... 10	
96 spDA	1,2		96 x 48 x 125	92 x 44	μA 100 ... 600 mA 1 ... 600 mA 4 - 20 A 1 ... 10	
72 spDA	1,2		72 x 36 x 105	68 x 33	μA 100 ... 600 mA 1 ... 600 mA 4 - 20 A 1 ... 10	



Moving-Coil DIN Profile Ammeters DC

The instruments are suitable for measurement of DC current.
DIN size, Scaling vertical or horizontal.

Type	Continuous Overload	Option	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
96 vA	1,2	Available for x/1 A ct connection	96 x 24 x 125	91,5 x 22,5	μA 50 ... 600 mA 1 ... 600 mA 4 - 20 A AC x/1	
72 vA	1,2	Available for x/1 A ct connection	72 x 24 x 92	67 x 22,2	μA 50 ... 600 mA 1 ... 600 mA 4 - 20 A AC x/1	
48 vA	1,2	Available for x/1 A ct connection	48 x 24 x 68	43,2 x 22,2	μA 50 ... 600 mA 1 ... 600 mA 4 - 20 A AC x/1	



Moving-Coil DIN Profile Voltmeters DC

The instruments are suitable for measurement of DC voltage.
DIN size, Scaling vertical or horizontal.

Type	Continuous Overload		Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
144spDV	1,2		144 x 72 x 170	138 x 68	mV 60 ... 600 V 1 ... 600 Shunt x/60 mV or /150	
96 spDV	1,2		96 x 48 x 125	92 x 44	mV 60 ... 600 V 1 ... 600 Shunt x/60 mV or /150	
72 spDV	1,2		72 x 36 x 105	68 x 33	mV 60 ... 600 V 1 ... 600 Shunt x/60 mV or /150	

Please order terminal covers separately.



Moving-Coil DIN Profile Voltmeters DC

The instruments are suitable for measurement of DC voltage.
DIN size, Scaling vertical or horizontal.

Type	Continuous Overload	Option	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
96 vV	1,2	Available with rectifier for AC - Voltage	96 x 24 x 125	91,5 x 22,5	mV V	60 ... 600 1 ... 600
72 vV	1,2	Available with rectifier for AC - Voltage	72 x 24 x 92	67 x 22,2	mV V	60 ... 600 1 ... 600
48 vV	1,2	Available with rectifier for AC - Voltage	48 x 24 x 68	43,2 x 22,2	mV V	60 ... 600 1 ... 600



Moving-Coil DIN Profile with 2 Limit Value Switches

The instruments are suitable for measurement of DC current.
DIN size, Scaling vertical or horizontal. Open collector Output.

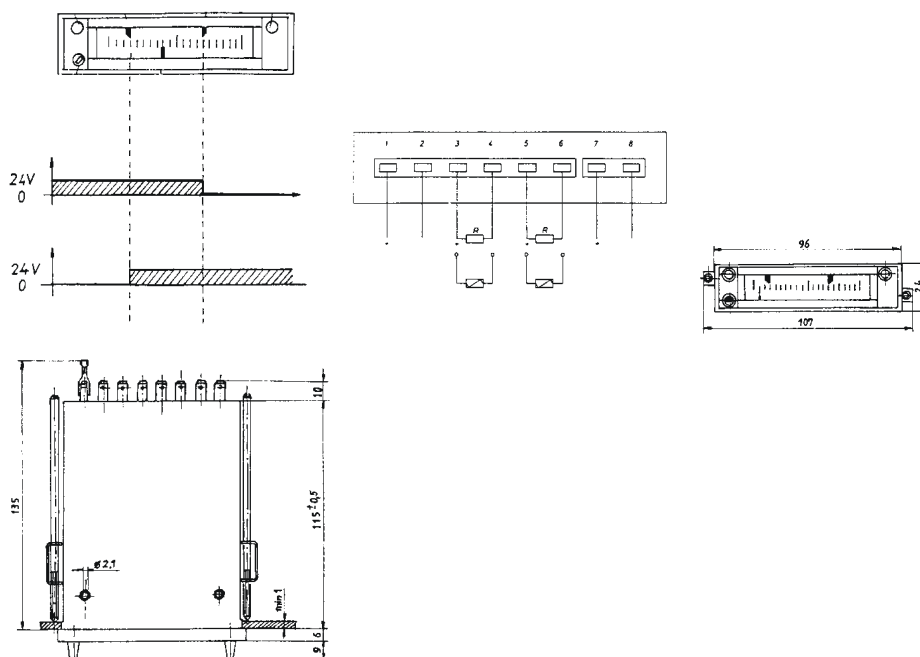
Type	Continuous Overload	Aux. Voltage	Load	Consumption	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
96 vAK	1,2	24 VDC	max. 50mA	max. 5 W	96 x 24 x 125	91,5 x 22,5	μA 100 ... 600 mA 1 ... 600 mA 4-20 A 1 ... 6 ct x.../1A	



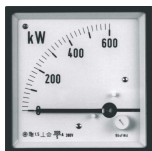
Moving-Coil DIN Profile with 2 Limit Value Switches

The instruments are suitable for measurement of DC voltage.
DIN size, Scaling vertical or horizontal. Open collector Output.

Type	Continuous Overload	Aux. Voltage	Load	Consumption	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
96 vVK	1,2	24 VDC	max. 50mA	max. 5 W	96 x 24 x 125	91,5 x 22,5	mV V	60 ... 600 1 ... 600



Please order terminal covers separately.

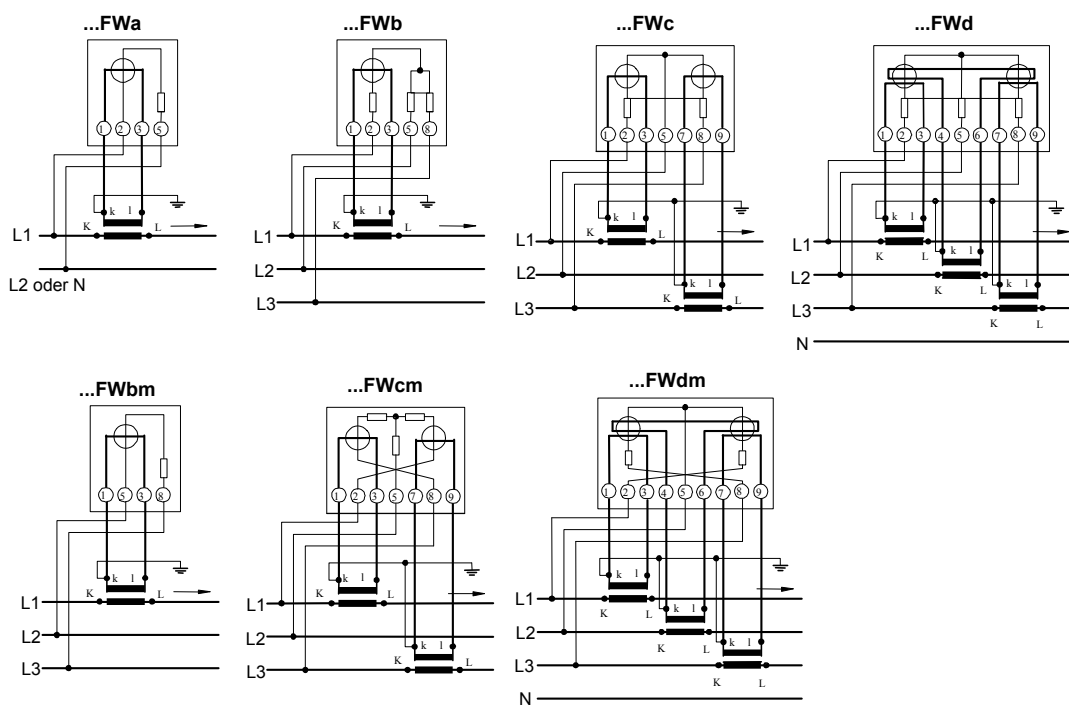


Ferrodynamic Power - and Reactive Power Meters

The instruments are suitable for measuring active (KW) and reactive power (Kvar) in single or three-phase alternating current networks as it shown by the tables.

The types FWbm, FWcm and FWdm are Reactive Power Meters.

Type	Continuous Overload	Freq. Hz	Consumption	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
144 FWa	1,2	50	max. 3,5 VA	144 x 144 x 90	136 x 136	V ct	100 ... 500 x.../5A or /1A
96 FWa	1,2	50	max. 3,5 VA	96 x 96 x 87	92 x 92	V ct	100 ... 500 x.../5A or /1A
144 FWb	1,2	50	max. 3,5 VA	144 x 144 x 90	136 x 136	V ct	100 ... 500 x.../5A or /1A
96 FWb	1,2	50	max. 3,5 VA	96 x 96 x 87	92 x 92	V ct	100 ... 500 x.../5A or /1A
144 FWc	1,2	50	max. 3,5 VA	144 x 144 x 121	136 x 136	V ct	100 ... 500 x.../5A or /1A
96 FWc	1,2	50	max. 3,5 VA	96 x 96 x 120	92 x 92	V ct	100 ... 500 x.../5A or /1A
144 FWd	1,2	50	max. 5,5 VA	144 x 144 x 121	136 x 136	V ct	100 ... 500 x.../5A or /1A
96 FWd	1,2	50	max. 5,5 VA	96 x 96 x 120	92 x 92	V ct	100 ... 500 x.../5A or /1A
144 FWbm	1,2	50	max. 3,5 VA	144 x 144 x 90	136 x 136	V ct	100 ... 500 x.../5A or /1A
96 FWbm	1,2	50	max. 3,5 VA	96 x 96 x 87	92 x 92	V ct	100 ... 500 x.../5A or /1A
144 FWcm	1,2	50	max. 3,5 VA	144 x 144 x 121	136 x 136	V ct	100 ... 500 x.../5A or /1A
96 FWcm	1,2	50	max. 3,5 VA	96 x 96 x 120	92 x 92	V ct	100 ... 500 x.../5A or /1A
144 FWdm	1,2	50	max. 5,5 VA	144 x 144 x 121	136 x 136	V ct	100 ... 500 x.../5A or /1A
96 FWdm	1,2	50	max. 5,5 VA	96 x 96 x 120	92 x 92	V ct	100 ... 500 x.../5A or /1A



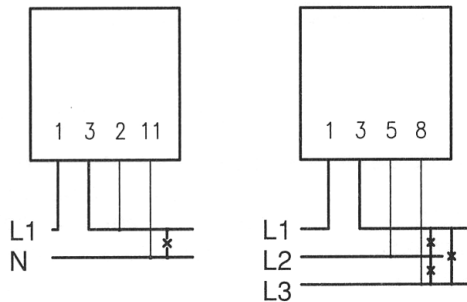
Please order terminal covers separately.



Electronic Power Factor Meters

The instruments are suitable for measuring power factor ($\cos \phi$) in single or three-phase alternating current networks as it shown by the tables.

Type	Continuous Overload	Freq. Hz	Consumption	Dimensions W x H x D	Panel Cutout mm	Measuring range		List-price €
96 eQa	1,2	50	max. 1,5 VA	96 x 96 x 76	92 x 92	V cap. cap. ct	100 ... 400 0,5-1-0,5 ind. 0,8-1-0,2 ind x.../5A .../1A	
72 eQa	1,2	50	max. 1,5 VA	72 x 72 x 102	68 x 68	V cap. cap. ct	100 ... 400 0,5-1-0,5 ind. 0,8-1-0,2 ind x.../5A .../1A	
96 eQb	1,2	50	max. 1,5 VA	96 x 96 x 76	92 x 92	V cap. cap. ct	100 ... 400 0,5-1-0,5 ind. 0,8-1-0,2 ind x.../5A .../1A	
72 eQb	1,2	50	max. 1,5 VA	72 x 72 x 102	68 x 68	V cap. cap. ct	100 ... 400 0,5-1-0,5 ind. 0,8-1-0,2 ind x.../5A .../1A	



72eQa, 96eQa, , 72eQb, 96eQb,



96 sh, 72 sh



48 sh

Elapsed Time Meters

With synchronous motor drive, without manual reset, 6 digits, will show "0" after reaching of 99.999,9 h, quadratic DIN case.

Type	Digits	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
96 sh	6	96 x 96 x 60	92 x 92	230 VAC 400 VAC 50Hz or 60Hz	
72 sh	6	72 x 72 x 60	68 x 68	230 VAC 400 VAC 50Hz or 60Hz	
48 sh	6	48 x 48 x 28	45 x 45	230 VAC 400 VAC 50Hz or 60Hz 24 VDC	

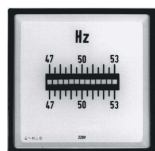
Please order terminal covers separately.



Moving Coil Frequency Meters

The instruments are suitable for measuring frequency in sinusoidal AC circuits. Magnet core, moving-coil movement with pivot spring-type bearing, class of accuracy 0.5.

Type	Voltage	Consumption	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
96 DP	V 100/110/230/400/500	max. 15 mA	96 x 96 x 76	92 x 92	45-55/55-65 Hz	
72 DP	V 100/110/230/400/500	max. 15 mA	72 x 72 x 76	68 x 68	45-55/55-65 Hz	



Reed Frequency Meters

The instruments are suitable for measuring frequency in sinusoidal AC circuits. Vibrating-reed movement with reeds tuned to 1/2 Hz, Class of accuracy 0.5.

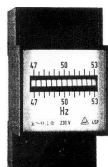
Type	Voltage	Scale Subdivisions	Consumption	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
144 P-1	V 100/110/230/400/500	1/2 Hz	max. 1,5VA	144 x 144 x 75	138 x 138	47-53/57-63 Hz, 13 reeds	
96 P-1	V 100/110/230/400/500	1/2 Hz	max. 1,5VA	96 x 96 x 56	92 x 92	47-53/57-63 Hz, 13 reeds	
72 P-1	V 100/110/230/400/500	1/2 Hz	max. 1,5VA	72 x 72 x 60	68 x 68	47-53/57-63 Hz, 13 reeds	
48 P-1	V 100/110/230/400/500	1/2 Hz	max. 1,5VA	48 x 48 x 62	45 x 45	47-53/57-63 Hz, 13 reeds	



Reed Frequency Meters

The instruments are suitable for measuring frequency in sinusoidal AC circuits. Vibrating-reed movement with reeds tuned to 1/2 Hz, Class of accuracy 0.5.

Type	Voltage	Scale Subdivisions	Consumption	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
144 P	V 100/110/230/400/500	1/2 Hz	max. 1,5VA	144 x 144 x 75	138 x 138	45-55/55-65 Hz, 21 reeds	
96 P	V 100/110/230/400/500	1/2 Hz	max. 1,5VA	96 x 96 x 56	92 x 92	45-55/55-65 Hz, 21 reeds	

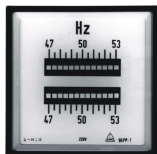


Reed Frequency Meters DIN Rail Mounting

The instruments are suitable for measuring frequency in sinusoidal AC circuits. Vibrating-reed movement with reeds tuned to 1/2 Hz, Class of accuracy 0.5.

Type	Reeds	Class	Abmessung B x H x T	Mounting	Measuring range	List-price €
45 P	13	0.5	45 x 85 x 59	DIN-Rail according to DIN 46277 and EN 50022	47 ... 50 ... 53 Hz 100/110/115/230/400 V	
45 P	13	0.5	45 x 85 x 59	DIN-Rail according to DIN 46277 and EN 50022	57 ... 60 ... 63 Hz 100/110/115/230/400 V	

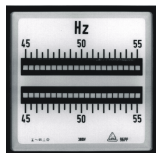
Please order terminal covers separately.



Double Reed Frequency Meters

The instruments are suitable for measuring frequency in sinusoidal AC circuits. Vibrating-reed movement with reeds tuned to $\frac{1}{2}$ Hz, Class of accuracy 0.5.

Type	Voltage	Scale Subdivisions	Consumption	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
144 PP-1	V 100/110/230/400/500	$\frac{1}{2}$ Hz	max. 1,5VA	144 x 144 x 75	138 x 138	47-53/57-63 Hz, 2 x 13 reeds	
96 PP-1	V 100/110/230/400/500	$\frac{1}{2}$ Hz	max. 1,5VA	96 x 96 x 56	92 x 92	47-53/57-63 Hz, 2 x 13 reeds	



Double Reed Frequency Meters

The instruments are suitable for measuring frequency in sinusoidal AC circuits. Vibrating-reed movement with reeds tuned to $\frac{1}{2}$ Hz, Class of accuracy 0.5.

Type	Voltage	Scale Subdivisions	Consumption	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
144 PP	V 100/110/230/400/500	$\frac{1}{2}$ Hz	max. 1,5VA	144 x 144 x 75	138 x 138	45-55/55-65 Hz, 2 x 21 reeds	
96 PP	V 100/110/230/400/500	$\frac{1}{2}$ Hz	max. 1,5VA	96 x 96 x 56	92 x 92	45-55/55-65 Hz, 2 x 21 reeds	

Please order terminal covers separately.



Zero Voltmeter

The instruments are used as synchroscope. At equal voltage and frequency the instrument will indicate zero when the two circuitries are in phase.

Type	Continuous Overload	Freq. Hz	Consumption	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
144 LV/0	1,2	50	max 3 VA	144 x 144 x 85	136 x 136	V 115/230, 230/460 400/800, 500/1000 50 Hz	
96 LV/0	1,2	50	max 3 VA	96 x 96 x 62	92 x 92	V 115/230, 230/460 400/800, 500/1000 50 Hz	



Moving Iron Double Voltmeters

The instruments are suitable for measuring AC voltage in two networks at once.

Type	Continuous Overload	Freq. Hz	Consumption	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
96 LVV	1,2	50	max 2 x 3 VA	96 x 96 x 124	92 x 92	V 2 x 100, 2 x 250 2 x 500, 2 x 600 50 Hz	



Synchroscope

The instrument are used for synchroising of 2 systems. It indicates if the alternator to be coupled, is more or less advanced or retarded with respect to mains or another generator.

Type	Voltage tolerance	Frequency Hz	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
96 SY 1phase	± 15%	50 ± 1% oder 60 ± 1%	96 x 96 x 117	92 x 92	V 100 ... 500	
96 SY 3phase	± 15%	50 ± 3% oder 60 ± 3%	96 x 96 x 117	92 x 92	V 100 ... 500	



Phase Sequence Indicator

The instruments are suitable to indicate the phase sequence in a three-phase system.

Type	Indication	Freq. Hz	Voltage	Dimensions W x H x D	Panel Cutout mm	Measuring range	List-price €
96 FS	with LED	45-55	200-600 V	96 x 96 x 56	92 x 92	V 100 ... 600 50 Hz ... 60 Hz	

Please order terminal covers separately.

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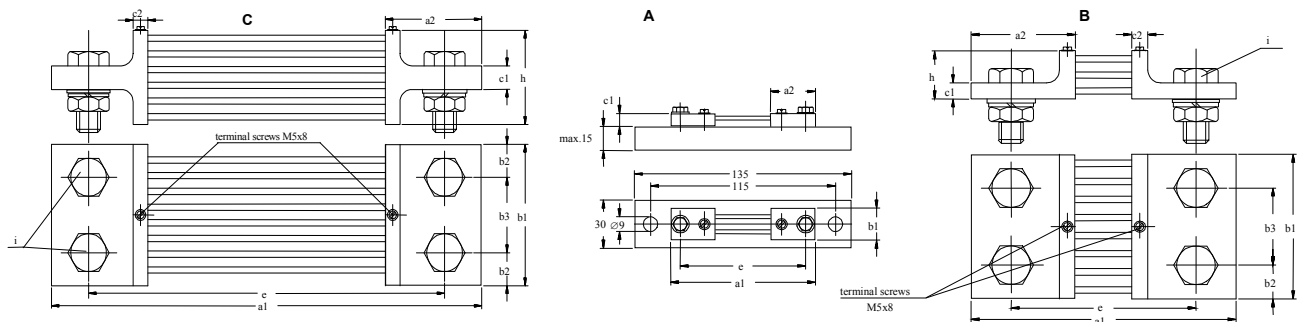


Shunts 60 mV und 150 mV

Shunts provide an accurate DC millivolt signal to drive moving-coil ammeters and control devices. They supply a voltage output proportional to the DC current which is measured for a instruments with dial calibrated in amperes.

Type	Output voltage	Construction	Measuring range	List-price €
S-1	.../60 mV	Up to 25 A with insulation base	A 1 ... 25	
S-1	.../60 mV	Without insulation base	A 40 ... 100	
S-1	.../60 mV	Without insulation base	A 150	
S-1	.../60 mV	Without insulation base	A 200	
S-1	.../60 mV	Without insulation base	A 250	
S-1	.../60 mV	Without insulation base	A 300	
S-1	.../60 mV	Without insulation base	A 400	
S-1	.../60 mV	Without insulation base	A 500	
S-1	.../60 mV	Without insulation base	A 600	
S-1	.../60 mV	Without insulation base	A 750	
S-1	.../60 mV	Without insulation base	A 800	
S-1	.../60 mV	Without insulation base	A 1000	
S-1	.../60 mV	Without insulation base	A 1200	
S-1	.../60 mV	Without insulation base	A 1500	
S-1	.../60 mV	Without insulation base	A 2000 ... 4000	

Type	Output voltage	Construction	Measuring range	List-price €
S-2	.../150 mV	Up to 25 A with insulation base	A 1 ... 25	
S-2	.../150 mV	Without insulation base	A 40 ... 60	
S-2	.../150 mV	Without insulation base	A 100	
S-2	.../150 mV	Without insulation base	A 150	
S-2	.../150 mV	Without insulation base	A 200	
S-2	.../150 mV	Without insulation base	A 250	
S-2	.../150 mV	Without insulation base	A 300	
S-2	.../150 mV	Without insulation base	A 400	
S-2	.../150 mV	Without insulation base	A 500	
S-2	.../150 mV	Without insulation base	A 600	
S-2	.../150 mV	Without insulation base	A 750	
S-2	.../150 mV	Without insulation base	A 800	
S-2	.../150 mV	Without insulation base	A 1000	
S-2	.../150 mV	Without insulation base	A 1200	
S-2	.../150 mV	Without insulation base	A 1500	
S-2	.../150 mV	Without insulation base	A 2000 ... 2500	



Type	S-1 Dimensions (mm)										
Output voltage	60 mV										
Measuring range A	Drawing	a ₁	a ₂	b ₁	b ₂	b ₃	c ₁	c ₂	e	h	i
1	A with insulation base	90	28	20	-	-	8	-	78	-	M5x12
1,5											
2,5											
4											
6											
10											
15											
25	A	100	33	20	-	-	8	-	80	-	M8x15
40											
60											
100											
150											
250											
400											
600	B	145	55	30	15	-	10	10	105	30	M12x40
1000				40	20						M16x45
1500				40	20						M16x45
ab 2000				60	30	-	10	10	115	30	M20x50
	90	21	48	M16x45							
	on request										

Type	S-2 Dimensions (mm)										
Output voltage	150 mV										
Measuring range A	Drawing	a ₁	a ₂	b ₁	b ₂	b ₃	c ₁	c ₂	e	h	i
1	A with insulation base	90	28	20	-	-	8	-	78	-	M5x12
1,5											
2,5											
4											
6											
10											
15											
25	A	225	33	25	-	-	8	-	205	-	M8x15
40											
60											
100											
150											
250											
400											
600	B	270	55	30	15	-	10	10	230	50	M12x50
1000				40	20	-					M16x45
1500				40	20	-					M16x45
ab 2000				290	65	70	10	10	240	60	M20x50
	C	290	65	90	21	48	15	10	240	60	M16x60
	on request										