from 01.03.2022
plus 6,8%
surcharge

MÜLLER ZIEGLER
Elektrische Messgeräte

PRODUCT CATALOG

MEASURING TRANSDUCER • MAINS AND LIMIT MONITORING • ENERGY METERS • UNIVERSAL MEASURING INSTRUMENTS • PANEL METERS ANALOG AND DIGITAL • CURRENT TRANSFORMERS • ELECTRIC SHUNTS • TEST APPARATUS

www.mueller-ziegler.de

made in germany

"Precision for all and maximum requirements are our strength"

MÜLLER ZIEGLER Elektrische Messgeräte

LÜBERG TECHNOLOGIE-HOLDING

Measure us by our benefit for you!
Much has been changed, developed and renewed in over 100 years history. But the good tradition was preserved!

In 1911 Müller+Ziegler is founded Max Müller and Karl Ziegler.

In 1930 Georg Beck becomes Managing Director and in1950 sole owner of the company.
The company was three generations under the management of the Beck Family.

In 2020 became part of a regulated Successor solution from Lüberg Technolgieholding GmbH accepted.

"Precision and Service" are based on long-standing experience: Quality assurance and the competence for individual solutions.

Good tradition has a future!

Much has changed in over 100 years: From the continuous development of the products in cooperation with our customers it became **innovative measurement technology for the global market!**

Our thinking - our actions

Our **fair and committed cooperation** with customers and suppliers are the solid basis for a trusting partnership. We owe this success not least to ours competent and highly motivated team.

Development and quality assurance

Find an innovative solution for every requirement, whether modern multifunctional instruments or analog measurement technology: We are continuously developing our products.

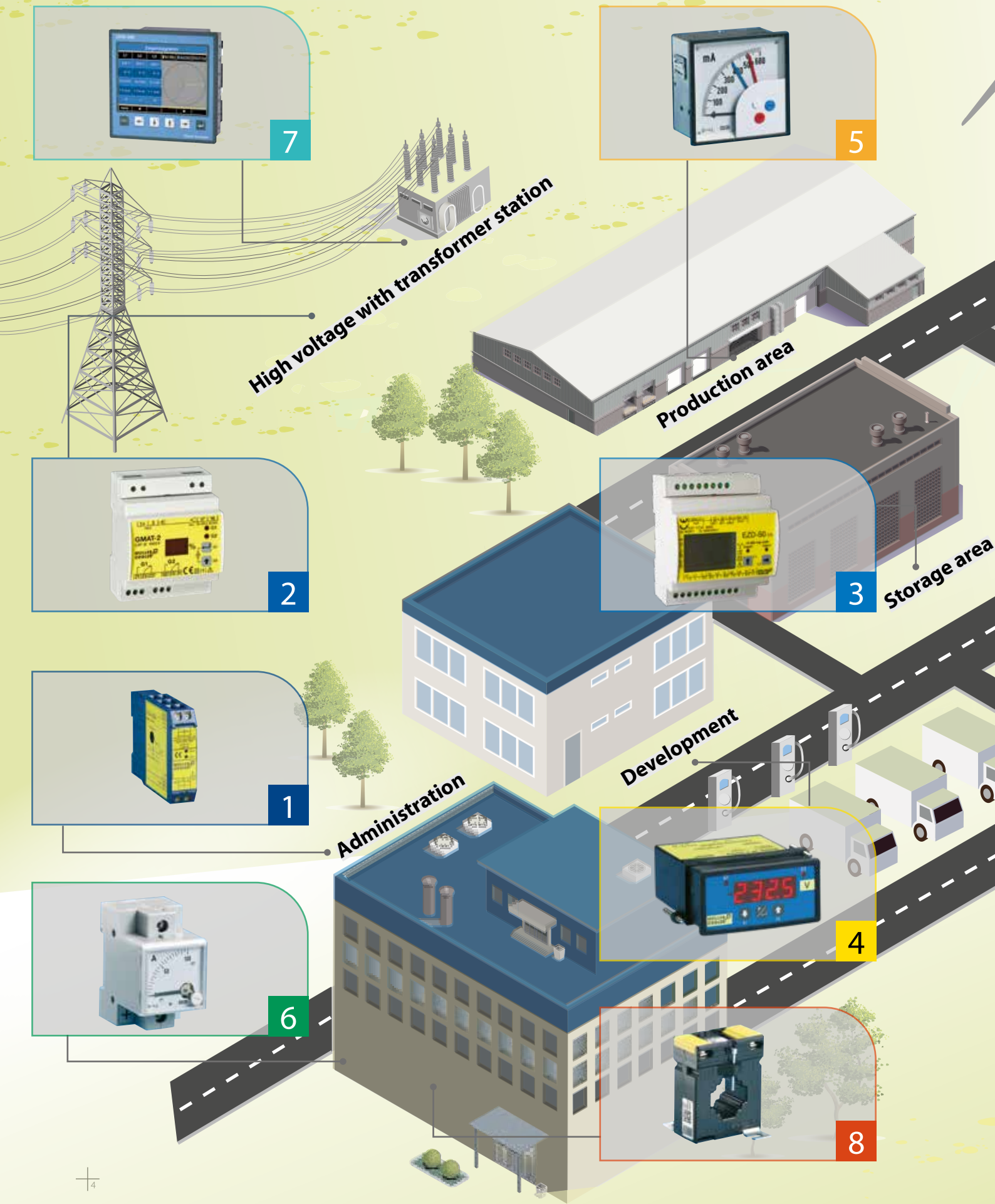
Assuring quality: This is what we work for every day!

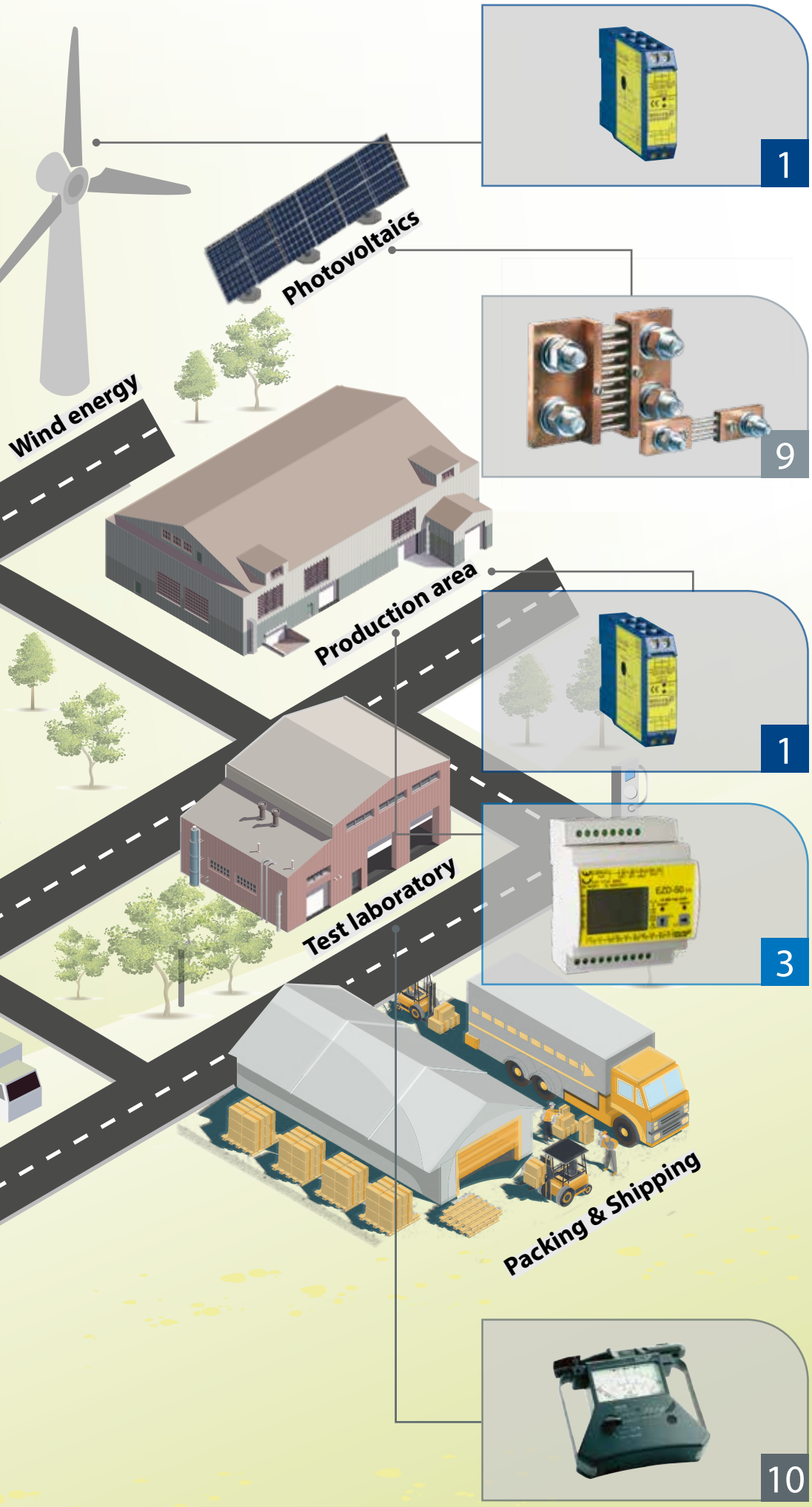
made in germany

We focus on production **"Made in Germany"** from day one – for **fast and lossless communication between all company areas**, from development to production, the sales up to the management.

MÜLLER ZIEGLER Elektrische Messgeräte

INNOVATIVE • PRECISE • COMPETENT






DIw-MU


Iw-MU


Uw-MU


Ieff-MU, Ueff-MU


IeffT-MU, UeffT-MU


F-MU


Phwd-MU


Pw-MU, Pz-MU, Pnz-MU, Pd-MU, Pdr-MU


PwB-MU, PzB-MU, PnzB-MU, PdB-MU, PdrB-MU


MFPw-MU, MFPz-MU, MFPnz-MU, MFPd-MU, MFPdr-MU


Multi-E4-MU


Multi-E11-MU


Multi-E-MU


PGs-MU


PGsT-MU


IgT-MU, UgT-MU


IgTT-MU, UgTT-MU


NgT-MU


NoH-MU


Pt-MU


Th-MU


W-MU


TSM-MU


DMS-MU


D-MU


Sum-MU

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Notice

General description of measuring transducers

Application

Measuring transducers are designed for the conversion and galvanic isolation of varied measuring signals in heavy-current and weak-current engineering. The input variable is converted to a proportional output signal to standard values of e.g. 20 mA and (or) 10 V. A frequency or pulse output is possible as well. Measuring transducers are indispensable where measuring values must be transmitted over long distances or at different locations for indication and evaluation.

Type and function

The output signal is an impressed direct current and (or) direct voltage; it is nonsensitive to interference signals, external magnetic fields as well as to distortion due to signal lines of varying lengths. Within the load range, the accuracy remains uninfluenced by different internal resistances of individual or also several evaluation instruments, like e.g. switchgear and measuring devices, controlling equipment, recorders, PLC systems etc. (when using both outputs simultaneously, the max. current which may be supplied to the voltage output is 1 mA, connecting both outputs is not permissible). In case of most measuring transducers, an auxiliary voltage is generated from the measuring voltage, an additional auxiliary voltage ist not required.
Measuring transducers have a fully electronic design and dispose of no mechanical parts; they are thus largely immune to environmental influences and suited for use under rough operating conditions.

Special features

- Simple installation, no programming required
- Accuracy class 0,5
- Analog (continuous) measurement
- Analog output immune to noise
- Setting option of zero point and span from front side
- Double output
- Calibrated double output switchable at the front using switch between 0-20 mA / 0-10 V and 4-20 mA / 2-10 V for transducers for direct current variables, rms value, process parameters and operands.
- To be combined with frequency output and relay module
- 4 kV up to 7,2 kV test voltage, also in case of DC auxiliary voltage between input, output and auxiliary voltage
- All transducers also with auxiliary voltage for 36-265 V AC + DC or 6-30 V AC + DC and 4 kV test voltage
- Small design (22.5 mm housing width)

Technical data

General specifications	EMC	DIN EN 61 326
	(for DC auxiliary voltage and multi voltage power supply)	DIN EN 61 326 class A
	Mechanical strength	DIN EN 61 010 part 1
	Electrical safety	DIN EN 61 010 part 1 and DIN EN 61 010 part 2-030 Housing insulated, protection class II, ● for working voltages up to 300 V (phase to neutral) pollution degree 2, measuring category CAT III ● for working voltages up to 600 V (phase to neutral) pollution degree 2, measuring category CAT III ● for working voltages up to 1000 V (phase to neutral) pollution degree 2, measuring category CAT III for types leffT-MU / UeffT-MU / IgTT-MU / UgTT-MU / PGsT-MU
	Accuracy, overload	DIN EN 60 688
	Isolation	DIN EN 61 010 part 1, 3,7 kV 50 Hz, 10 sec.
	Air and creep distances	DIN EN 61 010 part 1
	IP code	DIN EN 60 529, housing IP 30, terminals IP 20
	Connection	DIN 43807
	Housing	Polycarbonat (self extinguishing acc. to UL 94 V-0)
	Max. tightening torque of terminals	0,8 Nm

Test report

Measuring transdurcer	€ 55,- net
Universal measuring transducer:	
Multi-E11-MU	€ 340,- net
Multi-E4-MU	€ 170,- net
Multi-E-MU	€ 170,- net

from 01.03.2022 plus. 6,8 % surcharge

Frequency output for measuring transducers

(frequency module)

Type:
FM

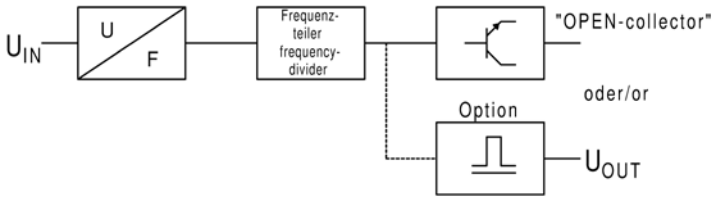
from 01.03.2022 plus. 6,8 % surcharge

Application

The frequency module is integrated in a measuring transducer and serves for converting the input variable of the measuring transducer into a frequency.

Function

The variable generated by the measuring transducer proportionally to the input is transmitted to a voltage frequency converter and is converted into a pulse train there. A subsequent divider determines the frequency. It is made available as a square-wave signal or as "open-collector"output.



Technical data

Input	Arbitrary measuring transducer	
Output	Output variable	Frequency
	Nominal value	a value from 0- 5Hz to 0-10 kHz
	OPEN collector	NPN, max. 30 V, max. load 100 mA
	Option	square-wave signal 5 V, max. load 10 mA
	Pulse / pause	50 / 50 %
Transfer behavior	Accuracy	± 0,5 %
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influece	< 0,3 % at 10 K
	Auxiliary voltage influence	no
	Burden influence	no
	External magnetic field influence	no (400 A/m)
	Response time	< 400 ms
	Limiting	max. 2-fold in case of overload
	Test voltage	4 kV between input, output, auxiliary voltage

Remarks:
The frequency module is installed in the measuring transducer used. This does not cause any changes to the housing dimensions.
By installing the frequency module in the measuring transducer, further outputs are not available!.

Price

FM	€ 29,30

Price group B

Relay module for measuring transducers

for limit value monitoring

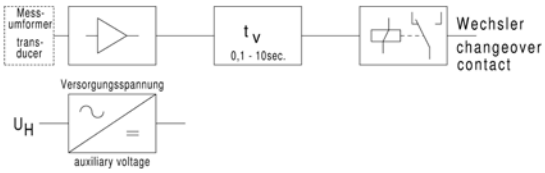
Type:
GWM

from 01.03.2022
plus. 6,8 %
surcharge

Application

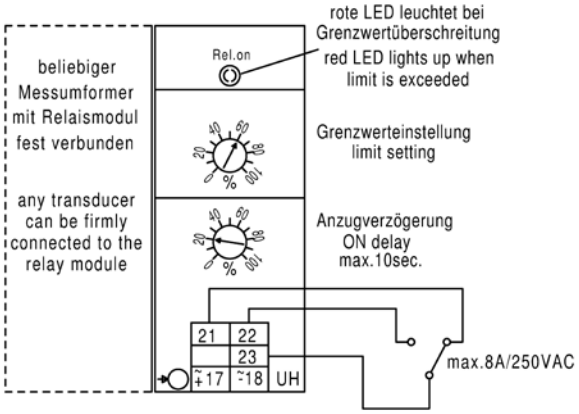
The relay module can only be used in connection with a measuring transducer and serves for monitoring of a set limit value triggering a relay when being exceeded.

Function



The variable generated by the measuring transducer proportionally to the input is transmitted to a comparator and is compared to the set limit value (0-100 %) there. Thereafter, the comparative value is sent to a driver stage via an adjustable timing element (0.1-10 s) where the stage then activates the output relay and the LED display.
The relay module is permanently connected to the measuring transducer.

Connection



Technical Data

Input	Arbitrary measuring transducer	
	Limit value adjustment	0-100 %
	Relay contact	1 changeover contact
	Function indicator	red LED lights up with relay energized
	Test voltage	4 kV between measuring input and relay contact
Switching characteristics	Switching accuracy	± 5 % of full scale
	Hysteresis	approx. 2 % of full scale
	Response delay	0,1-10 sec., adjustable
	Temperature range	- 15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,1 % at 10 K
	Switching capacity	max. 8 A, 250 V AC, 2000 VA
Dimensions	Housing	Housing A, (22,5 mm wide) page A1
Weight		170 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

Price

GWM	€ 72,50

Price group B

Measuring transducer for alternating current (AC)

(sinusoidal)
for direct connection
up to 50 A , 60 A, 100 A or 150 A

Type:
DIw-MU

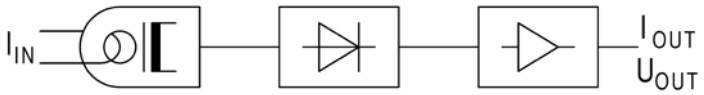
from 01.03.2022
plus. 6,8 %
surcharge

Application

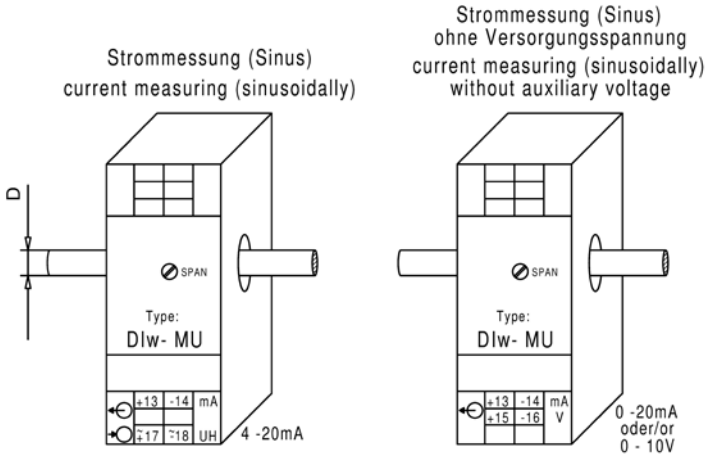
The measuring transducer DIw-MU is used for the direct transformation of a sinusoidal alternating current into an impressed direct current or direct voltage signal.

Function

The alternating current to be measured is transmitted to a current transformer - serving for galvanic isolation and transformation - via a through hole and from there to the downstream rectifier circuit. The direct voltage generated there is amplified and transformed into an impressed direct current or in an impressed direct voltage. The output is no-load proof and short-circuit proof. Only for "live zero", an auxiliary voltage is required.



Connection



DIw 50A bzw./resp. 60A: D=max. Ø8,5mm
DIw 100A bzw./resp. 150A: D=max. Ø15mm

Price

Input	50 A or 60 A (please specify value in case of order)	
Output	0-20 mA (without auxiliary voltage)	€ 85,60
	0-10 V (without auxiliary voltage)	€ 85,60
	4-20 mA (with auxiliary voltage)	€ 96,20
Input	100 A oder 150 A (please specify value in case of order)	
Output	0-20 mA (without auxiliary voltage)	€ 107,00
	0-10 V (without auxiliary voltage)	€ 107,00
	4-20 mA (with auxiliary voltage)	€ 117,60
Surcharges	Auxiliary voltage other than 230 V AC:	
	24 V DC	€ 33,00
	6-30 V AC + DC	€ 56,00
	36-265 V AC + DC	€ 48,00
	110 V AC	€ --,--

Price group B

Technical data

Input	Input variables	sinusoidal alternating current
	Rated values	Inputs
		0-50 A **0-60 A** **0-100 A** **0-150 A**
		0-10 A 0-12 A 0-20 A 0-30 A Pass trough prim. cond. 5 times
		0-12,5 A 0-15 A 0-25 A 0-37,5 A Pass trough prim. cond. 4 times
		0-25 A 0-30 A 0-50 A 0-75 A Pass trough prim. cond. twice
		0-50 A 0-60 A 0-100 A 0-150 A Pass trough prim. cond. once
	Rated frequency	50 Hz, 60 Hz or 400 Hz, 16 ⅔ Hz (auxiliary voltage required)
	Overload permanent	2-fold
	High surge load	20-fold, 1 s
Output	Output variables	Single output
	Rated values	0-20 mA / 500 Ω load or 0-10 V / max. load 10 mA
	Option	● „live zero“ 4-20 mA / 500 Ω load (auxiliary voltage required)
Transfer behavior	Accuracy	± 0,5 % at 5-100 % of rated value
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,1 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 30 mVss
	Response time	< 400 ms
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	4 kV between input, output, auxiliary voltage
Auxiliary voltage		230 V AC ± 20 %, 45-65 Hz, 2,5 VA
(with „live zero“ only)	Options	● 110 V AC ± 20 %, 45-65 Hz, 2,5 VA ● 24 V DC - 15 % to + 25 %, 2 W ● 6-30 V AC + DC, 2 VA ● 36-265 V AC + DC, 2 VA
Dimensions	Housing	Housing A, (22,5 mm wide) page A1
	Through hole	8,5 mm at 50 A and 60 A
		15 mm at 100 A and 150 A
Weight		250 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

Measuring transducer for alternating current (AC)

(sinusoidal)
at current transformer and direct measurement
1 A or 5 A or 10 A

Type:
Iw-MU

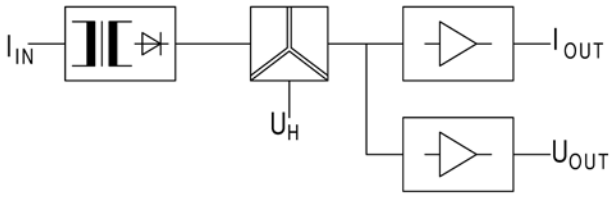
from 01.03.2022 plus. 6,8 % surcharge

Application

The measuring transducer Iw-MU is used for the direct transformation and isolation of a sinusoidal alternating current into an impressed direct current and/or direct voltage signal. For types with double output, these outputs are switchable between 0-20 mA and 0-10 V or 4-20 mA and 2-10 V.

Function

The alternating current to be measured is transmitted to the downstream rectifier circuit via an internal current transformer serving for galvanic isolation. The direct voltage generated there is amplified and transformed into an impressed direct current or in an impressed direct voltage. The output is no-load proof and short-circuit proof.
Only for „live zero" or double output, an auxiliary voltage is required. Connecting the two outputs is not permissible.

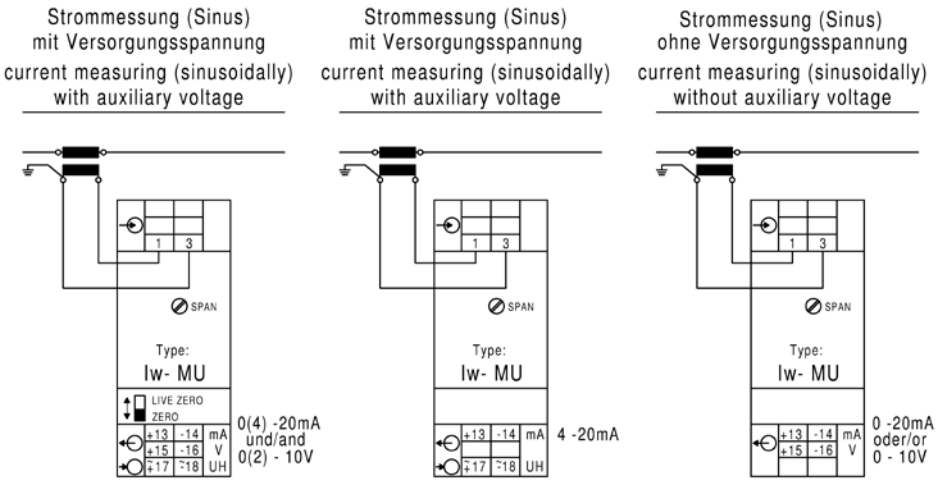


Price

Input	1 A or 5 A (please specify value in case of order)	
Output	0-20 mA (without auxiliary voltage)	€ 84,30
	0-10 V (without auxiliary voltage)	€ 84,30
	4-20 mA (with auxiliary voltage)	€ 95,70
	0-20 mA and 0-10 V as well as 4-20 mA and 2-10 V switchable on front side (with auxiliary voltage)	€ 110,00
Surcharges	Input directly up to 10 A (only with auxiliary voltage)	€ 9,50
	Auxiliary voltage other than 230 V AC:	
	24 V DC	€ 33,00
	6-30 V AC + DC	€ 56,00
	36-265 V AC + DC	€ 48,00
	110 V AC	€ --,--
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz)	€ 29,30
	(Description page 10) can only be realized based on Iw-MU and double output	
Relay module	For limit monitoring type GWM	€ 72,50
	(Description page 11) can only be realized based on Iw-MU and double output	

Price group B

Connection



Technical data

Input	Input variables	sinusoidal alternating current
	Rated values	0-1 A or 0-5 A or 0-10 A
	Rated frequency	50 Hz, 60 Hz or 400 Hz, 16 ⅔ Hz (only with auxiliary voltage)
	Energy consumption	1 VA, with „live zero“ 0,3 VA
	Overload permanent	2-fold
	High surge load	20-fold, 1 s
Output	Output variables	Single output or double output
	Rated values	0-20 mA / 500 Ω load or 0-10 V / max. load 10 mA
	Options	● „live zero“ 4-20 mA / 500 Ω load (auxiliary voltage required) ● 0-20 mA / 500 Ω load and 0-10 V / max. load 10 mA as well as 4-20 mA / 500 Ω load and 2-10 V / max. load 10 mA switchable on front side (auxiliary voltage required)
Transfer behavior	Accuracy	± 0,5 % at 5-100 % rated value (with auxiliary voltage 0-100 % of rated value)
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,1 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 40 mVss
	Response time	< 400 ms
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	4 kV between input, output, auxiliary voltage
Auxiliary voltage		230 V AC ± 20 %, 45-65 Hz, 2,5 VA
(with „live zero“ and double output only)	Options	● 110 V AC ± 20 %, 45-65 Hz, 2,5 VA ● 24 V DC - 15 % to + 25 %, 2 W ● 6-30 V AC + DC, 2 VA ● 36-265 V AC + DC, 2 VA
Dimensions	Housing	Housing A, (22,5 mm wide) page A1
Weight		190 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

Measuring transducer for alternating voltage

(sinusoidal)

Type:
Uw-MU

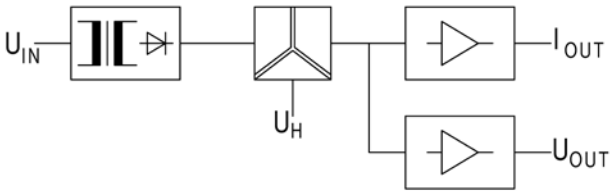
from 01.03.2022 plus. 6,8 % surcharge

Application

The measuring transducer Uw-MU is used for the transformation and isolation of a sinusoidal alternating voltage into an impressed direct current and/or direct voltage signal. For types with double output, these outputs are switchable between 0-20 mA and 0-10 V or 4-20 mA and 2-10 V.

Function

The alternating voltage to be measured is transmitted to the downstream rectifier circuit via an internal voltage transformer serving for galvanic isolation. The direct voltage generated there is amplified and transformed into an impressed direct current or in an impressed direct voltage. The output is no-load proof and short-circuit proof.
Only for „live zero" or double output, an auxiliary voltage is required. Connecting the two outputs is not permissible.



Price

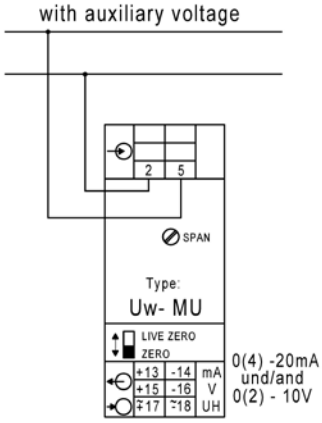
Input	100 V, 250 V, 500 V and 600 V	
	(for voltages above 500 V an auxiliary voltage is requested)	
Output	0-20 mA (without auxiliary voltage)	€ 89,40
	0-10 V (without auxiliary voltage)	€ 89,40
	4-20 mA (with auxiliary voltage)	€ 100,40
	0-20 mA and 0-10 V as well as 4-20 mA and 2-10 V switchable on front side (with auxiliary voltage)	€ 127,20
Surcharges	Auxiliary voltages other than 230 V AC:	
	24 V DC	€ 33,00
	6-30 V AC + DC	€ 56,00
	36-265 V AC + DC	€ 48,00
	110 V AC	€ --,--
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz)	€ 29,30
	(Description page 10) can only be realized based on Uw-MU and double output	
Relay module	For limit monitoring type GWM	€ 72,50
	(Description page 11) can only be realized based on Uw-MU and double output	

Price group B

Connection

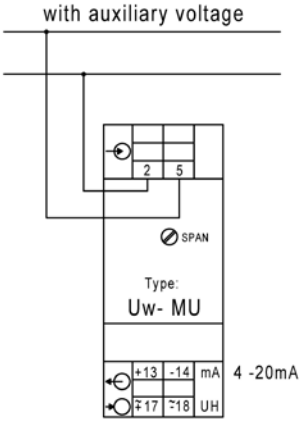
Spannungsmessung (Sinus) mit Versorgungsspannung

voltage measuring (sinusoidally) with auxiliary voltage



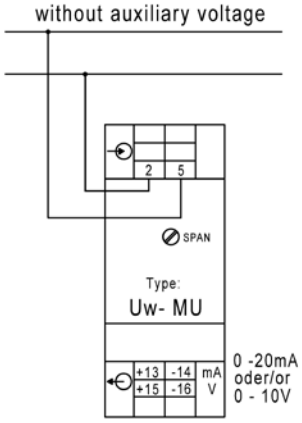
Spannungsmessung (Sinus) mit Versorgungsspannung

voltage measuring (sinusoidally) with auxiliary voltage



Spannungsmessung (Sinus) ohne Versorgungsspannung

voltage measuring (sinusoidally) without auxiliary voltage



Technical data

Input	Input variables	sinusodial alternating voltage
	Rated values	0-100 V, 0-250 V, 0-500 V and 0-600 V
	Rated frequency	50 Hz, 60 Hz or 400 Hz, 16 ⅔ Hz (only with auxiliary voltage)
	Energy consumption	2-5 VA, with „live zero“ 0,3-2 VA
	Overload permanent	1,2-fold
	High surge load	2-fold, 1 s
Output	Output variables	Single output or double output
	Rated values	0-20 mA / 500 Ω load or 0-10 V / max. load 10 mA
	Options	● „live zero“ 4-20 mA / 500 Ω load (auxiliary voltage required) ● 0-20 mA / 500 Ω load and 0-10 V / max. load 10 mA as well as 4-20 mA / 500 Ω load and 2-10 V / max. load 10 mA switchable on front side (auxiliary voltage required)
Transfer behavior	Accuracy	± 0,5 % at 5-100 % rated value (with auxiliary voltage 0-100 % of rated value)
	Frequency influence	< 0,05 % with 10 Hz frequency change
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,1 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 40 mVss
	Response time	< 400 ms
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	< 500 V: 4 kV between input, output, auxiliary voltage > 500 V: 5,2 kV between input and output 4 kV input / output to auxiliary voltage
Auxiliary voltage (with „live zero“ and double output and voltages > 500 V only)		230 V AC ± 20 %, 45-65 Hz, 2,5 VA
	Options	● 110 V AC ± 20 %, 45-65 Hz, 2,5 VA ● 24 V DC - 15 % to + 25 %, 2 W ● 6-30 V AC + DC, 2 VA ● 36-265 V AC + DC, 2 VA
Dimensions	Housing	Housing A, (22,5 mm wide) page A1
Weight		190 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

Measuring transducer for current and voltage

True RMS

Type:
Ieff-MU / Ueff-MU

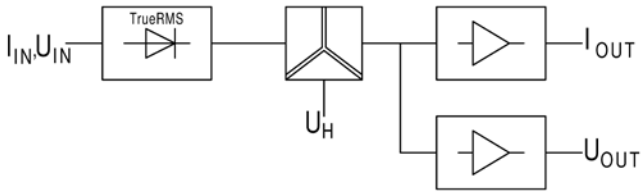
from 01.03.2022 plus. 6,8 % surcharge

Application

The measuring transducers Ieff-MU and Ueff-MU are used for the transformation and isolation of a current or a voltage of arbitray waveform into an impressed direct current and direct voltage signal. The calibrated double outputs are switchable between 0-20 mA and 0-10 V or 4-20 mA and 2-10 V.

Function

The measurand is transmitted to the rms rectifier via an input protective circuit and a filter. Crest factors (ratio between peak value and rms value) up to a value of 4 may be processed without problems. The direct voltage thus generated is galvanically isolated from the output by an optocoupler. A downstream amplifier effectuates the direct current and direct voltage impression. Both outputs are no-load proof and short-circuit proof. Connecting the two outputs is not permissible. An auxiliary voltage is required.



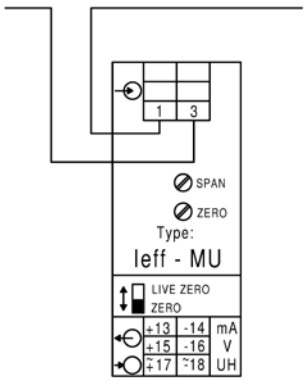
Price

Input	**Ieff-MU** a value from 0-1 mA to 0-5 A	
	Ueff-MU a value from 0-60 mV to 0-600 V	
Output	0-20 mA and 0-10 V as well as 4-20 mA and 2-10 V, switchable on front side	€ 171,40
Surcharges	Input directly up to 10 A for type Ieff-MU	€ 9,50
	Sub-range	€ 22,50
	Frequency range DC / 40-1000 Hz	€ 9,50
	Response time 70 ms	€ 35,00
	Auxiliary voltage other than 230 V AC:	
	24 V DC	€ 33,00
	6-30 V AC + DC	€ 56,00
	36-265 V AC + DC	€ 48,00
	110 V AC	€ --,--
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz)	€ 29,30
	(Description page 10)	
Relay module	For limit monitoring type GWM	€ 72,50
	(Description page 11)	

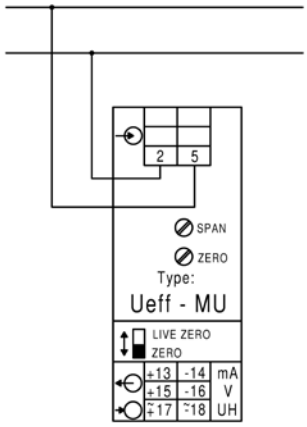
Price group B

Connection

Strommessung (TrueRMS)
current measuring (TrueRMS)



Spannungsmessung (TrueRMS)
voltage measuring (TrueRMS)



Technical data

Input	Input variables	direct and alternating current of arbitrary waveform (True RMS)
	Rated values	● a value from 0-1 mA to 0-5 A, voltage drop 60 mV
		● a value from 0-60 mV to 0-600 V, Ri = 100 k Ω to 1 V, > 1 V 100 k Ω /V, however max. 2 M Ω
	Rated frequency	DC / 40-200 Hz
	Option	● DC / 40-1000 Hz (other values on request)
	Overload permanent	current: 1,2-fold voltage: 5-fold / max. 830 V
	High surge load	current: 20-fold, 1 s
Output	Output variables	double output
	Rated values	0-20 mA / 500 Ω load and 0-10 V / max. load 10 mA as well as 4-20 mA / 500 Ω load and 2-10 V / max. load 10 mA switchable on front side
Transfer behavior	Accuracy	± 0,5 %
	Crest factor	4 with 0,5 % error
	Frequency influence	< 0,5 % with DC / 40-200 Hz
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,2 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 30 mVss
	Response time	< 300 ms
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	< 500 V: 4 kV between input, output, auxiliary voltage > 500 V: 5,2 kV between input and output 4 kV input / ouput to auxiliary voltage
Auxiliary voltage		230 V AC ± 20 %, 45-65 Hz, 2,5 VA
	Options	● 110 V AC ± 20 %, 45-65 Hz, 2,5 VA ● 24 V DC - 15 % to + 25 %, 2 W ● 6-30 V AC + DC, 2 VA ● 36-265 V AC + DC, 2 VA
Dimensions	Housing	Housing A, (22,5 mm wide) page A1
Weight		190 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

Measuring transducer for current and voltage (True RMS) for installations up to 1000 V (CAT III)

Type:
IeffT-MU / UeffT-MU

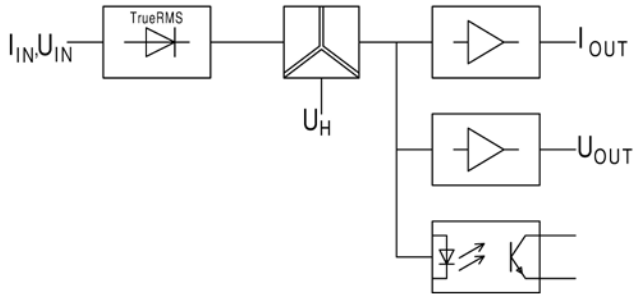
from 01.03.2022 plus. 6,8 % surcharge

Application

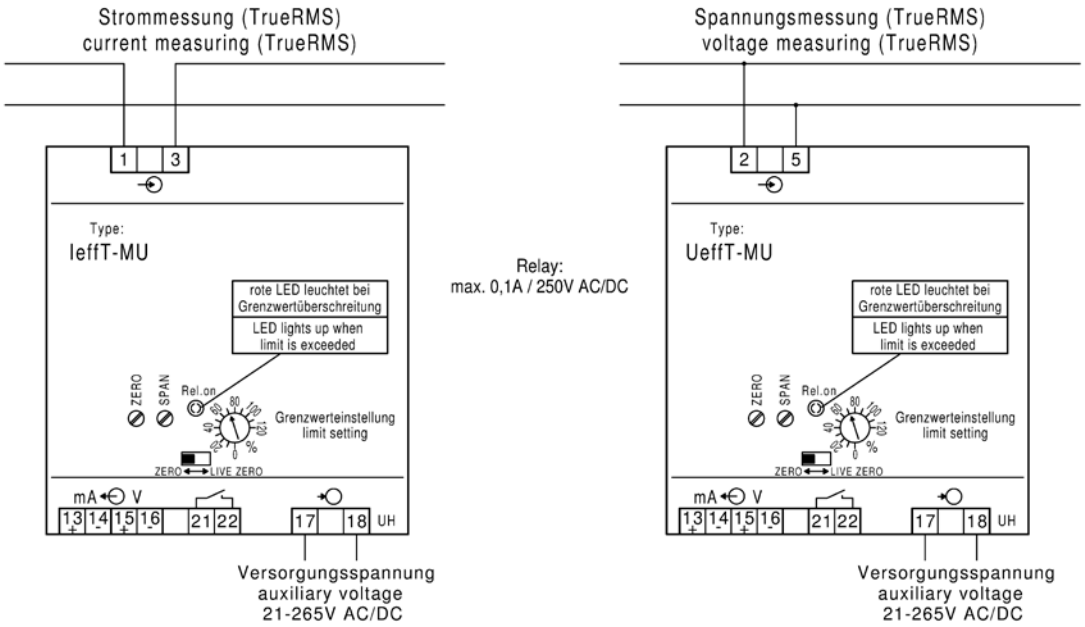
The measuring transducers IeffT-MU and UeffT-MU are used for the transformation and isolation of a current or a voltage into an impressed direct current and direct voltage signal. An integrated limit monitoring serves for monitoring the input signal.

Function

The measurand is transmitted to the rms rectifier via an input protective circuit. Crest factors (ratio between peak value and rms value) up to a value of 4 may be processed without problems. The direct voltage thus generated is galvanically isolated from the output by an optocoupler. A downstream amplifier effectuates the direct current and direct voltage impression. Both outputs are no-load proof and short-circuit proof. Connecting the two outputs is not permissible. The limit value may be adjusted within a range of 0-120 % of the input signal. Exceeding the limit value is indicated by an LED. An auxiliary voltage is required.



Connection

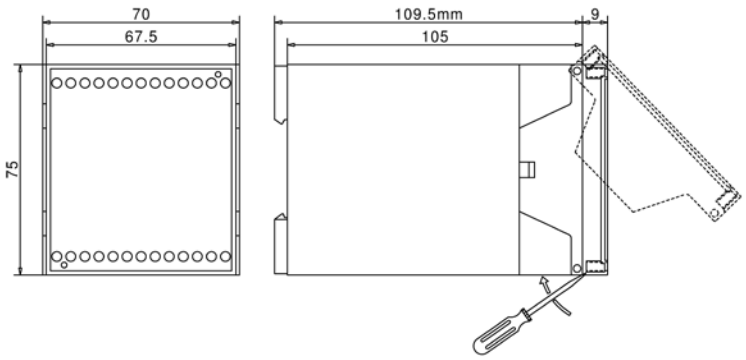


Price

Input	**IeffT-MU** a value from 0-1 mA to 0-5 A	€ 281,00
	UeffT-MU 0-1000 V (other values on request)	€ 281,00
Output	0-20 mA and 0-10 V as well as 4-20 mA and 2-10 V, switchable on front side	

Price group B

Technical data

Input	Input variables	direct and alternating voltage / direct and alternating current of arbitrary waveform
	Rated values	IeffT-MU a value from 0-1 mA to 0–5 A, voltage drop 60 mV UeffT-MU a value from 0-1000 V, Ri = 2 M Ω
	Rated frequency	DC / 40-200 Hz
	Option	● DC / 40-1000 Hz
	Overload permanent	for current 2-fold, for voltage 5-fold / max. 2000 V
	High surge load	for current 20-fold 1 s
Output	Output variables	double output
	Rated values	0-20 mA / 0-500 Ω load and 0-10 V / max. load 10 mA as well as 4-20 mA / 0-500 Ω load and 2-10 V / max. load 10 mA switchable on front side
	Limit value output	1 NO contact, hysteresis approx. 4 % of limit value, contact load max. 0,1 A / 250 V AC/DC
	Function indicator	red LED if limit value is exceeded
Transfer behavior	Accuracy	± 0,5 %
	Crest factor	4 with max. error of 0,5 %
	Frequency influence	< 0,5 % with DC / 40-200 Hz
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,2 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 50 mVss
	Response time	< 300 ms
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	7,4 kV between input to output, input to auxiliary voltage and input to relay contacts 4 kV between output to auxiliary voltage and relay contacts
Standards	EMC	DIN EN 61326
	Mechanical strength	DIN EN 61010 part 1
	Electrical safety	DIN EN 61010 part 1 housing insulated, protection class II, for working voltages up to 1000V (phase to neutral) pollution level 2, measuring category CAT III
	Accuracy, overload	DIN EN 60688
	Air and creep distances	DIN EN 61010 Part 1
	IP code	DIN EN 60529 housing IP30, terminals IP20
	Connection	DIN 43807
Auxiliary voltage		21-265 VAC + DC, 2 VA
Weight		220 g
Dimensions		
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

Measuring transducer for frequency

Type:
F-MU

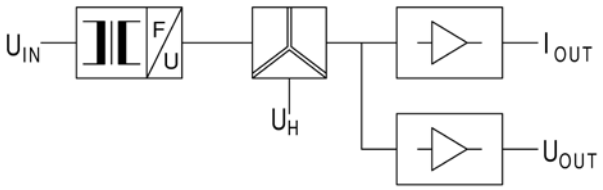
from 01.03.2022 plus. 6,8 % surcharge

Application

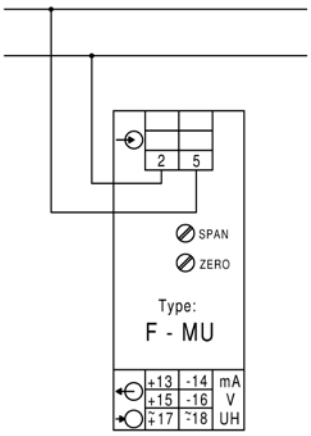
The measuring transducer F-MU is used for the transformation and isolation of a frequency into an impressed direct current and direct voltage signal. Alternating voltages and pulsed direct voltages may be processed.

Function

The frequency to be measured is sent to a filter via an internal voltage transformer serving for galvanic isolation and from there to a microcontroller for evaluation. The direct voltage generated there is transformed into an impressed direct current and in an impressed direct voltage. Both outputs are no-load proof and short-circuit proof. Connecting the two outputs is not permissible. An auxiliary voltage is required in case of "live zero" as well as in case of significantly fluctuating rated voltage and frequency ranges with reference to zero.



Connection



Price

Input	45-55 Hz, 48-52 Hz, 55-65 Hz, 58-62 Hz,	
	360-440 Hz, 380-420 Hz, 0-100 Hz, 0-500 Hz or 0-1000 Hz (with auxiliary voltage only)	
	Other values (measuring ranges) on request!	
Output	0-20 mA and 0-10 V (without auxiliary voltage)	€ 178,00
	4-20 mA and 2-10 V (with auxiliary voltage)	€ 188,60
	Please specify rated voltage (see page 23)!	
Surcharges	Auxiliary voltage other than 230 V AC:	
	24 V DC	€ 33,00
	6-30 V AC + DC	€ 56,00
	36-265 V AC + DC	€ 48,00
	110 V AC	€ --,--
	Other measuring ranges	€ 35,00
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 10)	€ 29,30
Relay module	for limit monitoring Type GWM - (description page 11)	€ 72,50

Price group B

Technical data

Input	Input variables	Frequency
	Rated values	45-55 Hz, 48-52 Hz, 55-65 Hz, 58-62 Hz, 360-440 Hz, 380-420 Hz, 0-100 Hz, 0-500 Hz or 0-1000 Hz (with seperate auxiliary voltage only)
	Rated voltage	100 V, 110 V, 230 V, 400 V or 500 V ± 20 % 2-50 V, 25-250 V, 50-500 V or 75-690 V (with seperate auxiliary voltage only)
	Energy consumption	2,5-5 VA, 0,5-1 VA with seperate auxiliary voltage
	Overload permanent	1,2-fold
	High surge load	2-fold 1 s
Output	Output variables	double output
	Rated values Option	0-20 mA / 500 Ω load and 0-10 V / max. load 10 mA ● "live zero"4-20 mA / 500 Ω load and 2-10 V / max. load 10 mA (auxiliary voltage required)
Transfer behavior	Accuracy	± 0,5 %
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,1 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 30 mVss
	Response time	< 300 ms
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	< 500 V: 4 kV between input, output, auxiliary voltage > 500 V: 5,2 kV between input and output 4 kV input / output to auxiliary voltage
Auxiliary voltage (with „live zero“ only, nominal values from 0-..Hz and voltage ranges)		230 V AC ± 20 %, 45-65 Hz, 2,5 VA
	Option	● 110 V AC ± 20 %, 45-65 Hz, 2,5 VA ● 24 V DC - 15 % to + 25 %, 2 W ● 6-30 V AC + DC, 2 VA ● 36-265 V AC + DC, 2 VA
Dimensions	Housing	Housing A, (22,5 mm wide) page A1
Weight		190 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

Measuring transducer for phase angle

Type:
Phwd-MU

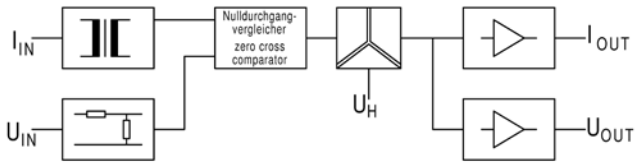
from 01.03.2022 plus. 6,8 % surcharge

Application

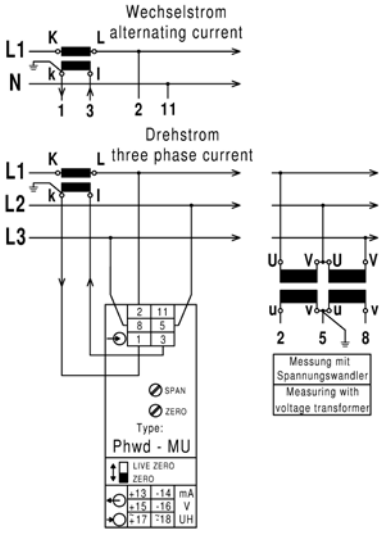
The measuring transducer Phwd-MU is used for the transformation and isolation of the phase angle between current and voltage of an alternating current and three-phase power system of the same load into an impressed direct current and direct voltage signal.

Function

The parameters to be measured are transmitted to the zero point comparator via internal current transformers and voltage dividers. At the comparator, a square-wave signal is available which is directly related to the phase angle. A downstream integration stage then generates the direct voltage mean value. This direct voltage is transformed into an impressed direct current and an impressed direct voltage. The galvanic isolation between input and output signals is done using optocoupler. Both outputs are no-load proof and short-circuit proof. Connecting the two outputs is not permissible.
An auxiliary voltage is required.



Connection



Price

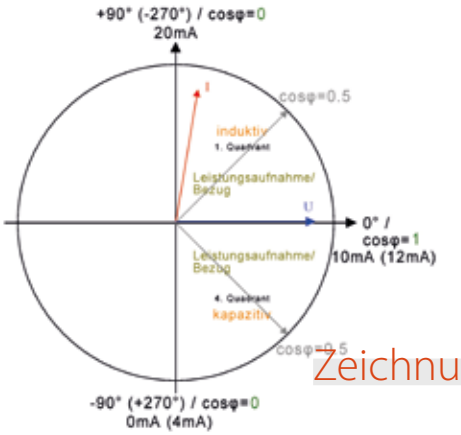
Input	cos φ 0,5 cap - 1 - 0,5 ind or cos φ 0,7 cap - 1 - 0,3 ind for alternating current and three-phase power system of the same load 100 / 110 / 230 / 400 / 500 / 600 V 1 A or 5 A	
Output	0-20 mA and 0-10 V as well as 4-20 mA and 2-10 V, switchable on front side	€ 202,30
Surcharges	Auxiliary voltage other than 230 V AC:	
	24 V DC	€ 33,00
	6-30 V AC + DC	€ 56,00
	36-265 V AC + DC	€ 48,00
	110 V AC	€ --,--
	... 4Q 4 quadrant operation for alternating and 3-phase current with bidirectional energy directions	€ 35,00
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 10)	€ 29,30
Relay module	for limit monitoring Type GWM - (description page 11)	€ 72,50

Price group B

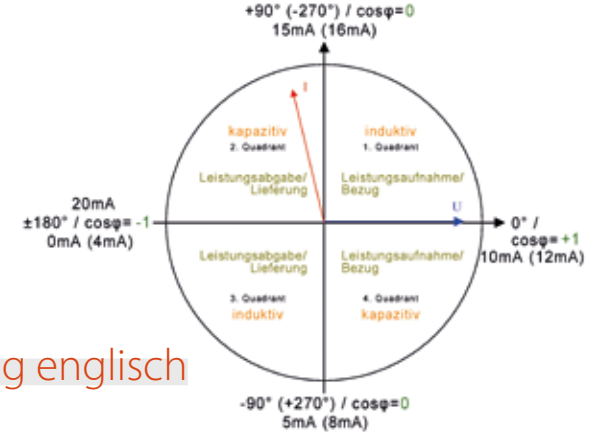
Technical data

Input	Input variables	Phase angle between sinusoidal voltages and currents in alternating current and 3-phase power system with auxiliary voltage
	Rated values	- 60° - 0 - + 60°, electrical cos φ 0,5 cap - 1 - 0,5 ind or - 45,6° - 0 - + 72,5°, electrical cos φ 0,7 cap - 1 - 0,3 ind
	Option	● Type ...4Q: 4-quadrant operation 1-0-1-0-1
	Rated voltage	100 V, 110 V, 230 V, 400 V, 500 V, 600 V ± 20 %, max. 2,5 VA
	Rated current	1 A or 5 A, 0,3 VA
	Rated frequency	50 Hz, 60 Hz or 400 Hz
	Overload permanent	current: 2-fold voltage: 1,2-fold
	High surge load	current: 20-fold, 1 s voltage: 2-fold, 1 s
Output	Output variables	double output
	Rated values	0-20 mA / 500 Ω load and 0-10 V / max. load 10 mA as well as 4-20 mA / 500 Ω load and 2-10 V / max. load 10 mA switchable on front side
Transfer behavior	Accuracy	± 0,5 % linear to angular degrees
	Current range	4-200 % of rated current
	Current influence	< 0,5 % with 0,15- to 2-fold rated current
	Voltage influence	< 0,1 % with ± 20 % of rated voltage
	Frequency influence	< 0,1 % with 10 Hz frequency change
	Temperature range	-15 °C to +20 °C zo +30 °C to +55 °C
	Temperature influece	< 0,2 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 30 mVss
	Response time	< 400 ms
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	4 kV between input, output, auxiliary voltage
Auxiliary voltage		230 V AC ± 20 %, 45-65 Hz, 2,5 VA
	Options	● 110 V AC ± 20 %, 45-65 Hz, 2,5 VA ● 24 V DC - 15 % to + 25 %, 2 W ● 6-30 V AC + DC, 2 VA ● 36-265 V AC + DC, 2 VA
Dimensions	Housing	Housing A, (22,5 mm wide) Page A1
Weight		200 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

2 - Quadrantenbetrieb (Standard)



4 - Quadrantenbetrieb (Option)

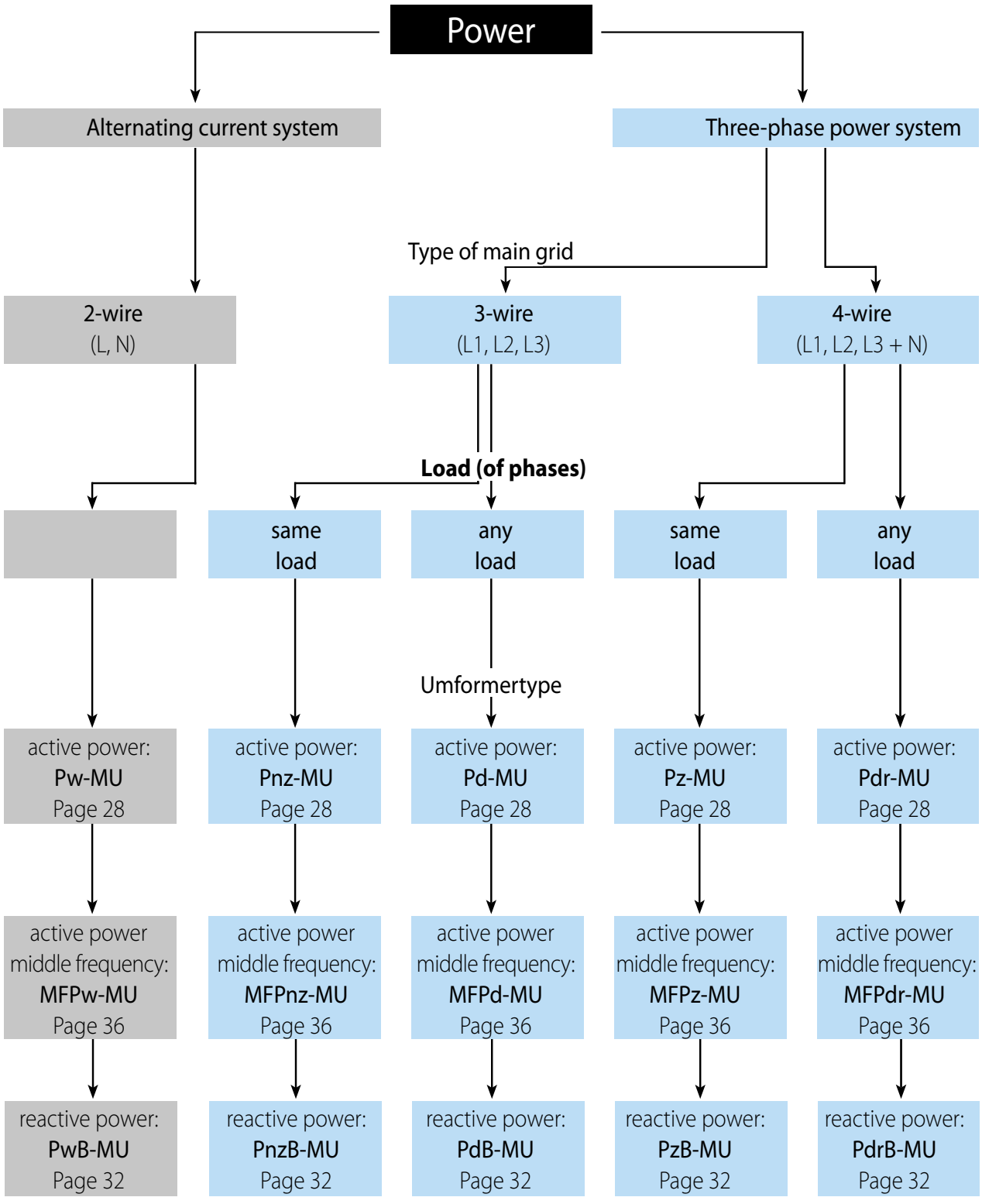


Zeichnung englisch

Notice

Measuring transducers for active power

Active power transducers - finding the right type



Short legend:		
	P	Power measuring transducer for active power
	MF	Middle frequency
	w	Alternating current
	z	accessible neutral, 4-wire 3-phase current of same load
	nz	non-accessible neutral, 3-wire 3-phase current of same load
	d	double power measuring transducer, 3-wire 3-phase current of any load
	dr	triple power measuring transducer, 4-wire 3-phase current of any load
	B	Reactive power

Measuring transducers for active power

Alternating current and 3-phase current

from 01.03.2022 plus. 6,8 % surcharge

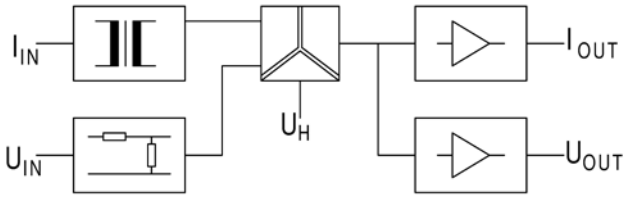
Type:
Pw-MU, Pnz-MU, Pz-MU, Pd-MU, Pdr-MU

Application

The measuring transducers Pw-MU, Pnz-MU, Pz-MU, Pd-MU and Pdr-MU are used for the transformation and isolation of the active power in alternating current or three-phase power systems into an impressed direct current and direct voltage signal.

Function

The parameters to be measured are transmitted to the analog multiplier via internal current transformers and voltage dividers. The instantaneous values of current and voltage are then multiplied and formed as the mean value of a direct voltage matching the active power in a downstream integration stage. Sinusoidal and non-sinusoidal alternating current parameters of any waveform may be measured. The galvanic isolation between input and output signals is done using optocoupler. A downstream amplifier supplies the impressed direct current and direct voltage signals. Both outputs are no-load proof and short-circuit proof. Connecting the two outputs is not permissible.
An auxiliary voltage is required for „live zero" or rated voltage flucuations >± 20%.



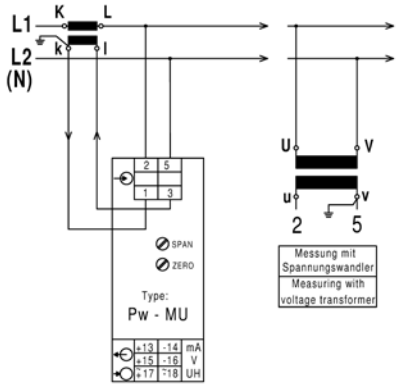
Price

Input	50-150 % of the apparent power, 100 / 110 / 230 / 400 / 500 or 600 V		
	1 A or 5 A (please specify primary current!)		
	Direct connection up to max. 10 A on request!		
Output	Pw-MU	(alternating current system) or	
	Pz-MU	(4-wire 3-phase power system of same load) or	
	Pnz-MU	(3-wire 3-phase power system of same load):	
		0-20 mA and 0-10 V (without auxiliary voltage)	€ 202,90
		4-20 mA and 2-10 V (with auxliary voltage)	€ 212,50
	Pd-MU	(3-wire 3-phase power system of any load):	
		0-20 mA and 0-10 V (without auxiliary voltage)	€ 336,30
		4-20 mA and 2-10 V (with auxiliary voltage)	€ 345,80
	Pdr-MU	(4-wire 3-phase power system of any load):	
		0-20 mA and 0-10 V (without auxiliary voltage)	€ 352,60
		4-20 mA and 2-10 V (with auxiliary voltage)	€ 362,10
Surcharges	Bidirectional energy directions		€ 35,00
	Auxiliary voltage required in case of rated voltage fluctuation > ± 20 % and voltages > 500 V		
	230 V AC or 110 V AC		€ 9,50
	24 V DC		€ 33,00
	6-30 V AC + DC		€ 56,00
	36-265 V AC + DC		€ 48,00
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 10)		€ 29,30
Relay module	for limit monitoring Type GWM - (description page 11)		€ 72,50

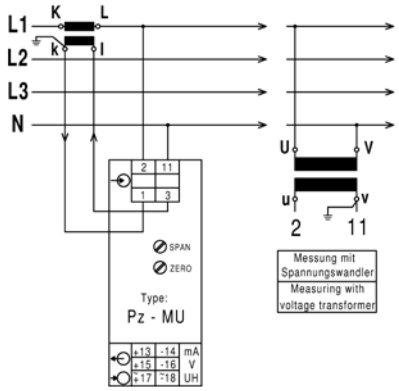
Price group B

Connection

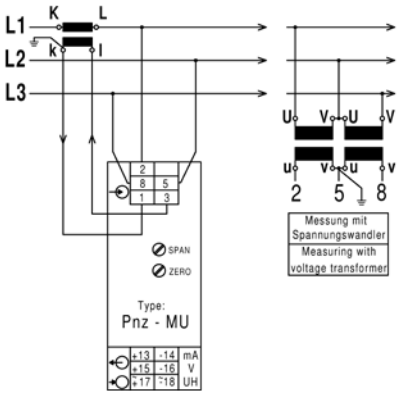
Type Pw-MU (Alternating current)
Working voltage up to 300 V (Phase to neutral L - N)



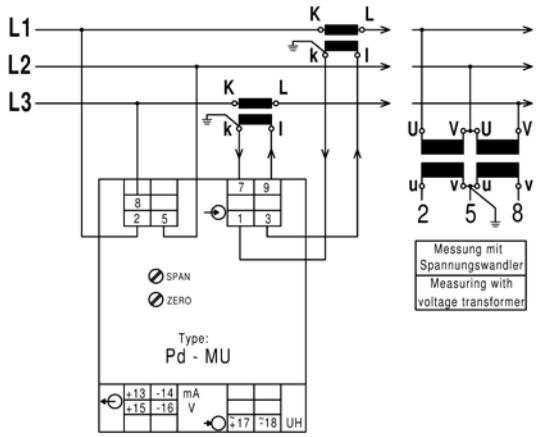
Type Pz-MU (4-wire 3-phase current same load)
Working voltage up to 300 V (Phase to neutral L - N)



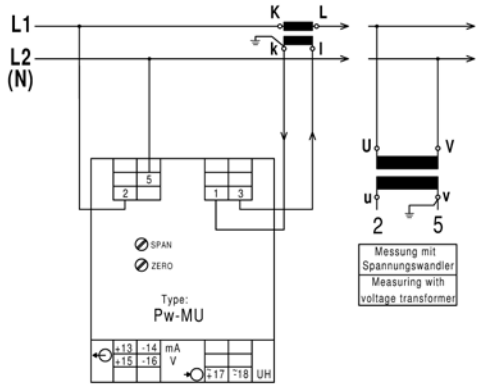
Type Pnz-MU (3-wire 3-phase current same load)
Working voltage up to 300 V (Phase to neutral L - N)



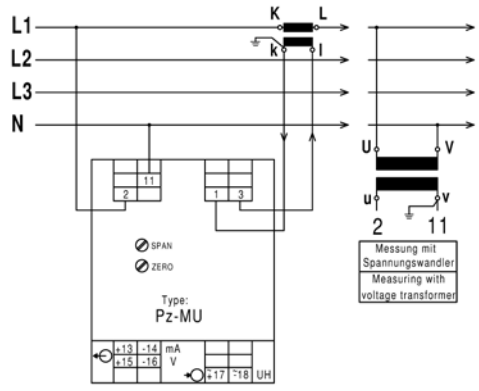
Type Pd-MU (3wire 3-phase current any load)
Working voltage up to 600 V (Phase to neutral L - N)



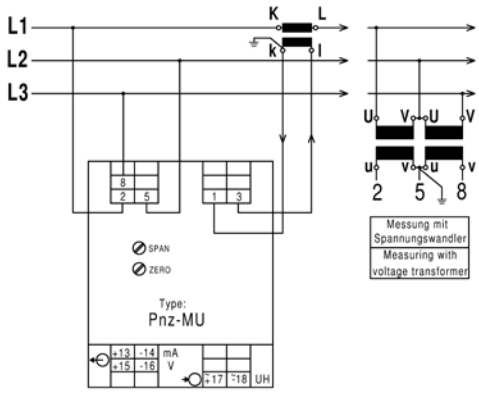
Working voltage up to 600 V (Phase to neutral L - N)



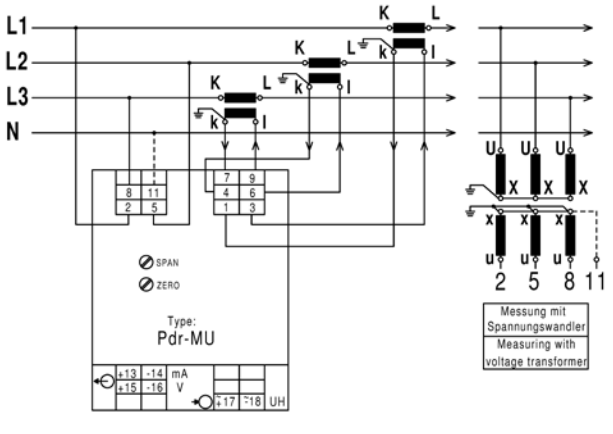
Working voltage up to 600 V (Phase to neutral L - N)



Working voltage up to 600 V (Phase to neutral L - N)



Type Pdr-MU (4-wire 3-phase current any load)



Technical data

Input	Input variables	active power for alternating and 3-phase current
	Rated values	50-150 % of apparent power with alternating current: S = U x I with 3-phase current: S = U x I x 1,732
	Rated voltage	100 V, 110 V, 230 V, 400 V, 500 V or 600 V ± 20 %, max. 3,5 VA
	Rated current	1 A or 5 A, 0,3 VA
	Rated frequency	50 Hz, 60 Hz or 400 Hz
	Overload permanent	current: 2-fold voltage: 1,2-fold
	High surge load	current: 20-fold, 1 s voltage: 2-fold, 1 s
Output	Output variables	double output
	Rated values	0-20 mA / 500 Ω load and 0-10 V / max. load 10 mA
	Option	● „live zero“ 4-20 mA / 500 Ω load and 2-10 V max. load 10 mA (auxiliary voltage required)
	Bipolar output	● e.g. - 20 - 0 - + 20 mA / 500 Ω load and - 10 - 0 - + 10 V / max. load 10 mA
	Zero point rise	● e.g. 0-10-20 mA / 500 Ω load and 0-5-10 V / max. load 10 mA
Transfer behavior	Accuracy	± 0,5 %
	Voltage influence	< 0,1 % with ± 10 % of rated voltage
	Frequency influence	< 0,3 % with 10 Hz frequency change
	Phase angle influence	< 0,5 % for ± 90 °
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,3 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 30 mVss
	Response time	< 300 ms
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	< 500 V: 4 kV between input, output, auxiliary voltage > 500 V: 5,2 kV between input and output 4 kV between input / output and auxiliary voltage
Auxiliary voltage (with„live zero“ or in case of rated voltage fluctuation or voltages > 500 V)		230 V AC ± 20 %, 45-65 Hz, 2,5 VA
	Options	● 110 V AC ± 20 %, 45-65 Hz, 2,5 VA ● 24 V DC - 15 % to + 25 %, 2 W ● 6-30 V AC + DC, 2 VA ● 36-265 V AC + DC, 2 VA
Dimensions	< 500 V: Pw-MU, Pz-MU, Pnz-MU:	Housing A, (22,5 mm wide) Page A1
	> 500 V: Pw-MU, Pz-MU, Pnz-MU:	Housing B, (45 mm wide) Page A1
	Pd-MU, Pdr-MU:	Housing B, (45 mm wide) Page A1
Weight	Pw-MU, Pz-MU, Pnz-MU:	250 g
	Pd-MU:	340 g
	Pdr-MU:	370 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

Notice

Measuring transducers for reactive power

Alternating current and 3-phase current

from 01.03.2022 plus. 6,8 % surcharge

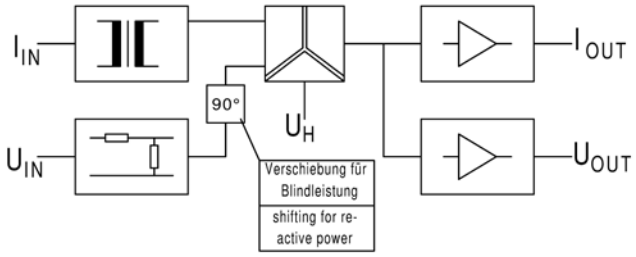
Type:
PwB-MU, PnzB-MU, PzB-MU, PdB-MU, PdrB-MU

Application

The measuring transducers PwB-MU, PnzB-MU, PzB-MU, PdB-MU and PdrB-MU are used for the transformation and isolation of the reactive power in alternating current or three-phase power systems into an impressed direct current and direct voltage signal.

Function

The parameters to be measured are transmitted to the analog multiplier via internal current transformers and voltage dividers. The instantaneous values of current and voltage are then multiplied and formed as the mean value of a direct voltage matching the reactive power in a downstream integration stage. Sinusoidal and non-sinusoidal alternating current parameters of any waveform may be measured. The galvanic isolation between input and output signals is done using optocoupler. A downstream amplifier supplies the impressed direct current and direct voltage signals. Both outputs are no-load proof and short-circuit proof. Connecting the two outputs is not permissible.
An auxiliary voltage is required for „live zero" or rated voltage flucuations >± 20%.



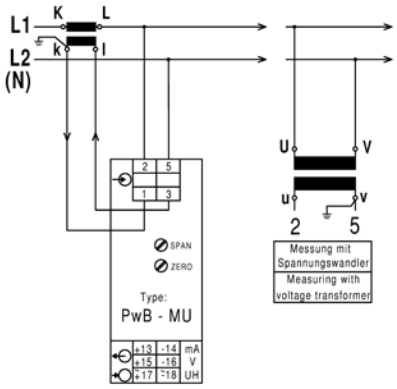
Price

Input	50-150 % of the apparent power, 100 / 110 / 230 / 400 / 500 or 600 V		
	1 A or 5 A (please specify primary current!)		
	Direct connection up to max. 10 A on request!		
Output	PwB-MU	(alternating current system) or	
	PzB-MU	(4-wire 3-phase power system of same load) or	
	PnzB-MU	(3-wire 3-phase power system of same load):	
		0-20 mA and 0-10 V (without auxiliary voltage)	€ 224,60
		4-20 mA and 2-10 V (with auxliary voltage)	€ 234,10
	PdB-MU	(3-wire 3-phase power system of any load):	
		0-20 mA and 0-10 V (without auxiliary voltage)	€ 378,60
		4-20 mA and 2-10 V (with auxiliary voltage)	€ 388,10
	PdrB-MU	(4-wire 3-phase power system of any load):	
		0-20 mA and 0-10 V (without auxiliary voltage)	€ 417,60
		4-20 mA and 2-10 V (with auxiliary voltage)	€ 427,10
Surcharges	Bidirectional energy directions		€ 35,00
	Auxiliary voltage required in case of rated voltage fluctuation > ± 20 % and voltages > 500 V		
	230 V AC or 110 V AC		€ 9,50
	24 V DC		€ 33,00
	6-30 V AC + DC		€ 56,00
	36-265 V AC + DC		€ 48,00
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 10)		€ 29,30
Relay moduloe	for limit monitoring Type GWM - (description page 11)		€ 72,50

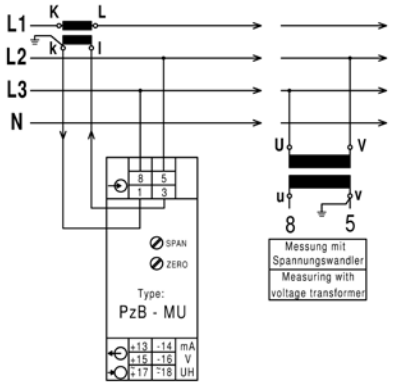
Price group B

Connection

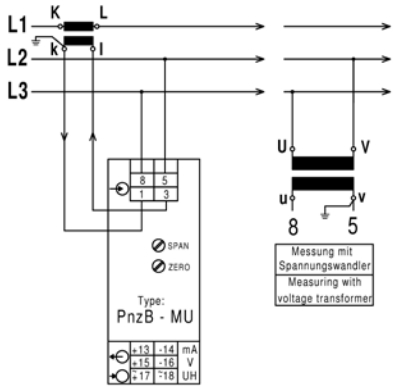
Type PwB-MU (Alternating current)
Working voltage up to 300 V (Phase to neutral L - N)



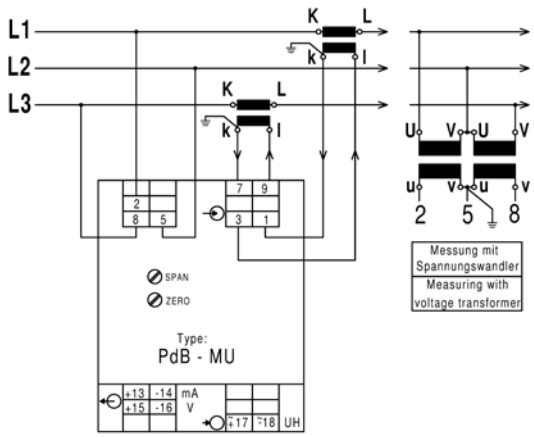
Type PzB-MU (4-wire 3-phase current same load)
Working voltage up to 300 V (Phase to neutral L - N)



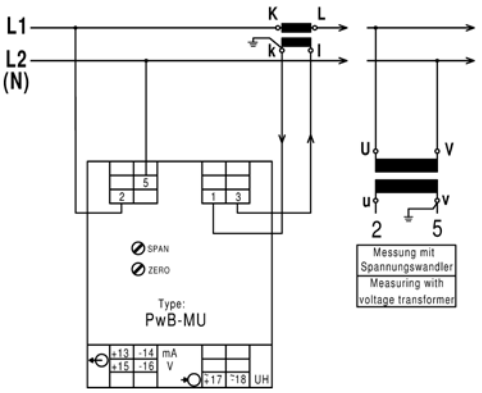
Type PnzB-MU (3-wire 3-phase current same load)
Working voltage up to 300 V (Phase to neutral L - N)



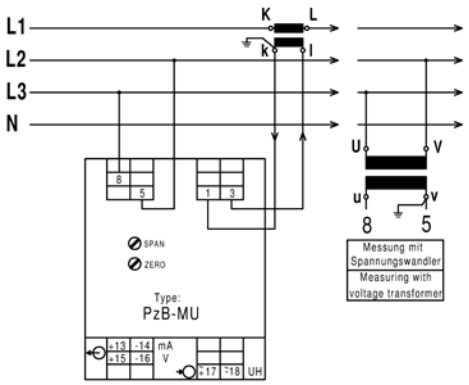
Type PdB-MU (3-wire 3-phase current any load)
Working voltage up to 600 V (Phase to neutral L - N)



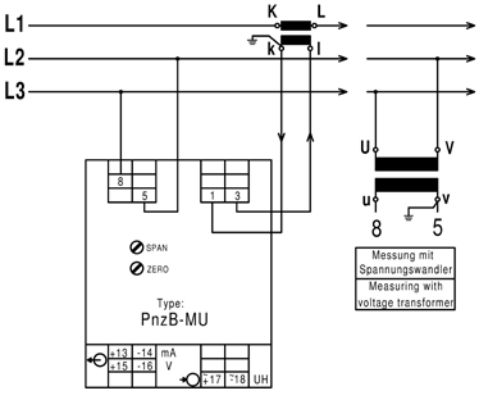
Working voltage up to 600 V (Phase to neutral L - N)



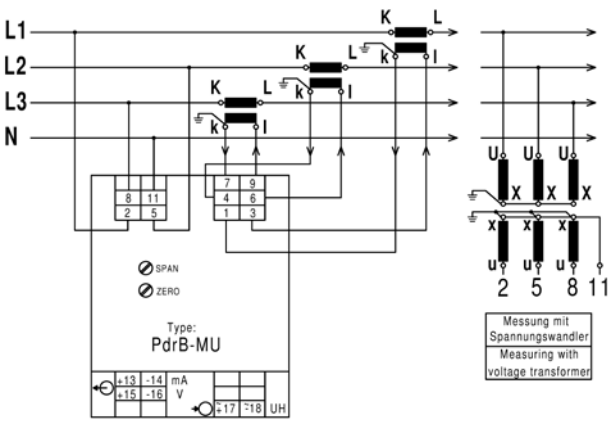
Working voltage up to 600 V (Phase to neutral L - N)



Working voltage up to 600 V (Phase to neutral L - N)



Type PdrB-MU (4-wire 3-phase current any load)



Technical data

Input	Input variables	reactive power for alternating and 3-phase current
	Rated values	50-150 % of apparent power with alternating current: S = U x I with 3-phase current: S = U x I x 1,732
	Rated voltage	100 V, 110 V, 230 V, 400 V, 500 V or 600 V ± 20 %, max. 3,5 VA
	Rated current	1 A or 5 A, 0,3 VA
	Rated frequency	50 Hz, 60 Hz or 400 Hz
	Overload permanent	current: 2-fold voltage: 1,2-fold
	High surge load	current: 20-fold, 1 s voltage: 2-fold, 1 s
Output	Output variables	double output
	Rated values	0-20 mA / 500 Ω load and 0-10 V / max. load 10 mA
	Option	● „live zero“ 4-20 mA / 500 Ω load and 2-10 V max. load 10 mA (auxiliary voltage required)
	Bipolar output	● e.g. - 20 - 0 - + 20 mA / 500 Ω load and - 10 - 0 - + 10 V / max. load 10 mA
	Zero point rise	● e.g. 0-10-20 mA / 500 Ω load and 0-5-10 V / max. load 10 mA
Transfer behavior	Accuracy	± 0,5 %
	Voltage influence	< 0,1 % with ± 10 % of rated voltage
	Frequency influence	< 0,3 % with 10 Hz frequency change except for PwB-MU and PdrB-MU < 0,5 % with 1 Hz frequency change
	Phase angle influence	< 0,5 % for ± 90 °
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,3 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 30 mVss
	Response time	< 300 ms
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	< 500 V: 4 kV between input, output, auxiliary voltage > 500 V: 5,2 kV between input and output 4 kV between input / output and auxiliary voltage
auxiliary voltage		230 V AC ± 20 %, 45-65 Hz, 2,5 VA
(with„live zero“ or in case of rated voltage fluctuation or voltages > 500 V)	Options	● 110 V AC ± 20 %, 45-65 Hz, 2,5 VA ● 24 V DC - 15 % to + 25 %, 2 W ● 6-30 V AC + DC, 2 VA ● 36-265 V AC + DC, 2 VA
Dimensions	< 500 V: PwB-MU, PzB-MU, PnzB-MU:	Housing A, (22,5 mm wide) Page A1
	> 500 V: PwB-MU, PzB-MU, PnzB-MU:	Housing B, (45 mm wide) Page A1
	PdB-MU, PdrB-MU:	Housing B, (45 mm wide) Page A1
Weight	PwB-MU, PzB-MU, PnzB-MU:	250 g
	PdB-MU:	340 g
	PdrB-MU:	370 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

Notice

Measuring transducer for active power in the middle frequency range

Frequency range DC/10 Hz – 20kHz
Measurement of direct, alternating, pulsed and mixed currents

from 01.03.2022 plus. 6,8 % surcharge

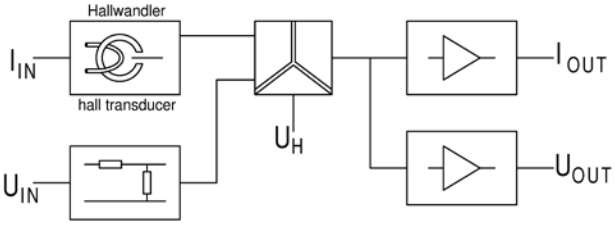
Type:
MFPw-MU, MFPz-MU, MFPnz-MU, MFPd-MU, MFPdr-MU

Application

The measuring transducer MFP..-MU is used for the transformation and isolation of the active power in the middle frequency range into an impressed direct current and direct voltage signal. It is used in power supplies of welding systems, UPS systems, switch-mode power supplies, induction furnaces, systems with frequency converters, three-phase and servo drives, generators and others.

Function

The parameters to be measured are transmitted to the analog multiplier via internal hall effect current transformers and voltage dividers. The instantaneous values of current and voltage are then multiplied and formed as the mean value of a direct voltage matching the active power in a downstream integration stage. Alternating current parameters of any waveform may be measured. The galvanic isolation between input and output signals is done using optocoupler. A downstream amplifier supplies the impressed direct current and direct voltage signals. Both outputs are no-load proof and short-circuit proof. Connecting the two outputs is not permissible. An auxiliary voltage is required.



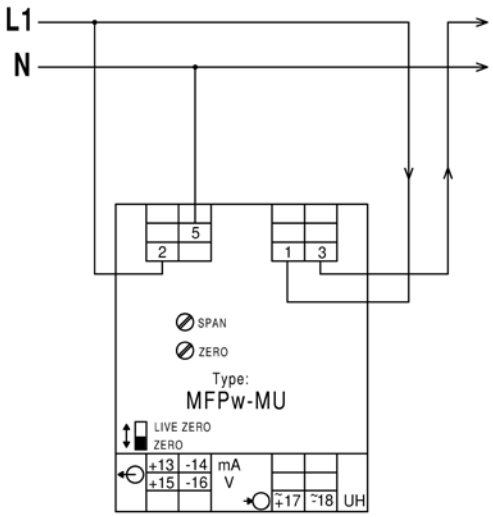
Price

Input	50-150 % of the apparent power, 100 / 110 / 230 / 400 / 500 or 600 V direct current measurement, a value of 0-2 A to 0-15 A, indirect current measurement, if using seperate CT's for hall effect or flexible CT's please specify technical data		
Output	MFPw-MU	(alternating current system) or	
	MFPz-MU	(4-wire 3-phase power system of same load) or	
	MFPnz-MU	(3-wire 3-phase power system of same load):	€ 366,70
	MFPd-MU	(3-wire 3-phase power system of any load):	€ 436,10
	MFPdr-MU	(4-wire 3-phase power system of any load):	€ 504,40
		0-20 mA and 0-10 V as well as 4-20 mA and 2-10 V switchable on front side	
Surcharges	Bidirectional energy directions		€ 35,00
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 10)		€ 29,30
Relay module	for limit monitoring Type GWM - (description page 11)		€ 72,50

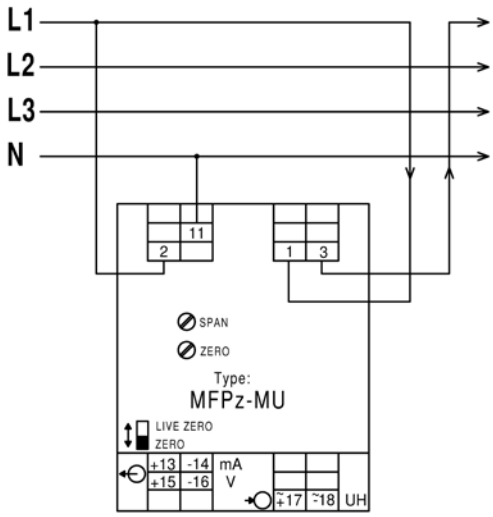
Price group B

Connecting

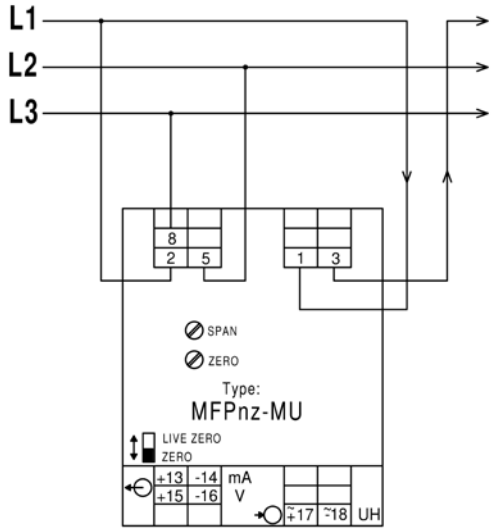
Type MFPw-MU (Alternating current)



Type MFPz-MU (4-wire 3-phase current same load)



Type MFPnz-MU (3-wire 3-phase current same load)

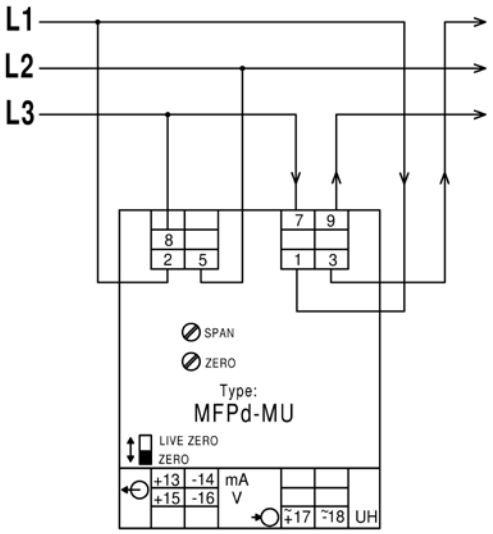


For devices with frequency module further outputs are not available. At terminal +13 and -14 the frequency output is available.

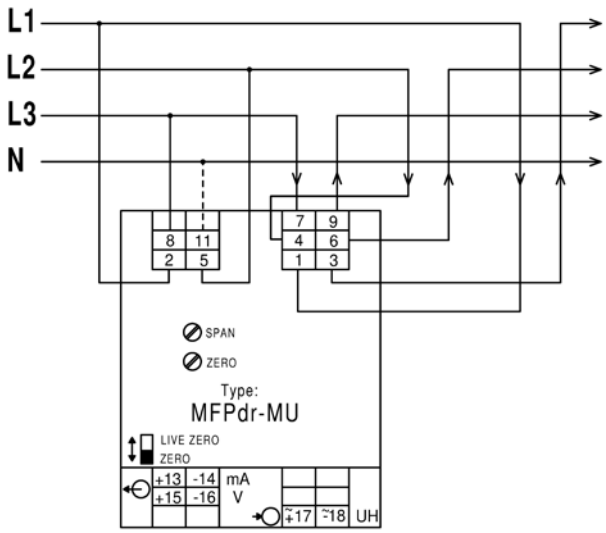
Current transformers for Power Quality Application up to 20 kHz XCTB-Series can be found in our individual catalog "XCTB" on our homepage at:

www.mueller-ziegler.de

Type MFPd-MU (3-wire 3-phase current any load)



Type MFPdr-MU (4-wire 3-phase current any load)



Technical data

Input	Input variables	active power with alternating and 3-phase current of same or any load, unidirectional or bidirectional energy direction
	Rated values	50-150 % of the apparent power for alternating current: S = U x I with 3-phase current: S = U x I x 1,732
	Rated voltage	0-100 V, 110 V, 230 V, 400 V, 500 V or 600 V, max. 0,3 VA
	Rated current	a value of 0-2 A to 0-15 A direct measurement, higher current values via indirect measurement using external current transformers (hall-effect or flexible CT's)
	Rated frequency	10 Hz – 20 kHz / DC
	Overlaod permanent	voltage 1,2-fold, current 2-fold (max. 20 A)
	High surge load	voltage 2-fold 1 s, current 20-fold 1 s
Output	Output variables	double output
	Rated values	0-20 mA / 500 Ω load and 0-10 V / max. load 10 mA „live zero" 4-20 mA / 500 Ω load und 2-10 V max. load 10 mA switchable on front side
	Options	● bipolar output e.g. - 20 - 0 - + 20 mA / 500 Ω load and - 10 - 0 - + 10 V / max. load 10 mA ● zero point rise e.g. 0-10-20 mA / 500 Ω load and 0-5-10 V / max. load 10 mA ● frequency module, value from 0-5 Hz to 0-10 kHz ● „open -collector" NPN, max. load 30 V 100 mA, pulse/pause 50/50 % ● square-wave signal 5 V, max. load 10 mA, pulse/pause 50/50 %
Transfer behavior	Accuracy	± 0,5 %
	Voltage influence	< 0,5 % within rated voltage
	Frequency influence	< 3 % in frequency range of10 Hz to 20 kHz or with DC
	Phase angle influence	< 0,5 % for ± 90° at 1000 Hz
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,3 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 40 mVss
	Response time	< 1 s
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	4 kV between input, output, auxiliary voltage
Auxiliary voltage		230 V AC ± 20 %, 45-65 Hz, 3,5 VA
Dimensions	Housing	Housing B, (45 mm wide) Page A1
Weight	MFP..-MU	300 g
	MFPd-MU	340 g
	MFPdr-MU	360 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

Notice

Universal measuring transducer with Ethernet interface

with HTTP, TCP/IP, Modbus-TCP protocol
with 4 bipolar configurable analog outputs
2 limit value or pulsed outputs

Type:
Multi-E4-MU

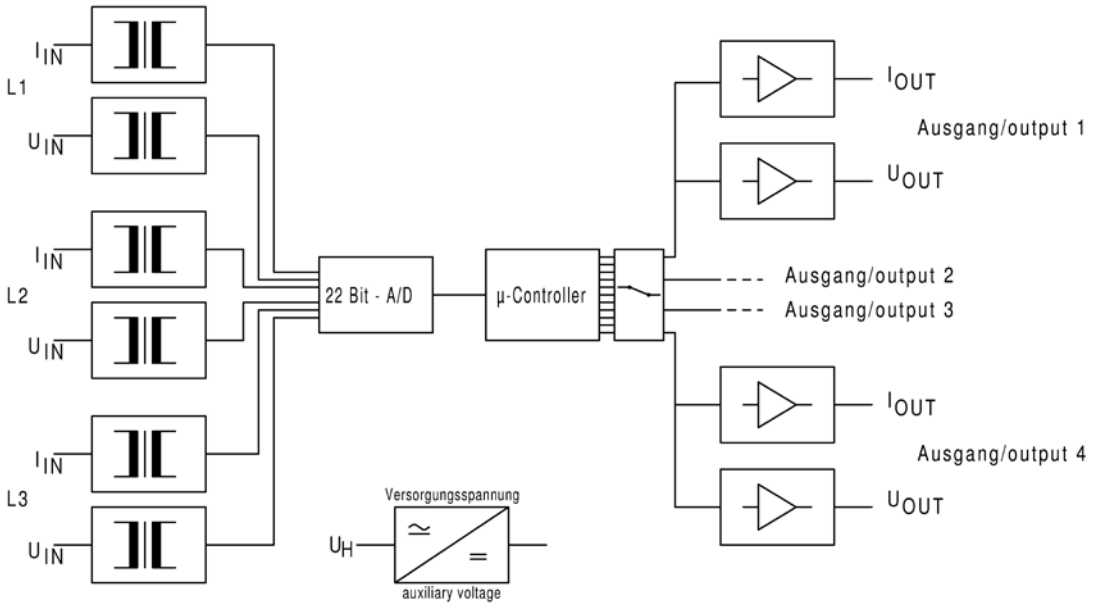
from 01.03.2022 plus. 6,8 % surcharge

Application

The measuring transducer Multi-E4-MU is used for the simultaneous transformation and isolation of current, voltage, frequency, active and reactive power, apparent power and the power factor for sinusoidal quantities into 4 impressed direct current and direct voltage signals. The measurement is possible in alternating current systems and 3-wire or 4-wire three-phase power systems with same or any load. The 29 measurands may be displayed, stored and configured via a 10 Mbit/sec Ethernet LAN interface at the PC. Up to 13000 series of measured values may be stored in the internal memory of the measuring transducer. Furthermore, the measuring results may be displayed via web browser or be read and further processed via HTTP, TCP/IP or Modbus-TCP protocol. Two further outputs may be used as limit value or pulsed outputs. The switching status of the limit value or pulsed outputs is indicated by 2 LEDs.

Function

The parameters to be measured are sent to a 22 bit A/D converter with a sample rate of >20 kSPS via current and voltage transformers and are then further transmitted to a microcontroller which calculates the required values for the outputs from the measured parameters. The output values for current and voltage are rms-values. The frequency is calculated from the period of the voltage signal of phase L1. The active powers are calculated from the products of the samples of current and voltage of the three phases. The calculations of the reactive power of the three phases are done using the product of the samples of the currents and the 90° offset voltage signals. The apparent power is the sum of the products from the three rms-values of current and voltage.
The power factors are calculated from the apparent power values and the active power values. The output amplifiers supply impressed direct current and direct voltage signals. The output signals are galvanically isolated from the input signals and the auxiliary voltage, but linked to each other via a common ground wire. The outputs are no-load proof and short-circuit proof. The two limit value and pulsed outputs are galvanically isolated from all inputs and outputs and the auxiliary voltage. An auxiliary voltage is required.



Price

Multi-E4-MU	incl. software download and LAN cable	€ 765,00
Surcharge	Connection to hall-effect or flexible current transformers	€ 250,00

Price group B

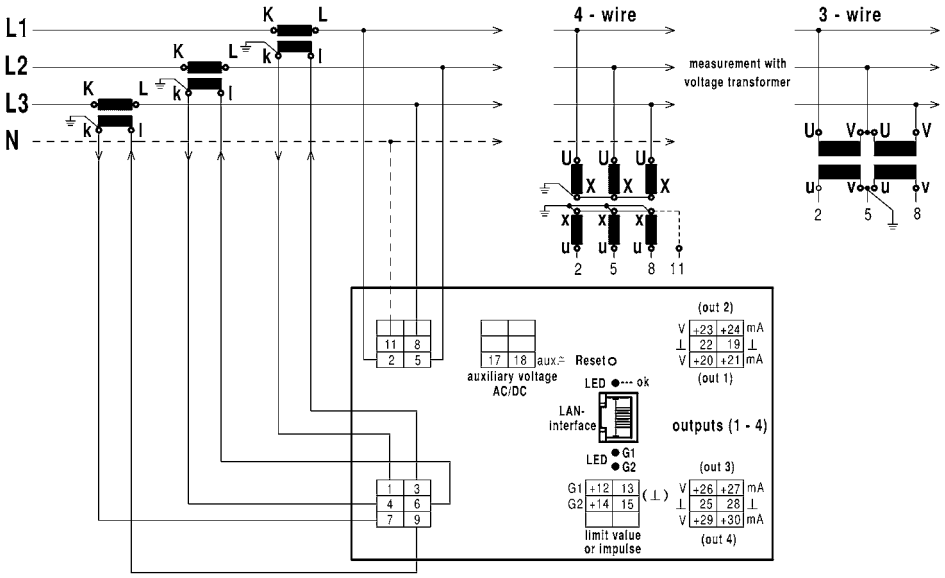
Technical data

Input	Input variables	Alternating current and voltage, frequency, active power, reactive power apparent power and power factor in alternating current systems, 4-wire and 3-wire 3-phase power systems with same and any load, unidirectional and bidirectional energy direction, configurable
	Rated current	2 A and 6 A
	Current range	0,3-10 A, configurable
	Rated voltage	100-750 V
	Voltage range	40-750 V, configurable
	Rated frequency	50 Hz
	Frequency range	40-80 Hz
	Energy consumption	per current path 0,06 VA with 1A, 0,3 VA with 5 A per voltage path 0,02 VA with 100V, 1 VA with 750 V
	Overload permanent	voltage max. 750 V, current max. 12 A
	High surge load	voltage 1000 V 1 s, current 240 A 1 s
Analog outputs	Output variables	double output
	Rated values current	0-10 mA, 0-20 mA, 4-20 mA, configurable
	Rated load current	< 500 Ω
	Rated values voltage	0-5 V, 0-10 V, 2-10 V, configurable
	Rated load voltage	> 750 Ω
	Polarity	4 x unipolar or bipolar, configurable
Limit value and pulsed outputs	Type	Open collector, (NPN-Transistor)
	Operating voltage	5-24 V DC, max. 30 V DC
	Operating current	max. 40 mA
	Pulse length	ca. 40 ms
	Hysteresis	ca. 4 % of set limit value
	Accurarcy	± 1 % of full scale
	Caution!	**The valence of the pulses must be divided by the transmission ratio (K_N) of the current and voltage transformers used!**
Transfer behavior	Accuracy	± 0,5 % (at power factor ± 0,5 % in the range >25 % of apparent power = U x INom x 1,732 , with apparent power <25 % the accuracy is ± 1 %, below 10 % of apparent power, (power factor is not measured)
	Current influence	< 0,5 % with 0,15 to 2-fold rated current
	Frequency influence	< 0,3 % within frequency range
	Phase angle influence	< 0,5 % with ± 90°
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,2 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (up to 400 A/m)
	Residual ripple	< 100 mVss
	Response time	ca. 200 ms (power factor approx. 600 ms)
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	4 kV between output and auxiliary voltage, 5,2 kV between input to output and input to auxiliary voltage, 2 kV between limit value or pulsed output to output
	Caution!	**The Ethernet LAN interface is galvanically connected to the outputs!**
Auxiliary voltage	Wide range power supply	10-30 V AC + DC, 5 VA or 60-265 V AC + DC, 5 VA (please specify at order)
Dimensions	Housing	Housing C (90 mm wide) Page A 1
Weight		600 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

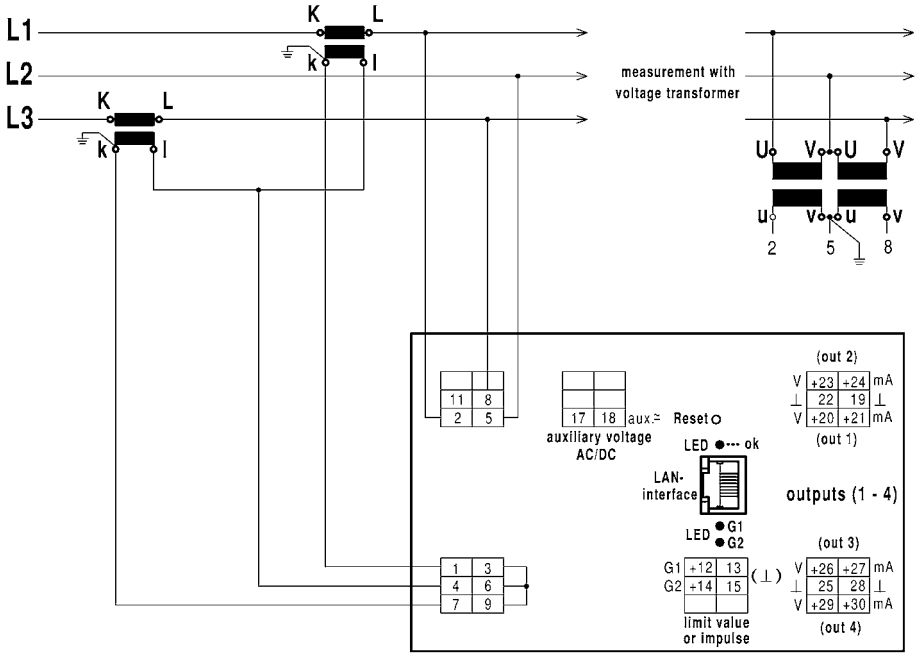
Calibration	The measuring transducer is factory-calibrated. The calibration should be renewed in the manufacturers plant every two years
Configuration	The measuring transducer is configured in the factory if the required data are known. A reconfiguration is possible at any time. This will require the related software (download from www.mueller-ziegler.de) and a PC. The measuring transducer and the PC must be connected to each other using a LAN cable (accessory). The auxiliary voltage must be connected to the measuring transducer. The various configuration options of the inputs and outputs are program-guided.

Connection

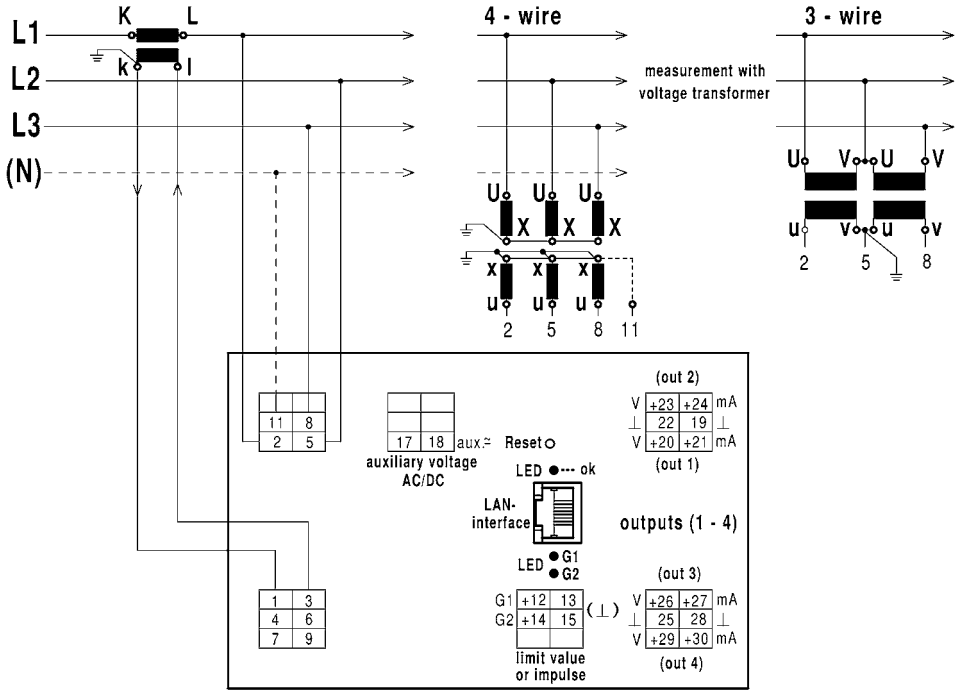
3-/ 4-wire 3-phase current, any load (inputs and outputs not used remain unconnected)



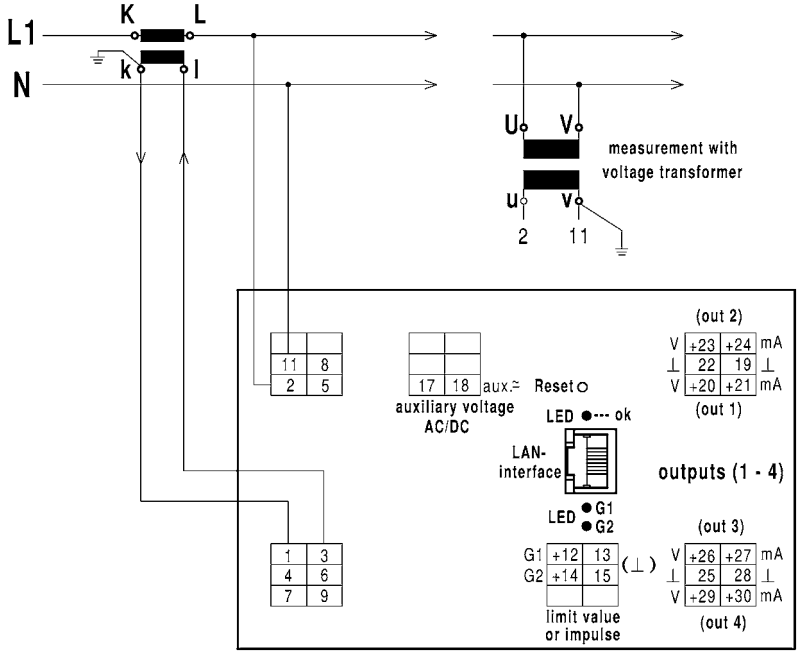
3-wire 3-phase current any load (inputs and outputs not used remain unconnected)



3- /4-wire 3-phase current same load (inputs and outputs not used remain unconnected)

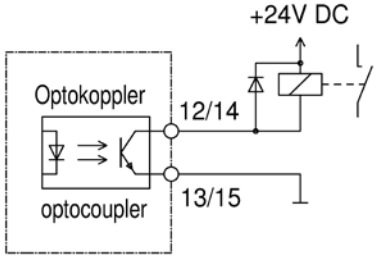


Alternating current (inputs and outputs not used remain unconnected)

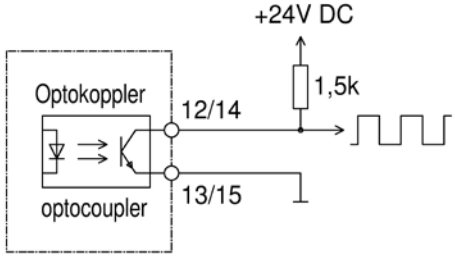


Limit value or pulsed output G1 and G2

Schaltausgang mit externem Relais
switching output with external relay



Impulsausgang mit Lastwiderstand
pulse output with load resistor



Universal measuring transducer with Ethernet interface

with HTTP, TCP/IP, Modbus-TCP protocol
with 11 bipolar configurable analog outputs
2 limit value or pulsed outputs

Type:
Multi-E11-MU

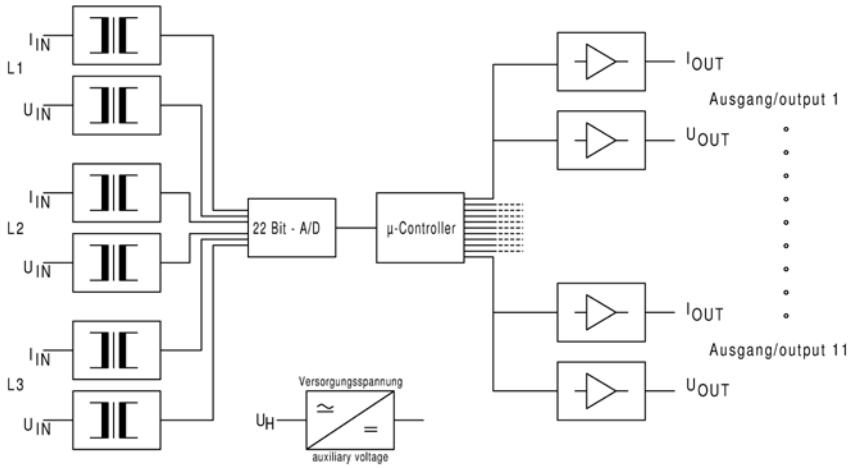
from 01.03.2022 plus. 6,8 % surcharge

Application

The measuring transducer Multi-E11-MU is used for the simultaneous transformation and isolation of current, voltage, frequency, active and reactive power, apparent power and the power factor for sinusoidal quantities into 11 impressed direct current and direct voltage signals. The measurement is possible in alternating current systems and 3-wire or 4-wire three-phase power systems with same or any load.
The 29 measurands may be displayed, stored and configured via a 10 Mbit/sec Ethernet LAN interface at the PC. Up to 13000 series of measured values may be stored in the internal memory of the measuring transducer. Furthermore, the measuring results may be displayed via web browser or be read and further processed via HTTP, TCP/IP or Modbus-TCP protocol. Two further outputs may be used as limit value or pulsed outputs. The switching status of the limit value or pulsed outputs is indicated by 2 LEDs.

Function

The parameters to be measured are sent to a 22 bit A/D converter with a sample rate of >20 kSPS via current and voltage transformers and are then further transmitted to a microcontroller which calculates the required values for the outputs from the measured parameters. The output values for current and voltage are rms-values. The frequency is calculated from the period of the voltage signal of phase L1. The active powers are calculated from the products of the samples of current and voltage of the three phases. The calculations of the reactive power of the three phases are done using the product of the samples of the currents and the 90° offset voltage signals. The apparent power is the sum of the products from the three rms-values of current and voltage.
The power factors are calculated from the apparent power values and the active power values. The output amplifiers supply impressed direct current and direct voltage signals. The output signals are galvanically isolated from the input signals and the auxiliary voltage, but linked to each other via a common ground wire. The outputs are no-load proof and short-circuit proof. The two limit value and pulsed outputs are galvanically isolated from all inputs and outputs and the auxiliary voltage. An auxiliary voltage is required.



Price

Multi-E11-MU	incl. software download and LAN cable	€ 971,00
Surcharge	Connection to hall-effect or flexible current transformers	€ 250,00

Price group B

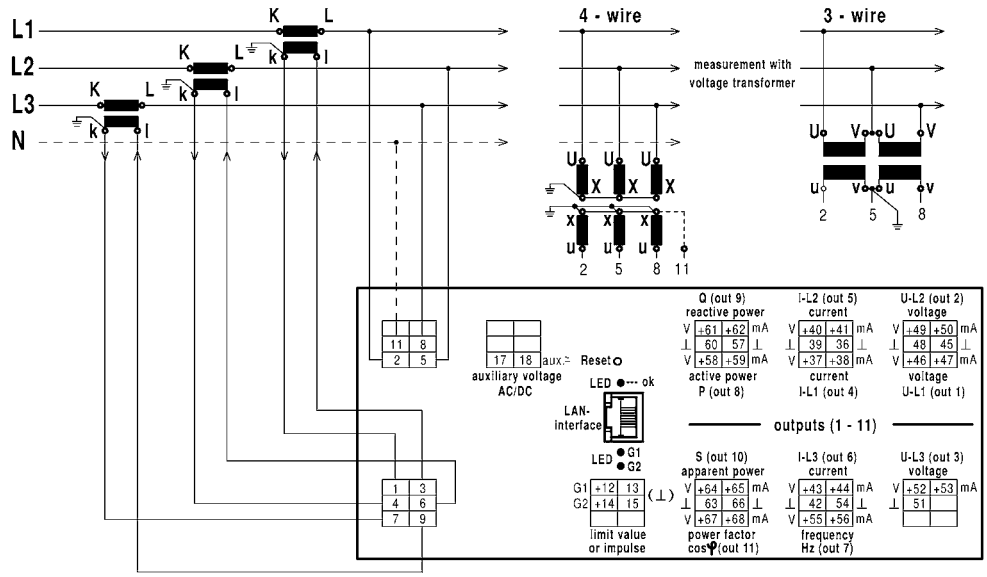
Technical data

Input	Input variables	Alternating current and voltage, frequency, active power, reactive power apparent power and power factor in alternating current systems, 4-wire and 3-wire 3-phase power systems with same and any load, unidirectional and bidirectional energy direction, configurable
	Rated current	2 A and 6 A
	Current range	0,3-10 A, configurable
	Rated voltage	100-750 V
	Voltage range	40-750 V, configurable
	Rated frequency	50 Hz
	Frequency range	40-80 Hz
	Energy consumption	per current path 0,06 VA with 1A, 0,3 VA with 5 A per voltage path 0,02 VA with 100V, 1 VA with 750 V
	Overload permanent	voltage max. 750 V, current max. 12 A
	High surge load	voltage 1000 V 1 s, current 240 A 1 s
Analog outputs	Output variables	double output
	Rated values current	0-10 mA, 0-20 mA, 4-20 mA, configurable
	Rated load current	< 500 Ω
	Rated values voltage	0-5 V, 0-10 V, 2-10 V, configurable
	Rated load voltage	> 750 Ω
	Polarity	4 x unipolar or bipolar, configurable, 7 x unipolar
Limit value and pulsed outputs	Type	Open collector, (NPN-Transistor)
	Operating voltage	5-24 V DC, max. 30 V DC
	Operating current	max. 40 mA
	Pulse length	ca. 40 ms
	Hysteresis	ca. 4 % of set limit value
	Accurarcy	± 1 % of full scale
	Caution!	**The valence of the pulses must be divided by the transmission ratio (K_N) of the current and voltage transformers used!**
Transfer behavior	Accuracy	± 0,5 % (at power factor ± 0,5 % in the range >25 % of apparent power = U x INom x 1,732 , with apparent power <25 % the accuracy is ± 1 %, below 10 % of apparent power, (power factor is not measured)
	Current influence	< 0,5 % with 0,15 to 2-fold rated current
	Frequency influence	< 0,3 % within frequency range
	Phase angle influence	< 0,5 % with ± 90°
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,2 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (up to 400 A/m)
	Residual ripple	< 100 mVss
	Response time	ca. 200 ms (power factor approx. 600 ms)
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	4 kV between output and auxiliary voltage, 5,2 kV between input to output and input to auxiliary voltage, 2 kV between limit value or pulsed output to output
	Caution!	**The Ethernet LAN interface is galvanically connected to the outputs!**
Auxiliary voltage	Wide range power supply	10-30 V AC + DC, 5 VA or 60-265 V AC + DC, 5 VA (please specify at order)
Dimensions	Housing	Housing D (135 mm wide) Page A 1
Weight		850 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

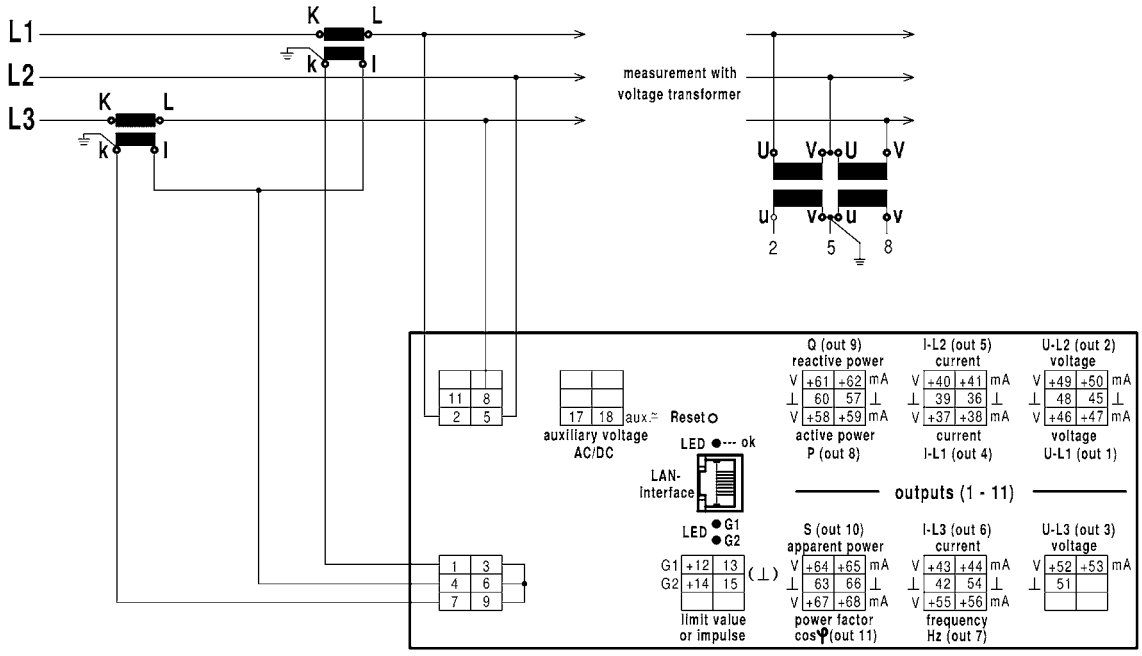
Calibration	The measuring transducer is factory-calibrated. The calibration should be renewed in the manufacturers plant every two years
Configuration	The measuring transducer is configured in the factory if the required data are known. A reconfiguration is possible at any time. This will require the related software (download from www.mueller-ziegler.de) and a PC. The measuring transducer and the PC must be connected to each other using a LAN cable (accessory). The auxiliary voltage must be connected to the measuring transducer. The various configuration options of the inputs and outputs are program-guided.

Connection

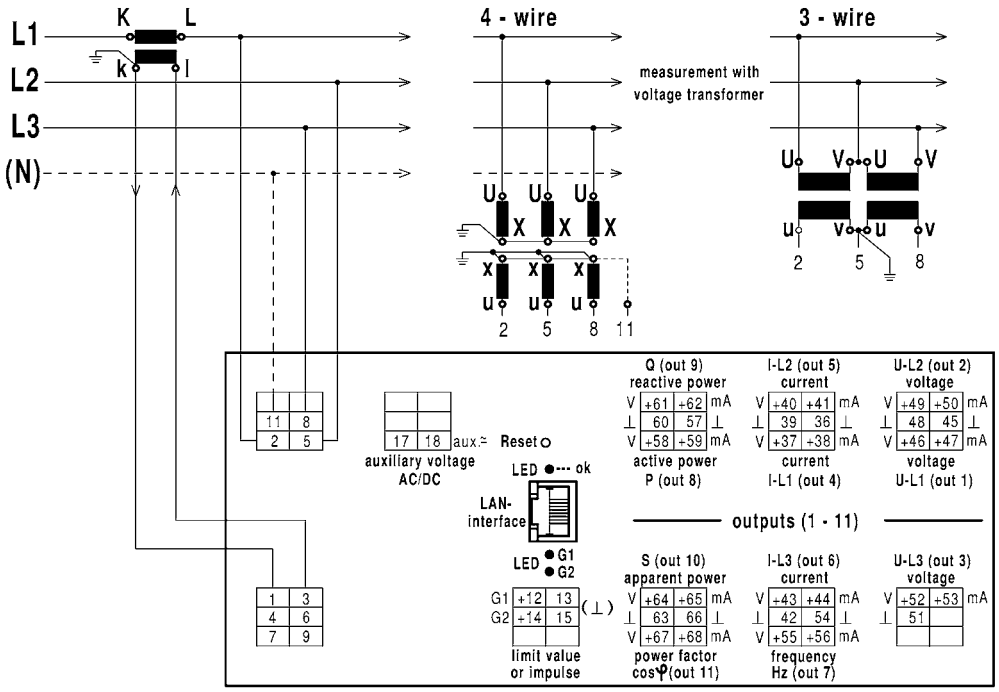
3-/ 4-wire 3-phase current, any load (inputs and outputs not used remain unconnected)



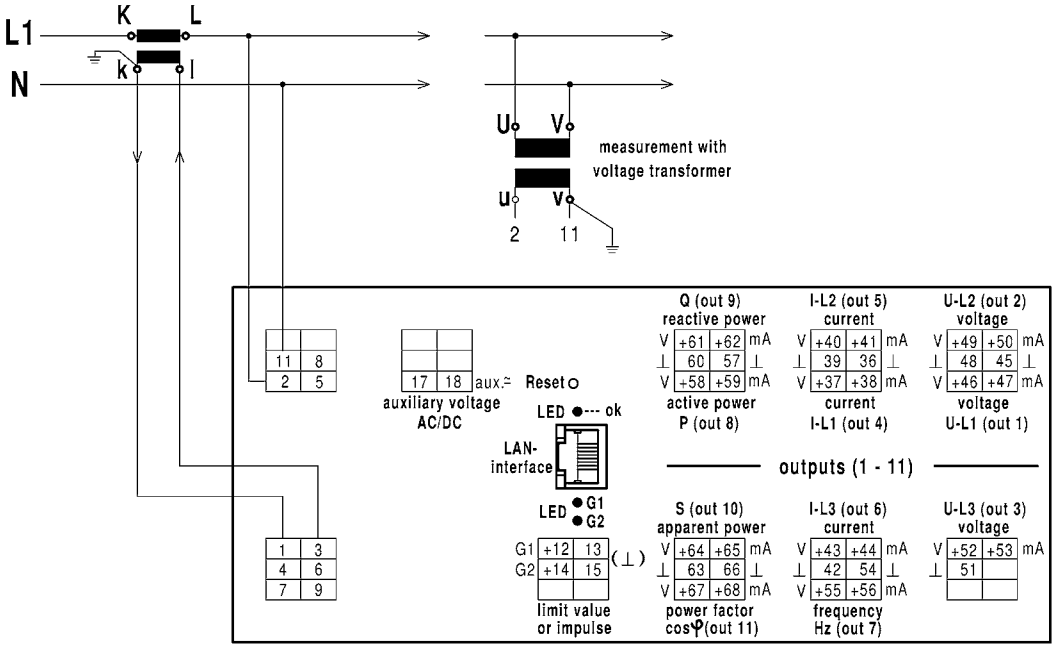
3-wire 3-phase current any load (inputs and outputs not used remain unconnected)



3- /4-wire 3-phase current same load (inputs and outputs not used remain unconnected)

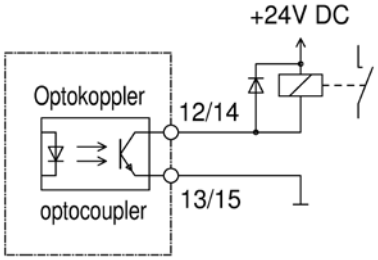


Alternating current (inputs and outputs not used remain unconnected)

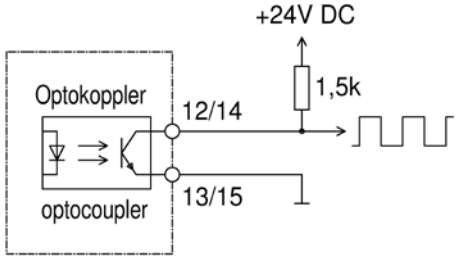


Limit value or pulsed output G1 and G2

Schaltausgang mit externem Relais
switching output with external relay



Impulsausgang mit Lastwiderstand
pulse output with load resistor



Universal measuring transducer with Ethernet interface

with HTTP, TCP/IP, Modbus-TCP protocol
2 limit value or pulsed outputs

Type:
Multi-E-MU

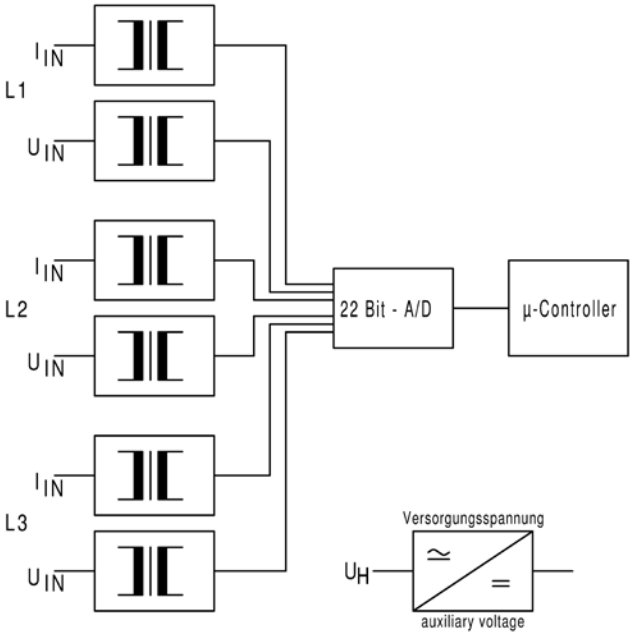
from 01.03.2022 plus. 6,8 % surcharge

Application

The measuring transducer Multi-E-MU serves to measure current, voltage, frequency, active and reactive power, apparent power and the power factor in case of sinusoidal quantities. The measurement is possible in alternating current systems and 3-wire or 4-wire threephase power systems with same or any load.
The 29 measurands may be displayed, stored and configured via a 10 Mbit/sec Ethernet LAN interface at the PC. Up to 13000 series of measured values may be stored in the internal memory of the measuring transducer. Furthermore, the measuring results may be displayed via web browser or be read and further processed via HTTP, TCP/IP or Modbus-TCP protocol. Two further outputs may be used as limit value or pulsed outputs. The switching status of the limit value or pulsed outputs is indicated by 2 LEDs.

Function

The parameters to be measured are transmitted to a 22 bit A/D converter with a sample rate of >20 kSPS via a current and voltage transformer. In a microcontroller, the required values for the outputs are calculated from the measured parameters. The output values for current and voltage are rms-values. The frequency is calculated from the period of the voltage signal of phase L1. The active powers are calculated from the products of the samples of current and voltage of the three phases. The calculations of the reactive power of the three phases are done using the product of the samples of the currents and the 90° offset voltage signals. The apparent power is the sum of the products from the three rms-values of current and voltage. The power factors are calculated from the apparent power values and the active power values.
The two limit value and pulsed outputs are galvanically isolated from all inputs and the auxiliary voltage. An auxiliary voltage is required.



Price

Multi-E-MU	incl. software download and LAN cable	€ 665,00
Surcharge	Connection to hall-effect or flexible current transformers	€ 250,00

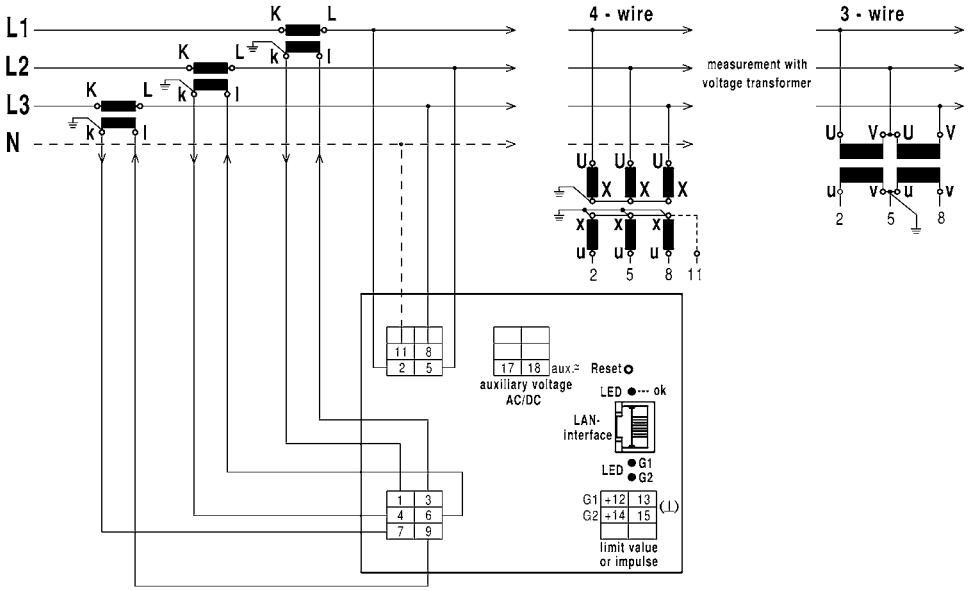
Price group B

Technical data

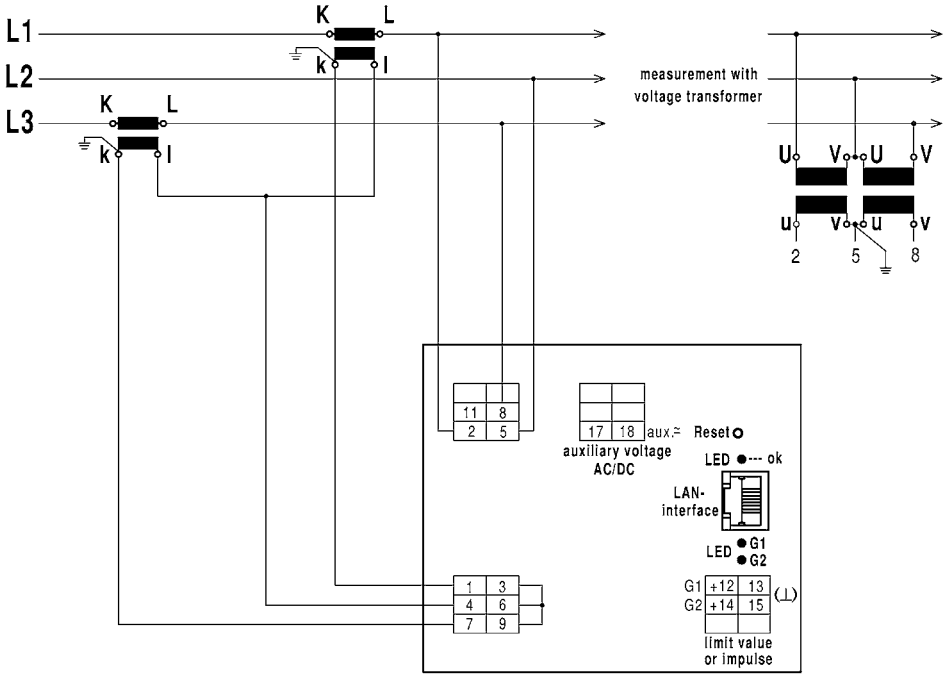
Input	Input variables	Alternating current and voltage, frequency, active power, reactive power apparent power and power factor in alternating current systems, 4-wire and 3-wire 3-phase power systems with same and any load, unidirectional and bidirectional energy direction, configurable
	Rated current	2 A and 6 A
	Current range	0,3-10 A, configurable
	Rated voltage	100-750 V
	Voltage range	40-750 V, configurable
	Rated frequency	50 Hz
	Frequency range	40-80 Hz
	Energy consumption	per current path 0,06 VA with 1A, 0,3 VA with 5 A per voltage path 0,02 VA with 100V, 1 VA with 750 V
	Overload permanent	voltage max. 750 V, current max. 12 A
	High surge load	voltage 1000 V 1 s, current 240 A 1 s
Limit value and pulsed outputs	Type	Open collector, (NPN-Transistor)
	Operating voltage	5-24 V DC, max. 30 V DC
	Operating current	max. 40 mA
	Pulse length	ca. 40 ms
	Hysteresis	ca. 4 % of set limit value
	Accurarcy	± 1 % of full scale
	Caution!	**The valence of the pulses must be divided by the transmission ratio (K_N) of the current and voltage transformers used!**
Transfer behavior	Accuracy	± 0,5 % (at power factor ± 0,5 % in the range >25 % of apparent power = U x INom x 1,732 , with apparent power <25 % the accuracy is ± 1 %, below 10 % of apparent power, (power factor is not measured)
	Current influence	< 0,5 % with 0,15 to 2-fold rated current
	Frequency influence	< 0,3 % within frequency range
	Phase angle influence	< 0,5 % with ± 90°
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,2 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (up to 400 A/m)
	Test voltage	5,2 kV between input to auxiliary voltage 5,2 kV between input to interface, 2 kV between limit value or pulsed output and interface
Auxiliary voltage	Wide range power supply	10-30 V AC + DC, 5 VA or 60-265 V AC + DC, 5 VA (please specify at order)
Dimensions	Housing	Housing E (67,5 mm wide) Page A 1
Weight		500 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²
Calibration	The measuring transducer is factory-calibrated. The calibration should be renewed in the manufacturers plant every two years	
Configuration	The measuring transducer is configured in the factory if the required data are known. A reconfiguration is possible at any time. This will require the related software (download from www.mueller-ziegler.de) and a PC. The measuring transducer and the PC must be connected to each other using a LAN cable (accessory). The auxiliary voltage must be connected to the measuring transducer. The various configuration options of the inputs and outputs are program-guided.	

Connection

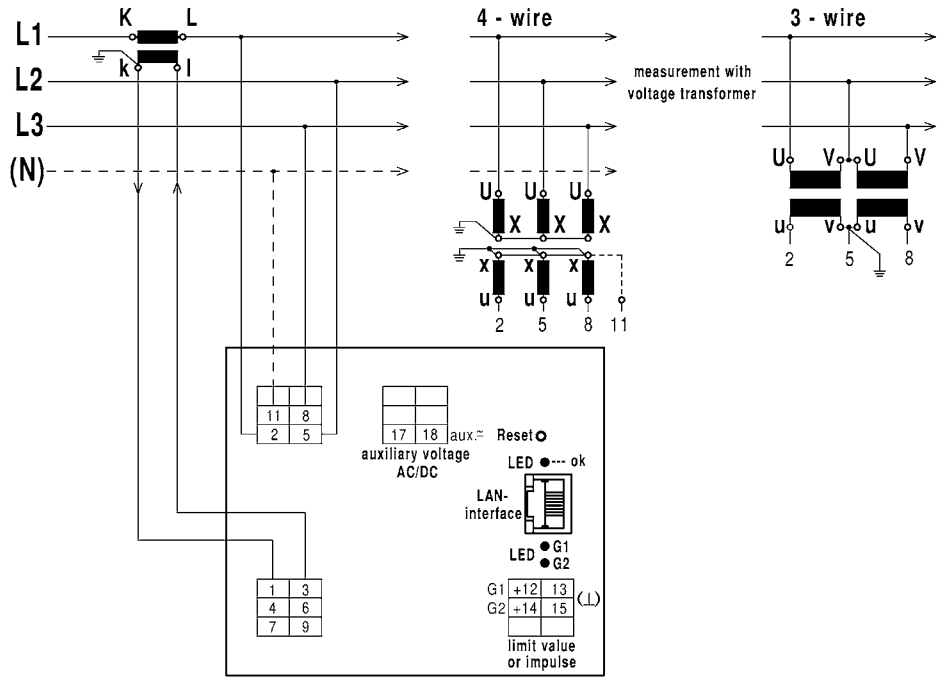
3-/ 4-wire 3-phase current, any load (inputs and outputs not used remain unconnected)



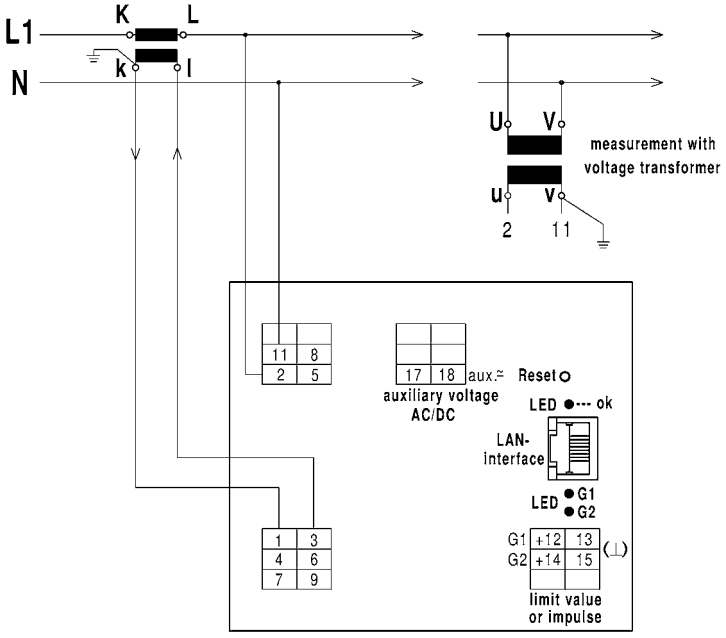
3-wire 3-phase current any load (inputs and outputs not used remain unconnected)



3- /4-wire 3-phase current same load (inputs and outputs not used remain unconnected)

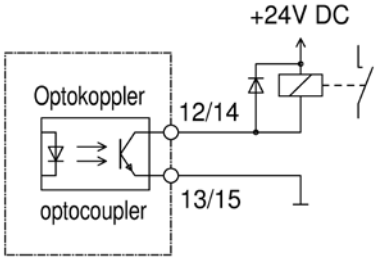


Alternating current (inputs and outputs not used remain unconnected)

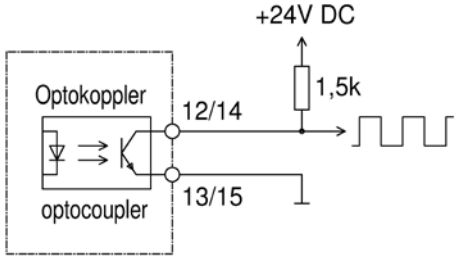


Limit value or pulsed output G1 and G2

Schaltausgang mit externem Relais
switching output with external relay



Impulsausgang mit Lastwiderstand
pulse output with load resistor



Measuring transdurcer for direct current power

Type:
PGs-MU

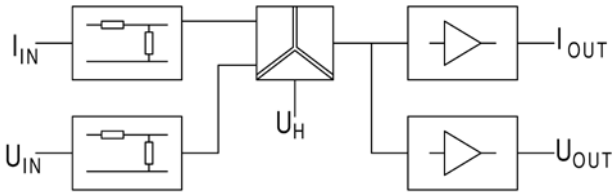
from 01.03.2022 plus. 6,8 % surcharge

Application

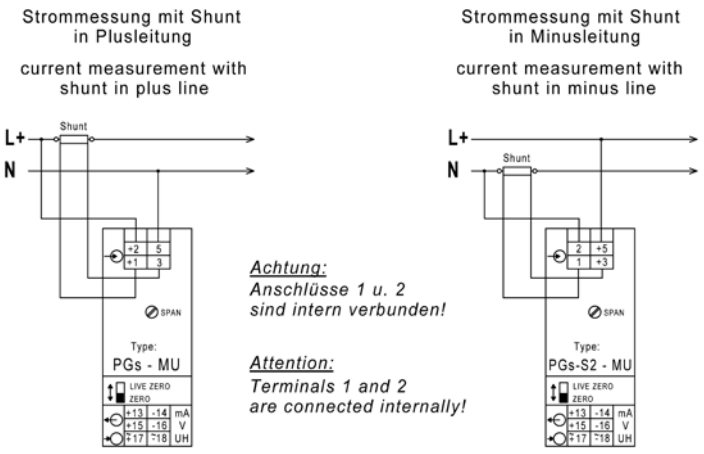
The measuring transducer PGs-MU is used for the transformation and isolation of a DC power into an impressed direct current and direct voltage signal. The calibrated double outputs are switchable between 0-20 mA and 0-10 V or 4-20 mA and 2-10 V.

Function

The parameters to be measured are transmitted to the analog multiplier via internal voltage dividers or shunts. The instantaneous values are then multiplied and formed as the mean value of a direct voltage matching the active power in a subsequent integration stage. The galvanic isolation between input and output signals is done using optocoupler. A downstream amplifier supplies the impressed direct current and direct voltage signals. Both outputs are no-load proof and short-circuit proof. Connecting the two outputs is not permissible. An auxiliary voltage is required.



Connection



Price

Input	50-150 % of the power, voltage: a value of 10-600 V current: shunt ... A/60 mV (please specify current!)	
Output	0-20 mA and 0-10 V as well as 4-20 mA and 2-10 V switchable on front side	€ 209,90
Surcharges	Auxiliary voltage other than 230 V AC:	
	24 V DC	€ 33,00
	6-30 V AC + DC	€ 56,00
	36-265 V AC + DC	€ 48,00
	110 V AC	€ --,--
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 10)	€ 29,30
Relay module	for limit monitoring Type GWM - (description page 11)	€ 72,50

Price group B

Technical data

Input	Input variables	direct current power (DC power)
	Nominal power	50-150 % of the DC power P = U x I
	Rated current	via seperate shunt with 0-60 mV, Ri ≥ 10 M Ω
	Rated voltage	a value from 0-10 V to 0-600 V Ri ≥ 4 k Ω / V
	Overload permanent	current input (shunt) 1,2-fold voltage input 5-fold / max. 830 V
	High surge load	current input 5-fold 5 s
Output	Output variables	double output
	Rated values	0-20 mA / 500 Ω load and 0-10 V / max. load 10 mA as well as 4-20 mA / 500 Ω load and 2-10 V / max. load 10 mA, switchable on front side
Transfer behavior	Accuracy	± 0,5 %
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,3 % at 10 K
	Auxiliary voltage influence	no
	Load influende	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 30 mVss
	Response time	< 300 ms
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	4 kV between input, output, auxiliary voltage
Auxiliary voltage		230 V AC ± 20 %, 45-65 Hz, 2,5 VA
	Options	● 110 V AC ± 20 %, 45-65 Hz, 2,5 VA ● 24 V DC - 15 % to + 25 %, 2 W ● 6-30 V AC + DC, 2 VA ● 36-265 V AC + DC, 2 VA
Dimensions	Housing	Housing A, (22,5 mm wide) page A1
Weight		190 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

Measuring transducer for direct current power installations up to 1000 V (CAT III)

Type:
PGsT-MU

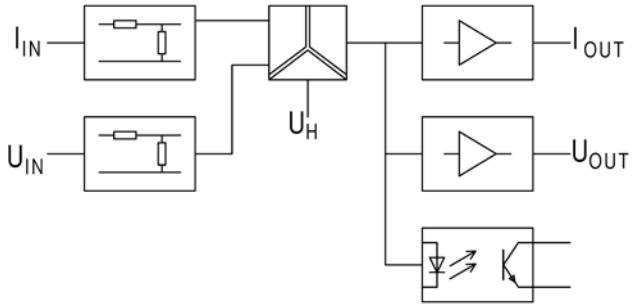
from 01.03.2022 plus. 6,8 % surcharge

Application

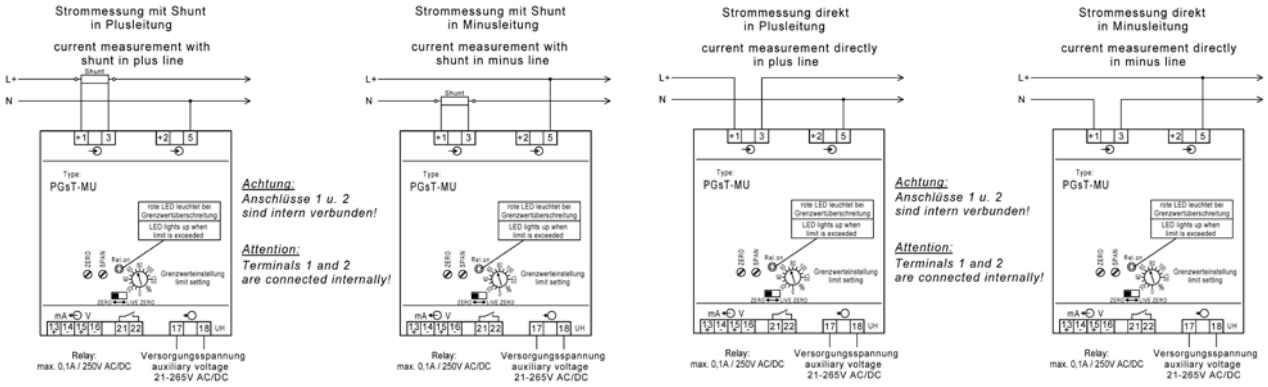
The measuring transducer PGsT-MU is used for the transformation and isolation of a DC power into an impressed direct current and direct voltage signal. An integrated limit monitoring serves for monitoring the input signal.

Function

The parameters to be measured are transmitted to the microcontroller via internal voltage dividers or shunts. The instantaneous values are then multiplied and formed as the mean value of a direct voltage matching the DC power in a subsequent integration stage. The galvanic isolation is realized using an optocoupler. An downstream amplifier supplies the impressed direct current and direct voltage signals. Both outputs are no-load proof and short-circuit proof. Connecting the two outputs is not permissible. The limit value may be adjusted within a range of 0-120 % of the input signal. An auxiliary voltage is required.



Connection



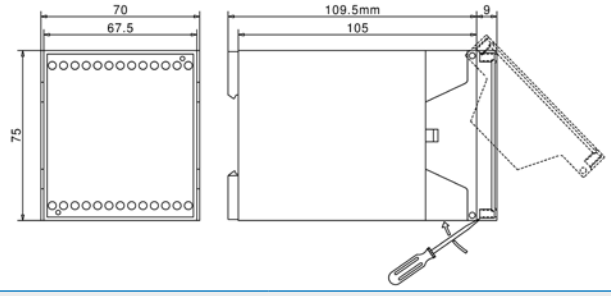
Price

Input	50-150 % of the DC power P = U x I	
	Voltage: a value of 0-1000 V or 0-1500 V (other values on request)	
	Current: shunt …A/60 mA (please specify current!) or direct measurement 0-5 A	
Output	0-20 mA and 0-10 V as well as 4-20 mA and 2-10 V switchable on front side	€ 270,70
Surcharge	Bidirectional energy directions	€ 35,00
	Note: There is no limit value monitoring with bidirectional energy direction!	

Price group B

Technical data

Input	Input variables	DC power, pulsed DC power (e.g. PWM) within a range of 20 Hz-30 kHz
	Nominal power	50-150 % of the DC power P = U x I
	Rated current	via seperate shunt with 0-60 mV, Ri ≥ 10 M Ω or direct measurement 0-5 A
	Rated voltage	a value of 0-1000 V or 0-1500 V (other values on request) Ri ≥ 2 M Ω
	Overload permanent	current input (shunt) 1,2-fold
	High surge load	current input 5-fold 5 s
Output	Output variables	double output
	Rated values	0-20 mA/0-500 Ω load and 0-10 V max. load 10 mA as well as 4-20 mA/0-500 Ω load and 2-10 V max. load 10 mA switchable at front side ● bipolar output (e.g. –20 mA – 0 – +20 mA and –10 V – 0 – +10 V, without limit monitoring) ● zero point rise (e.g. 0-10-20 mA and 0-5-10 V)
	Limit value output	● NO contact, Hysteresis approx. 4 % of limit value, contact load max. 0,1 A AC/DC, 250 V AC/DC
	Function indicator	red LED if limit value is exceeded
Transfer behavior	Accuracy	± 0,5 %
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,3 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 50 mVss
	Response time	< 300 ms
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	7,4 kV between input to output, input to auxiliary voltage and input to relay contact 4 kV between output to auxiliary voltage and to relay contacts
Standards	EMC	DIN EN 61326
	Mechanical strength	DIN EN 61010 part 1
	Electrical safety	DIN EN 61010 part 1 Housing insulated, protection class II, for working voltages up to 1000V (phase to neutral) pollution level 2, measuring category CAT III
	Accuracy, overload	DIN EN 60688
	Isolation	DIN EN 61010 part 1, 3,52 kV 50 Hz 10 s and 7,4 kV 50 Hz 10 s
	Air and creep distances	DIN EN 61010 part 1
	IP code	DIN EN 60529 housing IP30, terminals IP20
	Connection	DIN 43807
Auxiliary voltage		21-265 VAC+DC, 2 VA
Weight		220 g
Dimensions		



Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

Measuring transducers for direct current and direct voltage

Type:
IgT-MU, UgT-MU

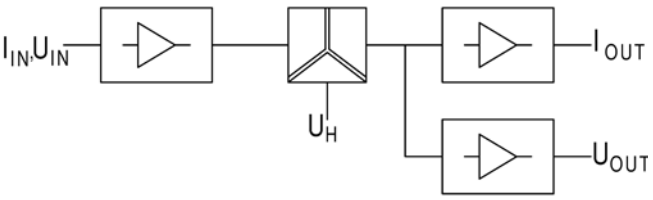
from 01.03.2022 plus. 6,8 % surcharge

Application

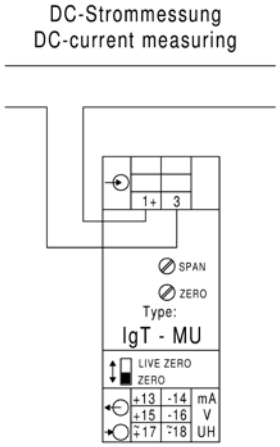
The measuring transducers IgT-MU and UgT-MU are used for the transformation and isolation of a direct current or a direct voltage into an impressed direct current and direct voltage signal. The calibrated double outputs are switchable between 0-20 mA and 0-10 V or 4-20 mA and 2-10 V.

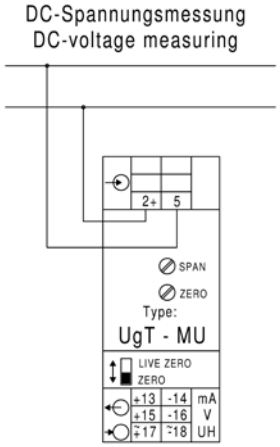
Function

The measurand is transmitted to the amplifier or impedance converter via an input protective circuit. The direct voltage generated there is transformed into an impressed direct current and in an impressed direct voltage. The galvanic isolation is realized using an optocoupler. Both outputs are no-load proof and short-circuit proof.
Connecting the two outputs is not permissible. An auxiliary voltage is required.



Connection





Price

Input	**IgT-MU**	a value from 0-100 µA to 0-5 A	
	UgT-MU	a value from 0-5 mV to 0-600 V	
Output	0-20 mA and 0-10 V as well as 4-20 mA and 2-10 V switchable on front side		€ 130,20
Surcharges	Input directly up to 10 A for Type IgT-MU		€ 9,50
	Sub-range		€ 22,50
	Response time < 200 µs		€ 9,50
	Input 4-20 mA		€ 22,50
	Both polarities	(e.g. input -20-0-20 mA, output 20-0-20 mA or e.g. input 20-0-20 mA, output 0-10-20 mA)	€ 35,00
	Class 0,2		€ 35,00
	Auxiliary voltage other than 230 V AC:		
	24 V DC		€ 33,00
	6-30 V AC + DC		€ 56,00
	36-265 V AC + DC		€ 48,00
	110 V AC		€ --,--
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 10)		€ 29,30
Relay module	for limit monitoring Type GWM - (description page 11)		€ 72,50

Price group B

Technical data

Input	Input variables	direct current or direct voltage
	Rated values	IgT-MU a value from 0-100 µA to 0-5 A, voltage drop 60 mV UgT-MU a value from 0-5 mV to 0-600 V R_i = 100 k Ω up to 1 V, > 1 V 100 k Ω / V, but max. 2 M Ω
	Option	● transmission of both polarities
	Overload permanent	current: 2-fold voltage: 5-fold / max. 830 V
	High surge load	current: 20-fold, 1 s
Output	Output variables	double output
	Rated values	0-20 mA/ 500 Ω load and 0-10 V max. load 10 mA as well as 4-20 mA/ 500 Ω load and 2-10 V max. load 10 mA, switchable at front side
	Options	● bipolar output e.g. - 20 - 0 - + 20 mA / 500 Ω load and, - 10 - 0 - + 10 V / max. load 10 mA ● zero point rise e.g. 0-10-20 mA / 500 Ω load and 0-5-10 V / max. load 10 mA
Transfer behavior	Accuracy	± 0,5 %
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,1 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 15 mVss
	Response time	< 300 ms
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	< 500 V: 4 kV between input, output, auxiliary voltage > 500 V: 5,2 kV between input and output 4 kV input / output to auxiliary voltage
Auxiliary voltage		230 V AC ± 20 %, 45-65 Hz, 2,5 VA
	Options	● 110 V AC ± 20 %, 45-65 Hz, 2,5 VA ● 24 V DC - 15 % to + 25 %, 2 W ● 6-30 V AC + DC, 2 VA ● 36-265 V AC + DC, 2 VA
Dimensions	Housing	Housing A, (22,5 mm wide) page A1
Weight		170 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm^2

Measuring transducers for direct current and direct voltage for installations up to 1000 V (CAT III)

Type:
IgTT-MU / UgTT-MU

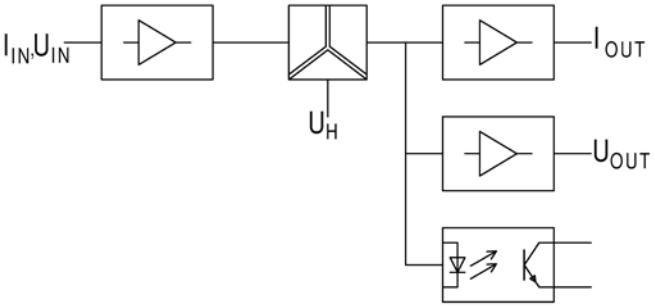
from 01.03.2022 plus. 6,8 % surcharge

Application

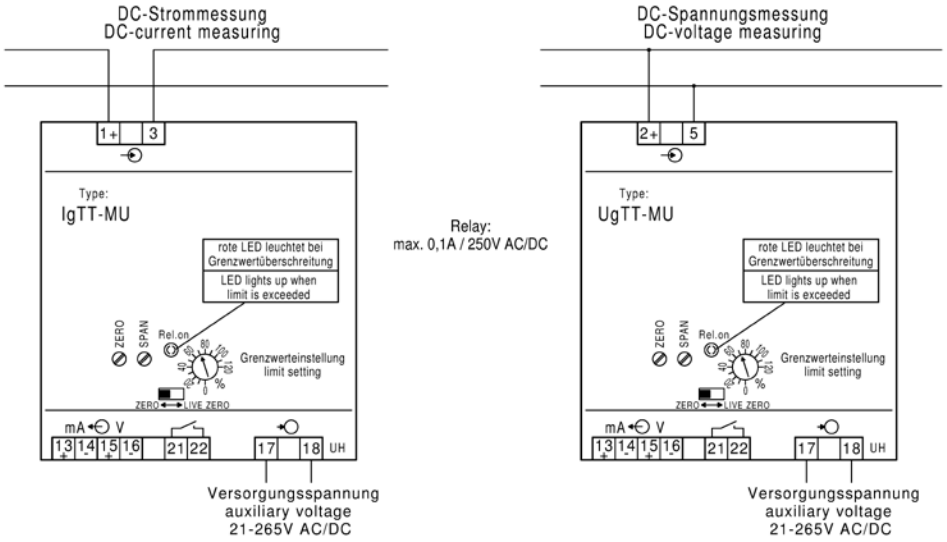
The measuring transducers IgTT-MU and UgTT-MU are used for the transformation and isolation of a direct current or a direct voltage into an impressed direct current and direct voltage signal. An integrated limit monitoring serves for monitoring the input signal.

Function

The measurand is transmitted to the amplifier or impedance converter via an input protective circuit. The direct voltage generated there is transformed into an impressed direct current and in an impressed direct voltage. The galvanic isolation is realized using an optocoupler. Both outputs are no-load proof and short-circuit proof. Connecting the two outputs is not permissible. The limit value may be adjusted within a range of 0-120 % of the input signal. Exceeding the limit value is indicated by an LED. An auxiliary voltage is required.



Connection

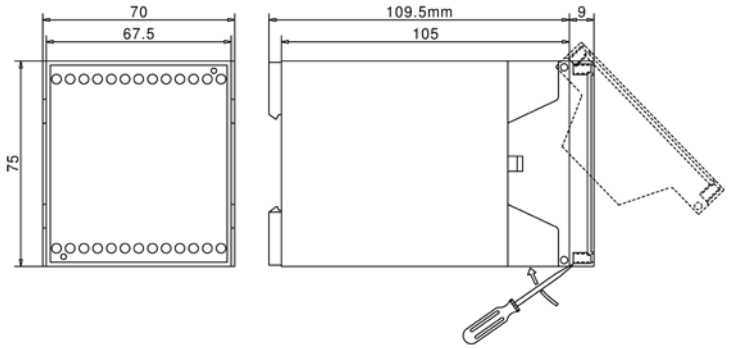


Price

Input	**IgTT-MU**	a value from 0-100 µA to 0-5 A	€ 270,70
	UgTT-MU	a value of 0-1500 V (other values on request)	€ 270,70
Ouput	0-20 mA and 0-10 V as well as 4-20 mA and 2-10 V switchable on front side		
Surcharges	Both polarities	(e.g. input -20-0-20 mA, output 20-0-20 mA or e.g. input 20-0-20 mA, output 0-10-20 mA)	€ 35,00

Price group B

Technical data

Input	Input variables	direct current of direct voltage
	Rated values	IgTT-MU a value from 0-100 µA to 0-5 A, voltage drop 60 mV UgTT-MU a value of 0-1500V, R_i = 2 MΩ
	Option	● Transmission of both polarities (no limit value monitoring!)
	Overload permanent	for current 2-fold, for voltage 5-fold / max. 2000 V
	High surge load	for current 20-fold 1 s
Ouput	Output variables	double output
	Rated values	0-20 mA/0-500 Ω load and 0-10 V max. load 10 mA as well as 4-20 mA/0-500 Ω load and 2-10 V max. load 10 mA, switchable on front side
	Limit value output	1 NO contact, Hysteresis approx. 4 % of limit value, contact load max. 0,1 A AC/DC, 250 V AC/DC
	Function indicator	red LED if limit value is exceeded
Transfer behavior	Accuracy	± 0,5 %
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,2 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 50 mVss
	Response time	< 300 ms
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	7,4 kV between input to output, input to auxiliary voltage and input to relay contacts 4 kV between output to auxiliary voltage and relay contacts
Standards	EMC	DIN EN 61326
	Mechanical strength	DIN EN 61010 part 1
	Electrical safety	DIN EN 61010 part 1 housing insulated, protection class II, for working voltages up to 1000V (phase to neutral) pollution level 2, measuring category CAT III
	Accuracy, overload	DIN EN 60688
	Isolation	DIN EN 61010 part 1, 3,52 kV 50 Hz 10 s and 7,4 kV 50 Hz 10 s
	Air and creep distances	DIN EN 61010 part 1
	IP code	DIN EN 60529 housing IP30, terminals IP20
	Connection	DIN 43807
Auxiliary voltage		21-265 VAC+DC, 2 VA
Weight		220 g
Dimensions		
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

Measuring transducer for standard signals

with selectable calibrated inputs and outputs

Type:
NgT-MU

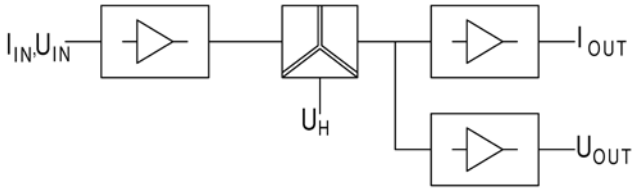
from 01.03.2022 plus. 6,8 % surcharge

Application

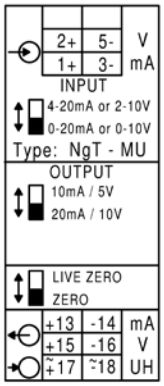
The measuring transducer NgT-MU is used for the transformation and isolation of a direct current or direct voltage standard signal into an impressed direct current and direct voltage signal. The calibrated inputs are selectable between the standard signals 0-20 mA, 4-20 mA, 0-10 V or 2-10 V. The calibrated double outputs are switchable between 0-20 mA and 0-10 V, 4-20 mA and 2-10 V, 0-10 mA and 0-5 V or 2-10 mA and 1-5 V.

Function

The measurand is transmitted to the amplifier or impedance converter via an input protective circuit. The direct voltage generated there is transformed into an impressed direct current and in an impressed direct voltage. The galvanic isolation is realized using an optocoupler. Both outputs are no-load proof and short-circuit proof. Connecting the two outputs is not permissible. An auxiliary voltage is required.



Connection



Normsignaleingänge
Inputs for standard signals

1+ / 3- = 0-20mA
1+ / 3- = 4-20mA
2+ / 5- = 0-10V
2+ / 5- = 2-10V

Price

Input	0-20 mA, 4-20 mA, 0-10 V and 2-10 V	
Output	0-20 mA and 0-10 V, 4-20 mA and 2-10 V, 0-10 mA and 0-5 V	€ 130,80
	as well as 2-10 mA and 1-5 V switchable on front side	
Surcharges	Auxiliary voltage other than 230 V AC:	
	24 V DC	€ 33,00
	6-30 V AC + DC	€ 56,00
	36-265 V AC + DC	€ 48,00
	110 V AC	€ --,--
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 10)	€ 29,30
Relay module	for limit monitoring Type GWM - (description page 11)	€ 72,50

Price group B

Technical data

Input	Input variables	direct current or direct voltage
	Rated values	0-20 mA, 4-20 mA, Ri = 100 Ω, 0-10 V, 2-10 V, Ri = 50 k Ω
	Overload permanent	current: 2-fold voltage: 5-fold
	High surge load	current: 20-fold, 1 s voltage: 5-fold
Output	Output variables	double output
	Rated values	0-20 mA/ 500 Ω load and 0-10 V max. load 10 mA as well as 4-20 mA/ 500 Ω load and 2-10 V max. load 10 mA, switchable on front side
		or
		0-10 mA / 500 Ω load and 0-5 V / max. load 10 mA as well as 2-10 mA / 500 Ω load and 1-5 V / max. load 10 mA switchable on front side
Transfer behavior	Accuracy	± 0,5 %
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,1 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 15 mVss
	Response time	< 30 ms
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	4 kV between input, output, auxiliary voltage
Auxiliary voltage		230 V AC ± 20 %, 45-65 Hz, 2,5 VA
	Options	● 110 V AC ± 20 %, 45-65 Hz, 2,5 VA ● 24 V DC - 15 % to + 25 %, 2 W ● 6-30 V AC + DC, 2 VA ● 36-265 V AC + DC, 2 VA
Dimensions	Housing	Housing A, (22,5 mm wide) page A1
Weight		180 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

Measuring transducer for standard signals

Type:
NoH-MU

from 01.03.2022 plus. 6,8 % surcharge

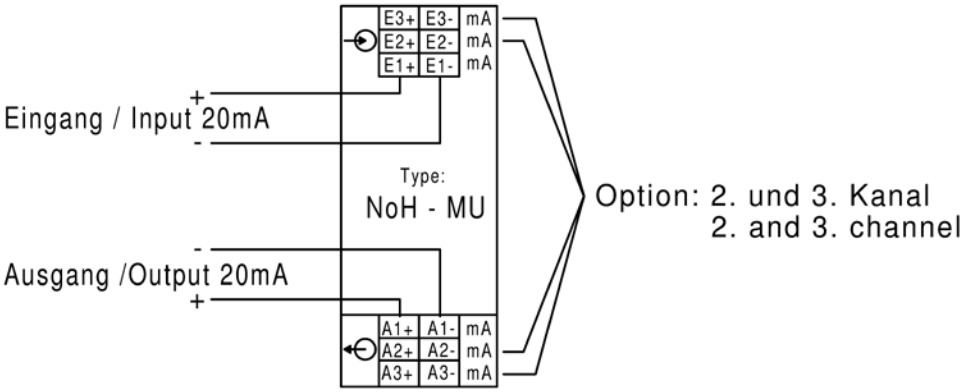
Application

The measuring transducers NoH-MU are used for the galvanic isolation of one, two or three direct current standard signals. The standard signal may lie within a range of 0-20 mA.

Function

The input current to be measured is transformed into a frequency signal and transmitted to the output side via a transformer after galvanic isolation. At the output side, the frequency signal is retransformed into a direct current. The auxiliary energy required for transformation and transmission is generated from the input signal. Therefore, the input resistance of the measuring transducer depends on the input current and the load connected to the output.

Connection



Price

NoH-MU	1 transmission channel	€ 69,70
NoH-MU	2 transmission channels	€ 99,40
NoH-MU	3 transmission channels	€ 123,60

Price group B

Technical data

Input	Input variables	direct current
	Rated values	0-20 mA
	Max. input voltage	16 V
	Energy consumption	2,7 V for 20 mA
	Overload permanent	2-fold
	High surge load	20-fold, 1 s
Output	Output variables	impressed direct current (1, 2 or 3 outputs)
	Rated output current	0-20 mA / 500 Ω load
Transfer behavior	Accuracy	± 0,2 %
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,2 % at 10 K
	Load influence	≤ 0,1 % with 500 Ω load
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 30 mVss
	Response time	< 20 ms with 500 Ω load
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	0,5 kV between input and output
		4 kV between the transmission channels
	Caution!	**The NoH-MU is not suited for power grid applications!**
Dimensions	Housing	Housing A, (22,5 mm wide) page A1
Weight		120 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm^2

Measuring transducer for temperature

(resistance thermometer)

Type:
Pt-MU

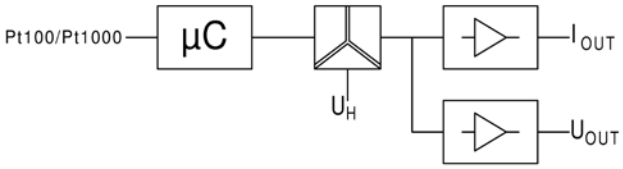
from 01.03.2022 plus. 6,8 % surcharge

Application

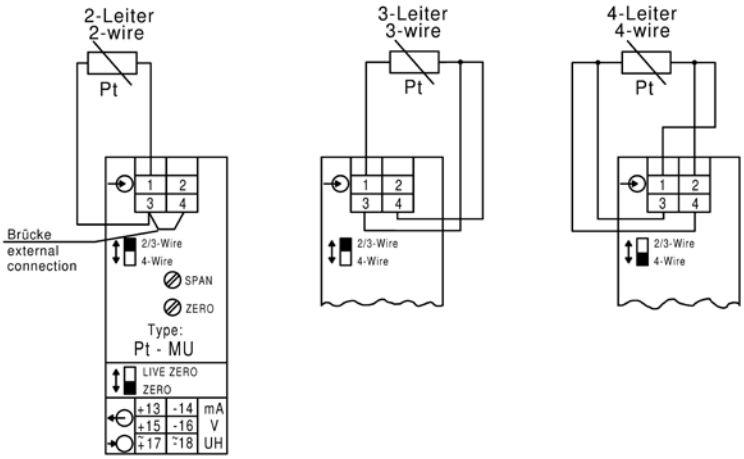
The measuring transducer Pt-MU is used for the transformation and isolation of a change in resistance due to the temperature into an impressed direct current and direct voltage signal. The calibrated double outputs are switchable between 0-20 mA and 0-10 V or 4-20 mA and 2-10 V.

Function

The resistance thermometer Pt 100 is a resistance depending on the temperature. A constant measurement current flows via the resistance thermometer to a sensor resistor which is part of a bridge circuit. The direct voltage generated there is linearized and amplified. It is then transformed into an impressed direct current and in an impressed direct voltage in a subsequent circuit. The galvanic isolation is realized using an optocoupler. Both outputs are no-load proof and short-circuit proof. Connecting the two outputs is not permissible. An auxiliary voltage is required.



Connection



Price

Input	arbitrary temperature range between -200 ... +850 °C (please specify when ordering, minimum range 40K)	€ 153,30
Output	0-20 mA and 0-10 V as well as 4-20 mA and 2-10 V switchable on front side	
Surcharges	for Pt 1000 sensor	€ 26,00
	Auxiliary voltage other than 230 V AC:	
	24 V DC	€ 33,00
	6-30 V AC + DC	€ 56,00
	36-265 V AC + DC	€ 48,00
	110 V AC	€ --,--
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 10)	€ 29,30
Relay module	for limit monitoring Type GWM - (description page 11)	€ 72,50

Price group B

Technical data

Input	Input variables	resistance Pt 100
	Option	● resistance Pt 1000
	Rated values	-200 ... +850 °C, arbitrary temperature range (please specify when ordering, minimum range 40K), other values on request the constant current trough the sensor is max. 1 mA
	Circuit type	two-wire, three-wire or four-wire circuit
	Input lead	two-wire: adjustment 0-10 Ω, using an installed spindle poti three-wire: no adjustment necessary, max. 100 Ω symmetrical four-wire: no adjustment necessary
Output	Output variables	double output
	Rated output values	0-20 mA / 500 Ω load and 0-10 V / max. load 10 mA as well as 4-20 mA / 500 Ω load and 2-10 V / max. load 10 mA switchable on front side
Transfer behavior	Accuracy	± 0,5 %
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,2 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 30 mVss
	Response time	< 300 ms
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	4 kV between input, output, auxiliary voltage
Auxiliary voltage		230 V AC ± 20 %, 45-65 Hz, 2,5 VA
	Options	● 110 V AC ± 20 %, 45-65 Hz, 2,5 VA ● 24 V DC - 15 % to + 25 %, 2 W ● 6-30 V AC + DC, 2 VA ● 36-265 V AC + DC, 2 VA
Dimensions	Housing	Housing A, (22,5 mm wide) page A1
Weight		150 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

Measuring transducer for temperature

(thermocouple, according to DIN EN 60 584)

Type:
Th-MU

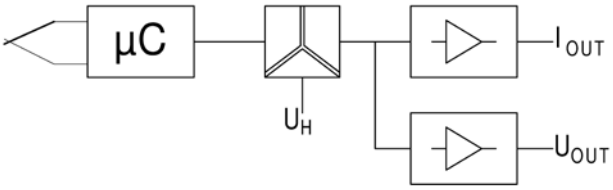
from 01.03.2022 plus. 6,8 % surcharge

Application

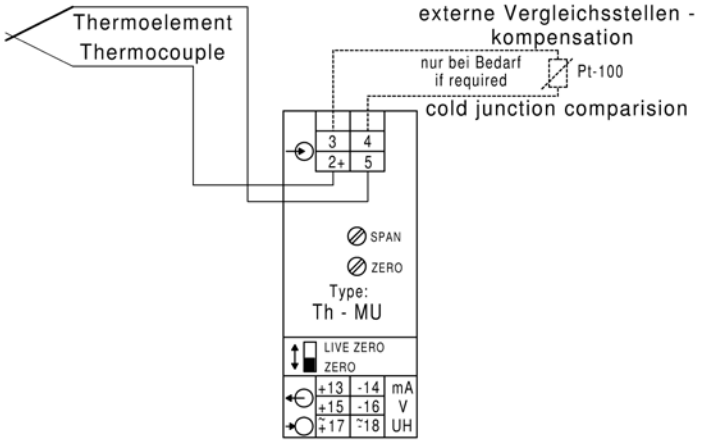
The measuring transducer Th-MU is used for the transformation and isolation of a temperature-dependent voltage of a thermocouple into an impressed direct current and direct voltage signal. The calibrated double outputs are switchable between 0-20 mA and 0-10 V or 4-20 mA and 2-10 V.

Function

The thermocouple constitutes a voltage source depending on the temperature. This voltage is supplied to an amplifier with integrated cold junction compensation. Following the linearization, the voltage is transformed into an impressed direct current and in an impressed direct voltage. The galvanic isolation is realized using an optocoupler. Both outputs are no-load proof and short-circuit proof. Connecting the two outputs is not permissible. An auxiliary voltage is required.



Connection



Price

Input	Thermocouple (DIN EN 60584-1) J, K, N, B, E, R, T or S, arbitrary temperature range (please specify when ordering, minimum range 200K)	€ 152,10
Output	0-20 mA and 0-10 V as well as 4-20 mA and 2-10 V switchable on front side	
Surcharges	Auxiliary voltage other than 230 V AC:	
	24 V DC	€ 33,00
	6-30 V AC + DC	€ 56,00
	36-265 V AC + DC	€ 48,00
	110 V AC	€ --,--
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 10)	€ 29,30
Relay module	for limit monitoring Type GWM - (description page 11)	€ 72,50

Price group B

Technical data

Input	Rated values	Type J (DIN EN 60584-1) -210 ... +1200 °C, arbitrary temperature range Type K (DIN EN 60584-1) -270 ... +1372 °C, arbitrary temperature range Type N (DIN EN 60584-1) -270 ... +1300 °C, arbitrary temperature range Type B (DIN EN 60584-1) +100 ... +1820 °C, arbitrary temperature range Type E (DIN EN 60584-1) -270 ... +1000 °C, arbitrary temperature range Type R (DIN EN 60584-1) -50 ... +1768 °C, arbitrary temperature range Type T (DIN EN 60584-1) -270 ... +400 °C, arbitrary temperature range Type S (DIN EN 60584-1) -50 ... +1768 °C, arbitrary temperature range (please specify when ordering, minimum range 200K)
	Input wire	no adjustment necessary
	Cold junction	0-80 °C
	Measuring circuit interruption	max. 2-fold output current
Output	Output variables	double output
	Rated output values	0-20 mA / 500 Ω load and 0-10 V / max. load 10 mA as well as 4-20 mA / 500 Ω load and 2-10 V / max. load 10 mA switchable on front side
Transfer behavior	Accuracy	± 0,5 %
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,2 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 30 mVss
	Response time	< 300 ms
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	4 kV between input, output, auxiliary voltage
Auxiliary voltage		230 V AC ± 20 %, 45-65 Hz, 2,5 VA
	Options	● 110 V AC ± 20 %, 45-65 Hz, 2,5 VA ● 24 V DC - 15 % to + 25 %, 2 W ● 6-30 V AC + DC, 2 VA ● 36-265 V AC + DC, 2 VA
Dimensions	Housing	Housing A, (22,5 mm wide) page A1
Weight		170 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

Measuring transducers for potentiometers and resistors

Type:
W-MU

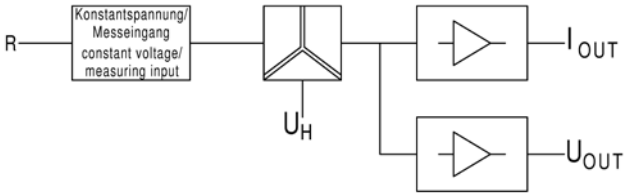
from 01.03.2022 plus. 6,8 % surcharge

Application

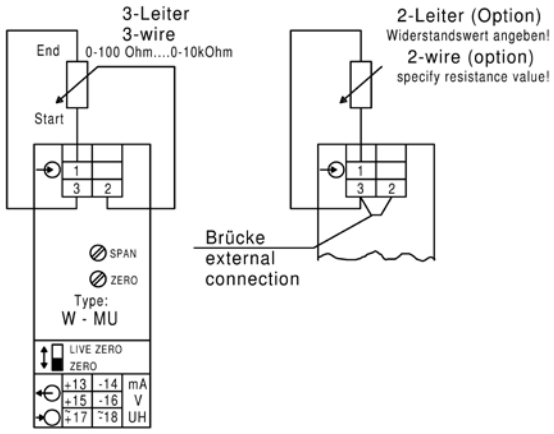
The measuring transducer W-MU is used for the transformation and isolation of a change in resistance into an impressed direct current and direct voltage signal. The calibrated double outputs are switchable between 0-20 mA and 0-10 V or 4-20 mA and 2-10 V.

Function

A constant measuring voltage is applied to the potentiometer in case of 3-wire circuits. The measuring signal generated via the center tap is amplified and transformed into an impressed direct current or in an impressed direct voltage. In case of the 2-wire circuit, the measuring signal is generated using a constant current. The galvanic isolation is realized using an optocoupler. Both outputs are no-load proof and short-circuit proof. Connecting the two outputs is not permissible. An auxiliary voltage is required.



Connection



Price

Input	3-wire conductor: 0-100 Ω to 0-10 k Ω	€ 137,00
Output	0-20 mA and 0-10 V as well as 4-20 mA and 2-10 V switchable on front side	
Surcharges	2-wire conductor: please specify resistance value	€ 22,50
	Auxiliary voltage other than 230 V AC:	
	24 V DC	€ 33,00
	6-30 V AC + DC	€ 56,00
	36-265 V AC + DC	€ 48,00
	110 V AC	€ --,--
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 10)	€ 29,30
Relay module	for limit monitoring Type GWM - (description page 11)	€ 72,50

Price group B

Technical data

Input	Input variables	Resistance
	Rated values	3-wire: arbitrary value from 0-100 Ω to 0-10 k Ω 2-wire: 0-100 Ω, 0-500 Ω, 0-1000 Ω, other values on request
Output	Output variables	double output
	Rated values	0-20 mA / 500 Ω load and 0-10 V / max. load 10 mA as well as 4-20 mA / 500 Ω load and 2-10 V / max. load 10 mA switchable on front side
Transfer behavior	Accuracy	± 0,5 %
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,2 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 30 mVss
	Response time	< 300 ms
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	4 kV between input, output, auxiliary voltage
Auxiliary voltage		230 V AC ± 20 %, 45-65 Hz, 2,5 VA
	Options	● 110 V AC ± 20 %, 45-65 Hz, 2,5 VA ● 24 V DC - 15 % to + 25 %, 2 W ● 6-30 V AC + DC, 2 VA ● 36-265 V AC + DC, 2 VA
Dimensions	Housing	Housing A, (22,5 mm wide) page A1
Weight		170 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

Measuring transducers for process parameters

parameterizable using USB

Type:
TSM-MU

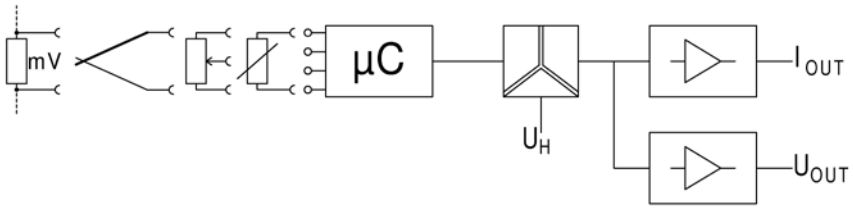
from 01.03.2022 plus. 6,8 % surcharge

Application

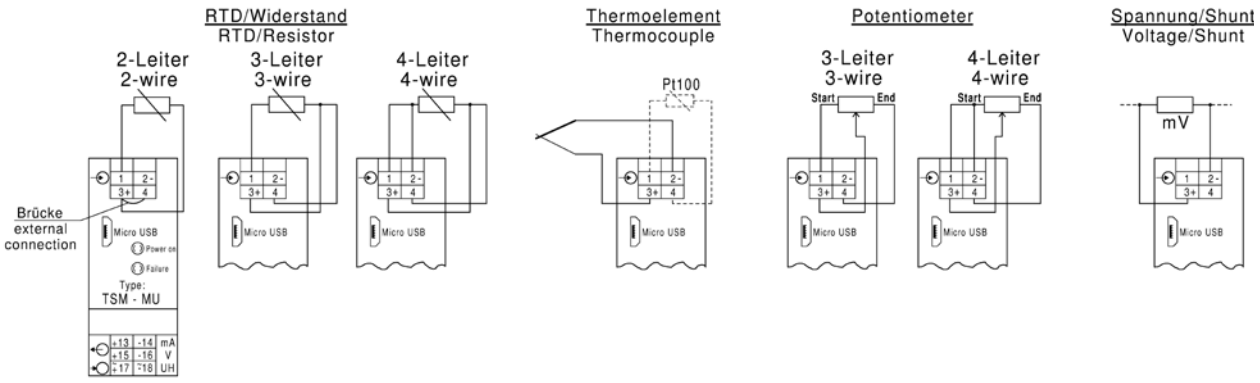
The measuring transducer TSM-MU is used for the transformation and isolation of measurements at thermocouples, resistance thermometers, resistors, potentiometers and voltage measurement (e.g. shunt). In case of measurements at resistors (e.g. Pt100), the connection (2-, 3- or 4-wire connection) is automatically recognized when starting the instrument. Via an USB interface, the measuring transducer may be parameterized. The corresponding software may be downloaded under www.mueller-ziegler.com.

Function

The voltage values measured at the inputs are linearized and transformed into an impressed direct current and in an impressed direct voltage. When making measurements at a thermocouple, the cold junction compensation is done by an internal, external or constanct temperature measurement. The galvanic isolation is realized using an optocoupler. An auxiliary voltage is required. Both outputs are no-load proof and short-circuit proof. Connecting the two outputs is not permissible.



Connection



Price

Input	Thermocouples, Pt100, Pt1000, resistor, potentiometer or voltage	€ 178,50
Output	0-20 mA + 0-10 V, 4-20 mA + 2-10 V, 0-10 mA + 0-5 V adjustable per software	
Surcharges	Auxiliary voltage other than 230 V AC:	
	24 V DC	€ 33,00
	6-30 V AC + DC	€ 56,00
	36-265 V AC + DC	€ 48,00
	110 V AC	€ --,--
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 10)	€ 29,30
Relay module	for limit monitoring Type GWM - (description page 11)	€ 72,50

Price group B

Technical data

Input	Input variables	**Thermocouples** (DIN 60584-1) Type B +100 … +1820 °C, Typ E -270 … +1000 °C, Type J -210 … +1200 °C, Typ K -270 … +1372 °C, Type N -270 … +1300 °C, Typ R -50 … +1768 °C, Type S -50 … +1768 °C, Typ T -270 … +400 °C cold junction compensation internal: Pt 100, 0-80 °C external: Pt 100, sensor current max. 0,5 mA, detection of sensor break constant: 0-100 °C
		Resistance thermometer / resistance / potentiometer Type Pt100 (DIN 60751) -200 … +850 °C Type Pt1000 (DIN 60751) -200 … +850 °C resistance 0 … 5 kΩ otentiometer 100 Ω … 10 kΩ sensor current max. 0,5 mA max. 100 Ω wire resistance symmetrical (2-wire connection max. 10 Ω) connection 2-, 3-, 4-wire with automatic recocnition when starting the instrument, detection of sensor break
		Voltage measurement -1000 … + 1000 mV
	Overlaod	max. 5 V between inputs
	Input resistance	10 MΩ
	Sensor break	max. 2-fold output value
	Parameterization	via micro USB port and software (www.mueller-ziegler.de)
	Function indicators	1x green „Power" LED and type of connection when starting the instrument and resistance measurement; 1x red "Fail" LED, error status display
Output	Output variables	double output
	Rated values	0-20 mA/500 Ω load and 0-10 V / max. load 10 mA as well as 4-20 mA/500 Ω load and 2-10 V / max. load 10 mA and 0-10 mA/0-500 Ω load and 0-5 V / max. load 10 mA, adjustable via software
	Options	● Frequency module a value from 0-5 Hz tp 0-10 kHz ● „Open-collektor" NPN, max. load 30 V 100 mA, pulse/pause 50/50 % ● Square wave signal 5 V, max. load 10 mA, pulse/pause 50/50 %
	Resolution	16 bit
Transfer behavior	Accuracy	± 0,5 %
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,2 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 30 mVss
	Response time	< 300 ms
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	4 kV between input, output, auxiliary voltage
Standards	EMC	DIN EN 61326
	Mechanical strength	DIN EN 61010 part 1
	Electrical safety	DIN EN 61010 part 1, housing insulated working voltage 300V (phase to neutral), pollution degree 2, measurement category CAT III
	Accuracy, overload	DIN EN 60688
	Isolation	DIN EN 61010 part 1, 3,52 kV 50 Hz 10 s
	Air and creep distances	DIN EN 61010 part 1
	IP code	DIN EN 60529 housing IP30, terminals IP20
	Connections	DIN 43807
Auxiliary voltage		230 V AC ± 20 %, 45-65 Hz, 2,5 VA
	Options	● 110 V AC ± 20 %, 45-65 Hz, 2,5 VA ● 24 V DC - 15 % to + 25 %, 2 W ● 6-30 V AC + DC, 2 VA ● 36-265 V AC + DC, 2 VA
Dimensions	Housing	Housing A, (22,5 mm wide) Page A1
Weight		150 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

Measuring transducers for strain gauge

(with 4-arm strain gauge full bridge)

Type:
DMS-MU

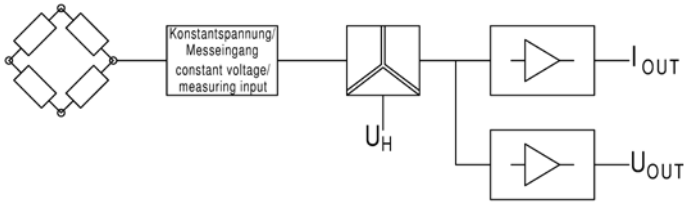
from 01.03.2022 plus. 6,8 % surcharge

Application

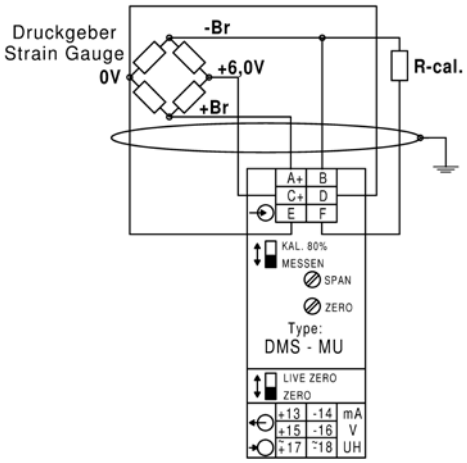
The measuring transducer DMS-MU is used for the transformation and isolation of the change in resistance of a 4-arm strain gauge full bridge into an impressed direct current and direct voltage signal. The calibrated double outputs are switchable between 0-20 mA and 0-10 V or 4-20 mA and 2-10 V.

Function

The strain gauge measuring bridge is supplied with a constant reference voltage and the measuring signal is picked up in the form of a voltage difference. The input signal is amplified and transformed into an impressed direct current and in an impressed direct voltage. The input leads at terminals A, B, C and D are monitored for wire breakage. The galvanic isolation is realized using an optocoupler. Both outputs are no-load proof and short-circuit proof. Connecting the two outputs is not permissible. An auxiliary voltage is required.



Connection



Price

Input	4-arm strain gauge full bridge with e.g. 350 Ω	€ 158,00
Output	0-20 mA and 0-10 V as well as 4-20 mA and 2-10 V, switchable on front side	
Surcharges	Strain gauge full bridge 75 Ω - 450 Ω (housing width 45 mm)	€ 60,00
	Auxiliary voltage other than 230 V AC:	
	24 V DC	€ 33,00
	6-30 V AC + DC	€ 56,00
	36-265 V AC + DC	€ 48,00
	110 V AC	€ --,--
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 10)	€ 29,30
Relay module	for limit monitoring Type GWM - (description page 11)	€ 72,50

Price group B

Technical data

Input	Input variables	change of resistance from a 4-arm strain gauge full bridge with e.g. 350 Ω (170 Ω - 450 Ω)
	Rated values	differential input voltage 2-3,3 mV/V adjustable from 1,8 to 3,6 mV/V (corresponds to 12 to 24,5 mV)
	Bridge supply voltage	ca. 6,0 V
	Zero point	± 3 mV adjustable
Output	Output variables	double output
	Rated values	0-20 mA / 500 Ω load and 0-10 V / max. load 10 mA as well as 4-20 mA / 500 Ω load and 2-10 V / max. load 10 mA switchable on front side
Transfer behavior	Accuracy	± 0,5 %
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,2 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 30 mVss
	Response time	< 300 ms
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	4 kV between input, output, auxiliary voltage
	Sensor break	if one of the input wires at the terminals A, B, C or D is interrupted, the output of the measuring transducer switches to maximum output signal
Auxiliary voltage		230 V AC ± 20 %, 45-65 Hz, 2,5 VA
	Options	● 110 V AC ± 20 %, 45-65 Hz, 2,5 VA ● 24 V DC - 15 % to + 25 %, 2 W ● 6-30 V AC + DC, 2 VA ● 36-265 V AC + DC, 2 VA
Dimensions	Housing	Housing A, (22,5 mm wide) Page A1
Weight		180 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

Measuring transducers for r.p.m

Type:
D-MU

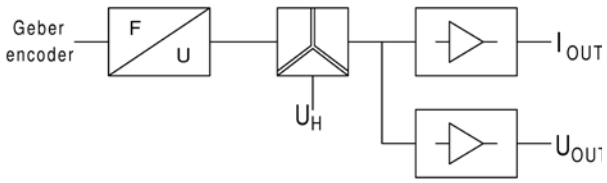
from 01.03.2022 plus. 6,8 % surcharge

Application

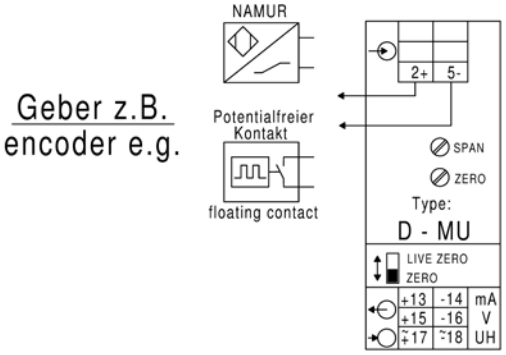
The measuring transducer D-MU is used for the transformation and isolation of a rotation speed into an impressed direct current and direct voltage signal.

Function

The rotation speed to be measured is supplied to the input of the measuring transducer via a proximity switch (NAMUR), a mechanical contact or a passive switched transistor. Via a filter, the current changes pending in this case are fed to a microcontroller which will then take care of the evaluation. The direct voltage generated there is transformed into an impressed direct current and in an impressed direct voltage. Both outputs are no-load proof and short-circuit proof. Connecting the two outputs is not permissible. An auxiliary voltage is required.



Connection



Price

Input	Rotation speed in a range of 1,6 to 1000 Hz (e.g. 1,6-100 Hz)	€ 188,70
Output	0-20 mA and 0-10 V as well as 4-20 mA and 2-10 V, switchable on front side	
Surcharges	Auxiliary voltage other than 230 V AC:	
	24 V DC	€ 33,00
	6-30 V AC + DC	€ 56,00
	36-265 V AC + DC	€ 48,00
	110 V AC	€ --,--
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 10)	€ 29,30
Relay module	for limit monitoring Type GWM - (description page 11)	€ 72,50

Price group B

Technical data

Input	Input variables	rotation speed, frequency
	Rated values	a value in the range of 1,6 Hz and1000 Hz (e.g. 1,6-100 Hz)
	Encoder	proximity switch, mechanical contact or passive transistor
	Values of encoder	open circuit voltage 12 V(optionally 24 V or 5 V) short circuit current 10 mA, switching point 2 mA
Output	Output variables	double output
	Rated values	0-20 mA / 500 Ω load and 0-10 V / max. load 10 mA as well as 4-20 mA / 500 Ω load and 2-10 V / max. load 10 mA switchable on front side
Transfer behavior	Accuracy	± 0,5 %
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,2 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 30 mVss
	Response time	< 300 ms
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	4 kV between input, output, auxiliary voltage
Auxiliary voltage		230 V AC ± 20 %, 45-65 Hz, 2,5 VA
	Options	● 110 V AC ± 20 %, 45-65 Hz, 2,5 VA ● 24 V DC - 15 % to + 25 %, 2 W ● 6-30 V AC + DC, 2 VA ● 36-265 V AC + DC, 2 VA
Dimensions	Housing	Housing A, (22,5 mm wide) Page A1
Weight		190 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

Measuring transducers for summation

Type:
Sum-MU

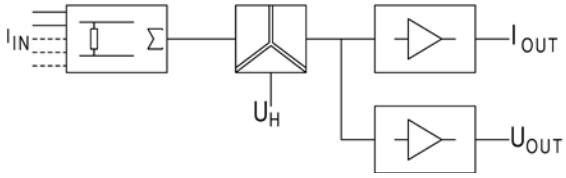
from 01.03.2022 plus. 6,8 % surcharge

Application

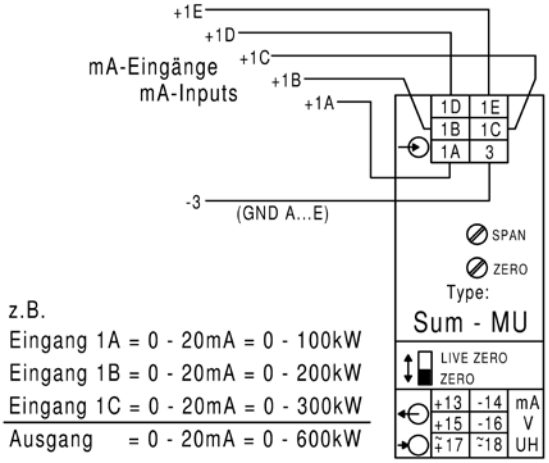
The measuring transducer Sum-MU is used for the transformation and isolation of the sum of several direct currents into an impressed direct current and direct voltage signal. The calibrated double outputs are switchable between 0-20 mA and 0-10 V or 4-20 mA and 2-10 V.

Function

The up to 5 direct currents are converted in direct voltages using shunts and added up. The direct voltage thus generated is galvanically isolated using an optocoupler, amplified and transformed into an impressed direct current or in an impressed direct voltage. The output is no-load and short-circuit proof. Connecting the two outputs is not permissible. An auxiliary voltage is required.



Connection



z.B.
Eingang 1A = 0 - 20mA = 0 - 100kW
Eingang 1B = 0 - 20mA = 0 - 200kW
Eingang 1C = 0 - 20mA = 0 - 300kW
Ausgang = 0 - 20mA = 0 - 600kW

e.g.
Input 1A = 0 - 20mA = 0 - 100kW
Input 1B = 0 - 20mA = 0 - 200kW
Input 1C = 0 - 20mA = 0 - 300kW
Output = 0 - 20mA = 0 - 600kW

Price

Input	(Please specify valences of the inputs to each other in the order)	
	2 direct currents of: 0-20 mA	€ 155,70
	4-20 mA	€ 180,50
Output	0-20 mA and 0-10 V as well as 4-20 mA and 2-10 V, switchable on front side	
Surcharges	Input: per additional input (max. 5 inputs possible)	€ 9,50
	Auxiliary voltage other than 230 V AC:	
	24 V DC	€ 33,00
	6-30 V AC + DC	€ 56,00
	36-265 V AC + DC	€ 48,00
	110 V AC	€ --,--
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 10)	€ 29,30
Relay module	for limit monitoring Type GWM - (description page 11)	€ 72,50

Price group B

Technical data

Input	Input variables	Direct current
	Rated values	max. 5 direct currents of 0-20 mA or 4-20 mA, Ri = 3 Ω It is possible ex works to asign a value to each input e. g. Input 1A = 0-20 mA corresponds to 0-150 kW => value 0.25 Input 1B = 0-20 mA corresponds to 0-150 kW => value 0.25 Input 1C = 0-20 mA corresponds to 0-300 kW => value 0.5 Output 0-20 mA corresponds to 0-600 kW => value 1,0 Please specify when ordering!
	Overload permanent	2-fold
	High surge load	20-fold, 1 s
Output	Output variables	double output
	Rated values	0-20 mA / 500 Ω load and 0-10 V / max. load 10 mA as well as 4-20 mA / 500 Ω load and 2-10 V / max. load 10 mA switchable on front side
Transfer behavior	Accuracy	± 0,5 %
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,2 % at 10 K
	Auxiliary voltage influence	no
	Load influence	no
	External magnetic field influence	no (400 A/m)
	Residual ripple	< 30 mVss
	Response time	< 300 ms
	Open circuit voltage	max. 24 V
	Current limiting	max. 2-fold in case of overload
	Test voltage	4 kV between input, output, auxiliary voltage
Auxiliary voltage		230 V AC ± 20 %, 45-65 Hz, 2,5 VA
	Options	● 110 V AC ± 20 %, 45-65 Hz, 2,5 VA ● 24 V DC - 15 % to + 25 %, 2 W ● 6-30 V AC + DC, 2 VA ● 36-265 V AC + DC, 2 VA
Dimensions	Housing	Housing A, (22,5 mm wide) Page A1
Weight		190 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

GMAT-2

GMA

DNW 100, DNW 400, DNW 500, DNW 690

	Type:	
Limit monitoring, limit value relay		
Direct and alternating current, direct and alternating voltage 2 limit values, installations up to 1000 V (CAT III)	GMAT-2	Page 80
Direct and alternating current, direct and alternating voltage 1 or 2 limit values	GMA	Page 82

Mains monitoring		
Three-phase mains monitoring	DNW 100, DNW 400, DNW 500, DNW 690	Page 84

Limit value relay with indicator for installations up tp 1000 V (CAT III)

for direct and alternating current as well as
for direct and alternating voltage
2 limit values

Type:
GMAT-2

from 01.03.2022 plus. 6,8 % surcharge

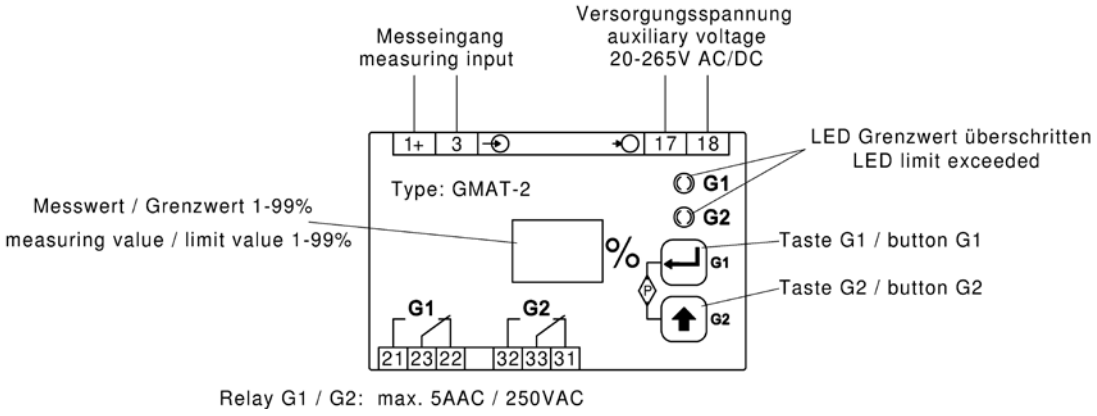
Application

The electronic limit value relay with indication GMAT-2 is used for monitoring the alternating or direct current and voltage. The alternating current parameters are measured as TrueRMS value with arbitrary waveform. The measured value or the limit values are indicated in a 2-digit LED display.

Function

The limit values are adjustable in 1% intervals using pushbuttons on the front panel. Hysteresis, switch on and switch off delay, closed circuit / open-circuit principle and min/max principle may also be set via the pushbuttons. If limit values are exceeded, this is indicated by LEDs. The limit value relay has a housing width of 71 mm and is designed for snap-on fastening on top hat rail.

Connection



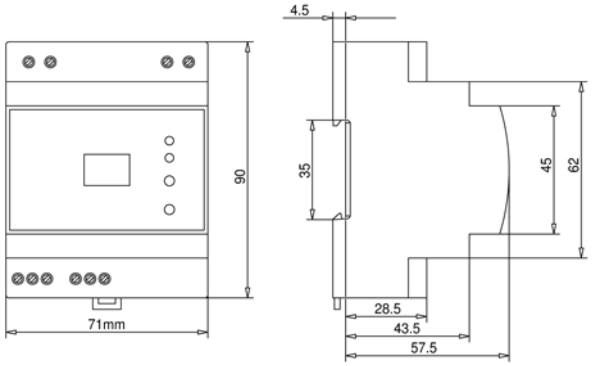
Relay G1 / G2: max. 5AAC / 250VAC

Price

Input	DC	€ 274,50
	AC + DC True RMS	€ 282,00

Price group B

Technical data

Input	Input variables	direct current or direct voltage, alternating current or alternating voltage, the quantities are measured as true RMS value (up to crest factor 4) with arbitrary waveform in the range of DC and AC 40 - 1000 Hz			
	Limit value adjustment	0–99 %, adjustable in 1 % intervalls			
	Indicators	2 digit LED display for measuring values 0-99 % of full scale 2 red LEDs for limit value violation			
	Overflow	LED indicator shows dd			
	Accuracy	± 1 % of full scale			
	Test voltage	7,4 kV between measuring input and relay contact and auxiliary voltage, 4kV between relay G1 and relay G2			
Switching characteristic	Switching accuracy	± 1 % of full scale			
	Hysteresis	adjustable from 0-10 % of full scale			
	Circuit time	< 400 ms for 10 % limit value exceedance			
	Switching delay	adjustable range 0-99 s			
	Switching state	selectable between close-circuit and open-circuit principle			
	Relay contact	2 changeover contact			
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C			
	Temperature influence	< 0,1 % at 10 K			
	Overload capacity	voltage 10-fold, max. 2000 V, current 10-fold up to 20 mA, 2-fold for above			
	Contact rating	max. 5 AAC, 250 VAC, 1250 VA			
Standards	EMC	DIN EN 61326			
	Mechanical strength	DIN EN 61 010 part 1			
	Electrical safety	DIN EN 61010 part 1 and DIN EN 61010 part 2-030 Housing insulated, protection calls II, for working voltages up to 1000V (phase to neutral), pollution level 2, measuring category CAT III			
Auxiliary voltage		20-265 VAC+DC, 2 VA			
Weight		200 g			
Measuring ranges	Alternating current	adjustable	from	to	internal resistance
	AC+DC True RMS	10 A	0,1 A	9,9 A	0,006 Ω
		5 A	0,05 A	4,95 A	0,012 Ω
		1 A	0,01 A	0,99 A	0,06 Ω
		100 mA	1 mA	99 mA	0,6 Ω
		10 mA	0,1 mA	9,9 mA	6 Ω
	Alternating voltage AC+DC True RMS	1000 V	10 V	990 V	2 M Ω
	Direct current DC	10 A	0,1 A	9,9 A	0,006 Ω
		1 A	0,01 A	0,99 A	0,06 Ω
		100 mA	1 mA	99 mA	0,6 Ω
		10 mA	0,1 mA	9,9 mA	6 Ω
		20 mA	0,2 mA	19,8 mA	3 Ω
		4-20 mA	4 mA	19,84 mA	3 Ω
	Direct voltage DC	1000 V	10 V	990 V	2 M Ω
Dimensions					
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715			
	Electrical connection	Screw terminal max. 4 mm²			

Limit value relay with indicator

for direct and alternating current as well as direct and alternating voltage
1 or 2 limit values

Type:
GMA

from 01.03.2022 plus. 6,8 % surcharge

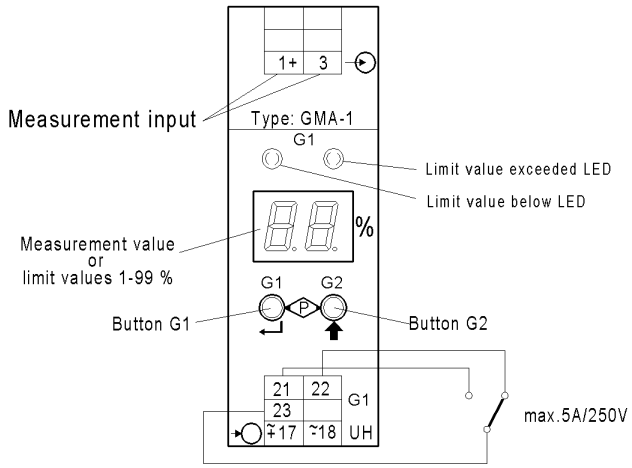
Application

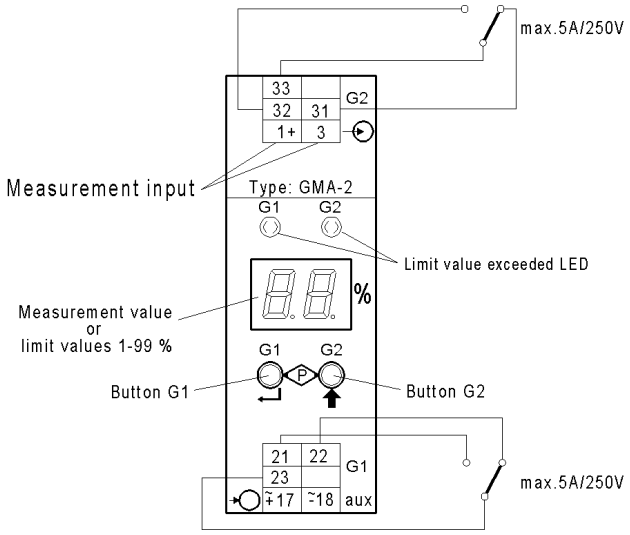
The electronic limit value relay GMA is used for monitoring the alternating or direct current as well as the alternating or direct voltage. The alternating current parameters are measured as TrueRMS value with arbitrary waveform. The measured value or the limit values are indicated in a 2-digit LCD display.

Function

The limit values are adjustable in 1% intervals using pushbuttons on the front panel. Hysteresis, switch on or switch off delay, closed-circuit/open-circuit principle and min/max principle may also be set via the pushbuttons. If limit values are exceeded, this is indicated by LEDs. The limit value relay is installed in a 22.5 mm wide housing and designed for snap-on fastening on top hat rail. An auxiliary voltage is required.

Connection





Price

Input	**GMA-1**	DC	€ 130,70
	(1 limit value)	AC + DC True RMS	€ 151,50
	GMA-2	DC	€ 154,40
	(2 limit values)	AC + DC True RMS	€ 175,20
Surcharges	Auxiliary voltage other than 230 V AC:		
	24 V DC		€ 33,00
	6-30 V AC + DC		€ 56,00
	36-265 V AC + DC		€ 48,00
	110 V AC		€ --,--

Price group B

Technical data

Input	Input variables	direct current or direct voltage, alternating current or alternating voltage, the quantities are measured as true RMS value (up to crest factor 4) with arbitrary waveform in the range of DC and AC 40 - 1000 Hz			
	Limit value adjustment	0–99 %, adjustable in 1 % intervalls			
	Indicators	2 digit LED display for measuring values 0-99 % of full scale 2 red LEDs for limit value violation			
	Accuracy	± 1 %			
	Test voltage	4 kV between measuring input and relay contact			
Switching characteristic	Switching accuracy	± 1 % of full scale			
	Hysteresis	adjustable from 0-10 % of full scale			
	Circuit time	< 400 ms for 10 % limit value exceedance			
	Switching delay	adjustable range 0-99 s			
	Relay contacts	1 (GMA-1) or 2 (GMA-2) changeover contacts			
	Contact rating	max. 5 AAC, max. 250 V AC, 1250 VA			
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C			
	Temperature influence	< 0,1 % at 10 K			
	Overload capacity	voltage 10-fold, max. 2000 V, current 10-fold up to 20 mA, 2-fold for above			
Standards	EMC	DIN EN 61326			
	Mechanical strength	DIN EN 61 010 part 1			
	Electrical safety	DIN EN 61 010 part 1, housing insulated, protection class II, measuring category CAT III for voltages up to 300 V (phase to neutral) as well as measuring catogory CAT II for rated voltages above 300 V to 600 V (phase to neutral)			
Auxiliary voltage		230 V AC ± 15 %, 45-65 Hz, 2 VA			
	Options	● 110 V AC ± 15 %, 45-65 Hz, 2 ● 24 V DC – 15 % to + 25 %, 2,5 W ● 6-30 V AC + DC, 2 VA ● 36-265 V AC + DC, 2 VA			
Dimensions	Housing	Housing A (22,5 mm wide), page A1			
Weight		200 g			
Measuring ranges	Alternating current	adjustable	from	to	internal resistance
	AC+DC True RMS	10 A	0,1 A	9,9 A	0,006 Ω
		5 A	0,05 A	4,95 A	0,012 Ω
		1 A	0,01 A	0,99 A	0,06 Ω
		100 mA	1 mA	99 mA	0,6 Ω
		10 mA	0,1 mA	9,9 mA	6 Ω
	Alternating voltage	500 V	5 V	495 V	1 M Ω
	AC+DC True RMS	100 V	1 V	99 V	1 M Ω
		10 V	0,1 V	9,9 V	100 M Ω
		1 V	0,01 V	0,99 V	10 M Ω
	Direct current DC	10 A	0,1 A	9,9 A	0,006 Ω
		1 A	0,01 A	0,99 A	0,06 Ω
		100 mA	1 mA	99 mA	0,6 Ω
		10 mA	0,1 mA	9,9 mA	6 Ω
		20 mA	0,2 mA	19,8 mA	3 Ω
		4-20 mA	4 mA	19,84 mA	3 Ω
	Direct voltage DC	500 V	5 V	495 V	1 M Ω
		100 V	1 V	99 V	1 M Ω
		10 V	0,1 V	9,9 V	100 k Ω
		1 V	0,01 V	0,99 V	10 k Ω
		100 mV	1 mV	99 mV	1 kΩ
		60 mV	0,6 mV	59,4 mV	1 kΩ
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715			
	Electrical connection	Screw terminal max. 4 mm^2			

Three-phase mains monitor

from 01.03.2022 plus. 6,8 % surcharge

Type:
DNW 100, DNW 400, DNW 500, DNW 690

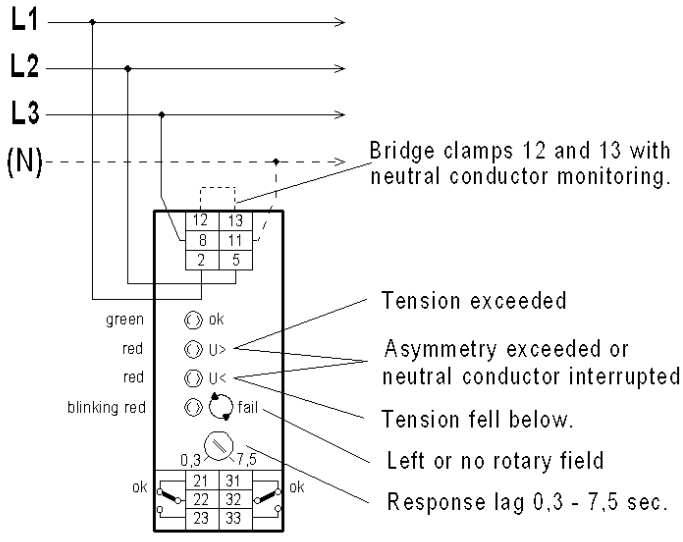
Application

The three-phase mains monitor DNW is used for the comprehensive monitoring of a three-wire or four-wire power supply for phase failure, interruption of neutral, violation of the 3 phase voltages (above/below max/min value), asymmetry of the 3 phase voltages and the phase sequence (rotating field).

Function

The three-phase mains monitor continuously checks the voltage values of the 3 phases for violation of the set limit values, phase sequence, asymmetry as well as a complete phase failure or interruption of the neutral. If one of these errors occurs, the output relay is deenergized after a selectable delay time; if, however, one of the supply phases L2 or L3 fails completely, the relay is switched off immediately. As soon as all values have returned in the correct range, the output relay is energized without delay. The switching state of the output relay as well as the kind of the error that has occurred are indicated via LEDs. The supply is taken from the measuring voltage, an auxiliary voltage is not required.

Connection



limit values

5 on 6 on = 5%	asymmetry	DIL - switch
5 off 6 on = 7.5%		
•5 on 6 off = 10%		
5 off 6 off = 15%		
3 on 4 on = -5%	undervoltage	
3 off 4 on = -10%		
•3 on 4 off = -15%		
3 off 4 off = -20%		
1 on 2 on = +5%	overvoltage	
1 off 2 on = +10%		
•1 on 2 off = +15%		
1 off 2 off = +20%		

(•= factory setting)

Price

Input	DNW 100 / DNW 400 / DNW 500 / DNW 690 three-phase mains monitor	€ 157,90

Price group B

Technical data

Input	Rated voltages	Type DNW 100 for 3 x 100 V, (without neutral) and 3 x 100/58 V, (with neutral) Type DNW 400 for 3 x 400 V, (without neutral) and 3 x 400/230 V, (with neutral) Type DNW 500 for 3 x 500 V, (without neutral) and 3 x 500/289 V, (with neutral) Type DNW 690 for 3 x 690 V, (without neutral) and 3 x 690/400 V, (with neutral)
	Rated frequency	50 Hz and 60 Hz
	Limit values	for overvoltage adjustable to +5 %, +10 %, +15 % or +20 % of rated value for undervoltage adjustable to -5 %, -10 %, -15 % or -20 % of rated value for asymmetry adjustable to 5 %, 7,5 %, 10 % or 15 % of rated value
	LED indication	U > (red), lights up if overvoltage limit value is exceeded U < (red), lights up if undervoltage limit value is exceeded U > (red) und U < (red), lights up if asymmetry value is exceeded or if neutral is interrupted fail (red), flashes in case of wrong phase sequence (left-hand or missing rotating field) ok (green), lights up if value is correct (relay energized)
	Hysteresis	2 % of rated value
	Relay release time	0,3-7,5 s adjustable
	Relay outputs	2 potential-free changeover contacts 250 V AC, 4 A, 1000 VA
	Test voltage	4 kV between contacts and measuring input
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Power input	between L2 and L3 1,5 VA (with 3 x 400 V power supply)
Standards	EMC	DIN EN 61326
	Mechanical strength	DIN EN 61 010 part 1
	Electrical safety	DIN EN 61010 part 1, housing insulated, protection class II, pollution degree 2, measuring category CAT III for rated voltages up to 300 V (phase to neutral) measuring category CAT II for rated voltages above 300 V to 600 V (phase to neutral)
	Isolation	DIN EN 61 010 part 1, 3,7 kV 50 Hz 10 s
	Air and creep distances	DIN EN 61 010 part 1
	IP code	DIN EN 60 529 housing IP 30, terminals IP 20
Weight		180 g
Installation	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm²

		Type:	
General description			Page 89
Energy meters for direct current			
0 - 1500 Volt, 0 - 10 A direct / via shunt resistor, S0 output	NEW	EZG-S0	Page 90
0 - 1500 Volt, via shunt resistor, Ethernet interface	NEW	EZG-TCP	Page 92
Energy meters for alternating current			
CT connection sec. 5 A and sec. 1 A, S0 ouput	NEW	EZD-S0 1/5	Page 94
Direct connection up to 80 A, S0 ouput	NEW	EZD-S0 80	Page 96
CT connection sec. 5 A und sec. 1 A, Ethernet interface	NEW	EZD-TCP 1/5	Page 98
Direct connection up to 80 A, Ethernet interface	NEW	EZD-TCP 80	Page 100
Energy meters for alternating current with MID conformity			
General description and technical data			Page 103
CT connection sec. 5 A and sec. 1 A, S0 output		SINUS 5//1 S0 MID	Page 104
CT connection sec. 5 A and sec. 1 A, M-BUS interface		SINUS 5//1 M-BUS MID	Page 104
CT connection sec. 5 A and sec. 1 A, Modus interface	NEW	SINUS 5//1 Modbus MID	Page 104
Direct connection up to 85 A, S0 output		SINUS 85 S0 MID	Page 106
Direct connection up to 85 A, M-BUS interface		SINUS 85 M-BUS MID	Page 106
Direct connection up to 85 A, Modbus interface	NEW	SINUS 85 Modbus MID	Page 106

Notizen

General description of energy meters

Application

The Müller + Ziegler energy meters are meters for direct current (EZG) or alternating three-phase current (EZD). The energy meters can be operated either for direct measurement or in connection with shunt resistors (EZG - direct current) or current transformers (EZD - alternating three-phase current). They are used, depending on the model, in photovoltaic systems, battery systems, charging stations, DC machines or industrial plants, workshops, machines and offices.

Special features

- S0 or Ethernet interface
- Analog output 20 mA in various types
- EZG types with wide-range power supply unit for auxiliary voltages from 21-265 VAC+DC
- EZD types can be operated without auxiliary voltage
- Adjustable ratio of shunt resistors and current transformers
- Direct connection possible
- Selectable value of pulses / kWh
- LEDs for function display
- Slim design with housing width 71 mm

Technical data

General data	Operation temperature	-15 °C to +20 °C to +30 °C to + 55 °C
	Storage temperature	-25 °C to +85 °C
	Temperature influence	< 0,2 % at 10 K
	Ambient condictions	stationary application, indoor, rel. air humidity 5 .. 95%, no condensation, altitude up to 2000 m, water, rain, snow or hail excluded
	EMC	DIN EN 50470-1
	Electrical safety	DIN EN 61 010 part 1 housing insulated, protection class II, for rated voltages up to 1000V (phase to neutral), pollution degree 2, measuring category CAT III
	Fuse	The devices are equipped with short-circuit proofed transformers, an overcurrent protection device for the energy meter itself is not required.
	Test voltage EZG-S0	7,4 kV, 50 Hz input against auxiliary voltage and analog output and relay contact
	Test voltage EZG-TCP	7,4 kV, 50 Hz auxiliary voltage against input against Ethernet interface 4 kV, 50 Hz input against Ethernet interface
	Test voltage EZD-S0/-TCP	4 kV, 50 Hz input against analog output against pulse outputs against tariff control input
	IP code	DIN EN 60529, housing IP30, terminals IP20
	Installation	snap-on mounting on top hat rail 35 mm (DIN EN 60715) The equipment is suitable for tight on tight assembly, however with ambiet temperatures of > 45 °C a distance apart of 10 mm is recomm-. ended. The assembly location should, if possible, free of vibration.
	Terminals	screw terminals max. 4 mm², tightening torque 0,5 Nm
	Housing material	PPO / Polyamid PA, self extinguishing acc. to UL 94 V-0
	Weight	220 g

Energy meter for direct current

for direct and indirect current measurement
voltage ranges 0 - 1500 VDC

Type:
EZG-S0

NEW

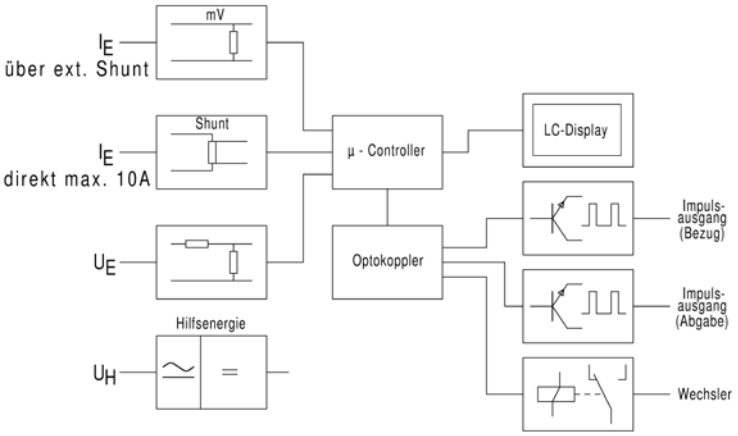
from 01.03.2022 plus. 6,8 % surcharge

Application

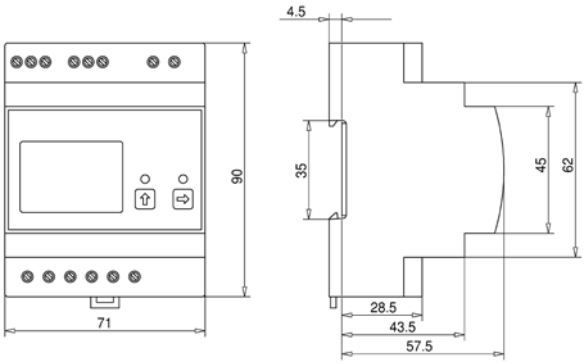
The electronic direct current meter EZG-S0 is used for measuring the active energy for import and export currents in direct current installations. It is applied in photovoltaic installations, battery systems, charging stations, direct current machines etc. Measurements can also be made in installations with pulsed direct current controls (PWM controls). The energy meter may directly measure up to 10 A DC or be connected to a shunt. The energy values are indicated in a display, stored and provided as pulses for further processing. Furthermore, the values for current, voltage and instantaneous active power can be displayed. A programmable relay contact may be used for monitoring the instantaneous active power, current or voltage.

Function

The parameters to be measured are supplied to an integrated module via an external or internal shunt as well as via a voltage divider. There, the instantaneous values of current and voltage are multiplied and converted into active power and active energy. A microcontroller accepts the assessments, the output of the pulses as well as the storage of the measured values. The results are displayed on LCD display. The pulse output of import and export active energy is realized via two open-collector transistor outputs. An auxiliary supply voltage is required. The meter readings are stored in case of power failure.



Dimensions

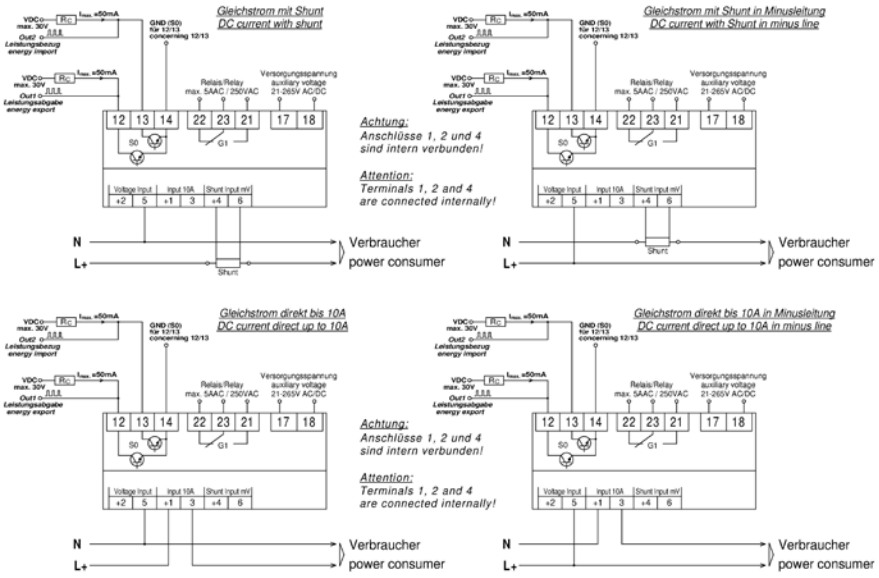


Price

	EZG-S0	€ 352,50

Price group C

Connection



Technical data

Input	Accuracy	± 1% class B acc. DIN EN 50470-3
	Rated voltages	0-10 VDC, 0-25 VDC, 0-50 VDC, 0-100 VDC, 0-500 VDC, 0-1000 VDC 0-1500 VDC or by choice (please specify by ordering), Ri ≥ 2 MΩ
	Rated current direct	direct measurement 0-10 A (voltage drop 60 mV)
	Rated current external	measuring via external shunt 1-20.000 A/ 60 mV, 100 mV or 150 mV, selectable via button on front panel
	Pulsed direct current (PWM)	20 Hz - 30 kHz
	Overload permanent	current and voltage 1,2-fold
	High surge load	voltage 2-fold 1 s, max. 2000 V, current 20-fold 0,5 s
Indicators	Display	LCD display active energy import 9 999 999,99 kWh/MWh (with return stop) active energy export 9 999 999,99 kWh/MWh (with return stop) ampere hours import 9 999 999,99 kAh (with return stop) ampere hours export 9 999 999,99 kAh (with return stop) instantaneous active power +9 999 999,99 kW with (-) in case of power, voltage, current
	Function indicators	LED for active energy (pulses/kWh equal to set pulses) LED for limit value G1 exceeded
	Update display	1 x per second
	Update registers	1 x per second
Pulse and relay outputs	Pulse output	npn-transistor, 24V DC (max. 30 V/50 mA), ON (activ) 10-27 mA OFF (inactiv) < 1 mA, switching state „open“ or „closed“ selectable
	Number of pulses	1-80.000 pulses/kWh, selectable via button on front panel, max. value depends on set current and voltage range
	Pulse length	adjustable from 10-120 ms
	Accuracy	± 1% class B acc. DIN EN 50470-3
	Standards	DIN EN 50470-1
	Limit range	0-(±) 120% of full scale
	Switching accuracy	± 1 % of full scale
	Hysteresis	adjustable from 0-10 % of full scale
	Min. current time circuit	< 200 ms for 10% limit value exceedance
	Switching delay	adjustable from 0-99 s
	Switching state	closed circuit or open circuit principle, min- or max-contact selectable
	Relay contact	1 changeover contact, 10 mA-5 A, 5-250 VDC / VAC, 1250 W(VA)
	Min. switching capacity	60 mW
Auxiliary voltage	Standard	21-265 VAC+DC, 2 VA, (EMC DIN EN 61326 class A)

Energy meter for direct current

with HTTP, TCP/IP, Modbus-TCP protocoll
for indirect current measurement via shunt resistors
voltage ranges 0 - 1500 VDC

Type:
EZG-TCP

NEW

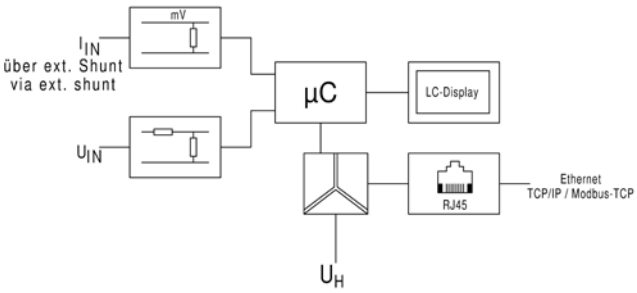
from 01.03.2022 plus. 6,8 % surcharge

Application

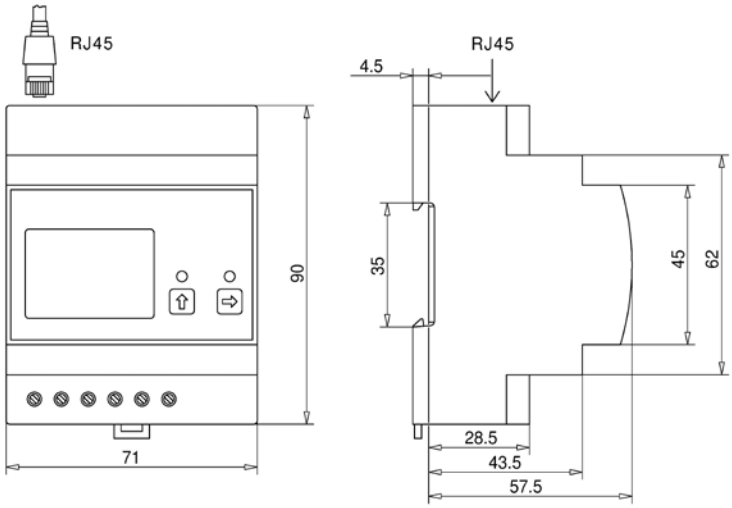
The electronic direct current meter EZG-TCP is used for measuring the active power for incoming and outgoing currents in direct current installations. It is applied in photovoltaic installations, battery systems, charging stations, direct current machines etc. Measurement can be made in installations with pulsed direct current controls (PWM controls). The energy meter is connected to a shunt. All measuring values for current, voltage and energy are indicated in a display. The energy values are stored and provided on an Ethernet interface for further processing.

Function

The parameters to be measured are supplied to an integrated module via an internal shunt as well as via a voltage divider. There, the instantaneous values of current and voltage are multiplied and converted into active power and active energy. A microcontroller accepts the assessments, the output of the pulses as well as the storage of the measured values. The results are displayed on LC display. An auxiliary supply voltage is required. The meter readings are stored in case of power failure.



Dimensions



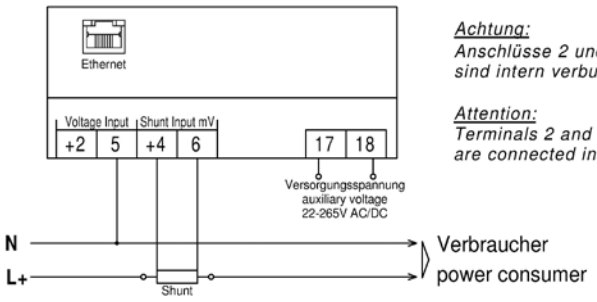
Price

	EZG-TCP	€ 406,50

Price group C

Connection

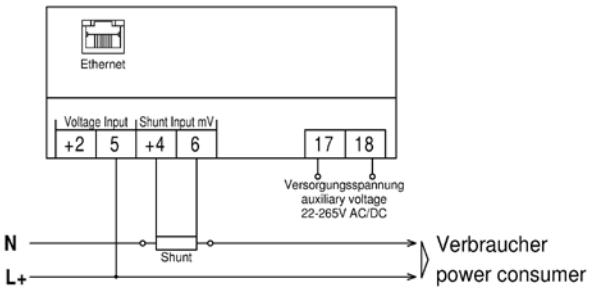
Gleichstrom mit Shunt in Plusleitung
DC current with shunt in plus line



Achtung:
Anschlüsse 2 und 4
sind intern verbunden!

Attention:
Terminals 2 and 4
are connected internally!

Gleichstrom mit Shunt in Minusleitung
DC current with Shunt in minus line



Technical data

Input	Accuracy	± 1% class B acc. DIN EN 50470-3
	Rated voltages	0-10 VDC, 0-25 VDC, 0-50 VDC, 0-100 VDC, 0-500 VDC, 0-1000 VDC 0-1500 VDC or by choice (please specify by ordering), Ri ≥ 2 MΩ
	Rated current external	measuring via external shunt 1-20.000 A/ 60 mV, 100 mV or 150 mV, selectable via button on front panel
	Pulsed direct current (PWM)	20 Hz - 30 kHz
	Overload permanent	current and voltage 1,2-fold
	High surge load	voltage 2-fold 1 s, max. 2000 V, current 20-fold 0,5 s
Indicators	Display	LCD display active energy import 9 999 999,99 kWh/MWh (with return stop) active energy export 9 999 999,99 kWh/MWh (with return stop) ampere hours import 9 999 999,99 kAh (with return stop) ampere hours export 9 999 999,99 kAh (with return stop) instantaneous active power +9 999 999,99 kW with (-) in case of power, voltage, current
	Function indicators	LED for active energy import and export (pulses/kWh depending on set shunt)
	Interface	10 Mbits/s Ethernet LAN interface
	Update display	1 x per second
	Update register	1 x per second
Auxiliary voltage	Standard	21-265 VAC+DC, 2 VA, (EMC DIN EN 61326 class A)

Energy meter for alternating three-phase current

for current transformer connection
secondary 1 / 5 A
with S0 and analog output

Type:
EZD-S0 1/5

NEW

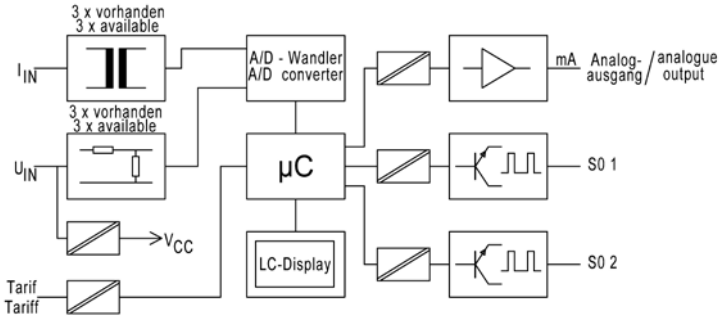
from 01.03.2022 plus. 6,8 % surcharge

Application

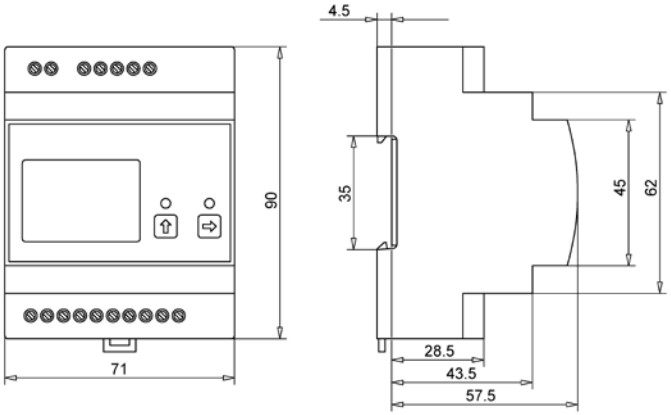
The electronic energy meter EZD-S0 is used to record the active and reactive energy during import and export in three-phase systems under any load. Their application covers for example industrial plants, workshops, machines and offices. The energy values are displayed, saved and made available as pulses for further processing. The current active or reactive power can be output via an analog output (20 mA). All values for current, voltage, frequency, power and energy can be read on an LCD display. The connection is made via current transformers with a nominal secondary current of 1 or 5 amps.

Function

The values to be measured are transferred to an integrated module via external and internal current transformers and voltage dividers. The instantaneous values of current and voltage are recorded here. A microcontroller takes over the evaluation, the output of the impulses as well as the storage of the measured values. The values are shown on an LCD display.
The pulse output of active or reactive energy is realized via two open collector transistor outputs (S0 interfaces). An analog output of 20 mA represents the current active or reactive power. A separate auxiliary voltage is not required, it is obtained from the measuring voltage. The meter readings and programming are saved in case of a power failure.



Dimensions

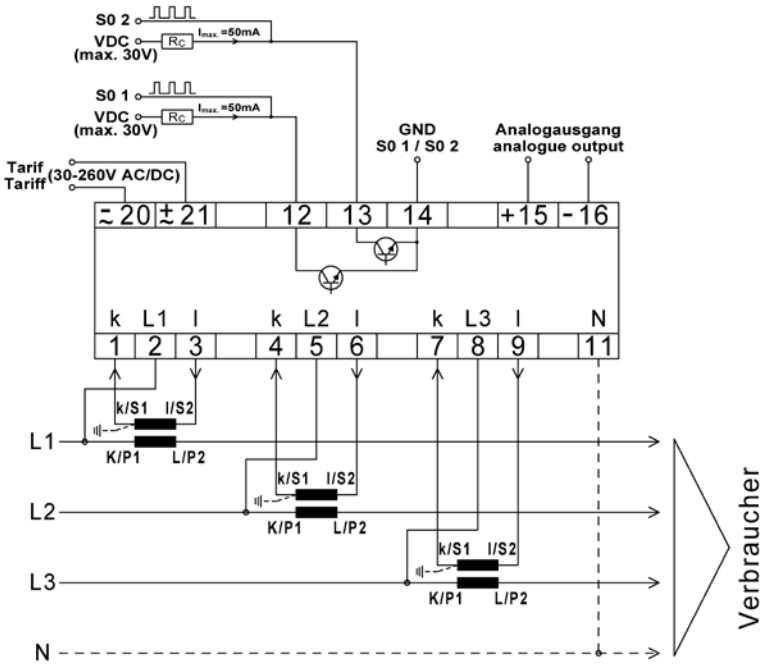


Price

	EZD-S0 1/5	€ 255,50

Price group C

Connection



Technical data

Input	Mains connection	3-phase 4-wire power system, current transformer measurement bidirectional meter, 2-tariff measurement
	Rated voltage	50-300 V / 87-520 V and 3 x 87-520 V
	Current information acc. to meter print	I_{min} - I_{ref} (I_{max}) A
	Starting current I_{st}	0,002 A (symmetrical per phase)
	Minimum current I_{min}	0,01 A
	Transition current I_{tr}	0,05 A
	Reference current I_{ref}	1 / 5 A
	Limit current I_{max}	7 A
	Rated frequency	40-70 Hz
	Energy consumption	voltage circuit approx. 0,7 VA; current circuit approx. 0,1 VA
	Accuracy	active energy class B acc. DIN EN 50470-3 reactive energy class 2 acc. DIN EN 62053-23
	Backstop	yes
Indicators	Display	LCD-display, update 2 times per second active energy in kWh or MWh with 7.2 digits reactive energy in kvarh or Mvarh with 5.2 digits
	Function indicators	LED for active energy import and export 10.000 pulses/kWh both LED light up at current < I_{min}
	Reset	via buttons on front panel
Pulse outputs (S0)	Pulse output	npn-transistor, 24V DC (max. 30 V/50 mA), ON (activ) 10-27 mA OFF (inactiv) < 1 mA, switching status open or closed selectable
	Number of pulses	selectable via button (number of pulses depend on the setting of current and voltage transformers)
	Pulse length	60 - 100 ms, selectable via button
	Accuracy	class B acc. DIN EN 50470-3
	Standards	DIN EN 62053-31
Tariff control input	Tariff 1	0 V or open
	Tariff 2	30 - 260V AC/DC, 0,4 VA
	Separation	4 kV
Analog output	Rated value	0-20 mA or 4-20 mA, load 0-500 Ohm
	Accuracy	± 0,5% of full scale (± 1% with spread < 50%)
	Setting time	< 1 s
	Spread	30 - 120% from power U x I x √3

Energy meter for alternating three-phase current

for direct connection up to 80 amps
with S0 and analog output

Type:
EZD-S0 80

NEW

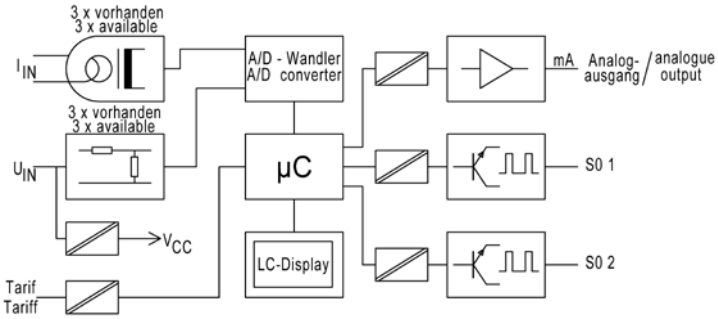
from 01.03.2022
plus. 6,8 %
surcharge

Application

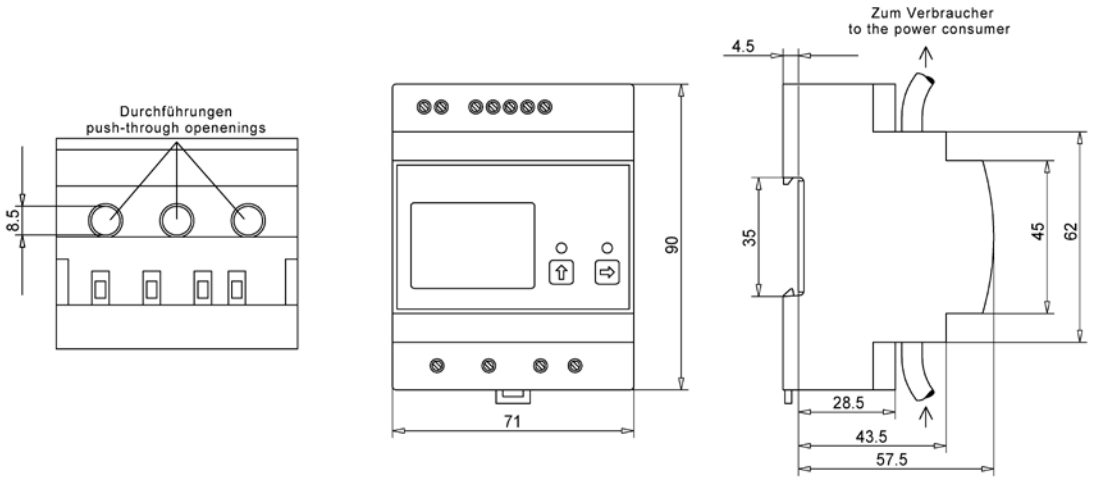
The electronic energy meter EZD-S0 is used to record the active and reactive energy during import and export in three-phase systems under any load. Their application covers for example industrial plants, workshops, machines and offices. The energy values are displayed, saved and made available as pulses for further processing. The current active or reactive power can be output via an analog output (20 mA). All values for current, voltage, frequency, power and energy can be read on an LCD display. The connection is made directly up to a maximum current of 80 amps.

Function

The values to be measured are transferred to an integrated module via internal current transformers and voltage dividers. The instantaneous values of current and voltage are recorded here. A microcontroller takes over the evaluation, the output of the impulses as well as the storage of the measured values. The values are shown on an LCD display.
The pulse output of active or reactive energy is realized via two open collector transistor outputs (S0 interfaces). An analog output of 20 mA represents the current active or reactive power. A separate auxiliary voltage is not required, it is obtained from the measuring voltage. The meter readings and programming are saved in case of a power failure.



Dimensions

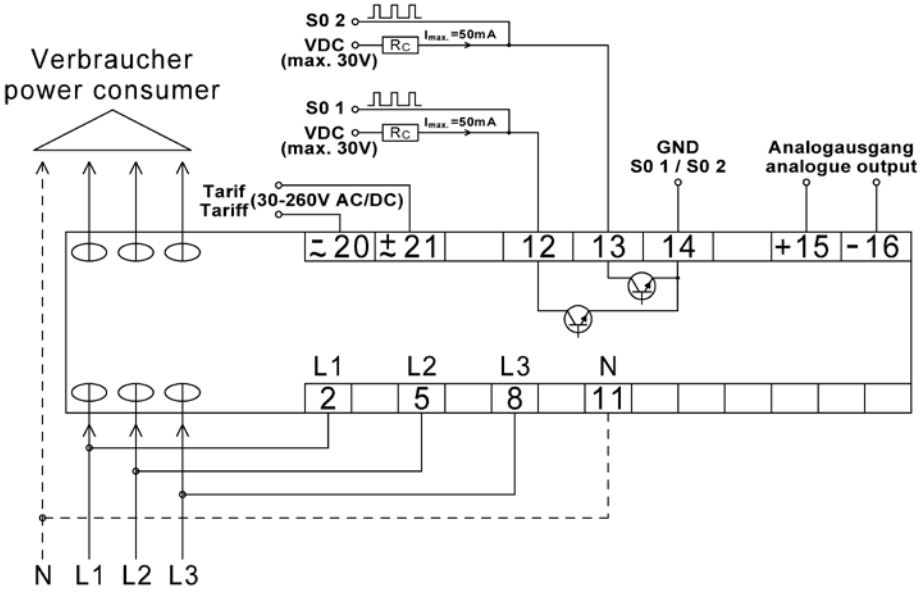


Price

EZD-S0 80		€ 291,00

Price group C

Connection



Technical data

Input	Mains connection	3-phase 4-wire power system, direct measurement bidirectional meter, 2-tariff measurement
	Rated voltage	50-300 V / 87-520 V and 3 x 87-520 V
	Current information acc. to meter print	I_{min} - I_{ref} (I_{max}) A
	Starting current I_{st}	0,02 A (symmetrical per phase)
	Minimum current I_{min}	0,2 A
	Transition current I_{tr}	0,5 A
	Reference current I_{ref}	5 A
	Limit current I_{max}	80 A
	Rated frequency	40-70 Hz
	Energy consumption	voltage circuit approx. 0,7 VA; current circuit approx. 0,1 VA
	Accuracy	active energy class B acc. DIN EN 50470-3 reactive energy class 2 acc. DIN EN 62053-23
	Backstop	yes
Indicators	Display	LCD-display, update 2 times per second active energy in kWh or MWh with 7.2 digits reactive energy in kvarh or Mvarh with 5.2 digits
	Funktionsanzeigen	LED for active energy import and export 600 pulses/kWh both LED light up at current < I_{min}
	Reset	via buttons on front panel
Pulse outputs (S0)	Pulse output	npn-transistor, 24V DC (max. 30 V/50 mA), ON (activ) 10-27 mA OFF (inactiv) < 1 mA, switching status open or closed selectable
	Number of pulses	selectable via button (number of pulses depend on the setting of voltage transformers)
	Pulse length	60 - 100 ms, selectable via button
	Accuracy	class B acc. DIN EN 50470-3
	Standards	DIN EN 62053-31
Tariff control input	Tariff 1	0 V or open
	Tariff 2	30 - 260V AC/DC, 0,4 VA
	Separation	4 kV
Analog output	Rated value	0-20 mA or 4-20 mA, load 0-500 Ohm
	Accuracy	± 0,5% of full scale (± 1% with spread < 50%)
	Setting time	< 1 s
	Spread	30 - 120% from power U x I x √3

Energy meter for alternating three-phase current

for current transformer connection
secondary 1 / 5 A
with Ethernet interface

Type:
EZD-TCP 1/5

NEW

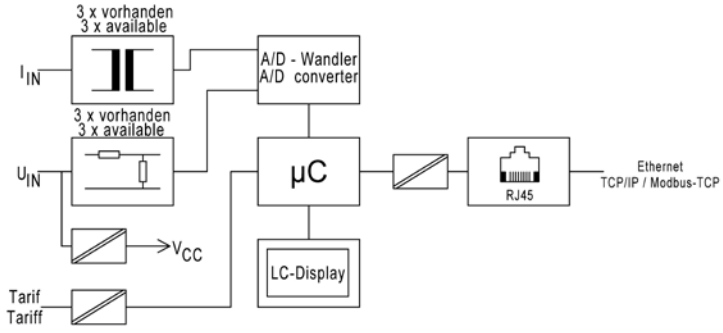
from 01.03.2022 plus. 6,8 % surcharge

Application

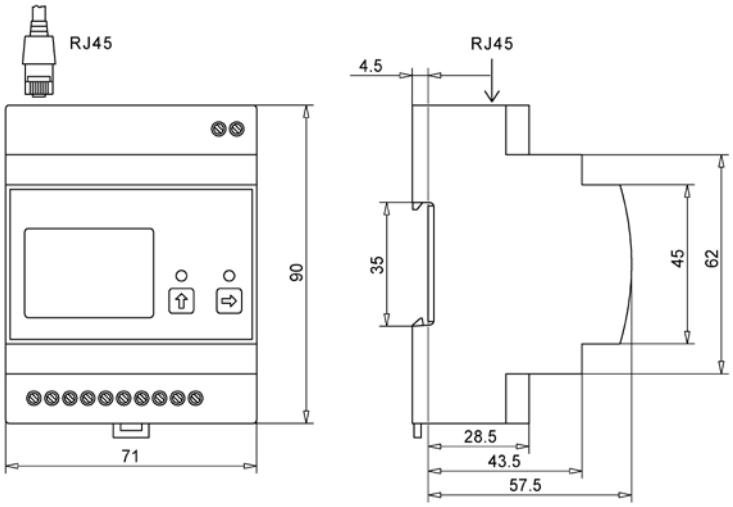
The electronic energy meter EZD-TCP is used to record the active and reactive energy during import and export in three-phase systems under any load. Their application covers for example industrial plants, workshops, machines and offices. The energy values are displayed, stored and provided on an Ethernet interface for further processing. All values for current, voltage, frequency, power and energy can be read on an LCD display. The connection is made via current transformers with a nominal secondary current of 1 or 5 amps.

Function

The values to be measured are transferred to an integrated module via external and internal current transformers and voltage dividers. The instantaneous values of current and voltage are recorded here. A microcontroller takes over the evaluation and the storage of the measured values. The values are shown on an LCD display.
A separate auxiliary voltage is not required, it is obtained from the measuring voltage. The meter readings and programming are saved in case of a power failure.



Dimensions

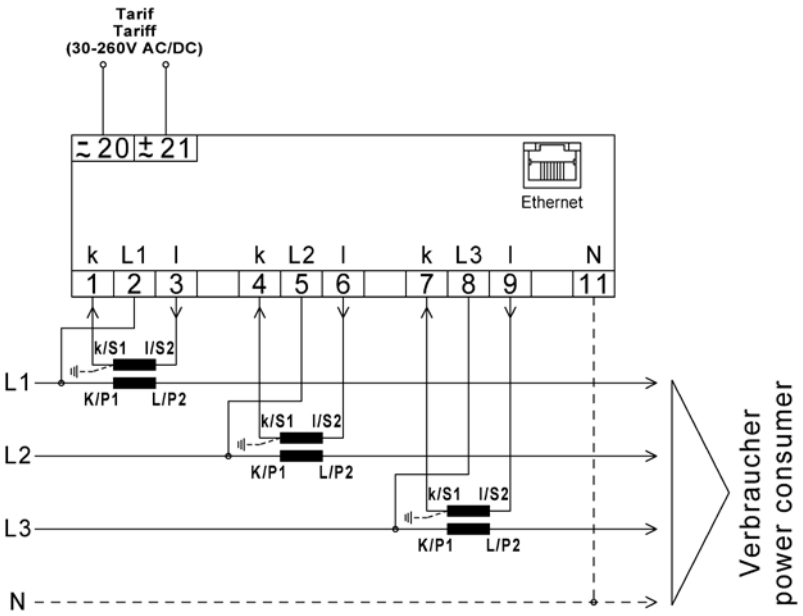


Price

	EZD-TCP 1/5	€ 266,50

Price group C

Connection



Technical data

Input	Mains connection	3-phase 4-wire power system, current transformer measurement bidirectional meter, 2-tariff measurement
	Rated voltage	50-300 V / 87-520 V and 3 x 87-520 V
	Current information acc. to meter print	I_{min} - I_{ref} (I_{max}) A
	Starting current I_{st}	0,002 A (symmetrical per phase)
	Minimum current I_{min}	0,01 A
	Transition current I_{tr}	0,05 A
	Reference current I_{ref}	1 / 5 A
	Limit current I_{max}	7 A
	Rated frequency	40-70 Hz
	Energy consumption	voltage circuit approx. 0,7 VA; current circuit approx. 0,1 VA
	Accuracy	active energy class B acc. DIN EN 50470-3 reactive energy class 2 acc. DIN EN 62053-23
	Backstop	yes
Indicators	Display	LCD-display, update 2 times per second active energy in kWh or MWh with 7.2 digits reactive energy in kvarh or Mvarh with 5.2 digits
	Function indicators	LED for active energy import and export 10.000 pulses/kWh both LED light up at current < I_{min}
	Reset	via buttons on front panel
Interface	Interface	10 Mbits/s Ethernet LAN-interface
	Protocol	TCP/IP protocol MODBUS-TCP-protocol
Tariff control input	Tariff 1	0 V or open
	Tariff 2	30 - 260V AC/DC, 0,4 VA
	Separation	4 kV

Energy meter for alternating three-phase current

for direct connection up to 80 amps
with Ethernet interface

Type:
EZD-TCP 80

NEW

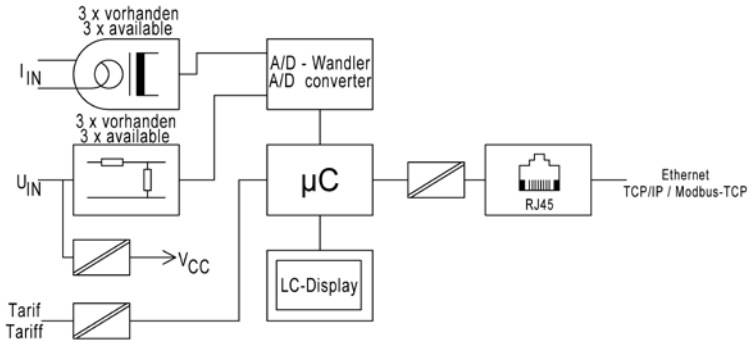
from 01.03.2022
plus. 6,8 %
surcharge

Application

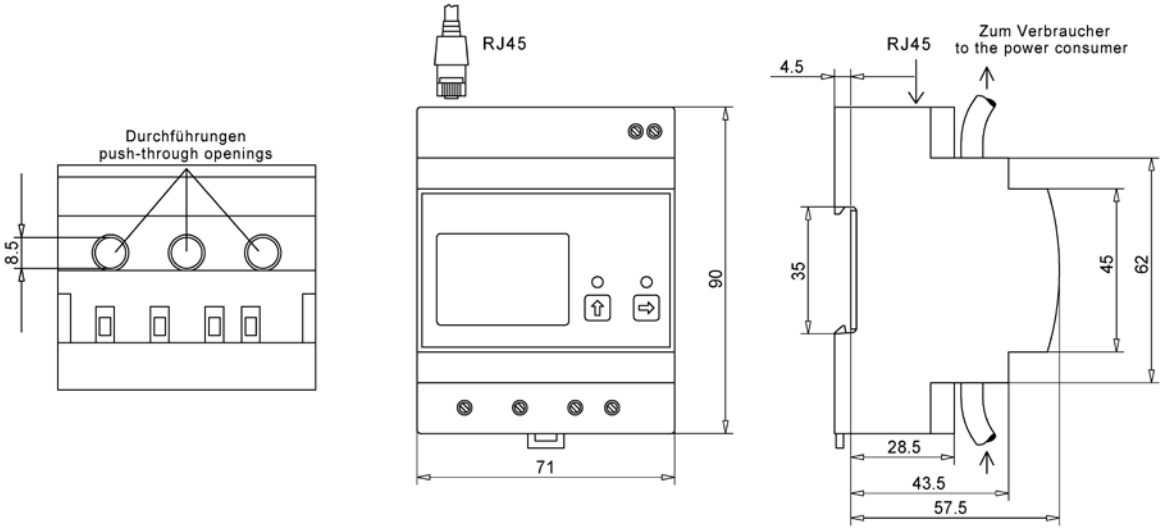
The electronic energy meter EZD-TCP is used to record the active and reactive energy during import and export in three-phase systems under any load. Their application covers for example industrial plants, workshops, machines and offices. The energy values are displayed, stored and provided on an Ethernet interface for further processing. All values for current, voltage, frequency, power and energy can be read on an LCD display. The connection is made directly up to a maximum current of 80 amps.

Function

The values to be measured are transferred to an integrated module via internal current transformers and voltage dividers. The instantaneous values of current and voltage are recorded here. A microcontroller takes over the evaluation and the storage of the measured values. The values are shown on an LCD display.
A separate auxiliary voltage is not required, it is obtained from the measuring voltage. The meter readings and programming are saved in case of a power failure.



Dimensions

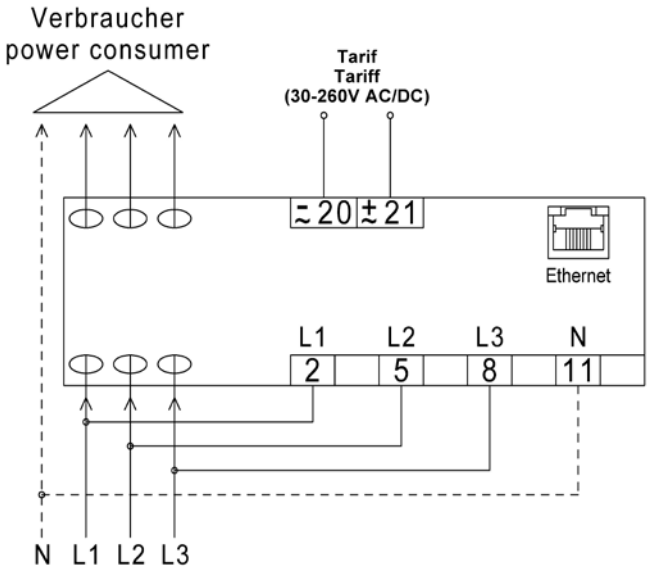


Price

	EZD-TCP 80	€ 301,50

Price group C

Connection



Technical data

Input	Mains connection	3-phase 4-wire power system, direct measurement bidirectional meter, 2-tariff measurement
	Rated voltage	50-300 V / 87-520 V and 3 x 87-520 V
	Current information acc. to meter print	I_{min} - I_{ref} (I_{max}) A
	Starting current I_{st}	0,02 A (symmetrical per phase)
	Minimum current I_{min}	0,2 A
	Transition current I_{tr}	0,5 A
	Reference current I_{ref}	5 A
	Limit current I_{max}	80 A
	Rated frequency	40-70 Hz
	Energy consumption	voltage circuit approx. 0,7 VA; current circuit approx. 0,1 VA
	Accuracy	active energy class B acc. DIN EN 50470-3 reactive energy class 2 acc. DIN EN 62053-23
	Backstop	yes
Indicators	Display	LCD-display, update 2 times per second active energy in kWh or MWh with 7.2 digits reactive energy in kvarh or Mvarh with 5.2 digits
	Function indicators	LED for active energy import and export 600 pulses/kWh both LED light up at current < I_{min}
	Reset	via buttons on front panel
Interface	Interface	10 Mbits/s Ethernet LAN-interface
	Protocol	TCP/IP protocol MODBUS-TCP-protocol
Tariff control input	Tariff 1	0 V or open
	Tariff 2	30 - 260V AC/DC, 0,4 VA
	Separation	4 kV

Notice

General description of types SINUS 5//1 und SINUS 85

Application

Energy meters of types SINUS 5//1 and SINUS 85 are three-phase four-wire alternating current meters for transformer and direct connection. They are used for measuring the electrical active and reactive energy in phases of any loads. It may be measured in installations with oscillation package controls (intermittent current consumption) as well as with distorted sine wave. The meters SINUS with MID conformity marking based on a type test are provided as offsetting measuring devices for the registration of electrical active energy. Their application covers industrial plants, workshops, machines, offices etc, and are designed for snap-on fastening on 35 mm top hat rails.

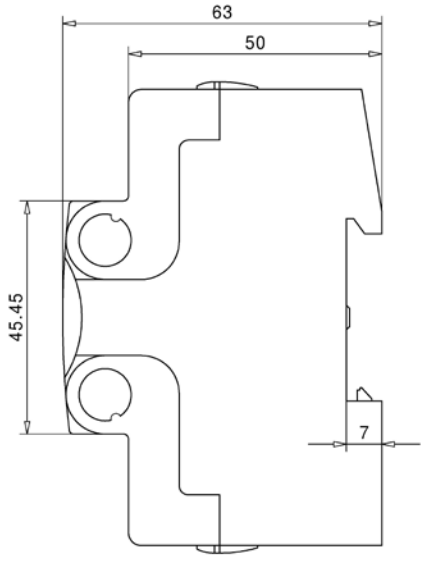
Type and function

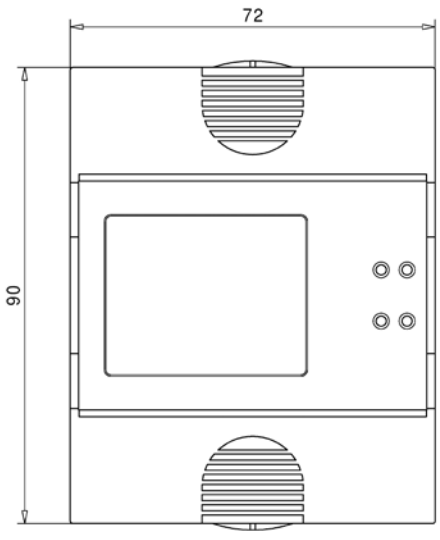
The meters SINUS 5//1 and SINUS 85 are fully electronic independently functioning alternating current electricity meters for fixed installation in three-phase four-wire power supply systems and are designed for measuring the electrical active and reactive energy and register them in up to two energy tariffs.
They are designed as indoor meters as housing type and as installation built-in type in 4 module widths and meant for snap-on fastening on top hat rails. One display, one tariff control input for tariff switchover and at least one pulsed output for the output of pulses proportional to the active energy are always available.
An additional auxiliary voltage for the meter is not necessary. The energy measured values are permanently stored in the meter in case of a power failure. Optionally, a second pulsed output for the output of pulses proportional to the reactive power or alternatively a M-Bus or Modbus communication interface for data transmission are available.

Special features

- Digital three-phase energy counter 5//1 A or 85 A direct measurement
- 2 x 230 / 400 V
- Module widths 72 mm
- with MID certificate valid in the EU
- optionally available with integrated M-BUS or Modbus
- Accuracy class 1 (class B)
- LC display 8-digit (6+2 decimal places)
- Installation self test
- two tariff meter HT/NT with tariff switchover input
- with 2 N terminals (loop through of the neutral)
- with 2 S0 pulsed outputs for active and reactive energy
- with 2 LED's for active and reactive energy, permanently lit after power ON without load and flashing proportionally to the load
- the menu indicates: consumption, voltage (V), current (A), power output (W), apparent power (VA), reactive power (var)
- Factory-set S0 pulse number and pulse length (Option)

Dimensions





Energy meter for alternating three-phase current

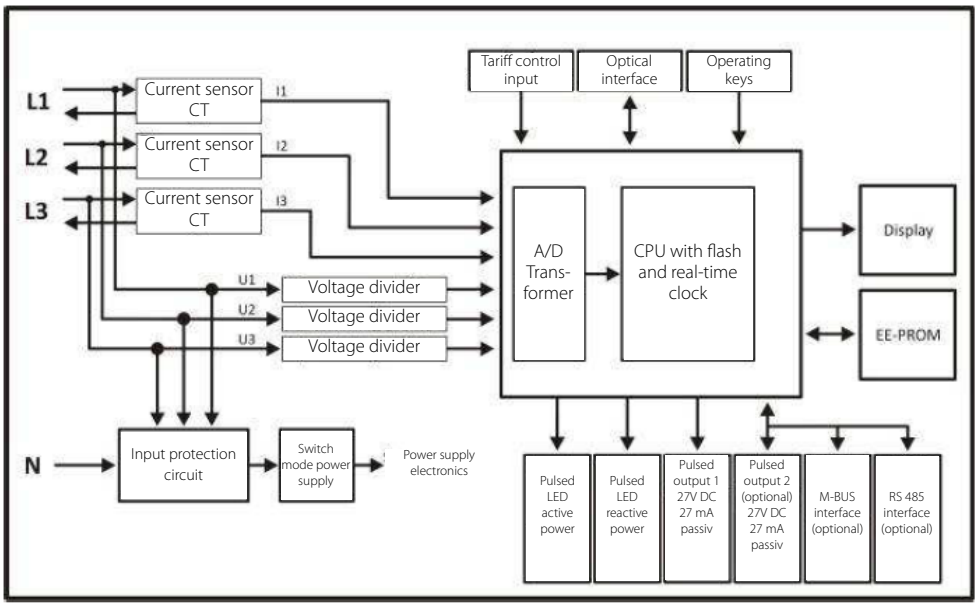
for current transformer connection
secondary 1/5 A

Type:
SINUS 5//1 S0 MID
SINUS 5//1 M-BUS MID
SINUS 5//1 Modbus MID

from 01.03.2022 plus. 6,8 % surcharge

Function

The meter consists of a multi-part plastic housing. One part is manufactured from transparent plastic and covers the LC display (liquid crystal display) below and the name plate. For connecting the meter, terminal screws accessible from the outside are provided. The electronic function circuit of the meter is installed on printed circuit boards and is located inside the plastic housing. The current to be measured is internally adapted to the input conditions of the electronic sensors via a current transformer per current circuit (per phase). The voltage to be measured is internally adapted to the input conditions of the electronic sensors via a voltage divider per voltage circuit (per phase). The current and voltage signals are transmitted to the A/D converter process via filter circuits. The digitalized measuring values are further processes in a downstream processor. Following the processing, the registered energy quantities are indicated in the display. The software controls the processing in the meter. In this way, functions for meter start/stop, pulse output, display control, storage and backup of measured values, start-up and switch-off behavior and error monitoring are realized.

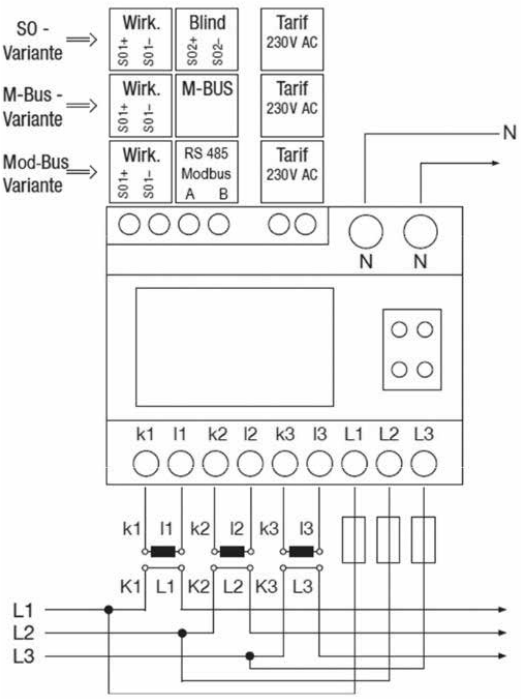


Price

	SINUS 5//1 S0 MID	€ 170,00
	SINUS 5//1 M-BUS MID	€ 317,00
	SINUS 5//1 Modbus MID NEW	€ 322,00

Price group C

Connection



Technical data

Types	SINUS 5//1 S0 MID; M-BUS MID; Modbus MID
Reference voltage range	3 x 230/400 (1 ± 10%) V - see meter imprint
Reference frequency range	50 (1 ± 2%) Hz - see meter imprint
Current information	see meter imprint I_{min} - I_n (I_{max}) A
Meter imprint	I_{min} - I_{ref} (I_{max}) A
Inrush current I_{st}	0,002 A (symmetrical per phase)
Minimum current I_{min}	0,01 A - see meter imprint
Transfer current I_{tr}	0,05 A
Rated current I_{ref}	1 A oder 5 A - see meter imprint
Maximum current I_{max}	6 A
Accuracy	class A (MPE = ± 3,5%) or class B (MPE = ± 2%)
Operation indicator/test output dev.	LED, red flashing, t_{min} = 30 ms
Detection of standstill/reverse motion	LED, red permanent lit
Registration indication	LC-display (liquid crystal display)
Display capacity	5 digits kWh and 3 decimal places
Pulse constant optical	R_L, standard 20.000 imp/kWh (0,05 Wh/imp) - see meter imprint
Pulse constant electrical	R_A, standard 5.000 imp/kWh (0,2 Wh/imp) - see meter imprint
Pusle number/measuring time	min 2 pulses and 20 s integration time
Pulse output electric. passiv	potential free acc. to DIN EN 62053-31 class A and B
Pulse parameters electrical	U_{max} = 30 V, I_{max} = 30 mA, inverse-polarity protection
Pulse length (set)	$t_{i\,max}$ = 35 ms (adjustable)
Operating voltage range	180 V to 265 V, voltage single-phase or three-phase
Operating frequency range	40 Hz to 65 Hz
Energy consumption	voltage circuit approx. 0,6 VA, current circuit approx. 0,06 VA
Consideration of harmonic wave energy content	by measurement techniques up to approx. 4 kHz
Temperature range	-25 °C to +55 °C, indoor
Protection class	class II, protective insulation
Protection level	housing IP 51 with terminal cover installed
Fastening	snap on fastening on top hat rail 35 mm, DIN EN 60715
Electrical connection	screw terminal max 6 mm²
Weight	230 g

Energy meter for alternating three-phase current

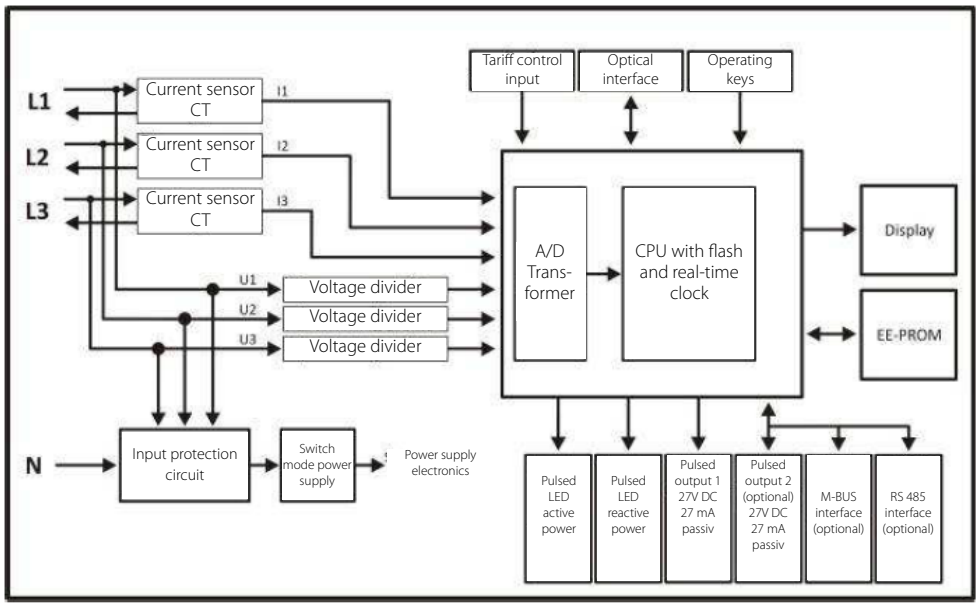
for direct connection up to 85 A

Type:
SINUS 85 S0 MID
SINUS 85 M-BUS MID
SINUS 85 Modbus MID

from 01.03.2022 plus. 6,8 % surcharge

Function

The meter consists of a multi-part plastic housing. One part is manufactured from transparent plastic and covers the LC display (liquid crystal display) below and the name plate. For connecting the meter, terminal screws accessible from the outside are provided. The electronic function circuit of the meter is installed on printed circuit boards and is located inside the plastic housing. The current to be measured is internally adapted to the input conditions of the electronic sensors via a current transformer per current circuit (per phase). The voltage to be measured is internally adapted to the input conditions of the electronic sensors via a voltage divider per voltage circuit (per phase). The current and voltage signals are transmitted to the A/D converter process via filter circuits. The digitalized measuring values are further processes in a downstream processor. Following the processing, the registered energy quantities are indicated in the display. The software controls the processing in the meter. In this way, functions for meter start/stop, pulse output, display control, storage and backup of measured values, start-up and switch-off behavior and error monitoring are realized.

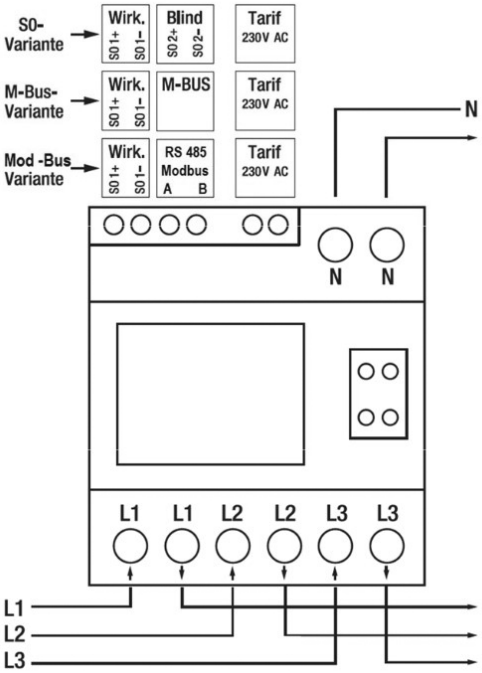


Price

SINUS 85 S0 MID		€ 170,00
SINUS 85 M-BUS MID		€ 317,00
SINUS 85 Modbus MID	NEW	€ 322,00

Price group C

Connection



Technical data

Types	SINUS 85 S0 MID; M-BUS MID; Modbus MID
Reference voltage range	3 x 230/400 (1 ± 10%) V - see meter imprint
Reference frequency range	50 (1 ± 2%) Hz - see meter imprint
Current information	see meter imprint I_{min} - I_n (I_{max}) A
Meter imprint	I_{min} - I_{ref} (I_{max}) A
Inrush current I_{st}	0,002 A (symmetrical per phase)
Minimum current I_{min}	0,25 A - see meter imprint
Transfer current I_{tr}	0,5 A
Rated current I_{ref}	5 A
Maximum current I_{max}	85 A
Accuracy	class A (MPE = ± 3,5%) or class B (MPE = ± 2%)
Operation indicator/test output dev.	LED, red flashing, t_{min} = 30 ms
Detection of standstill/reverse motion	LED, red permanent lit
Registration indication	LC-display (liquid crystal display)
Display capacity	5 digits kWh and 3 decimal places
Pulse constant optical	R_L, standard 5.000 imp/kWh (0,2 Wh/imp) - see meter imprint
Pulse constant electrical	R_A, standard 500 imp/kWh (2 Wh/imp) - see meter imprint
Pusle number/measuring time	min 2 pulses and 20 s integration time
Pulse output electric. passiv	potential free acc. to DIN EN 62053-31 class A and B
Pulse parameters electrical	U_{max} = 30 V, I_{max} = 30 mA, inverse-polarity protection
Pulse length (set)	$t_{i\,max}$ = 35 ms (adjustable)
Operating voltage range	180 V to 265 V, voltage single-phase or three-phase
Operating frequency range	40 Hz to 65 Hz
Energy consumption	voltage circuit approx. 0,6 VA, current circuit approx. 0,06 VA
Consideration of harmonic wave energy content	by measurement techniques up to approx. 4 kHz
Temperature range	-25 °C to +55 °C, indoor
Protection class	class II, protective insulation
Protection level	housing IP 51 with terminal cover installed
Fastening	snap on fastening on top hat rail 35 mm, DIN EN 60715
Electrical connection	screw terminal max 6 mm²
Weight	270 g

DSM 96

DSM 4824 A/V, N, C

DSM 9624 A/V, N, C

DSMF 96

DSM 4824 Pt/W

DSM 9624 Pt/W

DSM 96 Pt/W

DSMG 96

DSMG 96

Panel meters digital

Panel meters digital with limit values

Notice

General description

Application

Digital panel meters are used for the display and monitoring of various measuring signals in heavy-current and weak-current technique as well as different process variables. Our digital measuring instruments may directly be used for current, voltage, frequency, resistance or temperature measurements.
Furthermore, a measured value may be displayed in a switch room over larger distances using an upstream measuring transducer. Digital indicators may be applied everywhere where increased accuracy is required and reading errors are to be avoided.

Type and function

The digital measuring instruments are distinguished by 4-digit and 5-digit types according to their display capacity. In case of a 4-digit display, the largest presentable value is 9999, in case of a 5-digit display that value is 99999.
The values are shown in a 7-segment LED display. The front panel may be marked in a customer-specific or order-specific manner. Also, the zero point may be elevated or suppressed. A maximum of two limit values may be monitored, the minimum and maximum measured value may be stored and displayed. Decimal points, dark switching of the last digit, zero point as well as display range may be changed after removing the front panel.

Special features

DSM 96
- high accuracy of up to 0.1 % +/- 1 digit of measured value
- auxiliary voltages for 230 V AC, 24 V DC, 36-265 V or 6-30 V AC + DC are available
- 4 kV test voltage between measuring input and all available auxiliary voltages

DSM 9624 und DSM 4824
- high accuracy of up to 0.1 % +/- 1 digit of measured value
- min.-/max.-value recording
- adjustable support points
- display flashing at limit value exceedance/undershooting
- tara-function

Technical data

General data	EMC	DIN EN 61 326
	(for DC auxiliary voltage and multi voltage)	DIN EN 61 326 class A
	Mechanical strength	DIN EN 61 010 part 1
	Electrical safety	DIN EN 61 010 part 1 housing insulated, protection class II, DSM 96 ● for working voltages up to 300 V (phase to neutral) pollution degree 2, measurement category CAT III ● or working voltages up to 600 V (phase to neutral) pollution degree 2, measurement category CAT III DSM 9624 auxiliary voltage 100-240 V AC and 230 V AC ● for working voltages up to 300 V (phase to neutral) pollution degree 2, measurement category CAT III DSM 9624/4824 auxiliary voltage 24 V DC ● for working voltages up to 100 V (phase to neutral) pollution degree 2, measurement category CAT II
	Isolation	DIN EN 61 010 part 1, 3,7 kV 50 Hz, 10 s
	Air and creep distances	DIN EN 61 010 part 1
	Protection level	DIN EN 60 529, housing IP 50, terminals IP 10

Test report

Up to 10 testpoints (depending on type) € 60,– net

from 01.03.2022 plus. 6,8 % surcharge

Also availabe in black.
Please specify separately.

Digital measuring instruments

4 digit, 96 x 48 mm
for direct and alternating current and voltage (True RMS)

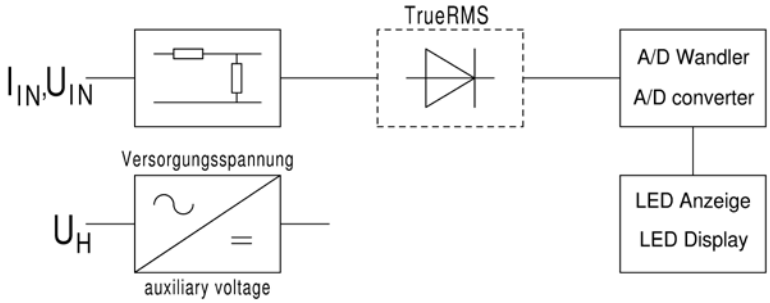
Type:
DSM 96

Application

The digital measuring instrument DSM 96 is used for measuring direct current, direct voltage, alternating current and alternating voltage as well as for indicating transformed non-electrical variables.

Function

The measurand is sent to a 4-digit A/D converter via series resistors and shunts (in case of alternating current via an rms rectifier). The conversion is made following the „Dual Slope" principle. The values are indicated by 7-segment low-power LED displays. A hold function may be achieved by connecting two ports. The zero point compensation is done automatically. Decimal points, dark switching of the last digit, zero point as well as display range may be changed after removing the front panel.



Technical data

	Display	LED seven-segment low-power, height 13mm, red; 4-digit
	Decimal points	adjustable on front panel using DIP switch
	Dark switching	of last digit, on front panel using DIP switch
	Polarity	by negative (-) display
	Resolution	maximum display +/- 9999 digit
	Sampling rate	approx. 3 measurements per second
	Measuring principle	Dual Slope integration
	Accuracy	± 0,1 % of measured value ± 1 digit for direct voltage ± 0,2 % of measured value ± 2 digit for direct current ± 0,2 % of measured value ± 2 digit for alternating current variables of arbitrary waveform, rms value up to crest factor 4, DC, 40-1000 Hz
	Hold function	by connecting terminals 1 + 4
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,05 % at 10 K
	Overload capacity	voltage 10-fold, max. 850 V, current 10-fold up to 20 mA, above 2-fold
	Test voltage	4 kV between measuring input and auxiliary voltage
	IP code	Housing IP 50, terminals IP 10
	Connection	plug-in 12-pin terminal block, screw terminal max. 2,5 mm²
Auxiliary voltage	Standard	230 V AC ± 20 %, 45-65 Hz, 3 VA
	Options	24 V DC, -15 % to +25 %, 2,5 W 6-30 V AC + DC or 36-265 V AC + DC, 2,5 VA

Price

Type	DSM 96 4-digit			
Front panel (mm)	96 x 48			
Housing (mm)	90 x 42,5			
Cut-out (mm)	92 x 45			
Installation depth (mm)	118			
Weight (kg)	0,35			

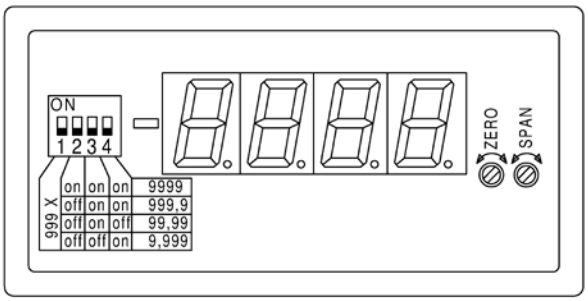
from 01.03.2022 plus. 6,8 % surcharge

Type of current	Measuring range	Display	Internal resistance	€
Direct voltage	± 60 mV	1000 to 9999	> 100 M Ω	
DC	± 100 mV	1000 to 9999	> 100 M Ω	
	± 1 V	1000 to 9999	> 1 M Ω	180,20
	± 10 V	1000 to 9999	1 M Ω	
	± 100 V	1000 to 9999	1 M Ω	
	± 600 V	1000 to 9999	1 M Ω	
Direct current	± 1 µA	1000 to 9999	100 k Ω	
DC	± 10 µA	1000 to 9999	10 k Ω	
	± 100 µA	1000 to 9999	1 k Ω	
	± 1 mA	1000 to 9999	100 Ω	
	± 10 mA	1000 to 9999	10 Ω	180,20
	± 20 mA	1000 to 9999	10 Ω	
	4 - 20 mA	1000 to 9999	10 Ω	
	± 100 mA	1000 to 9999	1 Ω	
	± 1 A	1000 to 9999	0,1 Ω	
	± 5 A	1000 to 9999	0,02 Ω	
Direct and alternating	0 - 100 mV	1000 to 9999	> 100 M Ω	
voltage	0 - 1 V	1000 to 9999	100 k Ω	
DC + AC True RMS	0 - 10 V	1000 to 9999	1 M Ω	193,10
	0 - 100 V	1000 to 9999	1 M Ω	
	0 - 600 V	1000 to 9999	1 M Ω	
	0 - 800 V	1000 to 9999	> 1 M Ω	225,60
Direct and alternating	0 - 1 mA	1000 to 9999	100 Ω	
current	0 - 10 mA	1000 to 9999	10 Ω	
DC + AC True RMS	0 - 100 mA	1000 to 9999	1 Ω	193,10
	0 - 1 A	1000 to 9999	0,1 Ω	
	0 - 5 A	1000 to 9999	0,02 Ω	

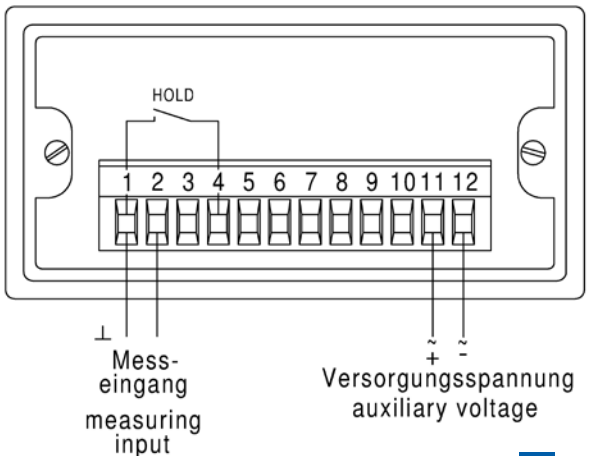
Surcharges	Outside of standard series		9,50
	Different measuring unit (e.g. mm/h)		9,50
	Auxiliary voltage	24 V DC	33,00
		6-30 V AC + DC	56,00
		36-265 V AC + DC	48,00

Connection

Front view
(without front panel)



Rear view



Digital measuring instruments

4 and 5 digit, 96 x 24 mm and 48 x 24 mm
for direct current and direct voltage

Type:
DSM 9624 N, DSM 9624 A/V, DSM 9624 C,
DSM 4824 N, DSM 4824 C

Application

The digital measuring instruments DSM 9624 N, DSM 4824 N and DSM 9624 A/V are used for measuring direct current variables as well as for the indication of transformed non-electrical parameters. Types DSM 9624 C and DSM 4824 C are used for measuring at electrical shunts.

Function

The panel meters serve as 4-digit or 5-digit display for direct voltage or direct current signals and as visual limit monitoring via the display. Programming is done via three front keys. An integrated programming interlock prevents unrequested changes of the parameter and can be unlocked again via an individual code. The electrical connection is at the rear via plug-in terminals. Further selectable functions like the recall of the min.-/max.-value, a zero point slowdown, a direct change of the limit value in operating mode and additional measuring supporting points for linearization are integrated into the device.

Technical data

Types	DSM 9624 N, DSM 9624 A/V, DSM 9624 C, DSM 4824 N, DSM 4824 C
Display	LED seven-segment low-power, DSM 9624: height 14mm, red; DSM 4824: height 10mm, red N and C: 4 digit adjustable from -1999 to 9999 A/V: 5 digit adjustable from -19999 to 99999
Decimal points	adjustable
Measuring range	adjustable via appropriate connection the rear side
Polarity	by negative (-) display
Overflow	horizontal bars above
Underflow	horizontal bars below
Limit values	optical display flashing at exceedance or undershooting
Resolution	approx. 18 bit at 1 s measuring time
Measuring time	0,1 to 10 s
Measuring principle	U/F-conversion
Accuracy	0/4-20 mA, 0-10 V DC: 0,1 % of measuring range, ± 1 digit remaining measuring ranges: 0,5 % of measuring range, ± 1 digit
Temperature range	-20 °C to 0 °C to +50 °C to +80 °C
Temperature influence	100 ppm/K
Test voltage	auxiliary voltage 100-240 VAC and 230 VAC: 2,5 kV 24 VDC: 1 kV
Auxiliary voltage	DSM 4824 N and C 24 VDC ± 10 % (max. 1 VA) DSM 9624 N and C 4-stellig 230 VAC ± 10 % (max. 3 VA) ● Option 24 VDC ± 10 % (max. 1 VA) DSM 9624 A/V 5-digit 100-240 VAC 50/60 Hz, DC ±10 % (max. 10 VA)
IP code	at the front IP65, rear side IP00
Connection	plug-in screw terminal, max. 2,5mm²
Material	housing: PC polycarbonate, black sealing: EPDM, 65 shore, black
Installation	screw mounting

Price

Types	DSM 9624 N / DSM 9624 A/V / DSM 9624 C	DSM 4824 N / DSM 4824 C
Front panel (mm)	96 x 24	48 x 24
Housing (mm)	91,7 x 21,7	44,4 x 21,6
Cut-out (mm)	92 x 22,2	45 x 22,2
Installation depth (mm)	N and C max. 74; A/V max. 154	54
weight (kg)	N and C 0,15; A/V 0,25	0,1

Type DSM 9624 A/V	Measuring range selectable via connection	Display	Internal resistance
Direct current	±1 A	-19999 to 99999	0,2 Ω
Direct voltage	± 300 V	-19999 to 99999	1 MΩ

Type DSM 9624 N DSM 4824 N	Measuring range selectable via connection	Display	Internal resistance
Direct current	± 20 mA	-1999 to 9999	100 Ω
	4-20 mA	-1999 to 9999	100 Ω
Direct voltage	± 10 V	-1999 to 9999	200 kΩ

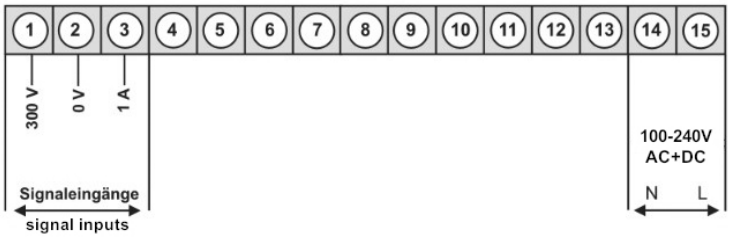
Type DSM 9624 C DSM 4824 C	Measuring range selectable via connection	Display	Internal resistance
Direct voltage	60 mV	-1999 to 9999	12 k Ω
at shunt resistor	150 mV	-1999 to 9999	30 k Ω

Type DSM 9624 A/V		auxiliary voltage 100-240 VAC	€ 293,00
Type DSM 9624 N	from 01.03.2022 plus. 6,8 % surcharge	auxiliary voltage 230 VAC/24 VDC	€ 163,00 / 173,00
Type DSM 9624 C		auxiliary voltage 230 VAC/24 VDC	€ 190,00 / 200,00
Type DSM 4824 N		auxiliary voltage 24 VDC	€ 136,00
Type DSM 4824 C		auxiliary voltage 24 VDC	€ 163,00

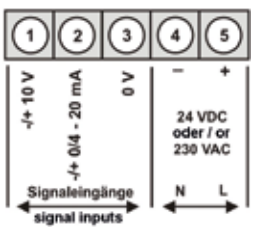
Other measuring ranges on request.

Connection

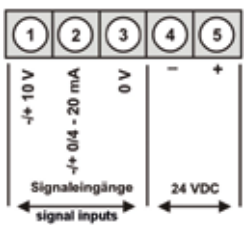
DSM 9624 A/V



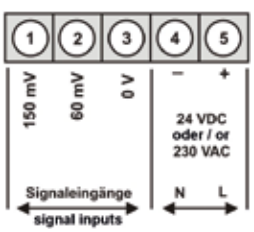
DSM 9624 N



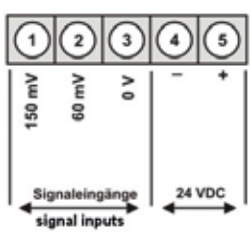
DSM 4824 N



DSM 9624 C



DSM 4824 C



Price group B

Also availabe in black.
Please specify separately.

Digital measuring instruments

4-digit, 96 x 48 mm
for frequency

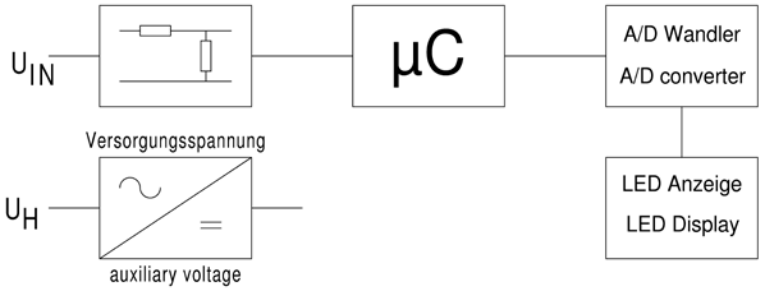
Type:
DSMF 96

Application

The digital measuring instrument DSMF 96 is used for measuring the frequency of alternating voltage as well as for the measurement of the pulsed direct voltage signals.

Function

The measurand passes via resistors to a pulse shaper and then to a 4-digit A/D converter. The conversion is made following the „Dual Slope“ principle. The values are indicated by 7-segment low-power LED displays. A hold function may be achieved by connecting two ports. The zero point compensation is done automatically. Decimal points, dark switching of the last digit, zero point as well as display range may be changed after removing the front panel.



Technical data

	Display	LED seven-segment low-power, height 13mm, red; 4-digit
	Decimal points	adjustable on front panel using DIP switch
	Dark switching	of last digit, on front panel using DIP switch
	Overflow	by negative (-) display
	Resolution	maximum display +/- 9999 digit
	Sampling rate	approx. 3 measurements per second
	Measuring principle	Dual Slope integration
	Accuracy	± 0,5 % of measured value +/- 2 digit for arbitrary waveform
	Hold funtion	by connecting terminals 1 + 4
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,05 % at 10 K
	Overload capacity	voltage 10-fold, max. 850 V, current 10-fold up to 20 mA, above 2-fold
	Test voltage	4 kV between measuring input and auxiliary voltage
	IP code	Housing IP 50, terminals IP 10
	Connection	plug-in 12-pin terminal block, screw terminal max. 2,5 mm²
Auxiliary voltage	Standard	230 V AC ± 20 %, 45-65 Hz, 3 VA
	Options	24 V DC, -15 % to +25 %, 2,5 W
		6-30 V AC + DC or 36-265 V AC + DC, 2,5 VA

Price

Types	DSMF 96 4-digit				
Front panel (mm)	96 x 48				
Housing (mm)	90 x 42,5				
Cut-out (mm)	92 x 45				
Installation depth (mm)	118				
weight (kg)	0,35				

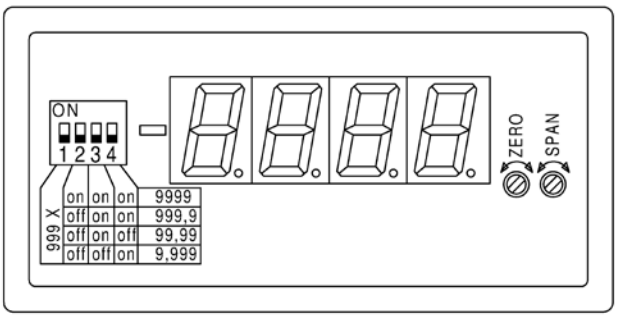
from 01.03.2022 plus. 6,8 % surcharge

Type of current	Measuring range	Display	Measuring voltage	Internal resistance	€
Alternating voltage or pulsed direct voltage	0 - 1000 Hz	0 - 999,9 Hz	5 - 50 V	50 k Ω	199,70
	0 - 1000 Hz	0 - 999,9 Hz	50 - 500 V	500 k Ω	

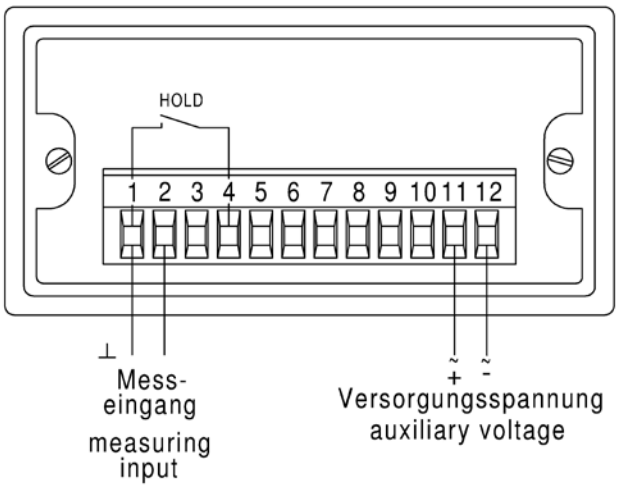
Surcharges			
	Outside of standard series		9,50
	Different measuring unit (e.g. mm/h)		9,50
	Auxiliary voltage	24 V DC	33,00
		6-30 V AC + DC	56,00
		36-265 V AC + DC	48,00

Connection

Front view
(without front panel)



Rear view



Also availabe in black.
Please specify separately.

Digital measuring instruments

4-digit, 96 x 48 mm
for temperature and resistance

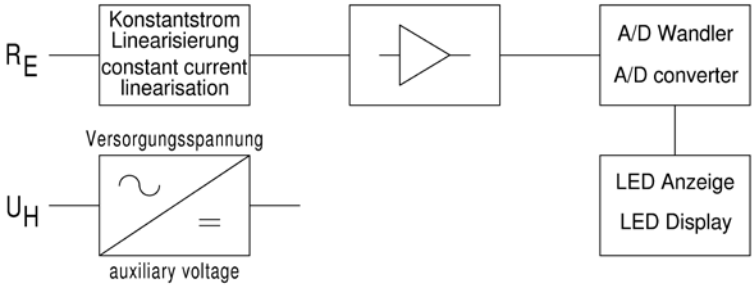
Type:
DSM 96 Pt / W

Application

The digital measuring instrument DSM 96 Pt is used for measuring the temperature in connection with a resistance thermometer Pt 100. Type DSM 96 W is designed for measuring resistances.

Function

The measurand is converted into a direct voltage in an evaluation circuit and fed to a 4-digit A/D converter. The conversion is made following the „Dual Slope" principle. The values are indicated by 7-segment low-power LED displays. In case of line breakage of the Pt 100, the LED flashes. The measurement may be done in two-wire or three-wire technique. A hold function may be achieved by connecting two ports. The zero point compensation is done automatically. Decimal points, dark switching of the last digit, zero point as well as display range may be changed after removing the front panel.



Technical data

Types	DSM 96 Pt / W	
	Display	LED seven-segment low-power, height 13mm, red; 4-digit
	Decimal points	adjustable on front panel using DIP switch
	Dark switching	of last digit, on front panel using DIP switch
	Sensor current	max. 3 mA
	Sensor voltage	max. 4 V
	Two-wire technique	max. input lead resistance 10 Ω (adjustment using „ZERO" -potentiom.)
	Three-wire technique	max. 100 Ω input lead resistance symmetrical
	Polarity	by negative (-) display
	Overflow	flashing LED
	Resolution	maximum display +/- 9999 digit
	Sampling rate	approx. 3 measurement per second
	Measuring principle	Dual-Slope integration
	Accuracy	± 0,2 % , ± 2 Digit of measuring range
	Hold function	by connecting terminals 1 + 4
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,05 % at 10 K
	Test voltage	4 kV between measuring input and auxiliary voltage
	IP code	housing IP 50, terminals IP 10
	Connection	plug-in 12-pin terminal block, screw terminal max. 2,5 mm^2
Auxiliary voltage	Standard	230 V AC ± 20 %, 45-65 Hz, 3 VA
	Options	24 V DC, -15 % to +25 %, 2,5 W
		6-30 V AC + DC or 36-265 V AC + DC, 2,5 VA

Price

Types	DSM 96 Pt, DSM 96 W		
Front panel (mm)	96 x 48		
Housing (mm)	90 x 42,5		
Cut-out (mm)	92 x 45		
Installation depth (mm)	118		
weight (kg)	0,35		

from 01.03.2022 plus. 6,8 % surcharge

DSM 96 Pt 4-digit	Measuring range	Display	€
Temperature measure-ment Pt 100	-60 to +850 °C	-60,0 to +850,0 °C	225,60

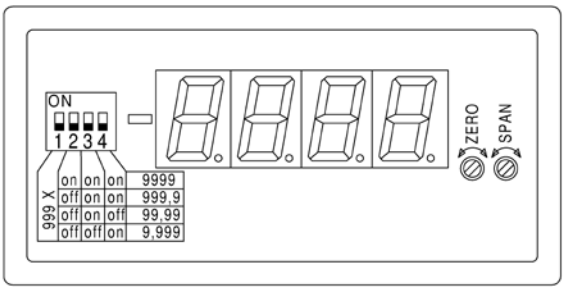
DSM 96 W4-digit	Measuring range	Display	€
Resistance measurement			
3-wire circuit	an arbitrary value between		
	0-100 Ω to 0-10 kΩ	1000 to 9999	
2-wire circuit	0-100 Ω	1000 to 9999	225,60
	0-1 k Ω	1000 to 9999	
	0-10 k Ω	1000 to 9999	

Surcharges			
	Outside of standard series		9,50
	Different measuring unit (e.g. mm/h)		9,50
	Auxiliary voltage	24 V DC	33,00
		6-30 V AC + DC	56,00
		36-265 V AC + DC	48,00

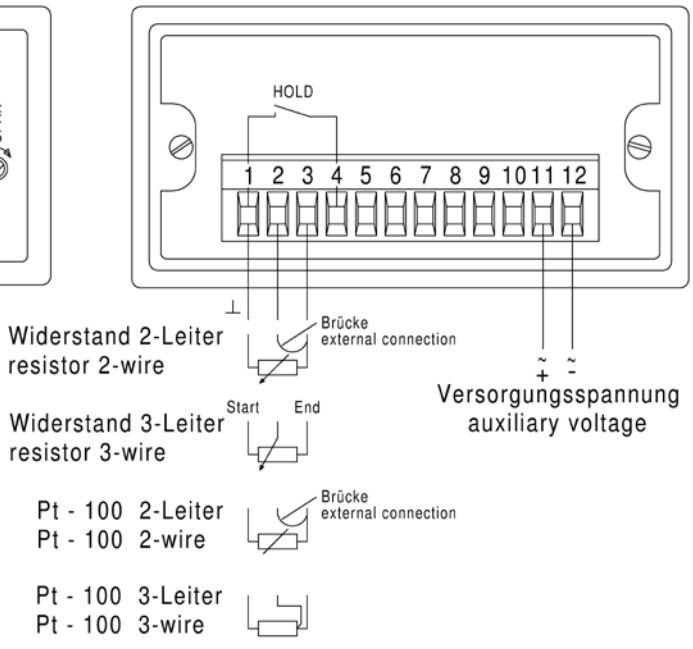
In case of resistance measurement: Please specify 2-wire or 3-wire circuit in order!

Connection

Front view
(without front panel)



Rear view



Digital measuring instruments

4 digit, 96 x 24 mm and 48 x 24 mm
for temperature and resistance

Type:
DSM 9624 Pt, DSM 4824 Pt,
DSM 9624 W, DSM 4824 W

Application

The digital measuring instruments DSM 9624 Pt and DSM 4824 Pt are used for measuring the temperature in connection with a resistance thermometer Pt 100. Types DSM 9624 W and DSM 4824 W are used for measuring resistances.

Function

The panel meters serve as 4-digit display for Pt 100 sensor signals and resistance and as visual limit monitoring via the display. Programming is done via three front keys. An integrated programming interlock prevents unrequested changes of the parameter and can be unlocked again via an individual code. The electrical connection is at the rear via plug-in terminals. Further selectable functions like e.g. the recall of the min.-/max.-value, a zero point slowdown, a direct change of the limit value in operating mode and an impedance matching up to 20 °C are integrated into the device.

Technical data

Types	DSM 9624 Pt, DSM 9624 4824 Pt, DSM 9624 W, DSM 4824 W	
Display	LED seven-segment low-ppwer, DSM 9624: height 14mm, red; DSM 4824: height 10mm, red	
Decimal points	adjustable	
Overflow	horizontal bars above	
Underflow	horizontal bars below	
Limit values	optical display flashing at exceedance or undershooting	
Resolution	Pt100: approx. 0,1 °C resistance: ca. 18 bit at 1 s measuring time	
Measuring time	0,1 to 10 s.	
Measuring principle	U/F-conversion	
Accuracy	Pt 100: 0,1 % of measuring range, +/- 1 digit resistance: 0,5 % of measuring range, +/- 1 digit	
Temperature range	-20 °C to 0 °C to +60 °C to +80 °C	
Tempereture influence	100 ppm/K	
Test voltage	auxiliary voltage 230 VAC: 2,5 kV	24 VDC: 1 kV
Auxiliary voltage	DSM 4824 Pt and W	24 VDC ± 10 % (max. 1 VA)
	DSM 9624 Pt and W	230 VAC ± 10 % (max. 3 VA)
	● Option	24 VDC ± 10 % (max. 1 VA)
IP code	at the front IP65, rear side IP00	
Connection	plug-in screw terminal, max. 2,5mm²	
Material	housing: PC polycarbonate, black sealing: EPDM, 65 shore, black	
Installation	screw mounting	

Price

Types	DSM 9624 Pt / DSM 9624 W	DSM 4824 Pt / DSM 4824 W
Front panel (mm)	96 x 24	48 x 24
Housing (mm)	91,7 x 21,7	44,4 x 21,6
Cut-out (mm)	92 x 22,2	45 x 22,2
Installation depth (mm)	74	54
Weight (kg)	0,15	0,1

Types DSM 9624 Pt DSM 4824 Pt	Measuring range	Display
Temperature measure-ment Pt 100	-200 °C to +850 °C	-19999 to 99999

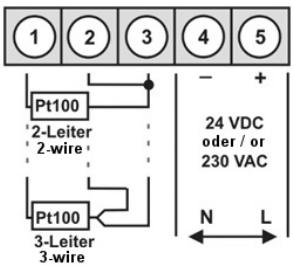
Types DSM 9624 W DSM 4824 W	Measuring range 2-wire	Display
Resistance measurement	0-1 kΩ	-1999 to 9999
	0-10 kΩ	-1999 to 9999
	0-100 kΩ	-1999 to 9999
	0-1 MΩ	-1999 to 9999
Resistance measurement	3-wire	
	>1 kΩ to <1000 kΩ	-1999 to 9999

Type DSM 9624 Pt		auxiliary voltage 230 VAC/24 VDC	€ 195,00 / 206,00
Type DSM 9624 W		auxiliary voltage 230 VAC/24 VDC	€ 190,00 / 200,00
Type DSM 4824 Pt		auxiliary voltage 24 VDC	€ 166,00
Type DSM 4824 W		auxiliary voltage 24 VDC	€ 163,00

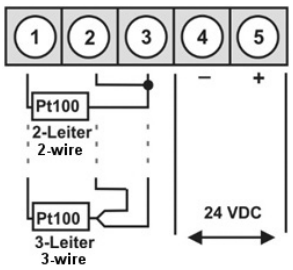
from 01.03.2022 plus. 6,8 % surcharge

Connection

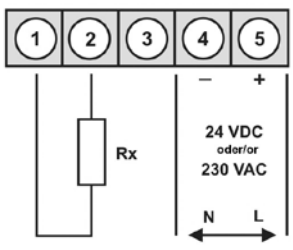
DSM 9624 Pt



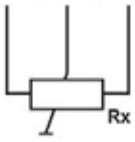
DSM 4824 Pt



DSM 9624 W



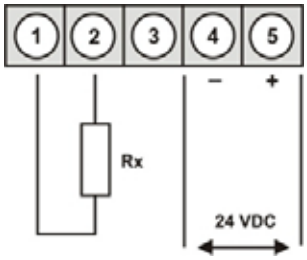
2-wire



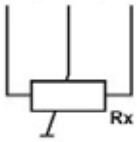
3-wire

(In case of order please specify 2-wire or 3-wire!)

DSM 4824 W



2-wire



3-wire

(In case of order please specify 2-wire or 3-wire!)

Price group B

Also availabe in black.
Please specify separately.

Digital measuring instruments

4 digit, 96 x 48 mm
with two adjustable limit values
for direct and alternating current and voltage
(True RMS)

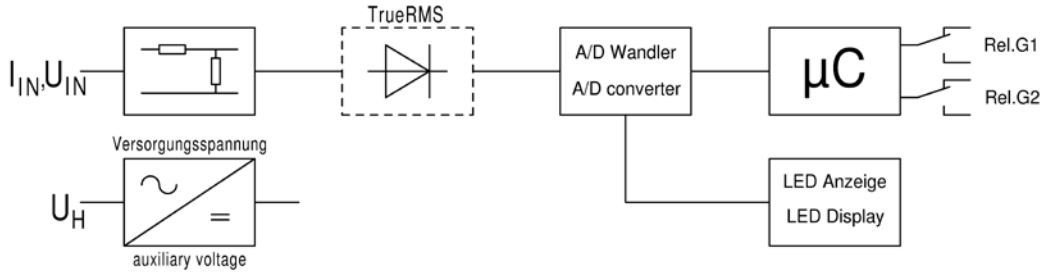
Type:
DSMG 96

Application

The digital measuring instrument DSMG 96 may be used for measuring and monitoring two limit values with direct current and direct voltage, alternating current and alternating voltage as well as for the indication of transformed nonelectrical parameters.

Function

The measurand is sent to a 4-digit A/D converter via series resistors and shunts (in case of alternating current via an rms rectifier). The conversion is made following the „Dual Slope" principle. The values are indicated by 7-segment low-power LED displays. The measurand is continuously compared to the set limit values. As soon as the limit values are reached, the related limit value contacts are switched. The programming of the limit values is done via the front panel using membrane keys. The measuring instrument is equipped with a min/max value memory. The zero point compensation is done automatically. Decimal points, dark switching of the last digit, zero point as well as display range may be changed after removing the front panel.



Technical data

	Display	LED seven-segment low-power, height 13mm, red; 4-digit
	Decimal points	adjustable on front panel using DIP switch
	Dark switching	of last digit, on front panel using DIP switch
	Polarity	by negative (-) display
	Overflow	flashing LED
	Resolution	maximum display +/- 9999 digit
	Sampling rate	approx. 3 measurements per second
	Measurement principle	Dual-Slope integration
	Accuracy	± 0,1 % of measured value ± 1 digit for direct voltage ± 0,2 % of measured value ± 2 digit for direct current ± 0,2 % of measured value ± 2 digit for alternating current variables of arbitrary waveform, rms value up to crest factor 4, DC, 40-1000 Hz
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,05 % at 10 K
	Overload capacity	voltage 10-fold, max. 850 V, current 10-fold up to 20 mA, above 2-fold
Limit values	Switching accuracy	± 0 digit
	Switching time	< 400 ms for 10 % limit value exceedance
	Hysteresis	adjustable from 0-10 % off limit value
	Switching delay	adjustable from 0-150 s
	Relay contacts	2 changeover contacts
	Switching capacity	max. 8 A, 250 V AC, 2000 VA
	Test voltage	4 kV between measuring input and auxiliary voltage
	IP code	housing IP 50, terminals IP 10
	Connection	plug-in 12-pin terminal block, screw terminal max. 2,5 mm²
Auxiliary voltage	Standard	230 V AC ± 20 %, 45-65 Hz, 3 VA
	Options	24 V DC, -15 % to +25 %, 2,5 W 6-30 V AC + DC or 36-265 V AC + DC, 2,5 VA

Price

Type	DSMG 96 4-digit			
Front panel (mm)	96 x 48			
Housing (mm)	90 x 42,5			
Cut-out (mm)	92 x 45			
Installation depth (mm)	118			
Weight (kg)	0,35			

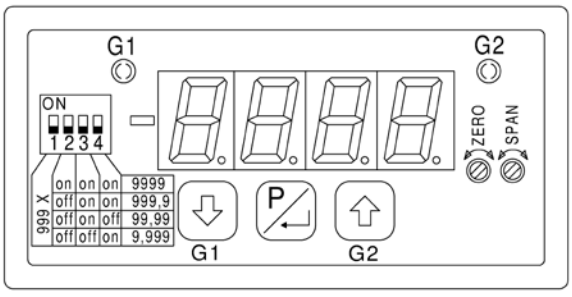
from 01.03.2022 plus. 6,8 % surcharge

Type of current	Measuring range	Display	Internal resistance	€
Direct voltage	± 60 mV	1000 to 9999	> 100 M Ω	
DC	± 100 mV	1000 to 9999	> 100 M Ω	
	± 1 V	1000 to 9999	> 1 M Ω	242,00
	± 10 V	1000 to 9999	1 M Ω	
	± 100 V	1000 to 9999	1 M Ω	
	± 600 V	1000 to 9999	1 M Ω	
Direct current	± 1 µA	1000 to 9999	100 k Ω	
DC	± 10 µA	1000 to 9999	10 k Ω	
	± 100 µA	1000 to 9999	1 k Ω	
	± 1 mA	1000 to 9999	100 Ω	
	± 10 mA	1000 to 9999	10 Ω	242,00
	± 20 mA	1000 to 9999	10 Ω	
	4 - 20 mA	1000 to 9999	10 Ω	
	± 100 mA	1000 to 9999	1 Ω	
	± 1 A	1000 to 9999	0,1 Ω	
	± 5 A	1000 to 9999	0,02 Ω	
Direct and alternating	0 - 100 mV	1000 to 9999	> 100 M Ω	
voltage	0 - 1 V	1000 to 9999	100 k Ω	
DC + AC True RMS	0 - 10 V	1000 to 9999	1 M Ω	255,00
	0 - 100 V	1000 to 9999	1 M Ω	
	0 - 600 V	1000 to 9999	1 M Ω	
	0 - 800 V	1000 to 9999	> 1 M Ω	287,00
Direct and alternating	0 - 1 mA	1000 to 9999	100 Ω	
current	0 - 10 mA	1000 to 9999	10 Ω	
DC + AC True RMS	0 - 100 mA	1000 to 9999	1 Ω	255,00
	0 - 1 A	1000 to 9999	0,1 Ω	
	0 - 5 A	1000 to 9999	0,02 Ω	

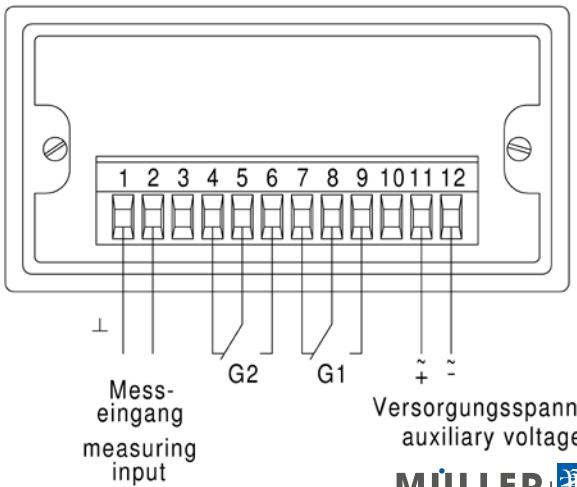
Surcharges	Outside of standard series		9,50
	Different measuring unit (e.g. mm/h)		9,50
	Auxiliary voltage	24 V DC	33,00
		6-30 V AC + DC	56,00
		36-265 V AC + DC	48,00

Connection

Front view
(without front panel)



Rear view



Price group B

Also availabe in black.
Please specify separately.

Digital measuring instruments

4 digit, 96 x 48 mm
with two adjustable limit values
for temperature and resistance

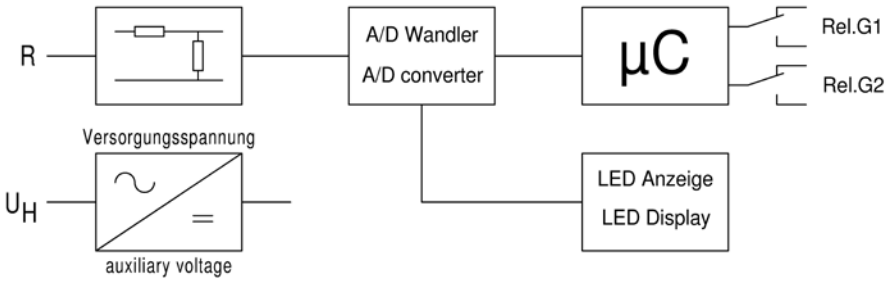
Type:
DSMG 96 Pt, DSMG 96 W

Application

The digital measuring instrument DSMG 96 Pt may be used for measuring and monitoring two limit values during temperature measurements in connection with a resistance thermometer Pt 100. Type DSM 96 W is designed for measuring resistances.

Function

The measurand is converted into a direct voltage in an evaluation circuit and fed to a 4-digit A/D converter. The conversion is made following the „Dual Slope" principle. The values are indicated by 7-segment low-power LED displays. In case of line breakage of the Pt 100, the LED flashes. The measurement may be done in two-wire or three-wire technique. The measurand is continuously compared to the set limit values. As soon as the limit values are reached, the related limit value contacts are switched. The programming of the limit values is done via the front panel using membrane keys. The measuring instrument is equipped with a min/max value memory. The zero point compensation is done automatically. Decimal points, dark switching of the last digit, zero point as well as display range may be changed after removing the front panel.



Technical data

	Display	LED seven-segment low-power, height 13mm, red; 4-digit
	Decimal points	adjustable on front panel using DIP switch
	Dark switching	of last digit, on front panel using DIP switch
	Sensor current	max. 3 mA
	Sensor voltage	max. 4 V
	Two-wire technique	max. input lead resistance 10 Ω (adjustment using „ZERO" potentiom.)
	Three-wire technique	max. 100 Ω input lead resistance symmetrical
	Polarity	by negative (-) display
	Overflow	flashing LED
	Resolution	maximum display +/- 9999 digit
	Sampling rate	approx. 3 measurements per second
	Measurement principle	Dual-Slope integration
	Accuracy	± 0,2 %, ± 2 digit of measuring range
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C
	Temperature influence	< 0,05 % at 10 K
	Test voltage	4 kV between measuring input and auxiliary voltage
Limit values	Switching accuracy	± 0 digit
	Switching time	< 400 ms for 10 % limit value exceedance
	Hysteresis	adjustable from 0-10 % off limit value
	Switching delay	adjustable from 0-150 s
	Relay contacts	2 changeover contacts
	Switching capacity	max. 8 A, 250 V AC, 2000 VA
	Test voltage	4 kV between measuring input and auxiliary voltage
	IP code	housing IP 50, terminals IP 10
	Connection	plug-in 12-pin terminal block, screw terminal max. 2,5 mm^2

Auxiliary voltage	Standard	230 V AC ± 20 %, 45-65 Hz, 3 VA
	Options	24 V DC, -15 % at +25 %, 2,5 W
		6-30 V AC + DC or 36-265 V AC + DC, 2,5 VA

Price

Type	DSMG 96 Pt / W		
Front panel (mm)	96 x 48		
Housing (mm)	90 x 42,5		
Cut-out (mm)	92 x 45		
Installation depth (mm)	118		
Weight (kg)	0,35		

from 01.03.2022 plus. 6,8 % surcharge

DSMG 96 Pt 4-digit	Measuring range	Display	€
Temperature measurement Pt 100	-60 to +850 °C	-60,0 to +850,0 °C	288,00

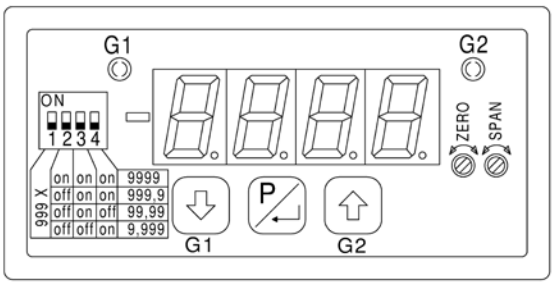
DSMG 96 W4-digit	Measuring range	Display	€
Resistance measurement			
3-wire circuit	an arbitrary value between		
	0-100 Ω to 0-10 kΩ	1000 to 9999	
2-wire circuit	0-100 Ω	1000 to 9999	288,00
	0-1 k Ω	1000 to 9999	
	0-10 k Ω	1000 to 9999	

Surcharges			
	Outside of standard series		9,50
	Different measuring unit (e.g. mm/h)		9,50
	Auxiliary voltage	24 V DC	33,00
		6-30 V AC + DC	56,00
		36-265 V AC + DC	48,00

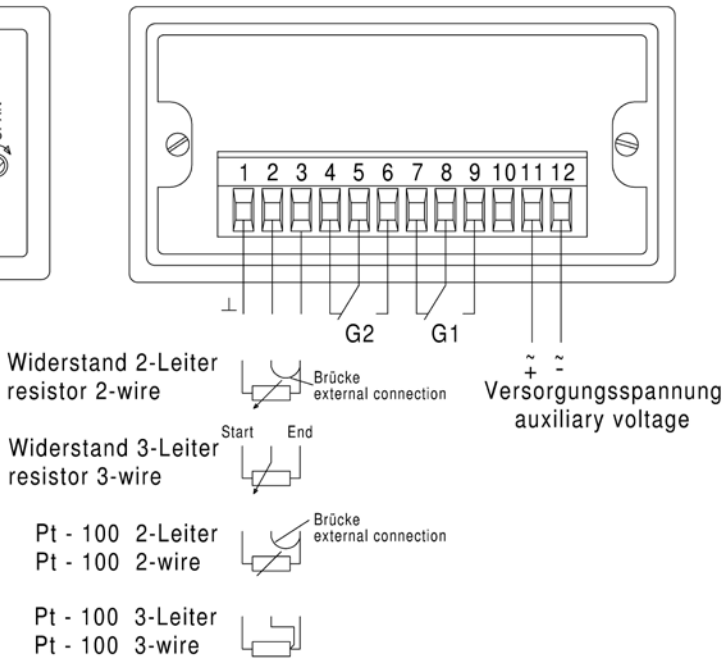
In case of resistance measurement: Please specify 2-wire or 3-wire circuit in order!

Connection

Front view
(without front panel)



Rear view



NW / WQ .. DIN

NW .. SU

NP / PQ .. DIN

PK

P

NPG / PQG .. DIN

NM / MQ .. DIN

NMW / MWQ .. DIN

WQ .. DIN

PQ .. DIN

DWQ .. DIN

DWQB .. DIN

LWQ .. DIN

F .. DIN

FZQ .. DIN

SZ

SZ ... Gs

NDR

SM8 / SM16

PIR... / PR ...

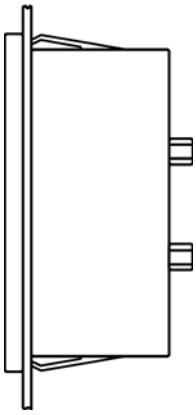
Panel meters analog

Notice

General description

Housing

Dimensions	For all types the housing dimensions and the required panel cut-outs comply with DIN 43 700.
Material	N-Series — Lexan 500 (self extinguishing acc. to UL 94 V-0) 48 DIN, PK 72 DIN, PK 96 DIN — PC / ABS 72 DIN, 96 DIN, 144 DIN — Sheet steel galvanzizted
IP code	All housing follow DIN EN 60 529 and comply with IP 52 on front side or special moduls with IP 54 if possible
Snap-on fastening	For types of N-series and 48 DIN for panel thickness 1 mm to 3 mm no seperat fastening element required



Fastening acc. to DIN 43 835	with screw clamp panel thickness 1 mm to 4 mm (standard type, figure 1) with DIN screw clamp shape B, panel thickness 1 mm to 40 mm for types 72 DIN, 96 DIN, 144 DIN (figure 2) against surcharge

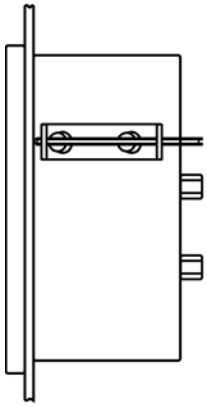


Figure 1

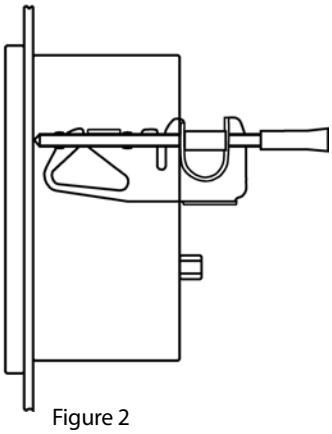


Figure 2

Contact protection sleeves

Technical data

Front panel	Dimensions acc. to DIN 43 718. The front frames are delivered as slim frame (black) for all types.
Scale, pointer	Design acc. to DIN 43 802. The scale graduation is designed as rough/fine division, the pointers as bar pointers.
Zero point setting	All analog measuring instruments offers a zero correction
Accuracy	Acc. to DIN EN 60 051. It is defined under reference conditions, referred to the full scale. With zero point offset, the sum of both full scale values applies. In case of power factor measuring instruments and resistance meters (scale characteristics highly nonlinear), the measuring error is referred to the scale length.
Reference conditions	Temperature 20°C ± 2K, nominal operating position ± 1°
Influecing quantities	Operating position normally vertical ± 5°, in case of deviating operating position, the angle of the horizontal position must be specified. Temperature influence, unless specified otherwise, is the additional error ≤ 1,5 % at 20 °C ± 10 K environmental temperature. Ferromagnetic control panels have no influence on the measuring accuracy.
Operating temperature	The measurement instruments operate faultlessly within a temperature range of –25°C bis +55°C (unless specified otherwise).
Mechanical strength	The measuring elements are designed with a steel tip bearing. Their mobile element is supported in spring-loaded ceramic stones. This guarantees a vibration resistance of up to 2.5 g and an impact resistance of up to 15. For higher levels of stress and loads, carbide tips are used.
EMC	EMC according to DIN EN 61 326
Safety regulations	According to DIN EN 61 010 part 1. Protection class acc. to DIN EN 60 529, connecting terminals with protection against contacts, back-of-hand-proof, IP10.

Types	Measuring category	Working voltage phase to neutral AC effective or DC	Test voltage/ Conditions
For all N ... types, WQ 48 DIN, PQ 48 DIN, WAS 45, SZAS 45 (Plastic housing)	CAT III	300 V	4 kV
For all PQ..., WQ..., MQ..., DWQ..., LWQ..., F..., SZ..., MWQ72, MWQ96 (Metal housing)		300 V	2,5 kV installed in grounded metal panel
Round scale indicator 240° of Pk typ Narrow profile of the device types P 48 x 24, P 72 x 24, P 96 x 24, P 144 x 36 (Plastic housing)		150 V	2,5 kV
MWQ144 (Metal housing)		150 V	2,5 kV installed in grounded metal panel
PAS 45 (Plastic housing)		100 V	2,5 kV

from 01.03.2022 plus. 6,8 % surcharge

General special versions

Increased requirements	Shakeproof > 2,5 g up to 5 g from 100 µA and 100 mV		€ 6,50
	Acid-resistant and splash proof		€ 9,50
	IP 54, front side	● Types 72 DIN and 96 DIN	€ 9,50
	(with screw fixing only)	● N-Series	€ 15,00
	conditionally tropicalized		€ 15,00
Pointer	Red marker pointer, adjustable at front side, for sizes 72, 96, 144 only		€ 22,50
Scales	Imprint	red marking at arbitray position of scale	€ 6,50
		colored sector at arbitray position of scale	€ 6,50
		e.g. charge / discharge	€ 6,50
		second scale numbering	€ 9,50
	Double scale		€ 15,00
	Special calibration	according to curve or table	€ 30,00
		in different measuring unit, e.g. min-1, bar, m/s	€ 6,50
	Special scale	blanc scale (without scale graduation and measuring unit)	€ --,--
		scale black, pointer, graduation and numbering white or yellow (as far as possible)	€ 35,00
		scale fine graduation	€ 15,00
	Illumination	by means of 12 V or 24 V lamp plugged at rear side (as far as possible)	€ 35,00
Fastening	screw clamp shape B acc. to DIN 43 835		€ 3,00
Front frame	grey (similar to RAL 7037, as far as possible)		€ 3,00
Front glass	low-glare glass		€ 6,50
	plexiglass		€ 6,50
Cover frame	with glass pane acc. to DIN 43 718 for cut-outs acc. to DIN 43 700		
	68 mm x 68 mm		€ 9,50
	92 mm x 92 mm		€ 9,50
	138 mm x 138 mm		€ 15,00
Blind cover	from black plastic material for cut-outs acc. to DIN 43 700		
	45 mm x 45 mm (front 48 mm x 48 mm)		€ 6,50
	68 mm x 68 mm (front 72 mm x 72 mm)		€ 9,50
	92 mm x 92 mm (front 96 mm x 96 mm)		€ 9,50
	92 mm x 22 mm (front 96 mm x 24 mm)		€ 9,50
	92 mm x 45 mm (front 96 mm x 48 mm)		€ 9,50
Protective cover	IP 65 protection for front 72 x 72 mm		€ 22,50
	IP 65 protection for front 96 x 96 mm		€ 22,50
Test report	up to 10 test points (depending on type)		€ 60,00

Moving-iron measuring instruments

Application	Moving-iron measuring instruments are mainly used in heavy-current installation for the measurement of alternating currents and alternating voltages (direct measurement or via current or voltage transformer). Moving-iron measuring instruments also indicate the rms value in case of non-sinusoidal quantities within a frequency range of 15-100 Hz. With direct current and direct voltage, additional indication errors of approx. 1 % may occur due to magnetization errors inside the iron. As compared to moving-coil measuring instruments, the energy consumption is relatively high ranging between 0.6 VA and 2 VA. They are thus not suited for measuring small currents or voltages, like e.g. at shunts, speed sensor, thermoelements, measuring transducers.		
Measuring systems	● Robust and electrically resistant to high overloads ● Spring loaded toe bearing in ceramic stones ● Damping through silicone bearings, setting time approx. 1 s ● High torque ● Shielding against external magnetic fields		
Design	Moving-iron measuring instruments are manufactured according to DIN 60 051 as well as according to the other relevant VDE and DIN regulations. The accuracy amounts to 1.5 % referred to the full scale. The graduation of the scale of standard ammeters disposes of a 2-fold overload scale and starts at approx. 10% (20% for voltmeters) of the full scale. Moving-iron measuring elements are resistant to a permanent 1.2-fold overload, ammeters temporarily to a max. 50-fold overload, voltmeters to a max. 2-fold overload; for the rest, DIN EN 60 051 applies. Voltmeters and ammeters up to 5 A are provided with a shielding against external magnetic fields up to a strength of 4 kA/m, ammeters of 6 A up to 60 A offer a shielding up to a strength of (2 kA/m). The connection is realized using M4 screws for voltmeters and for ammeters up to 15 A max. 6 mm², M5 screws up to 60 A max. 16 mm² (back-of-hand-proof).		
Special versions	Measuring ranges	without overload range	€ 30,00
		outside of standard series	€ 9,50
		increased overload range for CT connection max. 6-fold, with direct measurement < 50 A max. 5-fold	€ 30,00
		extended intial range up to 30 % of full scale in center of scale (up to 25 A and 800 V) without overload	€ 30,00
		extended accuracy1 %	€ 30,00
	Special calibration	for direct current	€ 15,00
		for frequency 16 2/3 Hz	€ 15,00
		fixed value between 100 Hz and 400 Hz	
		● for ammeters	€ 15,00
		● for voltmeters	€ 15,00
		fixed value between 400 Hz and 1000 Hz	
		● for ammeters	€ 30,00
		● for voltmeters	€ 30,00
	Damping	increased damping, strong aperiodic, setting time approx. 3 s	€ 6,50

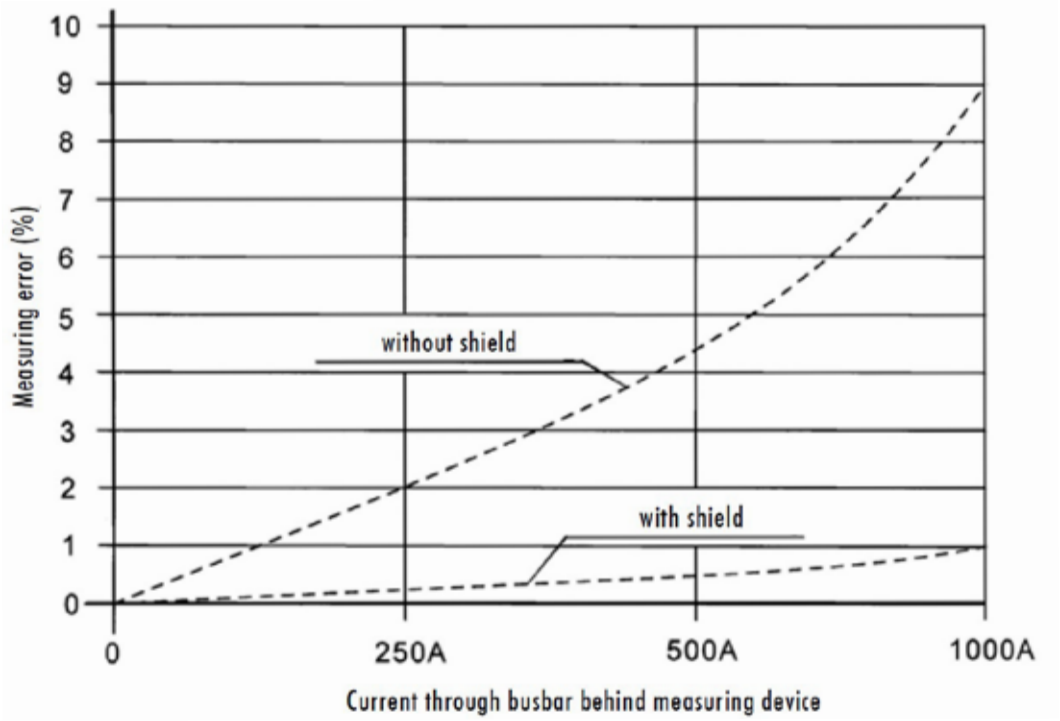
from 01.03.2022 plus. 6,8 % surcharge

Sizes 72, 96, 144

Price group A

External magnetic field influence in case of moving-iron measuring instruments

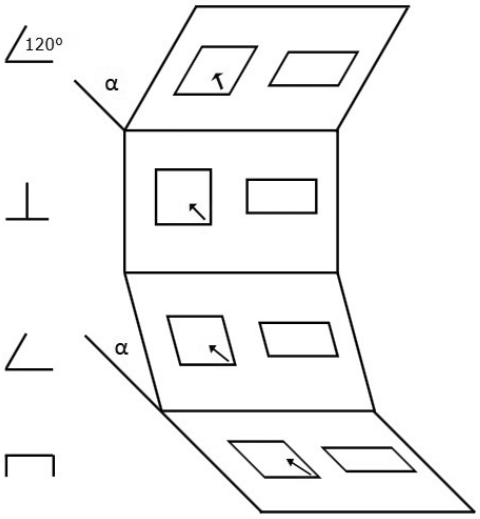
Influence of external magnetic field of a busbar at a horizontal distance of 100 mm and a vertical distance of 150 mm to the moving-iron ammeter.



Due to the capsuled measuring systems, Müller+Ziegler instruments still lie within the required accuracy class even in case of high external magnetic fields.

Operating position

In general, the operating position is indicated by a position symbol. For instruments without a position symbol, the reference area is any operating position between horizontal and vertical. The nominal operating position is 1 ° in each direction from the reference operating position, whereby the influencing effect (in addition to the display error) must not be greater than 50% of the corresponding class error.



Moving-iron measuring instruments

for alternating current and alternating voltage

Type:
NW / WQ .. DIN

from 01.03.2022 plus. 6,8 % surcharge

Square cut-out 40 - 100 Hz, class 1,5 Ammeter with 2-fold overload scale Energy consumption: Voltmeter 2 VA Ammeter 0,6-2 VA	plastic housing		plastic housing	metal housing		
Type	**NW 72**	**NW 96**	**WQ 48 DIN**	**WQ 72 DIN**	**WQ 96 DIN**	**WQ 144 DIN**
Front frame (mm)	72x72	96x96	48 x 48	72 x 72	96 x 96	144 x 144
Cut-out (mm)	68 x 68	92 x 92	45 x 45	68 x 68	92 x 92	138 x 138
Scale length (mm)	62	90	42	62	90	130
Weight (kg)	0,20	0,25	0,10	0,26	0,30	0,70

€ Price

Measuring ranges		**€**	**€**	**€**	**€**	**€**	**€**
Alternating voltage							
V	10 15 25 40 60	49,90	49,90	- - 60,30	60,30	60,30	78,70
	100 150 250 400 500 600	49,20	49,20	59,60 -	59,60	59,60	77,90
for use with voltage transformer	sec. 100 V sec. 110 V	49,20	49,20	59,60	59,60	59,60	77,90
Alternating current							
mA	40 60	55,60	55,60	- -	66,00	66,00	84,30
	100 150 250 400 600	49,90	49,90	60,30	60,30	60,30	78,70
A	1 1,5 2,5 4 6 10 15	41,60	41,60	52,00	52,00	52,00	70,30
	25 40 60	46,70	46,70	- - -	57,10	57,10	75,40
for use with current transformer	sec. 5A sec. 1 A	38,70	38,70	49,20	49,20	49,20	67,50

Price group A

Moving-iron measuring instruments

with integrated selector switch for measurement of the alternating voltage in 3-phase power systems phase against phase as well as phase against neutral with 6 switching positions

Type:
NW .. SU

from 01.03.2022 plus. 6,8 % surcharge

Square cut-out
40 - 100 Hz, class 1,5
Energy consumption max. 4 VA

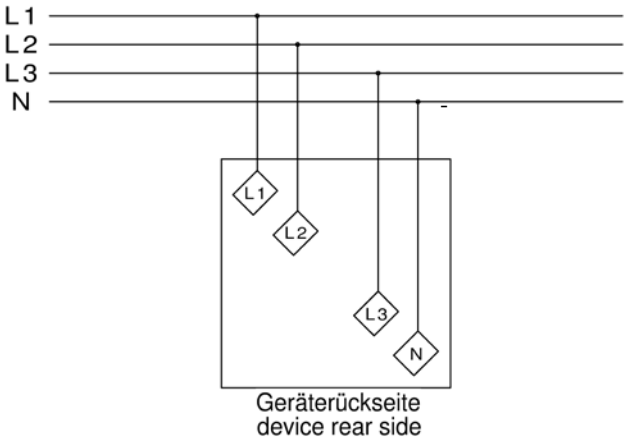
plastic housing

Type	NW 72 SU	NW 96 SU
Front frame (mm)	72x72	96x96
Cut-out (mm)	68 x 68	92 x 92
Scale length (mm)	62	90
Weight (kg)	0,20	0,25

Price

Measuring ranges	€	€
500 V	87,80	87,80

Wiring diagram NW96SU and NW72SU



Price group A

Notice

Description

Application	Moving-coil measuring instruments serve for measuring direct current and direct voltage. For extending the measuring range, shunts, series resistors or voltage dividers are used. The energy consumption of moving-coil measuring instruments is very low; they may thus be connected to shunts, speed sensors, thermocouples, measuring transducers or similar. Moving-coil measuring instruments with rectifier serve for measuring alternating current and alternating voltage. They measure the arithmetic mean value, but are designed in a way to indicate the rms value in case of sinusoidal variables. In case of non-sinusoidal variables, an rms-value rectifier is provided. It is able to still process crest factors of max. 8 without problem. The max. error amounts to less than 1% in this case.
Measuring systems	● Core-magnet measuring system ● Spring loaded toe bearing in ceramic stones ● High damping ● Independent of external fields ● Linear scale characteristics
Design	Moving-coil measuring instruments are manufactured according to DIN 60 051 as well as according to the other relevant VDE and DIN regulations. The accuracy amounts to 1.5 % referred to the full scale. The energy consumption lies between 5 µW and 50 µW, the smallest possible measuring ranges lie around 25 µA and 10 mV. In case of smaller values than stated above, a measuring amplifier is provided. When adjusting moving-coil measuring instruments for their connection to shunts, an input lead resistance of 0.06 Ω is principally accounted for; this corresponds to an input lead of 1.3 m, 2 x 0.75 mm^2. Moving-coil measuring instruments are resistant to a permanent 1.2-fold overload, ammeters temporarily to a max. 10-fold overload voltmeters to a max. 2-fold overload; for the rest, DIN EN 60 051 applies. The connection is made using M4 screws for voltmeters and for ammeters up to 15 A max. 6 mm^2 M5 screws up to 60 A max. 16 mm^2 (back-of-hand-proof), with slim profile moving-coil measuring instruments via blade terminal.

from 01.03.2022 plus. 6,8 % surcharge

General special designs

Measuring range	Outside of standard series	€ 9,50
	Second measuring range	
	for voltmeters and ammeters up to 15 A with additional numbering	€ 35,00
	with additional graduation and numbering	€ 35,00
	Electrical suppressed initial range starting from 10 V, max. 60 % of full scale	€ 35,00
	Extended intial range, up to 10 % of full screen in center scale	€ 30,00
	Zero point at any position of scale	€ 9,50
	Extended accuracy 1 %	€ 30,00
	Extended accuracy 0,5 % in case of direct current or direct voltage for sizes 96 and 144 only	€ 50,00
Special adjustment	With ammeters Δ U ± 1 %	€ 15,00
	With voltmeters Ri ± 1 %	€ 15,00
	Input lead when connected to shunt different to 0,06 Ω	€ 6,50
	Installed potentiometer for voltmeters starting from 60 mV	
	● setting rang ± 10 % of full scale	€ 22,50
	● setting range ± 20 % to ± 50 % of full scale	€ 35,00
Increased input resistance	ca. 2000 Ω / V	€ 15,00
	ca. 4000 Ω / V	€ 15,00
	ca. 10000 Ω / V	€ 30,00
	ca. 20000 Ω / V (as far as possible)	€ 35,00
	> 20000 Ω / V with measuring amplifier	
Averager	e.g. in case of pulse packing controls for measuring ranges from 1 A to 25 A incl. current transformer (for types PQ 72 DIN, PQ 96 DIN and PQ 144 DIN only, basic price measuring instrument 400 µA)	€ 80,00

Moving-coil measuring instruments

for direct current

Type:
NP / PQ .. DIN

from 01.03.2022 plus. 6,8 % surcharge

Square cut-out Class 1,5	plastic housing		plastic housing	metal housing		
Type	**NP 72**	**NP 96**	**PQ 48 DIN**	**PQ 72 DIN**	**PQ 96 DIN**	**PQ 144 DIN**
Front frame (mm)	72x72	96x96	48 x 48	72 x 72	96 x 96	144 x 144
Cut-out (mm)	68 x 68	92 x 92	45 x 45	68 x 68	92 x 92	138 x 138
Scale length (mm)	62	90	42	62	90	130
Weight (kg)	0,20	0,25	0,10	0,26	0,30	0,70

€ Price

Measuring ranges			**€**	**€**	**€**	**€**	**€**	**€**
		Ri / Δ U						
µA	100	4400 Ω	74,50	74,50	87,30	87,30	87,30	113,90
	150	2200 Ω						
	250	900 Ω	65,50	65,50	78,30	78,30	78,30	104,90
	400	306 Ω						
	600	177 Ω						
mA	1	53 Ω	58,80	58,80	71,60	71,60	71,60	98,20
	1,5	23 Ω						
	2,5	9 Ω						
	4	6,5 Ω						
	6	3,5 Ω						
	10	2,5 Ω						
	15	1,3 Ω	58,80	58,80	71,60	71,60	71,60	98,20
	25	60 mV						
	40	60 mV						
	60	60 mV						
	100	60 mV	58,80	58,80	71,60	71,60	71,60	98,20
	150	60 mV						
	250	60 mV						
	400	60 mV						
	600	60 mV						
A	1	60 mV	61,10	61,10	73,90	73,90	73,90	100,50
	1,5	60 mV						
	2,5	60 mV						
	4	60 mV						
	6	60 mV						
	10	60 mV						
	15	60 mV			-			
	25	60 mV	72,40	72,40	-	85,20	85,20	111,70
for use with shunt								
mV	60	12 Ω	58,80	58,80	71,60	71,60	71,60	98,20
	100	20 Ω						
	150	30 Ω						
for use with measuring transducer								
mA	0-20	2,2 Ω	58,80	58,80	71,60	71,60	71,60	98,20
	4-20	50 Ω	76,30	76,30	89,10	89,10	89,10	115,60
V	0-10	10 k Ω	58,80	58,80	71,60	71,60	71,60	98,20

Price group A

Moving-coil measuring instruments

for direct voltage

Type:
NP / PQ .. DIN

from 01.03.2022 plus. 6,8 % surcharge

Square cut-out Class 1,5	plastic housing		plastic housing	metal housing		
Type	**NP 72**	**NP 96**	**PQ 48 DIN**	**PQ 72 DIN**	**PQ 96 DIN**	**PQ 144 DIN**
Front frame (mm)	72x72	96x96	48 x 48	72 x 72	96 x 96	144 x 144
Cut-out (mm)	68 x 68	92 x 92	45 x 45	68 x 68	92 x 92	138 x 138
Scale length (mm)	62	90	42	62	90	130
Weight (kg)	0,20	0,25	0,10	0,26	0,30	0,70

Price

Measuring ranges			€	€	€	€	€	€
		Ri / Δ U						
mV	40	200 Ω / V	77,90	77,90	90,70	90,70	90,70	117,30
	60	200 Ω / V	74,80	74,80	87,60	87,60	87,60	114,10
	100	200 Ω / V						
	150	200 Ω / V						
	250	200 Ω / V	66,10	66,10	78,90	78,90	78,90	105,50
	400	1000 Ω / V						
	600	1000 Ω / V						
V	1	1000 Ω / V						
	1,5	1000 Ω / V						
	2,5	1000 Ω / V						
	4	1000 Ω / V						
	6	1000 Ω / V						
	10	1000 Ω / V						
	15	1000 Ω / V						
	25	1000 Ω / V	58,80	58,80	71,60	71,60	71,60	98,20
	40	1000 Ω / V						
	60	1000 Ω / V						
	100	1000 Ω / V						
	150	1000 Ω / V						
	250	1000 Ω / V						
	400	1000 Ω / V						
	500	1000 Ω / V						
	600	1000 Ω / V						

Price group A

Moving-coil measuring instruments

for direct current

Type:
PK .. DIN

from 01.03.2022 plus. 6,8 % surcharge

Square cut-out
class 1,5
240° scale

plastic housing | metal housing

Type		PK 48 DIN	PK 72 DIN	PK 96 DIN	PK 144 DIN
Front frame (mm)		48 x 48	72 x 72	96 x 96	144 x 144
Cut-out (mm)		45 x 45	68 x 68	92 x 92	138 x 138
Scale length (mm)		70	105	150	230
Weight (kg)		0,20	0,30	0,40	0,90

€

Price

Measuring ranges			€	€	€	€
		Ri / Δ U				
µA	100	4400 Ω				
	150	4000 Ω				
	250	2500 Ω	138,10	138,10	138,10	165,50
	400	2000 Ω				
	600	1400 Ω				
mA	1	300 Ω				
	1,5	250 Ω				
	2,5	120 Ω				
	4	80 Ω				
	6	60 mV				
	10	60 mV	140,90	140,90	140,90	168,40
	15	60 mV				
	25	60 mV				
	40	60 mV				
	60	60 mV				
	100	60 mV				
	150	60 mV				
	250	60 mV	144,10	144,10	144,10	171,50
	400	60 mV				
	600	60 mV				
A	1	60 mV				
	1,5	60 mV				
	2,5	60 mV	160,20	160,20	160,20	187,70
	4	60 mV				
for use with shunt						
mV	60	12 Ω				
	100	20 Ω	138,10	138,10	138,10	165,50
	150	30 Ω				
for use with measuring transducer						
mA	0-20	3 Ω	135,30	135,30	135,30	162,70
	4-20	45 Ω	149,10	149,10	149,10	176,10
V	0-10	10 k Ω	138,10	138,10	138,10	165,50

Price group B

Moving-coil measuring instruments

for direct voltage

Type:
PK .. DIN

from 01.03.2022 plus. 6,8 % surcharge

Square cut-out
class 1,5
240° scale

plastic housing | metal housing

Type	PK 48 DIN	PK 72 DIN	PK 96 DIN	PK 144 DIN
Front frame (mm)	48 x 48	72 x 72	96 x 96	144 x 144
Cut-out (mm)	45 x 45	68 x 68	92 x 92	138 x 138
Scale length (mm)	70	105	150	230
Weight (kg)	0,20	0,30	0,40	0,90

Price

Measuring ranges		Ri / Δ U	€	€	€	€
mV	60	200 Ω / V	140,90	140,90	140,90	168,40
	100	200 Ω / V				
	150	200 Ω / V				
	250	200 Ω / V				
	400	1000 Ω / V				
	600	1000 Ω / V				
V	1	1000 Ω / V	138,10	138,10	138,10	165,50
	1,5	1000 Ω / V				
	2,5	1000 Ω / V				
	4	1000 Ω / V				
	6	1000 Ω / V				
	10	1000 Ω / V				
	15	1000 Ω / V				
	25	1000 Ω / V				
	40	1000 Ω / V				
	60	1000 Ω / V				
	100	1000 Ω / V				
	150	1000 Ω / V				
	250	1000 Ω / V				
	400	1000 Ω / V				
	500	1000 Ω / V				
	600	1000 Ω / V				

Price group B

Moving-coil measuring instruments

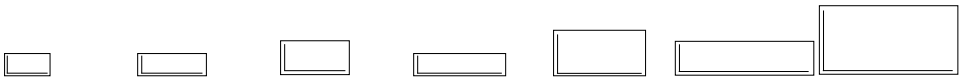
for direct current

Type:
P ...

from 01.03.2022 plus. 6,8 % surcharge

Rectangular cut-out
class 1,5
Horizontal scale (vertical scale possible - please specify at order)

plastic housing | metal housing



Type	P 48x24	P 72x24	P 72x36	P 96x24	P 96x48	P 144x36	P 144x72
Front frame (mm)	48x24	72x24	72x36	96x24	96x48	144x36	144x72
Cut-out (mm)	45x22	68x22	68x34	92x22	92x46	138x33	138x69
Scale length (mm)	32	52	52	60	60	95	95
Weight (kg)	0,08	0,10	0,12	0,15	0,25	0,50	0,80

€

Price

Measuring ranges		€	€	€	€	€	€	€
µA	100 150	93,40	93,40	164,50	102,60	209,00	on request	294,30
	250 400 600	88,60	88,60	150,50	97,20	196,80	on request	294,30
mA	1 1,5 2,5 4 6 10	85,00	85,00	145,30	93,40	188,30	on request	290,30
	15 25 40 60	88,60	88,60	152,80	97,20	195,90	on request	294,30
	100 150 250 400 600	88,60	88,60	160,20	97,20	203,40	on request	307,60
A	1	93,40	93,40	159,10	102,60	206,60	on request	307,6
for use with shunt								
mV	60 100 150	88,30	88,30	149,60 152,80 149,60	97,20 99,20 97,20	193,80 197,90 193,80	on request	292,30 290,30 292,30
for use with measuring transducer								
mA	0-20	84,60	84,60	152,80	93,40	195,90	on request	294,30
	4-20	88,60	88,60	179,80	103,00	223,00	on request	321,30
V	0-10	88,60	88,60	152,80	97,20	197,90	on request	290,30

Price group B

Moving-coil measuring instruments

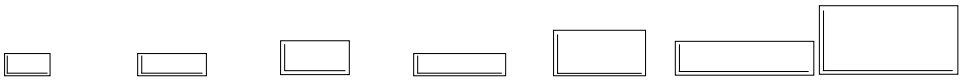
for direct voltage

Type:
P ...

from 01.03.2022 plus. 6,8 % surcharge

Rectangular cut-out
class 1,5
Horizontal scale (vertical scale possible - please specify at order)

plastic housing | metal housing



Type	P 48x24	P 72x24	P 72x36	P 96x24	P 96x48	P 144x36	P 144x72
Front frame (mm)	48x24	72x24	72x36	96x24	96x48	144x36	144x72
Cut-out (mm)	45x22	68x22	68x34	92x22	92x46	138x33	138x69
Scale length (mm)	32	52	52	60	60	95	95
Weight (kg)	0,08	0,10	0,12	0,15	0,25	0,50	0,80

Price

Measuring ranges		€	€	€	€	€	€	€
mV	60	88,30	88,30	149,60	97,20	213,40	on request	290,30
	100 150 250 400 600	88,30	88,30	152,80	99,20	197,90	on request	290,30
V	1 1,5 2,5 4 6 10 15 25 40 60 100 150 250 400 500 600	88,60	88,60	152,80	97,20	197,90	on request	290,30

Price group B

Moving-coil measuring instruments

with rectifier

for alternating current and alternating voltage

Type:
NPG / PGQ .. DIN

from 01.03.2022 plus. 6,8 % surcharge

Square cut-out 40 - 100 Hz, class 1,5	plastic housing		plastic housing	metal housing		
Type	**NPG 72**	**NPG 96**	**PGQ 48 DIN**	**PGQ 72 DIN**	**PGQ 96 DIN**	**PGQ 144 DIN**
Front frame (mm)	72x72	96x96	48 x 48	72 x 72	96 x 96	144 x 144
Cut-out (mm)	68 x 68	92 x 92	45 x 45	68 x 68	92 x 92	138 x 138
Scale length (mm)	62	90	42	62	90	130
Weight (kg)	0,20	0,25	0,10	0,26	0,30	0,60

€ Price

Measuring ranges		**€**	**€**	**€**	**€**	**€**	**€**
V	10 15 25 40 60 100 150 250 400 500 600	no longer available use type PGQ	no longer available use type PGQ	100,00	100,00	100,00	126,60
A	1 1,5 2,5 4 6 10 15 25	-	-	-	121,70 128,20	121,70 128,20	148,30 154,80

Price group A

Moving-coil measuring instruments

with rectifier

for alternating current and alternating voltage

Type:
PKG .. DIN / PG

from 01.03.2022 plus. 6,8 % surcharge

Square and rectangular cut-outs 40 - 100 Hz, Class 1,5 240° scale and slim profile	plastic housing			metal housing	plastic housing			metal housing
Type	**PKG 48 DIN**	**PKG 72 DIN**	**PKG 96 DIN**	**PKG 144 DIN**	**PG 48 x 24**	**PG 72 x 24**	**PG 96 x 24**	**PG 144 x 36**
Front frame (mm)	48 x 48	72x72	96x96	144 x 144	48 x 24	72 x 24	96 x 24	144 x 36
Cut-out (mm)	45 x 45	68 x 68	92 x 92	138 x 138	45 x 22	68 x 22	92 x 22	138 x 33
Scale length (mm)	70	105	150	230	32	52	60	95
Weight (kg)	0,20	0,30	0,40	0,90	0,08	0,10	0,12	0,50

Price

Measuring ranges		**€**	**€**	**€**	**€**	**€**	**€**	**€**	**€**
V	10 15 25 40 60 100 150 250 400 500 600	152,50	152,50	152,50	no longer available	103,00	103,00	103,00	no longer available
mA	1 1,5 2,5 4 6 10 15 25 40 60	195,90 - -	195,90	195,90	no longer available	140,00	140,00	140,00	no longer available
	100 150 250 400 600	-	199,00	199,00	no longer available	143,60	143,60	143,60	no longer available
A	1 1,5 2,5 4 5 6	-	215,20	215,20	no longer available	148,40 - - - - -	148,40 - - - - -	148,40 - - - - -	no longer available

Price group B

Bimetal measuring instruments

Application	Bimetal measuring instruments are used for monitoring the load ratios and conditions of electrical distribution installations. Due to their thermal inertia, the displayed measured values equal the rms value of the current; a built-in slave pointer is used to show the maximum values.
Measuring systems	● Highly robust ● Ultra high torque ● Trunnion bearing ● Setting time 8 min or 15 min
Design	Bimetal measuring instruments are manufactured according to DIN 60 051 as well as according to the other relevant VDE and DIN regulations. The accuracy amounts to 3 % referred to the full scale. The scale graduation starts at approx. 15 % of the full scale and has a 1.2-fold overload scale. Bimetal measuring instruments show the square mean value of the current, the measured value equals the rms value and is independent of the waveform. Due to the extremely high torque, a slave pointer showing the maximum current may be used. Using a sealable reset button, the maximum pointer (slave pointer) may be reset up to the measuring element pointer. Another model combines bimetal measuring elements with moving-iron measuring elements (class 1.5) inside one housing. This allows for measuring maximum value, mean value and instantaneous value of the current on one scale at the same time. The standard type allows for measuring currents within a frequency range of 15 Hz to 100 Hz. Bimetal measuring systems are resistant to a 1.2-fold overload and moving-iron systems to a 2-fold overload, temporarily also up to a 10-fold overload, for the rest DIN EN 60 051 applies. Moving-iron measuring elements are provided with a shielding against external magnetic fields up to a strength of 4 kA/m. The connection is made using M4 screws (back-of-hand-proof).
Measuring ranges	Bimetal measuring instruments 0-5 / 6 A. If connectect to current transformer sec. 5 A the scale is designed in a way that the full scale is 20 % higher than the primary current of the current transformer, e.g. current transformer 250 / 5 A, display range 0-300 A. Moving-iron measuring instruments combined with bimetal measuring instruments 0- 5 / 10 A. If connectect to current transformer sec. 5 A the scale is designed in a way that the full scale is 100 % higher than the primary current of the current transformer, e.g. current transformer 250 / 5 A, display range 0-500 A.
Energy consumption	Bimetal measuring system1,9 VA for 5 A, 0,9 VA for 1 A combined with moving-iron measuring system 2,5 VA for 5 A, 1,5 VA for 1 A
Special versions	Fixed value between100 Hz and 1000 Hz at bimetal measuring instrument € 15,00 at combined bimetal / moving-iron measuring instrument € 30,00 Extended initial range up to 30 % of full scale € 30,00 in center scale (moving-iron measuring element)

from 01.03.2022 plus. 6,8 % surcharge

Price group A

Bimetal measuring instruments

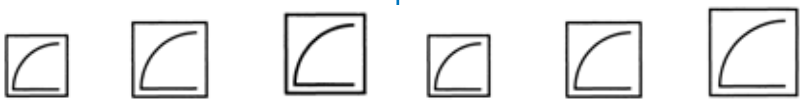
with slave pointer
(maximum current ammeter)

Type:
NM / MQ .. DIN

from 01.03.2022 plus. 6,8 % surcharge

Square cut-out
Class 3
Energy consumption 1,9 VA for 5 A,
0,9 VA for 1 A
Setting time 8 min., 15 min. on request
Reset button sealable

plastic housing | metal housing



Type	NM 48	NM 72	NM 96	MQ 72 DIN	MQ 96 DIN	MQ 144 DIN
Front frame (mm)	48 x 48	72 x 72	96 x 96	72 x 72	96 x 96	144 x 144
Cut-out (mm)	45 x 45	68 x 68	92 x 92	68 x 68	92 x 92	138 x 138
Scale length (mm)	44	62	90	62	90	130
Weight (kg)	0,10	0,12	0,17	0,20	0,25	0,75

€

Price

for use with current transformer	€	€	€	€	€	€
sec. 5 A sec. 1 A	44,50	79,70	79,70	105,10	105,10	131,70

Bimetal measuring instruments

with slave pointer, combined with moving-iron ammeter
(maximum and instantaneous current ammeter)

Type:
NMW / MWQ .. DIN

from 01.03.2022 plus. 6,8 % surcharge

Square cut-out
Class 3 (bimetal) / class 1,5 (moving iron)
Energy consumption 2,5 VA for 5 A,
1,5 VA for 1 A
Setting time 8 min., 15 min. on request
Reset button sealable

plastic housing | metal housing

Type	NMW 72	NMW 96	MWQ 72 DIN	MWQ 96 DIN	MWQ 144 DIN
Front frame (mm)	72 x 72	96 x 96	72 x 72	96 x 96	144 x 144
Cut-out (mm)	68 x 68	92 x 92	68 x 68	92 x 92	138 x 138
Scale length (mm)	62 / 43	90 / 70	50 / 46	95 / 74	135 / 100
Weight (kg)	0,16	0,25	0,34	0,42	0,90

€

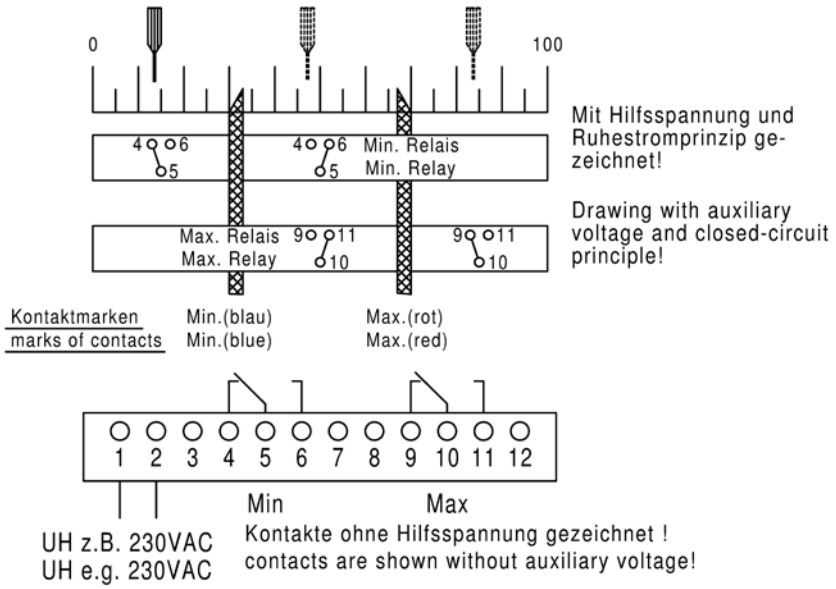
Price

for use with current transformer	€	€	€	€	€
sec. 5 A sec. 1 A	102,00	102,00	168,20	168,20	194,80

Price group A

Limit controllers

Application	Limit controllers monitor one or two limit values to be set over the entire scale range. They can be used for electrical measureable values.
Measuring system	● Moving-iron measuring system ● Moving-coil measuring system
Contact device	● Optical sampling through infrared reflected light barrier ● Nonreactive sampling ● Setting range 0-100 % (also in case of two contact marks) ● Setting of limit values at the front side
Design	For limit controllers, the same technical data and special models as for normal indicators apply. They are available in sizes 96 DIN and 144 DIN. The following variables may be measured: Direct current, direct voltage, alternating current, alternating voltage, frequency, in connection with a measuring transducer power, power factor, temperature and all other transformed non-electrical quantities. The sampling of the position of the measuring element pointer is done via a noncontact infrared reflected light barrier. A maximum of two limit values may be monitored. In case of the standard type, the relays are energized and are deenergized if the max. contact mark is exceeded or the limit value drops below the min. contact mark (closed-circuit principle). Electronics, relays and 230 V auxiliary voltage are installed; the maximum mounting depth of the device amounts to 68 mm only. The connection is made via a 12-pin terminal block for cross sections up to 4 mm². The measuring element is connected to hexagon bolts with M4 screws in case of voltmeters and ammeters up to 15 A max. 6 mm², M5 screws up to 60 A max. 16 mm² (back-of-hand-proof).
Function and connection diagram	



Technical data

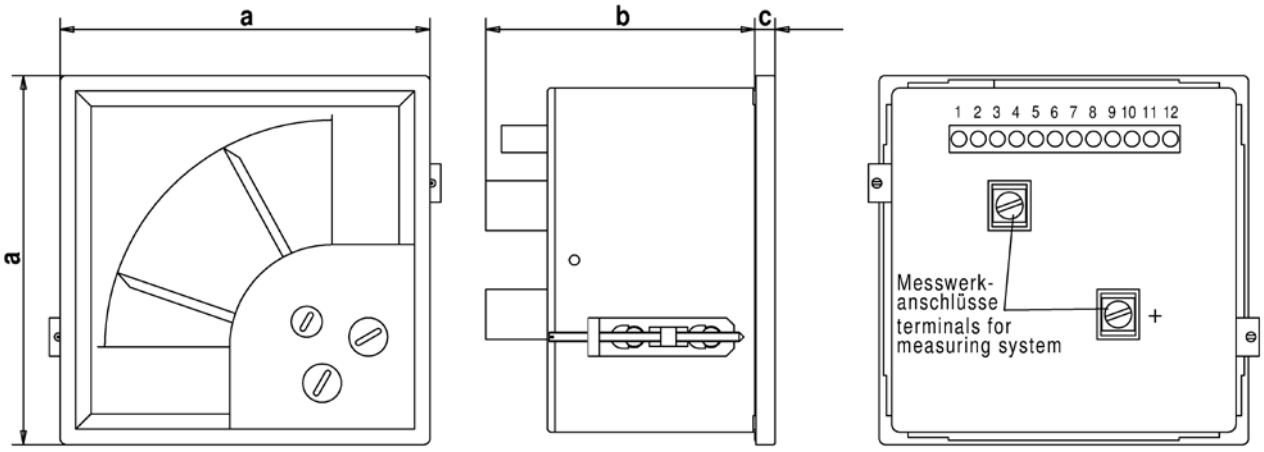
	Switching accuracy	± 1 % of scale lenght, (± 0,9 mm for ..96 DIN.. or ± 1,3 mm for ..144 DIN..)
	Hysteresis	± 0,5 % of scale length, (± 0,4 mm for ..96 DIN.. or ± 0,6 mm for ..144 DIN..)
	Response delay	100 ms after limit value is exceeded
	Sampling	optical, with reflected light barrier
	Limit value adjustment	at front side via full scale range, using screwdriver
	Temperature range	-25 °C to +20 °C to +30 °C to +55 °C
	Relay contacts	1 changeover contact per limit value, max. 8 A, 250 V AC, 2000 VA
	Switching state	closed-circuit prinziple, (Relay is deengergized if limit value is exceeded)
	Auxiliary voltage	230 V AC ± 15 %, 45-65 Hz, 2 VA
	Test voltage	2,5 kV, 50 Hz, 10 s, between measuring input, housing, auxiliary voltage and relay contacts
Standards	EMC	DIN EN 61 326,
	Mechanical strength	DIN EN 61 010 part 1
	Electrical safety	DIN EN 61 010 part 1, pollution degree 2, measuring category CAT III, for working voltages up to 300 V (phase to neutral)
	Accuracy, overlaod	DIN EN 60 051
	IP code	DIN EN 60 529, housing IP 52, terminals IP 10

Special versions

from 01.03.2022 plus. 6,8 % surcharge

Measuring range	Moving-iron measuring instruments	Page 132
	Moving-coil measuring instruments	Page 137
Auxiliary voltage	110 V AC ± 15 %, 45-65 Hz, 2 V	€ --,--
	24 V AC + DC, -15 % to +25 %, 2 W,	€ --,--
	6-30 V AC + DC, 2 VA, (EMC DIN EN 61 326 class A)	€ 56,00
	36-265 V AC + DC, 2 VA, (EMC DIN EN 61 326 class A)	€ 48,00
Contacts	2 max contacts or 2 min contacts	€ 15,00
Adjustment	using knurled knob, per contact	€ 6,50
Relays	Reversed switching states (open-circuit principle), per contact	€ 9,50
Relay contacts	2 changeover contacts (only possible for 1 contact)	€ 22,50
Relay delay	Fixed value between 1 and 30 s, per contact	€ 22,50
	adjustable at rear side of housing 1-30 s, per contact	€ 35,00

Dimensions



Type	Cut-out mm	a mm	b mm	c mm
WQ 96 DIN, PQ 96 DIN, PGQ 96 DIN	$92^{+0,8}$ x $92^{+0,8}$	96	70	5
WQ 144 DIN, PQ 144 DIN, PGQ 144 DIN	138^{+1} x 138^{+1}	144	70	7

Price group B

Limit controllers

for alternating current and alternating voltage

Type:
WQ .. DIN

from 01.03.2022 plus. 6,8 % surcharge

Square cut-out
40-100 Hz, moving-iron measuring system
class 1,5
Ammeter with 2-fold overload scale
Energy consumption ammeter 0,6-2 VA
voltmeter ca. 2 VA

metal housing

Type	WQ 96 DIN	WQ 96 DIN	WQ 144 DIN	WQ 144 DIN
	Min-contact or Max-contact	Min-contact and Max-contact	Min-contact or Max-contact	Min-contact and Max-contact
Front frame (mm)	96 x 96	96 x 96	144 x 144	144 x 144
Cut-out (mm)	92 x 92	92 x 92	138 x 138	138 x 138
Scale length (mm)	90	90	130	130
Weight (kg)	0,48	0,48	0,90	0,90

€

Price

Measuring ranges		€	€	€	€
V	6 10 15 25 40 60 100 150 250 400 500 600	291,20	395,20	317,70	421,70
for use with voltage transformer mA	sec. 100 V 40 60 100 150 250 400 600	291,20	395,20	317,70	421,70
A	1 1,5 2,5 4 6 10 15 25 40 60	291,20	395,20	317,70	421,70
for use with current transformer	sec. 5 A (0,6 VA) sec. 1 A (0,6 VA)	291,20	395,20	317,70	421,70

Price group B

Limit controllers

for direct current

Type:
PQ .. DIN

from 01.03.2022 plus. 6,8 % surcharge

Square cut-out
Class 1,5
Moving-coil measuring system

metal housing

Type	PQ 96 DIN	PQ 96 DIN	PQ 144 DIN	PQ 144 DIN
	Min-contact or Max-contact	Min-contact and Max-contact	Min-contact or Max-contact	Min-contact and Max-contact
Front frame (mm)	96 x 96	96 x 96	144 x 144	144 x 144
Cut-out (mm)	92 x 92	92 x 92	138 x 138	138 x 138
Scale length (mm)	90	90	130	130
Weight (kg)	0,48	0,48	0,90	0,90

€

Price

Measuring ranges			€	€	€	€
		Ri / Δ U				
µA	100	2575 Ω				
	150	955 Ω				
	250	420 Ω	316,10	418,40	342,70	445,00
	400	167 Ω				
	600	77 Ω				
mA	1	28,6 Ω				
	1,5	14,2 Ω				
	2,5	7,6 Ω				
	4	3,8 Ω				
	6	1,9 Ω				
	10	1,4 Ω				
	15	1,3 Ω				
	25	60 mV	316,10	418,40	342,70	445,00
	40	60 mV				
	60	60 mV				
	100	60 mV				
	150	60 mV				
	250	60 mV				
	400	60 mV				
	600	60 mV				
A	1	60 mV				
	1,5	60 mV				
	2,5	60 mV				
	4	60 mV				
	6	60 mV	316,10	418,40	342,70	445,00
	10	60 mV				
	15	60 mV				
	25	60 mV				
	40	60 mV				
for use with shunt						
mV	60	12 Ω				
	100	20 Ω	316,10	418,40	342,70	445,00
	150	30 Ω				
for use with measuring transducer						
mA	0-20	1,2 Ω	316,10	418,40	342,70	445,00
	4-20	50 Ω	332,30	434,10	358,80	460,70
V	0-10	10 kΩ	316,10	418,40	342,70	445,00

Alternating current:	with rectifier, type PGQ 96 DIN or PGQ 144 DIN, 40 - 10000 Hz sinusoidal		
	Measuring ranges between 100 µA and 600 mA	Surcharge:	€ 30,00
	Measuring ranges between 1 A and 25 A	Surcharge:	€ 50,00

Price group B

Limit controllers

for direct voltage

Type:
PQ .. DIN

from 01.03.2022 plus. 6,8 % surcharge

Square cut-out
Class 1,5
Moving-coil measuring system

metal housing

Type	PQ 96 DIN	PQ 96 DIN	PQ 144 DIN	PQ 144 DIN
	Min-contact or Max-contact	Min-contact and Max-contact	Min-contact or Max-contact	Min-contact and Max-contact
Front frame (mm)	96 x 96	96 x 96	144 x 144	144 x 144
Cut-out (mm)	92 x 92	92 x 92	138 x 138	138 x 138
Scale length (mm)	90	90	130	130
Weight (kg)	0,48	0,48	0,90	0,90

€

Price

Measuring ranges		Internal resistance	€	€	€	€
mV	25	200 Ω / V				
	40	200 Ω / V				
	60	200 Ω / V				
	100	200 Ω / V				
	150	200 Ω / V	316,10	418,40	342,70	445,00
	250	200 Ω / V				
	400	1000 Ω / V				
	600	1000 Ω / V				
V	1	1000 Ω / V				
	1,5	1000 Ω / V				
	2,5	1000 Ω / V				
	4	1000 Ω / V				
	6	1000 Ω / V				
	10	1000 Ω / V				
	15	1000 Ω / V				
	25	1000 Ω / V	316,10	418,40	342,70	445,00
	40	1000 Ω / V				
	60	1000 Ω / V				
	100	1000 Ω / V				
	150	1000 Ω / V				
	250	1000 Ω / V				
	400	1000 Ω / V				
	500	1000 Ω / V				
	600	1000 Ω / V				
Alternating voltage:		with rectifier, type PGQ 96 DIN or PGQ 144 DIN, 40 - 10000 Hz sinusoidal				
		Measuring ranges between 25 mV and 600 V			Surcharge:	€ 30,00

Price group B

Power meters

Application	Power meters are used for measuring active and reactive power in case of alternating current and threephase current or the active power for direct current. Sinusoidal and non-sinusoidal quantities may be measured. The frequency range amounts to 40-100 Hz, in case of special types 40-400 Hz. Power meters show the import active power for standard types, or the import and export active power if the zero point is offset, i.e. in case of bidirectional energy directions.
Measuring system and electronics	● Core magnet moving-coil measuring system ● Integrated analog multiplier ● Linear scale characteristics ● Independent of waveform ● Independent of external fields
Design	Power meters are manufactured according to DIN 60 051 as well as according to the other relevant VDE and DIN regulations. The accuracy amounts to 1.5 % referred to the full scale. The energy consumption lies at around 0.6 VA in the current path or at around 2 VA or 0.05 VA in the voltage path if a separate auxilary voltage is used. The full scale values should be adapted to the standard series 1 / 1.2 / 1.5 / 2 / 2.5 / 3 / 4 / 5 / 6 / 7.5 / 8 or a decadic multiple of these values. In case of reactive power meters for alternating current and four-wire three-phase current, the frequency range is restricted to a fixed value, normally 50 Hz. The auxiliary voltage for the supply of the electronics is gained from the measuring voltage. If the measuring voltage fluctuates by more than ± 20 % of the rated voltage, a separate auxiliary voltage is required. In case of size 96, the electronic is installed in the housing (housing depth 57 mm). For all other sizes and models, a separate measuring transducer must be used. The output to the connection of the panel meter amounts to 0-20 mA. Further technical data of the measuring transducers are specified in the relevant data sheets (from page 24). The inputs are resistant to a permanent 1.2-fold overload, the current path withstands a temporary max. 20-fold overload. For the rest, DIN EN 60 051 applies. The electrical connection is done using clamping screws max. 4 mm².
Measuring ranges	The full scale value may be selected between the 0,5-fold and 1,5-fold rated value of the apparent power. Apparent power with alternating current $S = U \times I$ with three-phase current $S = U \times I \times \sqrt{3}$ (U = external conductor voltage)

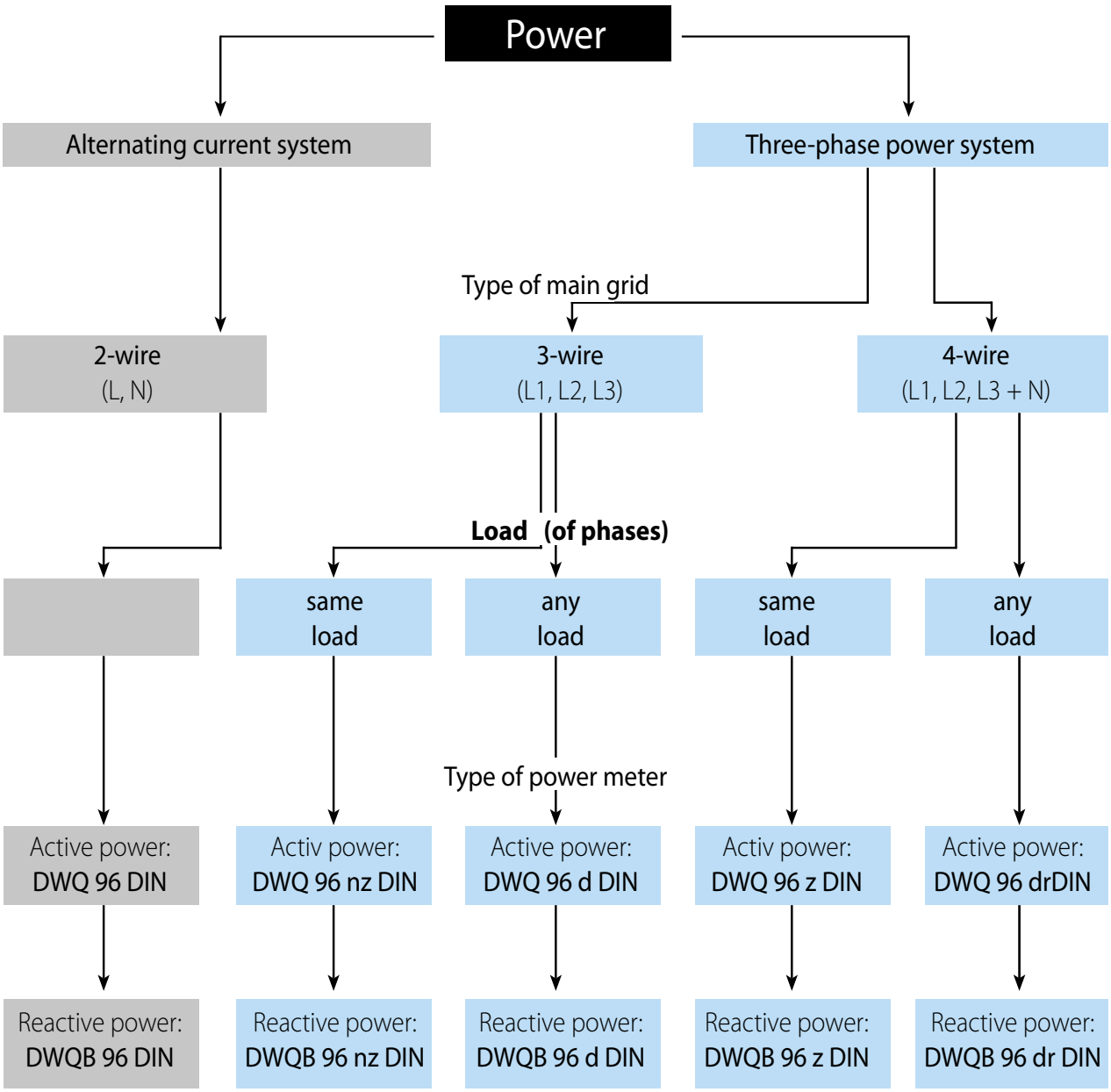
Special versions

from 01.03.2022 plus. 6,8 % surcharge

Measuring range	zero point at any point of scale (bidirectional energy direction)		€ 35,00
	increased accuracy 1 %		€ 30,00
Special calibration	with active power	fixed value between 100 Hz and 400 Hz	€ 30,00
		range between 40 Hz and 400 Hz	€ 50,00
		range between 40 Hz and 1000 Hz	€ 80,00
Special calibration	with reactive power	fixed value between 40 Hz and 400 Hz except for 50 Hz (standard)	€ 35,00
Auxiliary voltage	separate auxiliary voltage 230 V or 110 V ± 20 % 45-65 Hz 2 VA		€ 30,00

Power meters

Power meters - finding the right type



In case of these types (DWQ 96 ... DIN) electronics are installed in general (installation depth 57 mm).
In connection with our power meter transducers (from page 27) all measuring instruments may be used for indicating the power.

Short legend		
	DWQ	Power meter for active power
	B	for reactive power
	96	Front frame 96 x 96 mm
	...	without abbreviation, alternating current
	z	accessible neutral wire, 4-wire 3-phase current of same load
	nz	non-accessible neutral wire, 3-wire 3-phase current of same load
	d	double power meter, 3-wire 3-phase current of any load
	dr	triple power meter, 4-wire 3-phase current of any load
	DIN	built-in housing

Power meters

electronic, for alternating and three-phase current, for use with current transformers secondary 1 A and 5 A

Type:
DWQ .. DIN

from 01.03.2022 plus. 6,8 % surcharge

Square cut-out
40 - 100 Hz, class 1,5
Installation depth 57 mm
Power consumption:
current path 0,6 VA
voltage path approx. 2 VA

metal housing

Type	D .. 96 DIN	D .. 96 DIN	D .. 96 DIN	D .. 96 DIN	D .. 96 DIN
Front frame (mm)	96 x 96	96 x 96	96 x 96	96 x 96	96 x 96
Cut-out (mm)	92 x 92	92 x 92	92 x 92	92 x 92	92 x 92
Scale length (mm)	90	90	90	90	90
Weight (kg)	0,40	0,40	0,40	0,40	0,40
	Alternating current	3-wire 3-phase current same load	3-wire 3-phase current any load	4-wire 3-phase current same load	4-wire 3-phase current any load

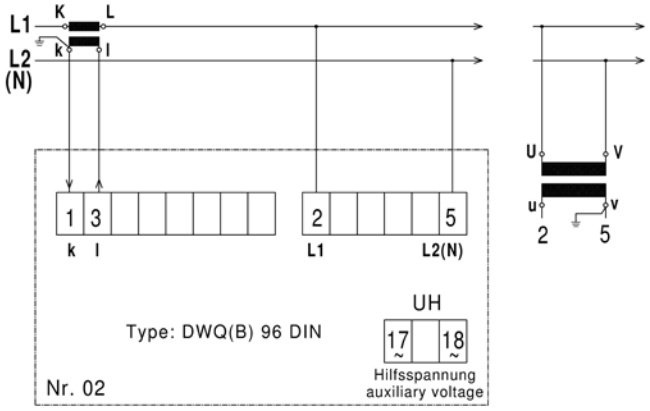
Price

Rated voltage		€	€	€	€	€
Active power		**DWQ 96 DIN**	**DWQ 96 nz DIN**	**DWQ 96 d DIN**	**DWQ 96 z DIN**	**DWQ 96 dr DIN**
V	100 230 400 500	225,60	-	-	-	-
	3 x 100 3 x 400 3 x 500	-	225,60	281,00	-	-
	100/58 400/230 500/289	-	-	-	225,60	332,00
Surcharge	10 A direct	30,00	30,00	30,00	30,00	30,00
Reactive load		**DWQB 96 DIN**	**DWQB 96 nz DIN**	**DWQB 96 d DIN**	**DWQB 96 z DIN**	**DWQB 96 dr DIN**
V	100 230 400	246,20	-	-	-	-
	3 x 100 3 x 400 3 x 500	-	246,20	321,00	-	-
	100/58 400/230 500/289	-	-	-	246,20	393,00
Surcharge	10 A direct	30,00	30,00	30,00	30,00	30,00

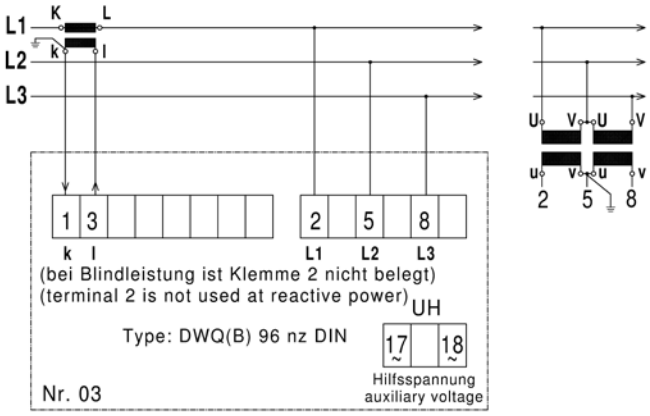
In connection with measuring transducers type P ... - MU (from page 28), all measuring instruments may be used for power measurement. The advantage is that only two lines (20 mA) must be connected to the panel meter and that the measuring transducer may be mounted at a central location.

Connection

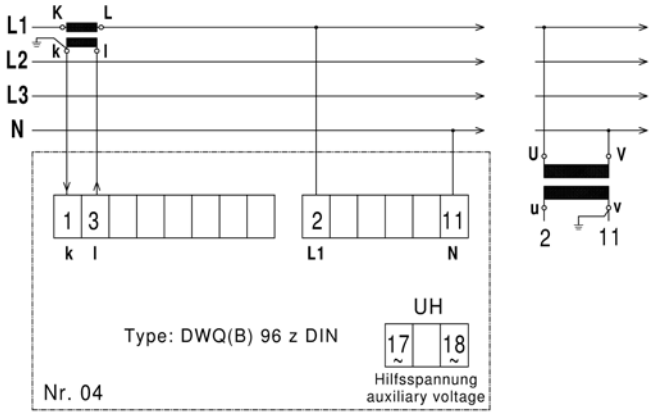
Alternating current



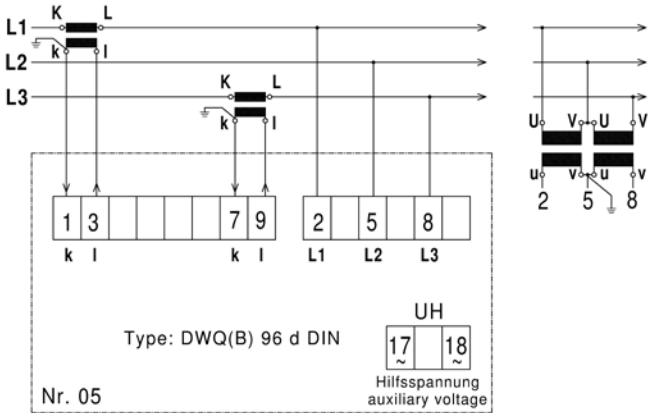
3-wire 3-phase current same load



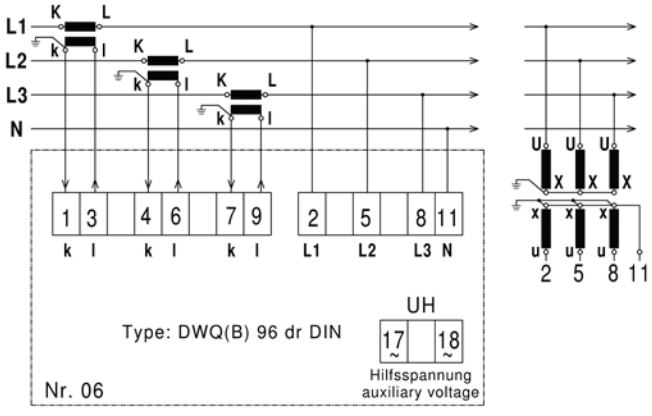
4-wire 3-phase current same load



3-wire 3-phase current any load



4-wire 3-phase current any load



Power factor meters

Application	Power factor meters serve for measuring the ratio between active and apparent power in alternating and three-phase current grids of 50 Hz, 60 Hz or 400 Hz sinusoidal.		
Measuring system and electronics	● Core magnet moving-coil measuring system ● Zero point comparator of current and voltage ● Independent of external fields		
Design	Power factor meters are manufactured according to DIN 60 051 as well as according to the other relevant VDE and DIN regulations. The accuracy amounts to 1.5 % referred to the scale length. The energy consumption lies at around 0.6 VA in the current path or around 2 VA in the voltage path. The auxiliary voltage for the supply of the electronics is gained from the measuring voltage. The voltage range amounts to ± 20 % of the rated voltage, the current range to 20 % to 120 % of the rated current. Exceeding these values may cause indication errors which are larger than the accuracy rating. Currents < 5 % of the rated value result in an uncontrolled indication. The inputs are resistant to a permanent 1.2-fold overload, the current path withstands a temporary max. 20-fold overload. DIN EN 60 051 applies. The electrical connection is done using clamping screws max. 4 mm^2..		
Special versions	Measuring range	deviating from standard measurement ranges	€ 30,00
	Special calibration	for 60 Hz or 400 Hz	€ 30,00

from 01.03.2022 plus. 6,8 % surcharge

Price group B

Power factor meters

electronic, for alternating and three-phase current

Type:
LWQ .. DIN

from 01.03.2022 plus. 6,8 % surcharge

Square cut-out
50 Hz, class 1,5
Installation depth 57 mm
For use with CT sec. 1 A or 5 A
Power consumption current path 0,6 VA
voltage path approx. 2 VA

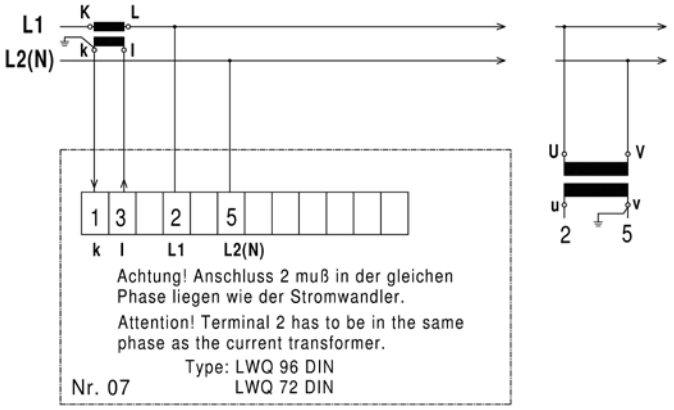
metal housing

Type	LWQ 72 DIN	LWQ 96 DIN	LWQ 72 nz DIN	LWQ 96 nz DIN
Front frame (mm)	72 x 72	96 x 96	72 x 72	96 x 96
Cut-out (mm)	68 x 68	92 x 92	68 x 68	92 x 92
Scale length (mm)	62	90	62	90
Weith (kg)	0,27	0,33	0,27	0,33
Measuring ranges	0,5 cap. - 1 - 0,5 ind. or 0,7 cap. - 1 - 0,3 ind alternating current		0,5 cap. - 1 - 0,5 ind. or 0,7 cap. - 1 - 0,3 ind 3-phase current	

€ Price

Rated voltage	€	€	€	€
100 V, 230 V, 400 V or 500 V	230,00	230,00	-	-
3 x 100 V, 3 x 400 V, 3 x 500 V or 3 x 690 V	-	-	230,00	230,00
Surcharge 10 A direct	30,00	30,00	30,00	30,00

Connection for alternating current



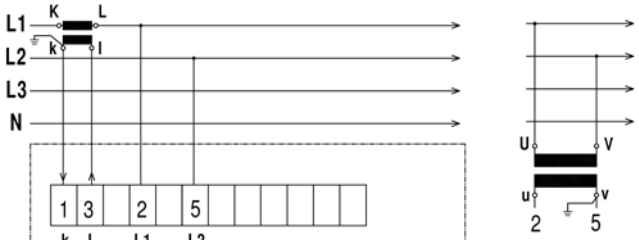
Achtung! Anschluss 2 muß in der gleichen Phase liegen wie der Stromwandler.

Attention! Terminal 2 has to be in the same phase as the current transformer.

Type: LWQ 96 DIN
LWQ 72 DIN

Nr. 07

Connection for three-phase current of same load



Achtung! Anschluss 2 muß in der gleichen Phase liegen wie der Stromwandler und Anschluss 5 in der nachfolgenden Phase des Drehfeldes.

Attention! Terminal 2 has to be in the same phase as the current transformer and terminal 5 has to be connected to the following phase of the rotary field.

Type: LWQ 96nz DIN
LWQ 72nz DIN

Nr. 08

Price group B

Notice

Frequency meters

Application	Frequency meters serve for measuring the mains frequency 50 Hz, 60 Hz, or 400 Hz. As measuring range just a selected partial range is used preferrably.
Measuring systems	Vibrating reed meter: ● Vibrating reed movement Pointer frequency meter: ● Core magnet moving-coil measuring system ● Integrated microcontroller ● Independent of waveform ● Large voltage range
Design	Frequency meters are manufactured according to DIN EN 60 051 as well as according to the other relevant VDE and DIN regulations. The accuracy amounts to 0.5 % referred to the full scale. The energy consumption lies between 1 VA and 4 VA depending on the reated voltage, measuring range and type. The measuring voltage may fluctuate between ± 20 % of the rated values without affecting the measured value indication. Pointer frequency meters offer two significant advantages over vibrating reed instruments: ● clear readability ● large voltage range, ± 20 % of rated voltage The linear scale characteristic is perfectly linear and starts at 5% of the scale length above the mechanical zero point. The temperature influence amounts to < 0.1 % with 10 K within a temperature range of - 25° to + 60 °C. The auxiliary voltage for the supply of the electronics is gained from the measuring voltage. The current draw is approx. 10 mA. Pointer and vibrating reed meters are resistant to a 1.2-fold overload, temporarily up to a 2-fold overload, DIN EN 60 051 applies. The connection is made using M4 screws (back-of-hand-proof).

Special versions

Measuring voltage	Vibrating reed meters	400 V	€ 22,50
		500 V	€ 22,50
		600 V	€ 22,50
	Pointer frequency meters	between 12 V and 100 V	€ 30,00
		400 V	€ 22,50
		500 V	€ 22,50
		600 V	€ 22,50
Auxiliary voltage	Pointer frequency meters with separate auxiliary voltage for measuring voltages 0-100 %, 230 V or 110 V ± 15 % 45-65 Hz 2 VA (not for size 72)		€ 30,00
Measuring range	Pointer frequency meters other than for standard measuring ranges e.g. 0-100 Hz		€ 30,00

from 01.03.2022 plus. 6,8 % surcharge

Price group B

Frequency meters

Vibrating reed meters

from 01.03.2022 plus. 6,8 % surcharge

Type:
F .. DIN

Square cut-out
Vibrating reed movement
Class 0,5
Energy consumption 1-4 VA
Measuring voltage 100 V, 133 V, 230 V
(please specify in order)

metal housing

Type	F 72 DIN	F 96 DIN	F 144 DIN
Front frame (mm)	72 x 72	96 x 96	144 x 144
Cut-out (mm)	68 x 68	92 x 92	138 x 138
Weight (kg)	0,20	0,30	0,70

€

Price

Hz	Number of reeds	Subdivision in Hz	€	€	€
44 - 50 - 56	13	1	180,10	180,10	206,70
47 - 50 - 53	13	1/2			
54 - 60 - 66	13	1			
57 - 60 - 63	13	1/2			

Frequency meters

Pointer frequency meters

from 01.03.2022 plus. 6,8 % surcharge

Type:
FZQ .. DIN

Square cut-out
Moving-coil measuring system
Class 0,5 or 0,2
Energy consumption ca. 2 VA
Measuring voltage 100 V, 133 V, 230 V
(please specify in order)

metal housing

Type	FZQ 72 DIN	FZQ 96 DIN	FZQ 144 DIN
Front frame (mm)	72 x 72	96 x 96	144 x 144
Cut-out (mm)	68 x 68	92 x 92	138 x 138
Scale length	62	90	130
Weight (kg)	0,35	0,40	0,70

€

Preis

Hz	Measuring range	class	€	€	€
50	45 - 50 - 55	0,5	124,20	124,20	150,80
50	48 - 50 - 52	0,2	135,10	135,10	161,70
60	55 - 60 - 65	0,5	124,20	124,20	150,80
60	58 - 60 - 62	0,2	135,10	135,10	161,70
400	360 - 400 - 440	0,5	124,20	124,20	150,80
400	380 - 400 - 420	0,2	135,10	135,10	161,70

Price group B

SZ 72/96

SZ 48

Operating hour counter

for alternating and direct current

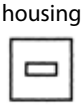
Type:
SZ .. DIN

from 01.03.2022 plus. 6,8 % surcharge

Square cut-out

plastic housing

metal housing



Alternating current
synchroneous motor 50 Hz

Type	SZ 48	SZ 72 DIN	SZ 96 DIN
Front frame (mm)	48 x 48	72 x 72	96 x 96
Cut-out (mm)	45 x 45	68 x 68	92 x 92
Weight (kg)	0,10	0,22	0,30
Counter range (hrs.)	99.999,99	99.999,99	99.999,99
Energy consumption	approx. 1 VA	approx. 2,5 VA	approx. 2,5 VA

€

Price

Operating voltage ± 15%	€	€	€
230 V 50 Hz	16,30	48,30	48,30
400 V 50 Hz	19,70	53,70	53,70

plastic housing

metal housing

Direct current
Quartz-controlled

Type	SZ 48 Gs	SZ 72 Gs DIN	SZ 96 Gs DIN
Front frame (mm)	48 x 48	72 x 72	96 x 96
Cut-out (mm)	45 x 45	68 x 68	92 x 92
Weight (kg)	0,15	0,26	0,37
Counter range (hrs.)	99.999,99	99.999,99	99.999,99

€

Price

Operating voltage ± 15%		Current draw		€	€	€
V	12 - 80	mA	1,4 - 1,5	-	83,30	83,30
	80 - 230		1,5 - 4,5	-	83,30	83,30
V	12 - 48	approx. 20 mW at 12 V		38,50	-	-

Price group B

Phase sequence indicatior

Type:
NDR

from 01.03.2022
plus. 6,8 %
surcharge

Application

Phase sequence indicator are used for determining and monitoring the rotating field (phase sequence) in electrical systems.

Design and function
The instruments comply with DIN EN 61557-7. Indication is made by LEDs:
green = right-hand rotating field
red = left-hand rotating field
Additionally, three further LEDs indicate whether all three phase voltages are present or which phase is missing.

Technical data

	Voltage range	3 x 220 V - 3 x 500 V	
	Frequency range	15 Hz - 500 Hz	
	Current draw	max. 5 mA per phase	
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C	
	Switch-on time	100 %	
Dimensions	Type	NDR 72	NDR 96
	Front frame (mm)	72 x 72	96 x 96
	Cut-out (mm)	68 x 68	92 x 92

Price

NDR	€ 89,00

Fault annunciators

96 x 96

Types:
SM8 und SM16

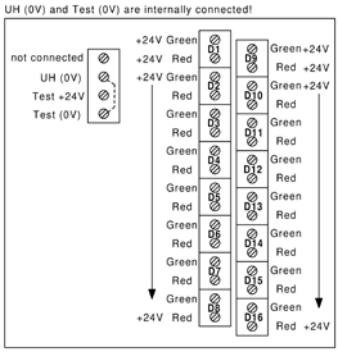
from 01.03.2022 plus. 6,8 % surcharge

Function

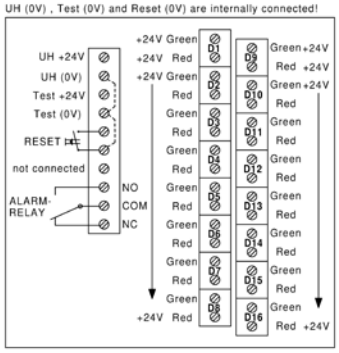
The fault annunciators use 8 (SM8) or 16 (SM16) two-color LEDs as a display. The LEDs may light up green or red. During the function test, the LEDs light up orange. The LEDs are controlled via connection terminals on the rear of the instrument. The control can take place with direct or alternating voltage, depending on the version. The scale can be easily removed and labeled through an opening on the side. The scale can also be labeled in the manufacturer's plant. An auxiliary voltage is always required for the collective alarm option. In the case of a collective alarm with storage, the reset button must be pressed to cancel the alarm and reset the alarm relay; without saving, the alarm is triggered by resetting the LEDs to green.

Connection

SM8 and SM16 at 24 VDC



SM8 and SM16 at 24 VDC with collective alarm and memory



Technical data

Input	Activation	24 VDC (Option: 60 VAC, 60 VDC or 24 V AC)
	Rated input current	6 mA per LED and colour (Option AC: 4,5 mA per LED and colour)
	Test input DC	24 VDC / 95 mA (SM16: 190 mA)
	Test input AC (Option)	24 VAC / 73 mA (SM16: 145 mA)
	Overload permanent	max. 30 V
	Temperature range	-25 °C to +20 °C to +30 °C to +55 °C
	External magnetic field influence	no (to 400 A/m)
	Electrical connection	screw terminal max. 4 mm²
	Test voltage	2,2 kV between input and housing 2,2 kV between input and relay contacts
	Caution!	**The inputs are not galvanically isolated from each other!**
Alarm	Relay contacts	1 changeover contact
	Switching capacity	max. 250 VAC, 1250 VA
Weight		230g

Price

	SM 8	€ 93,10
	SM 16	€ 120,00
Surcharges:	Operating with 24 VAC	€ 6,50
	Operating with 60 VAC or DC	€ 35,00
	Collective alarm with memory (auxiliary voltage required)	€ 35,00
	Collective alarm without memory (auxiliary voltage required)	€ 35,00
	Collective alarm for red LEDs only, with memory (auxiliary voltage required)	€ 35,00
	Collective alarm for red LEDs only, without memory (auxiliary voltage required)	€ 35,00
	Scale printed SM8	€ 15,00
	Scale printed SM16	€ 15,00

Price group B

Switch position indicators

from 01.03.2022
plus. 6,8 %
surcharge

Types:
PI 24, PI 25, PI 29, PI 36 (24-230 V DC)
PIR 24, PIR 25, PIR 29, PIR 36 (24-230 V AC)

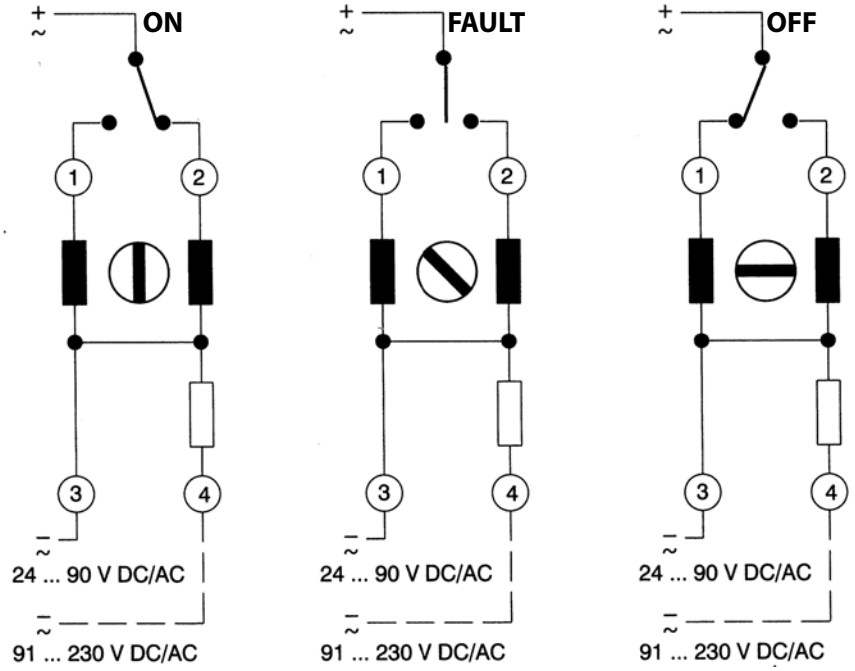
Application

Switch position indicators are used to signal the switching state in electrical installations. They may be used both in schematic diagrams of switchgear and control gear and in measuring stations and control rooms or also in mosaic systems. The switch position indicators dispose of screw terminal for cable cross sections of up to 1.5 mm^2.

Function

The switch position indicators are equipped with a rotating magnet system. This guarantees a precise symbol position. With a rather low energy consumption, the heat development in the indicator is negligible. The coil of the system generates a magnetic field. The moving magnet is axially linked to the symbol. Pole shoes determine its position. An external reset is not required.

Connection

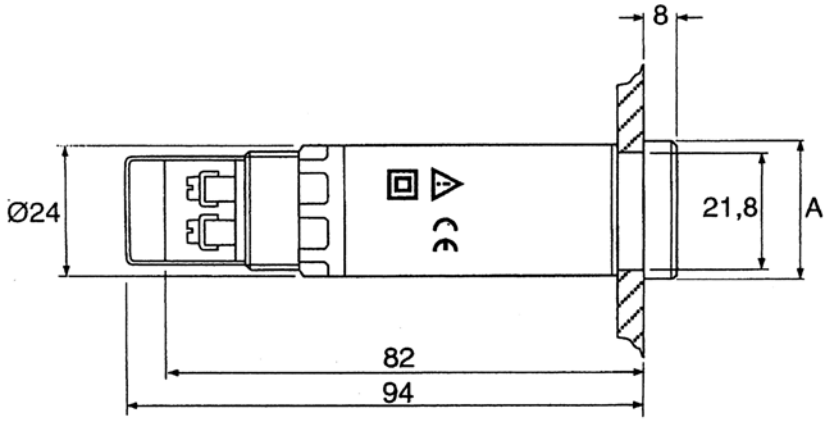


Technical data

Type	Round plastic housing with round or square front panel for cut-out installation in switchboards (PI / PIR 25/29/36) or mosaic panels (PI / PIR 24).
Housing material	Polycarbonat (self extinguishing acc. to UL 94 V-O)
Mounting position	Independent of position
Fastening	Union nut
Connection	Screw terminals up to 1,5 mm² with accidental-contact protection
IP code	IP 54
Types PI…	Direct voltage 24-230 V
Types PIR...	Alternating voltage 24-230 V
Power input	0,4 W at 110 V, 1,4 W at 230 V
Test voltage	3,7 kV
Frequency range	(for alternating voltage) 40 Hz to 10 kHz
Max. voltage fluctuation	± 20 %
Temperature range	-25 °C to +20 °C to +30 °C to +50 °C

Dimensions

Types	PI 24 / PIR 24	PI 25 / PIR 25	PI 29 / PIR 29	PI 36 / PIR 36
Front frame	□ 24	□ 25	Ø 29	□ 36
Housing	Ø 21,8	Ø 21,8	Ø 21,8	Ø 21,8
Instal. depth	94	94	94	94
Cut-out	Ø 22	Ø 22	Ø 22	Ø 22
Weight (kg)	0,1	0,1	0,12	0,12



Price

	PI 24 / PI 25 / PI 29	€ 66,10
	PI 36	€ 93,00
	PIR 24 / PIR 25 / PIR 29	€ 69,70
	PIR 36	€ 101,00

from 01.03.2022 plus. 6,8 % surcharge

Price group B

WAS 45

PAS 45

SUAS 45/7

General description

Application

Snap-on measuring instruments are mainly used for measuring heavy-current quantities in distribution boards. They allow for snap-on fastening on top hat rails.

Measuring systems

- Moving-iron measuring system
- Moving-coil measuring system

Special features

- standard front dimensions, 45 x 45 mm
- slim design, 2.5 module widths
- quadrant scale, 43 mm scale length
- contact-proof connecting terminals

General specifications

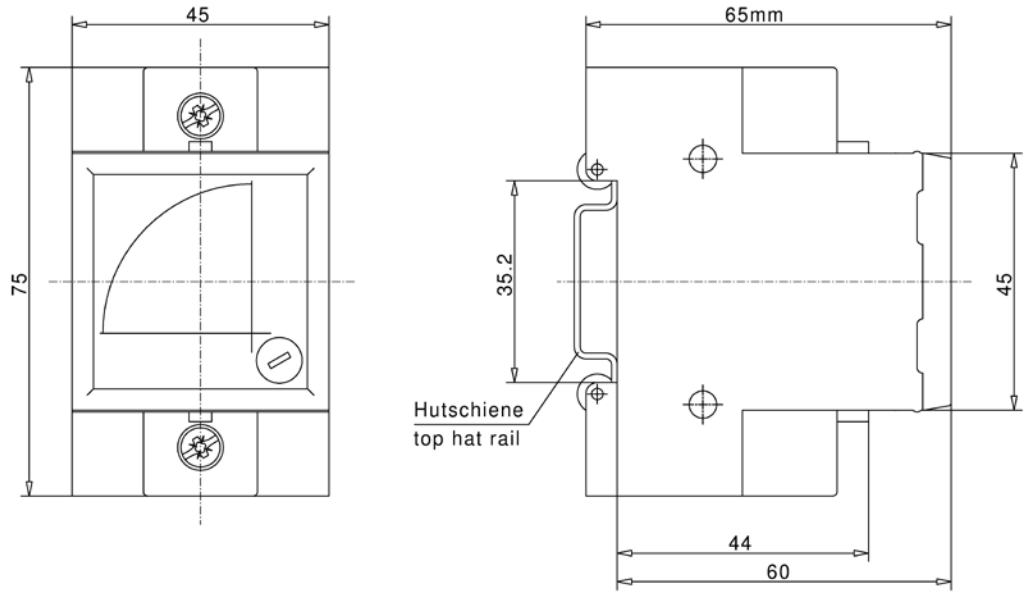
Snap-on measuring instruments are manufactured according to DIN 60 051 as well as according to the other relevant VDE and DIN regulations. The following variables may be measured: Direct current, direct voltage, alternating current, alternating voltage, operating hours. The accuracy amounts to 1.5 % referred to the full scale. Standard-type moving-iron ammeters dispose of a 2-fold overload scale.
All measuring instruments are resistant to a permanent 1.2-fold overload, ammeters temporarily to a max. 10-fold overload, voltmeters to an up to 2-fold overload. For the rest, DIN EN 60 051 applies. The measuring elements are mounted in an shock-resistant housing from polycarbonate. The housing dimensions comply with DIN 43 880 for built-in equipment for electrical installations. Connection is made to touch-proof captive M5 screws, max. 10 mm².

Special versions

Mounting on vertical top hat rail		€ --,--
Measuring range	without overload range (moving-iron)	€ 9,50
	outside of the standard series	€ 9,50
Scales	red marking at arbitray position of scale	€ 6,50
	colored sector at arbitray position of scale	€ 6,50

from 01.03.2022 plus. 6,8 % surcharge

Dimensional drawing



Price group B

Moving-iron measuring instruments

for alternating current and alternating voltage

Type:
WAS 45

from 01.03.2022 plus. 6,8 % surcharge

Snap-on fastening on top hat rail, 40-100 Hz, class 1,5
Please explicitly specify direct current!
Ammeters with 2-fold overload scale
Energy consumption: ammeters 0,6-1,5 VA, voltmeters approx. 2,5 VA

Type	WAS 45	
Installation width (mm)	45	(2.5 module width)
Scale length (mm)	43	
Weight (kg)	0,10	

€

Price

Measuring ranges		€
V	100 250 500	52,60
A	1 1,5 2,5 4 6 10 15	44,90
	25	50,00
for use with current transformer		
	sec. 5 A (0,6 VA) sec. 1 A (0,6 VA)	42,20

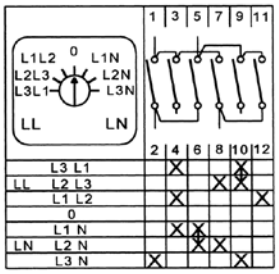
Voltmeter selector switch

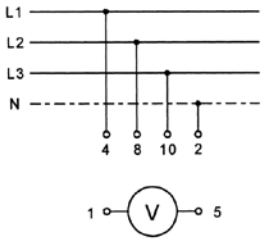
from 01.03.2022 plus. 6,8 % surcharge

Type:
SUAS 45/7

Snap-on fastening on top hat rail
for switchover between three different votlages and three phases against neutral acc. to VDE 0660

Type	SUAS 45/7
Operating voltage	max. 690 V
Operating current	max. 16 A
IP code	IP 54
Screw terminal	max. 4 mm
Installation width	52,5 mm (3 module widths)
Installation depth	45 mm
Price	€ 39,00





Price group B

Moving-coil measuring instruments

for direct current and direct voltage

Type:
PAS 45

from 01.03.2022 plus. 6,8 % surcharge

Snap-on fastening on top hat rail, class 1,5

Type		PAS 45	
Installation width (mm)		45	(2.5 module widths)
Scale length (mm)		43	
Weight (kg)		0,10	

€

Price

Measuring ranges		R_e / R_i / Δ U	€
mV	100	200 Ω / V	
	150	200 Ω / V	
	250	200 Ω / V	71,90
	400	1000 Ω / V	
	500	1000 Ω / V	
V	1	1000 Ω / V	
	1,5	1000 Ω / V	
	2,5	1000 Ω / V	
	4	1000 Ω / V	
	6	1000 Ω / V	
	10	1000 Ω / V	
	15	1000 Ω / V	
	25	1000 Ω / V	64,70
	40	1000 Ω / V	
	60	1000 Ω / V	
	100	1000 Ω / V	
	150	1000 Ω / V	
	250	1000 Ω / V	
	400	1000 Ω / V	
	500	1000 Ω / V	
	600	1000 Ω / V	
mA	1	28,6 Ω	
	1,5	14,2 Ω	
	2,5	7,6 Ω	
	4	3,8 Ω	
	6	1,9 Ω	
	10	1,4 Ω	
	15	1,3 Ω	
	25	60 mV	64,70
	40	60 mV	
	60	60 mV	
	100	60 mV	
	150	60 mV	
	250	60 mV	
	400	60 mV	
	600	60 mV	
A	1	60 mV	
	1,5	60 mV	
	2,5	60 mV	
	4	60 mV	66,80
	6	60 mV	
	10	60 mV	
	15	60 mV	
	25	60 mV	72,40
for use with shunt			
mV	60	12 Ω	64,70
for use with measuring transducer			
mA	0-20	1,2 Ω	64,70
	4-20	50 Ω	82,00
V	0-10	10 k Ω	64,70

Price group B

Universal measuring instruments

The universal measuring devices of the UMG series as well as the associated attachments, extensions and accessories are subject to ongoing technical improvements and adjustments to market requirements.
You can find detailed descriptions and data sheets of the current device version on our homepage

www.mueller-ziegler.de

in the field of universal measuring instruments.
Prices and delivery times for this product range on request.

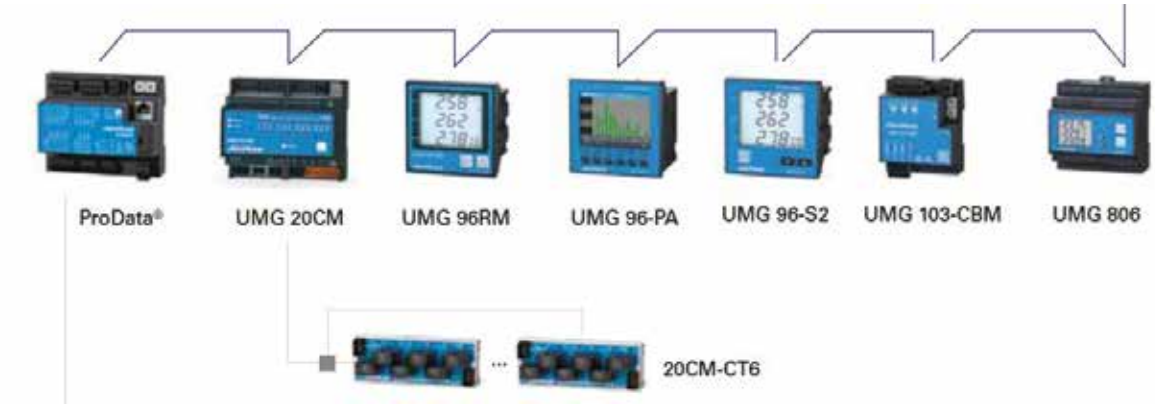
More products from the areas
- Energy management
- Software and IT solutions in the areas of energy and voltage quality as well as energy management
- Reactive power compensation
- Services

please ask us directly. We would be glad to help you!

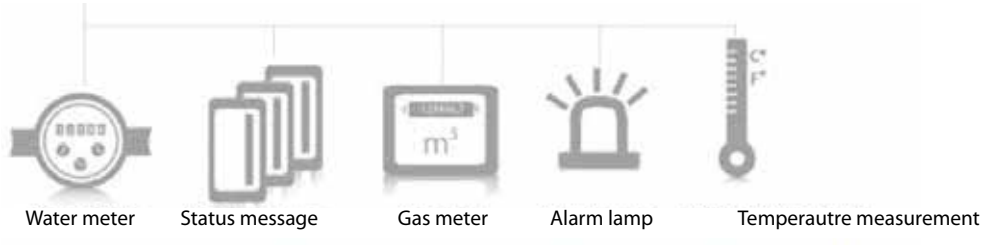
Energy and power quality management

Ethernet level (TCP/IP)

Fieldbus level (e.g. Modbus RTU)



Analog-/status level



PROFI NET® PROFI BUS® ASHRAE BACnet™ Modbus M-Bus

Panel mounting universal measuring instruments

Universal energy measurement device

UMG 96-S2

- Harmonics up to 15th
- Low price
- 2-button operation
- Modbus interface
- Class 0,5S

Multifunctional power analyzer

UMG 96RM series

- Harmonics up to 40th
- Various interface options
- 2-button operation
- Measured data memory
- UL application
- up to 6 digital outputs
- Class 0,5S

Modular energy measurement device

UMG 96-PA series

- Harmonics up to 40th
- Modulary expendable
- Residual current measuring
- MID application
- Fulfilment of legal stipulations
- High resolution color display
- 600 V CAT III
- Ethernet interface
- Class 0,2S

UMG 96RM-E

- Harmonics up to 40th
- Residual current measuring
- Homepage for instrument
- Measured data memory
- 300 V CAT III
- Ethernet interface
- Class 0,5S

Multifunctional power analyzer

UMG 509-PRO

- Harmonics up to 63th
- Residual current measuring
- Acquisition of transients
- Programming options (Jasic & Apps)
- Analyses of electrical disturbances

UMG 512-PRO

- Harmonics up to 63th
- Certified accuracy of measurement acc. to class A
- Residual current measuring
- Flicker measurment
- Acquisition of transients
- Programming options (Jasic & Apps)
- Analyses of electrical disturbances
- EN 50160 / 61000-2-4

Universal measuring instrument for mounting on top hat rail

Design, data sheet and prices on request

UMG 806

UMG 103-CBM

UMG 801

UMG 604-PRO

UMG 605-PRO

UMG 20CM

Overview of UMG 96 types

universal measuring instruments

Auxiliary-voltage												Interfaces										
90-265V AC / 90-250V DC	90-277V AC / 90-250V DC	24-90V AC / 24-90V DC	Digital inputs	Digital and pulse outpus	Digital inputs / outputs optionally 3 inputs or outputs	Analog inputs temperature / residual current can be combined with failure montoring	Analog outpus	4th current transformer input	Measured data memory, size in MB	Clock and battery	RS485 - Modbus	Profibus	Profinet	M-Bus	Ethernet 1000baseT	USB	MID certified	Fulfilment of legal stipulations acc. to PTB-A 50.7	UL certified	Dimensions in mm (WxHxD)	weight in g	Type
•	-	-	-	1	-	-	-	-	-	-	•	-	-	-	-	-	-	-	-	96 x 96 x 48	300	UMG 96-S2
-	•	-	2	-	-	-	-	-	-	-	•	-	-	-	-	-	-	-	-	96 x 96 x 48	300	UMG 96RM
-	-	•	2	-	-	-	-	-	-	-	•	-	-	-	-	-	-	-	-	96 x 96 x 48	300	UMG 96RM
-	-	-	-	2	3	2	-	•	256	•	•	-	-	-	•	-	-	-	-	96 x 96 x 78	400	UMG 96RM-E
-	-	•	-	2	3	2	-	•	256	•	•	-	-	-	•	-	-	-	-	96 x 96 x 78	400	UMG 96RM-E
-	•	-	4	6	-	-	-	•	256	•	•	•	-	-	-	•	-	-	-	96 x 96 x 78	300	UMG 96RM-P
-	-	•	4	6	-	-	-	•	256	•	•	•	-	-	-	•	-	-	-	96 x 96 x 78	300	UMG 96RM-P
-	•	-	4	6	-	-	-	•	256	•	•	-	-	-	-	•	-	-	-	96 x 96 x 78	300	UMG 96RM-CBM
-	-	•	4	6	-	-	-	•	256	•	•	-	-	-	-	•	-	-	-	96 x 96 x 78	300	UMG 96RM-CBM
-	•	-	-	2	-	-	-	-	-	-	-	-	-	•	-	-	-	-	-	96 x 96 x 48	300	UMG 96RM-M
-	-	•	-	2	-	-	-	-	-	-	-	-	-	•	-	-	-	-	-	96 x 96 x 48	300	UMG 96RM-M
-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	•	-	-	-	-	96 x 96 x48	300	UMG 96EM-EL
-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	•	-	-	-	-	96 x 96 x 48	300	UMG 96EM-EL
-	•	-	-	2	3	2	-	•	-	-	•	-	•	-	•	-	-	-	-	96 x 96 x 78	400	UMG 96RM-PN
-	-	•	-	2	3	2	-	•	-	-	•	-	•	-	•	-	-	-	-	96 x 96 x 78	400	UMG 96RM-PN
-	•	-	-	-	3	-	1	-	4	•	•	-	-	-	-	-	-	-	•	96 x 96 x 86	250	UMG 96-PA
-	-	•	-	-	3	-	1	-	4	•	•	-	-	-	-	-	-	-	•	96 x 96 x 86	250	UMG 96-PA
-	•	-	-	-	3	-	1	-	4	•	•	-	-	-	-	-	•	-	•	96 x 96 x 86	250	UMG 96-PA-MID
-	•	-	-	-	3	-	1	-	4	•	•	-	-	-	-	-	•	•	•	96 x 96 x 86	250	UMG 96-PA-MID+

Overview of UMG 5.. types

multifunctional power analyzers

Auxiliary voltage								Interfaces							
95-240V AC 80-300V DC	48-110V AC 24-150V DC	4 voltage and current inputs	2 residual current inputs (RCM) with failure monitoring	1 temperature measurement input	Measured data memory 256 MB Flash	2 digital inputs & 2 digital outputs	RS485 - (via connection terminals)	Ethernet 100baseT	Profibus DP V0 via Dsub-9-socket	7 freely programmable application programs	UL certified	Dimensions in mm (WxHxD)	Weight in g	Type
•	-	•	-	-	•	•	•	•	•	•	•	114 x 114 x 81	1000	UMG 509-PRO
-	•	•	-	-	•	•	•	•	•	•	•	114 x 114 x 81	1000	UMG 509-PRO
•	-	•	•	•	•	-	•	•	•	-	•	114 x 114 x 81	1000	UMG 512-PRO
-	•	•	•	•	•	-	•	•	•	-	•	114 x 114 x 81	1000	UMG 512-PRO

Universal energy measurement device

Panel mounting 96 x 96 mm

Type:
UMG 96-S2

Features

Communication
- Modbus RTU

Interfaces
- RS485

Power quality
- Harmonics up to 15th harmonic

Networks
- TN, TT networks

Outputs
- 1 digital output (S0 interface)

Accuracy of measurement
- Energy: class 0,5S (.../5 A)
- Current and voltage: 0,2%

Power grid monitoring software
- Free GridVis®-Basic

Application

The UMG 96-S2 is suitable for measuring and checking electrical parameters and energy consumption as well as for monitoring the voltage quality parameters, such as harmonics. Applications can be found in energy distribution systems, for example for cost center recording and limit value monitoring. Furthermore, the device can be used as a sensor for building management systems or a PLC.

Technical data (extract)

Auxiliary voltage	Voltage range	AC 90 V - 265 V (50/60 Hz) or DC 90 V - 250 V, 300V CAT III
	Energy consumption	max. 1,5 VA / 0,5 W
Voltage measurement	Rated voltage	230/400 V (+/- 10%), 3-phase 4-wire power systems
	Overvoltage category	300 V CAT III
	Metering range L-N	0 - 300 Vrms (max. overvoltage 400 Vrms)
	Metering range L-L	0 - 425 Vrms (max. overvoltage 425 Vrms)
Current measurement	Rated current	x/1 and x/5 A
	Metering range	0 - 6 Arms
	Overvoltage category	300 V CAT II
Digital output	1 digital output	Solid state relay, not short-circuit proog
	Switching voltage/current	max. 60 V DC / max. 50 mA eff DC
	Pulse output (Energy pulse)	max. 12,5 Hz

Price

Type	UMG 96-S2	Designs and prices on request

You can find designs as well as detailed technical data on our homepage www.mueller-ziegler.de

Multifunctional power analyzer

Panel mounting 96 x 96 mm

Type:
UMG 96RM - Serie

Features

Communication (device-specific)
- Modbus (RTU)
- Profibus DP V0 (option)
- Profinet
- TCP/IP (option)
- M-BUS

Power quality
- Harmonics up to 40th harmonic
- Rotary field components
- Distortion factor THD-U/THD-I
- Wave form display (Option)

Accuracy of measurement
- Energy: class 0,5S (.../5 A)
- Current and voltage: 0,2%

Interfaces (device-specific)
- RS485
- Profibus / Profinet
- M-Bus
- Ethernet / USB

Networks
- TN-, TT-, IT networks
- 3- and 4-phase networks
- up to 4 single-phase networks

Outputs
up to 6 digital outputs
- Pulse output kWh/kvarh
- Switch output
- Threshold value output
- Logic output
- Remote via Modbus/Profibus

Application

The UMG 96RM multifunction measuring device is primarily designed for use in low-voltage and medium-voltage distribution systems. The device measures harmonics up to the 40th harmonic, has rotating field components and can display data in wave form. The device has up to four digital inputs and 6 digital outputs. The measurement data memory is 256 MB.

Technical data (extract)

Auxiliary voltage	Voltage range	AC 90 V - 277 V (50/60 Hz) or DC 90 V - 250 V, 300 V CAT III or 24 - 90 V AC/DC, 150 V CAT III
	Energy consumption	see detailed technical data
Voltage measurement	Rated voltage	277/480 V (+/- 10%), 3-phase 4-wire power systems
	Overvoltage category	300 V CAT III
	Metering range L-N	0 - 300 Vrms (max. overvoltage 520 Vrms)
	Metering range L-L	0 - 520 Vrms (max. overvoltage 900 Vrms)
Current measurement	Rated current	5 A
	Metering range	0 - 6 Arms
	Overvoltage category	300 V CAT II
Outputs	device-specific	2 or 6 digital outpus (as switch or pulse outputs)

Price

Type	UMG 96-RM	Designs and prices on request

You can find designs as well as detailed technical data on our homepage www.mueller-ziegler.de

Modular energy measurement device

Panel mounting 96 x 96 mm

Type:
UMG 96-PA - Serie

Features

Interface
- RS485

Communication
- Protocols: Modbus RTU / Slave

MID measurement
- Tamper-proof and legally secure

Power quality
- Harmonics up to 40th (without MID) / 25th (with MID) harmonic
- Distortion factor THD-U
- Distortion factor THD-I

Measured data memory
- 4 MB

Meter reading
- Certification acc. to PTB-A 50.7

Accuracy of measurement
- Energy: class 0,2S (.../5 A)
- Current and voltage: 0,2%

Inputs / outputs
- 3 digital inputs
- 3 digital outputs
- 1 analog output

Networks
- TN-, TT networks with voltage-swell category 600 V CAT III

Application

The modular energy measurement devices of the UMG 96-PA series are used to measure, monitor and control electrical parameters in energy distribution systems. The recording of load profiles (in energy management systems) are just as much a task of the devices as the recording of energy consumption for cost center analysis. The MID variant is suitable for billing-related applications. The devices can be modularly expanded for differential and residual current measurement.

Technical data (extract)

Auxiliary voltage	Voltage range option 230 V	90 V - 277 V AC (50/60 Hz) / 90 V - 250 V DC, 300 V CAT III
	Energy consumption	max. 4,5 VA / 2 W
	Voltage range option 24 V	24 - 90 V AC (50-60 Hz) / 24 - 90 V DC, 150 V CAT III
	Energy consumption	max. 4,5 VA / 2W
Voltage measurement	Rated voltage	3-phase 4-wire power systems 417/720 V (+/- 10%) acc. to IEC as well as 347/600 V (+/- 10%) acc. to UL Single-phase 2-wire power system 480 V (+/- 10%)
	Overvoltage category	600 V CAT III
	Metering range L-N	0 - 600 Vrms (max. overvoltage 800 Vrms)
	Metering range L-L	0 - 1040 Vrms (max. overvoltage 1350 Vrms)
Current measurement	Rated current	5 A
	Metering range	0,005 - 6 Arms
	Overvoltage category	300 V CAT II
Outputs	3 digital outputs	Solid state relay, not short-circuit proog
	1 analog output	0 - 20 mA

Price

Type	UMG 96-PA - Serie	Designs and prices on request

You can find designs as well as detailed technical data on our homepage www.mueller-ziegler.de

Modular energy measurement device

Panel mounting 96 x 96 mm

Type:
UMG 96RM-E

Features

Interfaces
- RS485
- Ethernet

Communication
- Modbus (RTU, TCP, Gateway)
- HTTP (configurable homepage)
- FTP (file transfer)
- SNMP, NTP (time synchronisation)
- SMTP (email function)
- DHCP, SNTP, TFTP
- BACnet (optional)

Power quality
- Harmonics up to 40th harmonic
- Rotary field components
- Distortion factor THD-U/THD-I

Measured data memory
- 256 MB Flash

Thermistor input
- PT100, PT1000, KTY83, KTY84

Accuracy of measurement
- Energy: class 0,5S (.../5 A)
- Current and voltage: 0,2%

Inputs / outputs
- 3 digital inputs or outputs
- 2 analog inputs (temperature)
- 2 digital outputs

Networks
- TN-, TT-, IT networks
- 3- and 4-phase networks
- up to 4 single-phase networks

Anwendung

The multifunctional power analyzer UMG 96RM-E is used to measure, monitor and control electrical parameters in energy distribution systems. The recording of load profiles (in energy management systems) are just as much a task of the device as the recording of energy consumption for cost center analysis. A residual current monitoring is integrated.

Technical data (extract)

Auxiliary voltage	Voltage range option 230 V	90 V - 277 V AC (50/60 Hz) / 90 V - 250 V DC, 300 V CAT III
	Energy consumption	max. 4,5 VA / 2 W
	Voltage range option 24 V	24 - 90 V AC (50-60 Hz) / 24 - 90 V DC, 150 V CAT III
	Energy consumption	max. 4,5 VA / 2W
Voltage measurement	Rated voltage	3-phase 4-wire power systems 277/480 V (+/- 10%)
	Overvoltage category	300 V CAT III
	Metering range L-N	0 - 300 Vrms (max. overvoltage 520 Vrms)
	Metering range L-L	0 - 520 Vrms (max. overvoltage 900 Vrms)
Current measurement	Rated current	5 A
	Metering range	0 - 6 Arms
	Overvoltage category	300 V CAT II
Outputs	3 digital inputs or outputs	Solid state relay, not short-circuit proog
	2 analog inputs	for temperature measurement
	2 digital outputs	Solid state relay, not short-circuit proog

Price

Type	UMG 96RM-E	Designs and prices on request

You can find designs as well as detailed technical data on our homepage www.mueller-ziegler.de

Multifunctional power analyzer

Panel mounting 144 x 144 mm

Type:
UMG 509-PRO

Features

Interfaces
- Ethernet
- Profibus (DSUB-9)
- RS485 Modbus (terminal strip)

Communication
- Protocols: Profibus (DP/V0)
- Modbus (RTU, TCP, Gateway)
- TCP/IP
- BACnet (optional)
- HTTP (homepage)
- FTP (file transfer)
- SNMP, TFTP
- NTP (time synchronisation)
- SMTP (email function)
- DHCP

Power quality
- Harmonics up to 63th harmonic
- shot term interruptions (> 20 ms)
- Transient recorder (> 50 µs)
- Starting currents (> 20 ms)
- Unbalance

Measured data memory
- 256 MB Flash
- 32 MB SDRAM

Thermistor input
- PT100, PT1000, KTY83, KTY84

Accuracy of measurement
- Energy: class 0,2S (.../5 A)
- Current 0,2%, voltage 0,1%

Inputs / outputs
- 2 digital inputs
- 2 digital outputs

Networks
- TN-, TT-, IT networks
- 3- and 4-phase networks
- up to 4 single-phase networks

Application

The multifunctional power analyzer UMG 509PRO is used for the continuous monitoring of the voltage quality in power distribution systems and energy management systems (ISO 50001) as well as in test fields. The visualization of the energy supply in LV main boards, the analysis of electrical disturbances in case of network problems and the cost center analysis are among the tasks of the device.

Technical data (extract)

Auxiliary voltage	Voltage range option 230 V	90 V - 240 V AC (50/60 Hz) / 80 V - 300 V DC, 300 V CAT III
	Energie consumption	max. 7 W / 14 VA
	Voltage range option 24 V	48 - 110 V AC (50-60 Hz) / 24 - 150 V DC, 300 V CAT III
	Energy consumption	max. 9 W / 13 VA
Voltage measurement	Rated voltage	3-phase 4-wire power systems 417/720 V and 347/600 V UL listed 3-phase 3-wire power systems 600 V
	Overvoltage category	600 V CAT III
Current measurement	Rated current	5 A
	Metering range	0,005 - 7 Arms
	Overvoltage category	at option 230 V - 300 V CAT III at option 24 V - 300 V CAT II

Price

Type	UMG 509-PRO	Designs and prices on request

You can find designs as well as detailed technical data on our homepage www.mueller-ziegler.de

Multifunctional power analyzer - class A

Panel mounting 144 x 144 mm

Certified
ISO 9001
ISO 50001
IEC 61000-4-30
UL

Type:
UMG 512-PRO

Features

Interfaces
- Ethernet
- Profibus (DSUB-9)
- RS485 Modbus (terminal strip)

Communication
- Protocols: Profibus (DP/V0)
- Modbus (RTU, TCP, Gateway)
- TCP/IP
- BACnet (optional)
- HTTP (homepage)
- FTP (file transfer)
- SNMP, TFTP
- NTP (time synchronisation)
- SMTP (email function)
- DHCP

Power quality
- Harmonics up to 63.th harmonic, odd / even
- Flicker measurement
- Short term interruptions (from 10 ms)
- Transient recorder (> 39 µs)
- Start-up currents (> 10 ms)
- Imbalance
- Half wave RMS recorings (up to 11 min.)
- Events can be display in waveforms

Measured data memory
- 256 MB Flash
- 32 MB SDRAM

Accuracy of measurement
- Energy: class 0,2S (.../5 A)
- Current and voltage: 0,1%

Inputs / outputs
- 2 digital inputs
- 2 digital outputs

Networks
- TN-, TT-, IT networks
- 3- and 4-phase networks

Thermistor input
- PT100, PT1000, KTY83, KTY84

Application

The class A multifunctional power analyzer UMG 512-PRO is used for continuous monitoring of the voltage quality and for harmonic analysis in energy distribution systems. The documentation of the voltage quality for customers and supervisory authorities is the main task of the device; the current voltage quality standards and standards for measurement methods are observed.

Technical data (extract)

Auxiliary voltage	Voltage range option 230 V	90 V - 240 V AC (50/60 Hz) / 80 V - 300 V DC, 300 V CAT III
	Energy consumption	max. 7 W / 14 VA
	Voltage range option 24 V	48 - 110 V AC (50-60 Hz) / 24 - 150 V DC, 300 V CAT III
	Energy consumption	max. 9 W / 13 VA
Voltage measurement	Rated voltage	3-phase 4-wire power systems 417/720 V (+10%) and 347/600 V UL listed 3-phase 3-wire power systems 600 V (+10%)
	Overvoltage category	600 V CAT III
Current measurement	Rated current	5 A
	Metering range	0,005 - 7 Arms
	Overvoltage category	at option 230 V - 300 V CAT III at option 24 V - 300 V CAT II

Price

Type	UMG 512-PRO	Designs and prices on request

You can find designs as well as detailed technical data on our homepage www.mueller-ziegler.de

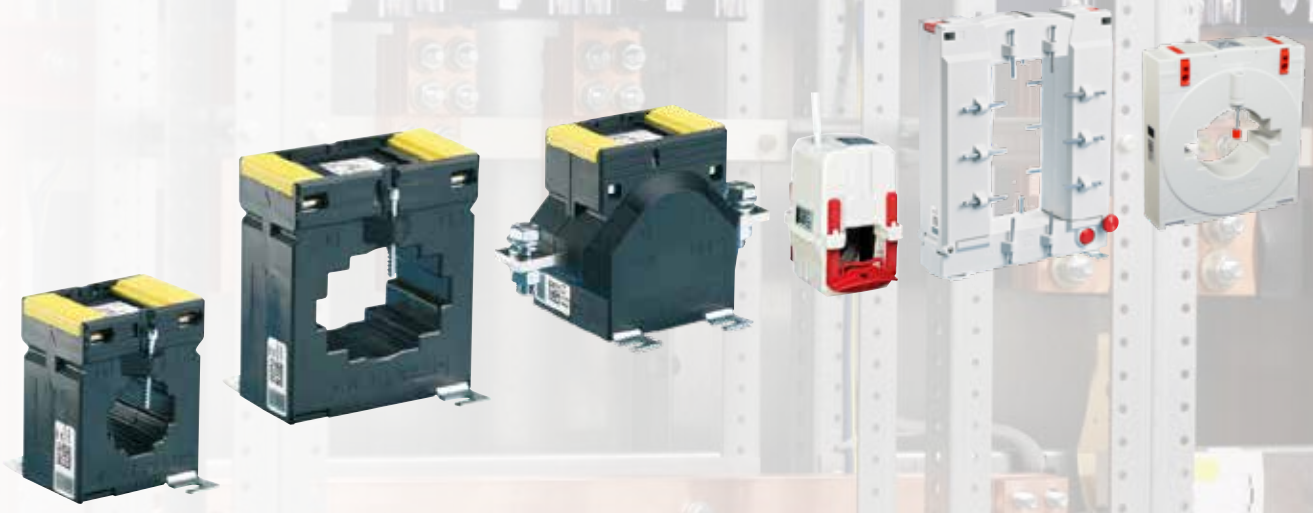
Current transformers

- 3-phase current transformer sets
- Tube unit current transformers
- Plug-in current transformers
- Wound primary current transformers
- Summary current transformers
- Split core current transformers
- Plug-in current transformers "Cage Clamp"

are show in our separate

"Product catalog Low Voltage Current Transformers"

as well as download on our homepage
www.mueller-ziegler.de

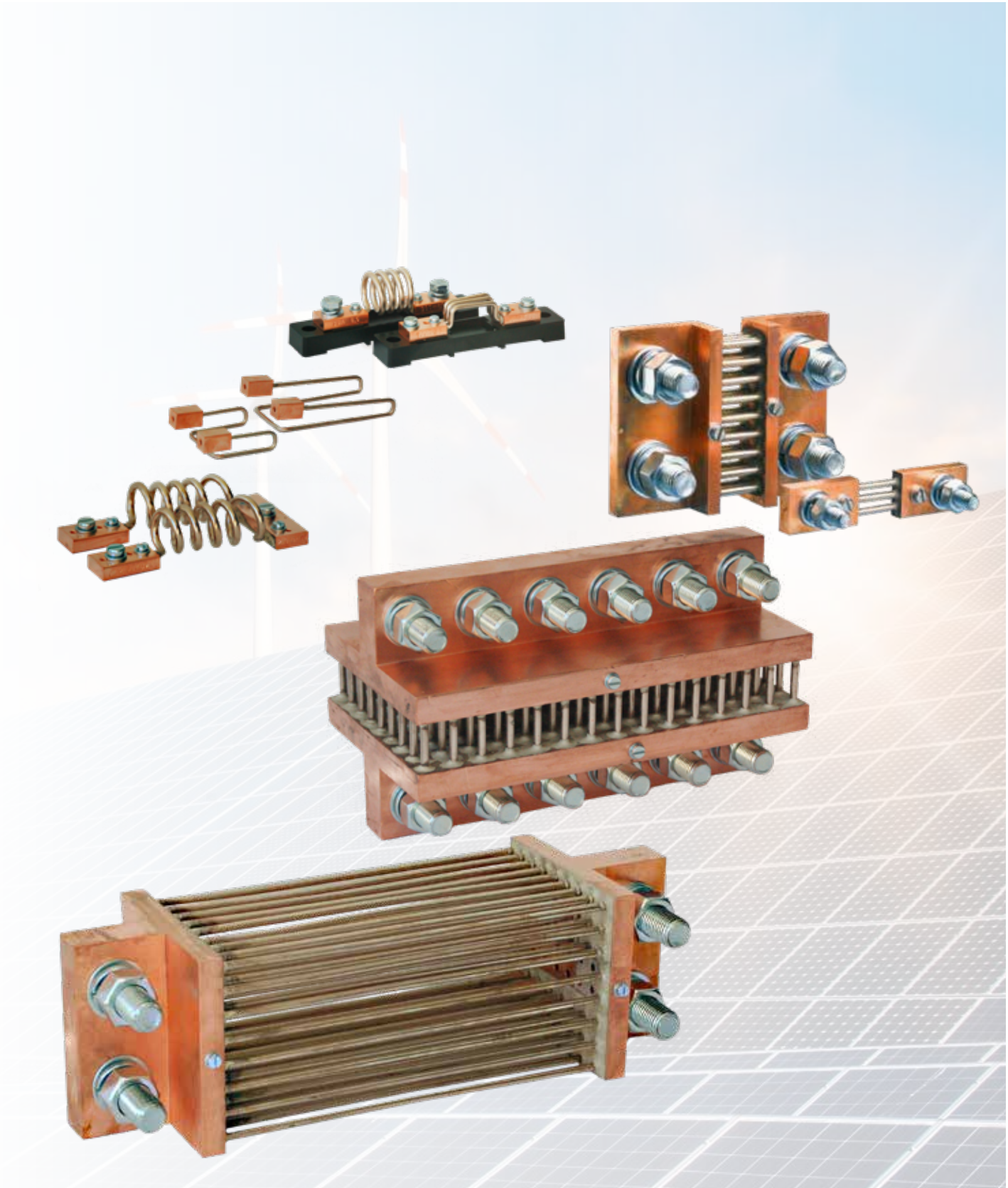


An overview of available type can be found on page 182.

Current transformers for low voltage

3-phase current transformer sets			
for round conductors up to Ø 13,5 mm	50 - 600 A		ASRD 14
for busbars 20x5 / 30x10 mm		NEW	ASRD 205.37 / ASRD 310.37
Tube unit current transformers			
for round conductors up to Ø 14,0 / 21,0 mm	40 - 300 A		RSW 14 / RSW 21
Plug-in current transformers			
for busbars 20x10 mm	40 - 500 A	NEW	SW-S 2010 / SW 2010
for busbars 30x10 mm	50 - 750 A		SW-S 3010 / SW 3010
	40 - 750 A	NEW	SW-L 3010 / SW-K 3010
for busbars 40x10 / 40x12 mm	50 - 1000 A	NEW	SW-S 4010 / SW 4010
	60 - 1000 A	NEW	SW-L 4010
for busbars 50x12 / 2x50x10 / 60x10 mm	100 - 1250 A	NEW	SW-S 5010 / SW 5010
for busbars 60x13 / 60x30 mm	200 - 1600 A		SW 6010 / SW 6030
for busbars 80x10 / 100x10 mm	400 - 2000 A	NEW	SW 8010 / SW 10010
for busbars 100x55 / 2x100x10 mm	600 - 3000 A		SW 10055 / SW 20010
for busbars 123x30 / 128x38 mm	400 - 3000 A		SW 12330 / SW 12838
Wound primary current transformers			
for direct connection CT width 70 mm	1 - 50 A		WSWK / WSWK-N
for direct connection with primary busbar	25 - 100 A		WSWS
Summary current transformers			
Description summary current transformers			
for summation of 2 up to 8 circuits	1 - 5 A	NEW	SSW
Split core current transformers			
for round conductors up to Ø 13,5 mm / 32,5 mm	50 - 600 A		SWU 18 / SWU 32
for busbars 20x30 / 50x80 mm	100 - 1000 A		SWU 2030 / SWU 5080
for busbars 80x120 / 80x160 mm	250 - 5000 A		SWU 80120 / SWU 80160
Plug-in current transformers „Cage Clamp“ CSW			
Description plug-in current transformers „Cage Clamp“ CSW			
Description plug-in current transformers„Cage Clamp“ up to 20 kHz XCSW			
for busbars 30x10 / 40x10 mm	60 - 1000 A	NEW	CSW 31 / CSW 41
for busbars 50x12 / 63x10 mm	100 - 1600 A	NEW	CSW 51 / CSW 61
for busbars 80x10 / 100x10 mm	400 - 2500 A	NEW	CSW 81 / CSW 101
Accessories current transformers			
Accessories overview for current transformers			all types

Shunts



General description shunts

Application

Shunts are used for expanding the measuring range of moving-coil measuring devices as well as for generating a current-dependent voltage drop, e.g. for electronic further processing.

Function

Shunts are manufactured according to DIN 43 703 and DIN EN 60 051. The accuracy amounts to 0.5 % referred to the nominal value.

Special options may achieve an even higher accuracy of 0.2 % or 0.1 %.

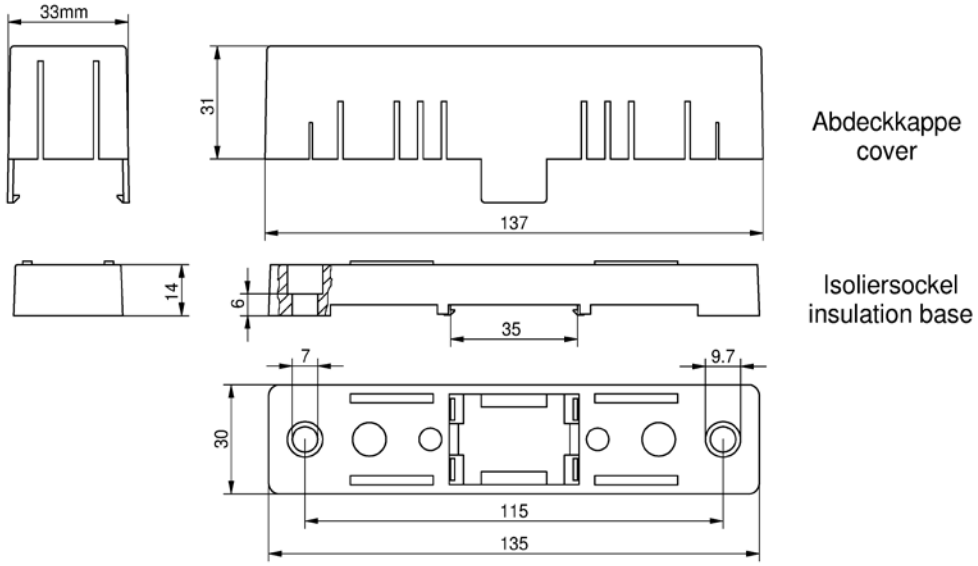
Shunts up to 25 A are mounted on insulation bases. Such bases are suited for top hat rail mounting or screw fastening.
The potential screws have an M5 thread. Connector copper and restistor material (Manganin) are hard-soldered with silver solder.

Special models

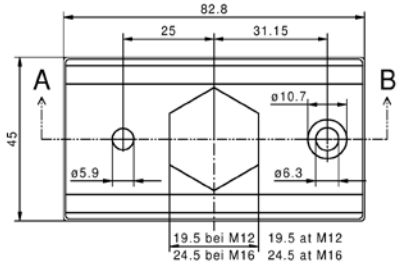
Adjustment of lead resistances at shunt	€ 6,50
Differing rated current and/or voltage drop	on request
Extenced accuracy 0,2% or 0,1%	on request
Shunt cover cap with insulating base for top hat rail mounting	
or screw fixing up to 25 A for 60 mV, 100 mV and 150 mV	€ 4,60
from 25 A up to 150 A for 60 mV	€ 8,50

from 01.03.2022 plus. 6,8 % surcharge

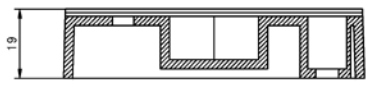
Dimensions shunt cover cap



Isoliersockel für 200A - 600A
(2St. pro Shunt)
insulation base for 200A - 600A
(2pcs. per Shunt)

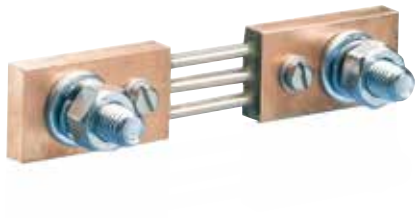


Schnitt A - B
sectional view A - B



Befestigungsbohrungen: Maß "e" + 62,3mm
fixing holes: dimension "e" + 62,3mm

Price group A



Shunts

Class 0,5 acc. to DIN EN 60 051
Dimensions acc. to DIN 43 703

Type:
Shunt

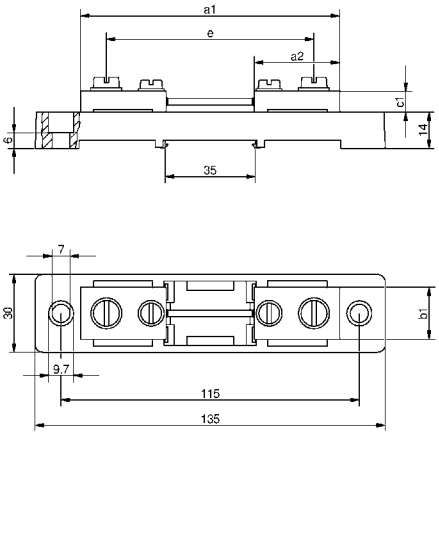
from 01.03.2022 plus. 6,8 % surcharge

€ Price

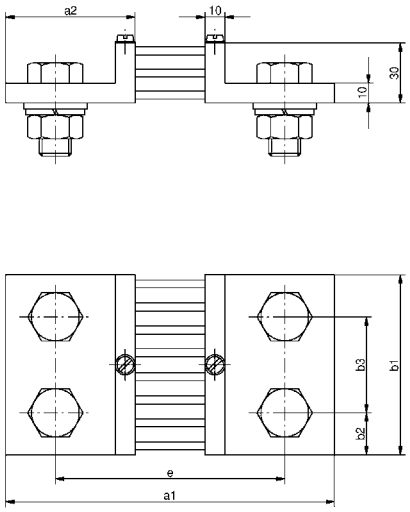
Rated current		Voltage drop 60 mV €	60 mV weight kg	100 mV €	100 mV weight kg	150 mV €	150 mV weight kg
A to	10 (with insulation base)	27,40	0,13	36,10	0,13	40,00	0,15
	15 (with insulation base)	20,90	0,13	29,60	0,13	33,50	0,15
	25 (with insulation base)	20,90	0,13	29,60	0,13	33,50	0,15
	40	20,90	0,12	29,60	0,14	33,50	0,16
	60	20,90	0,13	29,60	0,14	33,50	0,16
	100	20,90	0,13	29,60	0,15	33,50	0,17
	150	20,90	0,13	29,60	0,15	33,50	0,23
	200	29,60	0,43	42,00	0,55	42,70	0,65
	250	32,30	0,43	45,70	0,57	47,20	0,68
	300	33,50	0,54	48,90	0,60	53,20	0,70
	400	34,20	0,81	49,60	0,90	53,20	1,00
	500	41,30	0,81	62,00	0,92	66,50	1,10
	600	44,00	0,81	64,50	0,95	78,00	1,20
	800	66,50	1,45	97,80	1,85	113,60	2,00
	1000	77,40	1,47	113,60	1,90	134,00	2,10
	1200	114,90	1,47	169,00	2,00	182,50	2,20
	1500	127,00	2,00	186,20	2,76	235,10	3,80
	2000	156,80	2,90	231,00	3,40	289,00	4,10
	2500	182,00	3,00	267,20	4,70	350,00	5,60
	3000	246,00	3,50	361,60	4,80	468,40	5,90
	4000	316,10	4,20	464,30	5,60	608,00	11,70
	5000	455,70	4,40	655,70	5,90	838,40	12,30
	6000	565,10	11,30	849,10	12,50	1085,50	14,60
	7000	669,60	11,30	995,40	12,80	1231,80	15,30
	8000	783,30	15,40	1177,40	22,40	1534,60	25,30
	10000	997,70	21,00	1502,00	22,90	1975,60	26,60
	12000	1192,50	26,40	on request		on request	
	15000	1634,80	32,00	on request		on request	
	20000	2595,30	44,00	on request		on request	

Surcharge for insulation base above 25 A (up to 25 A principally on insulation base)		60 mV €	100 mV €	150 mV €
A	40	4,00	8,80	8,80
	60	4,00	8,80	8,80
	100	4,00	8,80	8,80
	150	4,00	8,80	8,80
	200	17,50	18,40	18,40
	250	17,50	18,40	18,40
	300	28,00	29,20	29,20
	400	28,00	29,20	29,20
	500	28,00	29,20	29,20

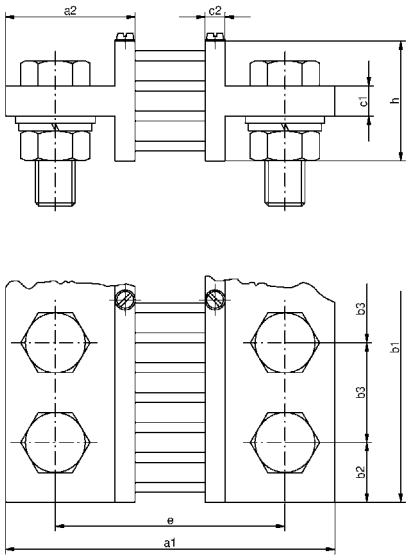
Form A (flat copper)



Form B (L-form copper)



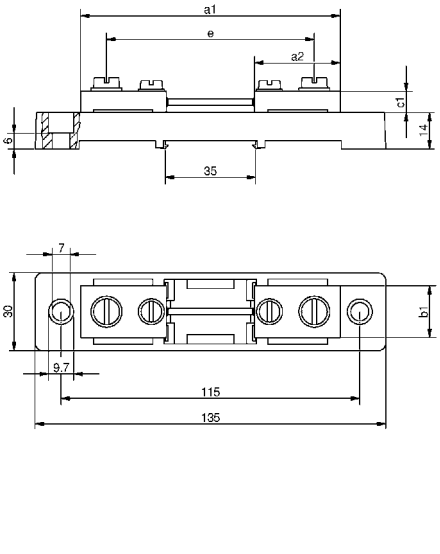
Form C (T-form copper)



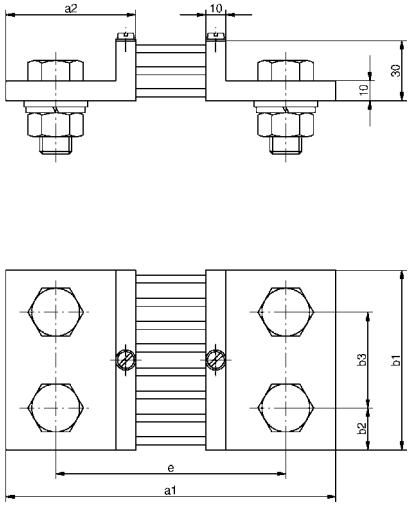
Insulation base up to 25 A		Dimensions 60 mV										
rated current		Form	a1	a2	b1	b2	b3	c1	c2	h	e	n[1]	s[2]
A	up to 25	A	100	33	20			8			78	2	M 6
	40-150	A	100	33	20			8			80	2	M 8
	200 / 250	A	145	55	30			10			105	2	M 12
	300	B	145	55	30	15					105	2	M 12
	400 / 500 / 600	B	145	55	40	20					105	2	M 16
	800 / 1000 / 1200	B	165	65	60	30					115	2	M 20
	1500	B	165	65	90	21	48				115	4	M 16
	2000 / 2500	B	165	65	120	30	60				115	4	M 20
	3000	B	165	65	150	45	60				115	4	M 20
	4000 / 5000	C	165	65	120	30	60	15	10	60	115	4	M 20
	6000 / 7000	C	175	70	154	25	52	25	15	130	125	6	M 20
	8000	C	175	70	206	25	52	25	15	130	125	8	M 20
	10000	C	185	75	206	25	52	30	20	170	135	8	M 20
	12000	C	185	75	258	25	52	30	20	170	135	10	M 20
	15000	C	185	75	310	25	52	30	20	170	135	12	M 20
	20000	C	185	75	414	25	52	30	20	170	135	16	M 20

1 = n: number of screws
2 = s: screws acc. to ISO 4017

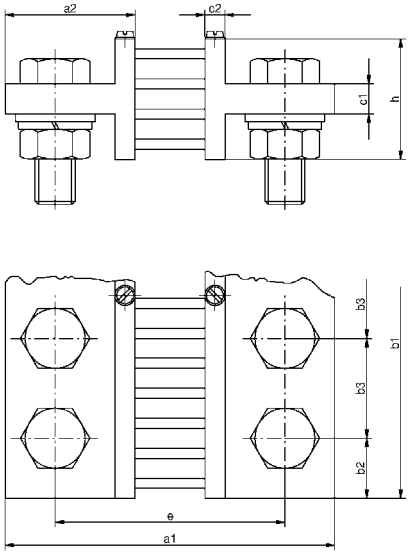
Form A (flat copper)



Form B (L-form copper)



Form C (T-form copper)



Insulation base up to 25 A		Dimensions 100 mV											
	rated current	Form	a1	a2	b1	b2	b3	c1	c2	h	e	n[1]	s[2]
A	up to 25	A	100	33	20			8			78	2	M 6
	40-150	A	150	33	25			8			131	2	M 8
	200 / 250 / 300	B	195	55	30	15					155	2	M 12
	400 / 500 / 600	B	195	55	40	20					155	2	M 16
	800 / 1000 / 1200	B	215	65	60	30					165	2	M 20
	1500	B	215	65	90	21	48				165	4	M 16
	2000	B	215	65	120	30	60				165	4	M 20
	2500 / 3000	C	215	65	120	30	60	15	10	60	165	4	M 20
	4000 / 5000	C	215	65	135	37,5	60	15	10	60	165	4	M 20
	6000 / 7000	C	225	70	154	25	52	25	15	130	175	6	M 20
	8000 / 10000	C	235	75	206	25	52	30	20	170	185	8	M 20

		Dimensions 150 mV										
	rated current	Form	a1	a2	b1	b2	b3	c1	c2	h	e	n[1]	s[2]
A	up to 25	A	100	33	20			8			78	2	M 6
	40-150	A	225	33	25			8			205	2	M 8
	200 / 250	B	270	55	30	15					230	2	M 12
	300 / 400 / 500 / 600	B	270	55	40	20					230	2	M 16
	800 / 1000 / 1200	B	290	65	70	35					240	2	M 20
	1500 / 2000	C	290	65	90	21	48	15	10	60	240	4	M 16
	2500 / 3000	C	290	65	120	30	60	15	10	60	240	4	M 20
	4000 / 5000	C	300	70	120	30	60	25	15	130	250	4	M 20
	6000 / 7000	C	300	70	154	25	52	25	15	130	250	6	M 20
	8000 / 10000	C	310	75	206	25	52	30	20	170	260	8	M 20

1 = n: number of screws
2 = s: screws acc. to ISO 4017

Notice

Test apparatus

Test equipment

Müzitester

Test apparatus for test according to
DIN VDE 0413 / EN 61 557

Application

The Müzitester is a testing device for testing the protective measures in electrical installations according to DIN VDE 0413 / EN 61557. It may be used for the insulation measurement with rated voltages of 250 V / 500 V and 1000 V as well as for the testing of protective conductor connections by low-impedance measurments.

Type and function

The electronics of the Müzitester is mounted in an impact-proof plastic housing from ABS. The operation is highly rational and safe due to the largely automatic measuring sequence. The display of the measured values is done through a moving coil measuring system. The insulation value, measured with test voltages 1000 V, 500 V or 250 V, may be indicated on a common scale. The test handle with power ON switch as well as the shoulder strap with wide neck part is especially suited for series measurements. The rechargeable battery used is environmentally friendly and completely free from mercury and cadmium. The high capacity of the battery as well as a sequence control allow for a large number of measurements per battery charge. Thanks to the mounted charging unit, the battery may be recharged at any time.

Price

	Müzitester		€ 790,00
	Accessory	Shoulder bag from nylon	€ 63,80
		Test report	€ 60,00
Scope of delivery	Müzitester with test handle, shoulder strap, clip terminal, loading cable, screwdriver for changing the probe, spare probe		

from 01.03.2022 plus. 6,8 % surcharge

Functional description

Insulation and low-impedance measurement with automatic measuring range switchover

The measuring function selector switch is set to„MΩ/Ω 1000 V Iso“, „500 V Iso“ or „250 V Iso“. By pressing the button on the test handle, the automatic test sequence is started. Testing for zero potential: If the input voltage lies below 50 V, the insulation measurement is started. A DC/AC converter converts a stabilized direct voltage into a test voltage of 250 V, 500 V or 1000 V DC. The current resulting from the test voltage and insulation resistance is recorded as voltage via a resistor and displayed as ohmic value on the insulation scale. If the measured resistance is smaller than approx. 200 Ω and if the input voltage (separate source voltage) lies below 5 V, the switchover to the low-impedance measurement is started which changes into a stable state at approx. 20 Ω. The DC/AC converter is separated from the direct voltage and a constant current of >200 mA flows though the measuring resistance. The voltage dropping via the measuring resistance is registered and displayed as resistance (ohmic value) on the low-ohm scale.
Returning to the insulation range starts at resistance values of above 20 Ω and changes over to a stable state at approx. 200 Ω. An acoustic signal is output during the measurement in case of resistance values >1 MΩ in the insulation range and of <1 Ω in the low-impedance range.

Low-impedance measurement

The measuring function selector switch is set to„+- Ω“ or „-+ Ω“. By pressing the button on the test handle, the automatic test sequence is started. Testing for zero potential: If the input voltage (separate source voltage) lies below 5 V, the low-impedance measurement is started. A constant current of >200 mA flows through the measuring resistance. The voltage dropping via the measuring resistance is registered and displayed as resistance (ohmic value) on the low-ohm scale. An acoustic signal is output during the measurement in case of resistance values of <1Ω. Using the measuring function selector switch, switch position„+- Ω“ and „-+ Ω“, the measuring voltage may be reversed. The connecting socket for the test cable is positive for switch position„+- Ω“ and negative for switch position „-+ Ω“.

Voltage measurement

The measuring function selector switch is set to an arbitrary position. By pressing the button at the test handle, the measurement voltage is applied. The measuring voltage is registered via a resistor by an rms value rectifier. This rectifier is able to measure direct and alternating voltage of arbitrary waveform and frequency. The voltage value may be read from the voltage scale.

Phase testing

This test only functions in combination with the rechargable battery installed in the device. By bringing the probe into contact with a phase conductor and simultaneously touching the contact face at the test handle, current flows. This current activates the LED via a transistor which signals the present voltage to ground.

Rechargeable battery capacity

The measuring function selector switch is set to„battery capacity“. By pressing the button on the test handle, the actual state of a counter is converted into a voltage and indicated as percentage value on the rechargeable battery scale. For determining the energy content of the rechargeable battery, the charging/discharge current as well as the self discharge are taken into account. After the energy content has dropped to <10 %, the battery status indicator signals "empty".

Charging the battery

The integrated charger allows for charging the battery at a voltage of 230 V, 50 Hz. Only the missing energy amount is recharged. After the energy content has been recharged to 100%, the charging current drops to the conservation charging current.

Technical data

General data	Test apparatus acc. to DIN VDE 0413 / EN 61557 with largely automatic measuring sequence	
Functions	Insulation measurement with 250 V, 500 V oder 1000 V, low-impedance measurement, voltage measurement and phase testing	
Display	Moving-coil measuring system with four scale gradutions	
Scale length	max. 95 mm	
Error in actual measurement	DIN VDE 0413 part 2+4, DIN EN 60 051	
Temperature range	0 °C to 40 °C	
EMC	DIN EN 61 326	
Test voltage	DIN EN 61 010 – 1, 3,7 kV 50 Hz 10 s	
Air and creep distances	DIN EN 61 010 – 1	
IP code	DIN EN 60 529, IP 50	
Electrical safety	DIN EN 61 010 – 1, housing insulated, protection class II, pollution degree 2, Measuring category CAT III for working voltages up to 300 V (phase to neutral), Measuring category CAT II for working voltages from 300 – 600 V (phase to neutral)	
External magnetic field influence	no (bis 4 kA/m)	
Power supply	NiMH rechargeable battery pack (6 x AA), 7,2 V, 1500 mAh	
Battery charge	230 V, 50 Hz, approx. 18 mA, 14 hrs.	
Dimensions	190 mm (L) x 180 mm (W) x 60 mm (H)	
Weight	900 g (incl. battery kit)	
Insulation measurement DIN VDE 0413–2 / EN 61557–2	**with 1000 V**	
	Display range	0-50 MΩ
	Measuring range	10 kΩ-5 MΩ
	Rated voltage	1000 V
	Open circuit voltage	max. 1200 V
	Short circuit current	3 mA
	Measuring time	arbitrary
Insulation measurement	**with 500 V**	
	Display range	0-50 MΩ
	Measuring range	10 kΩ-5 MΩ
	Rated voltage	500 V
	Open circuit voltage	max. 600 V
	Short circuit current	3 mA
	Measuring time	arbitrary
Insulation measurement	**with 250 V**	
	Display range	0-50 MΩ
	Measuring range	10 kΩ-5 MΩ
	Rated voltage	250 V
	Open circuit voltage	max. 300 V
	Short circuit current	3 mA
	Measuring time	arbitrary
Low-impedance mesurement DIN VDE 0413–4 / EN 61557–4	Display range	0-10 MΩ
	Measuring range	0,1 Ω-10 Ω
	Rated current	> 200 mA
	Open circuit voltage	ca. 5 V
	Pole reversal	manual
	Measuring line compensation	0 - 1 Ω, manual
	Measuring time	arbitrary
Voltage measurement	Measuring range	0-600 V
	Frequency range	DC/40-1000 Hz
	Internal resistance	approx. 250 kΩ
	Crest factor	4
	Accuracy	1,5 % from final value
	Measuring time	arbitrary
Phase testing DIN VDE 0680 - 6	Voltage range	30-250 V
	Frequency range	50-500 Hz
	Internal resistance	6 MΩ
	Temperature range	-10 °C to +50 °C
Rechargeable battery capacity DIN VDE 0413 / EN 61 557	per battery charge	30-250 V
	approx. 2000 measurements	

Safety appliance tester

for safety testings of portable alternating current equipment according to **DIN VDE 0701-0702** / DGUV Regulation 3

Type:
TG Basic 2
TG Basic 2+

from 01.03.2022 plus. 6,8 % surcharge

Application

The TG Basic 2 and TG Basic 2+ appliance testers can be used to carry out mobile, simple and inexpensive tests on electrical devices and work equipment in accordance with DIN VDE 0701-0702, DGUV regulation 3, ÖVE / ÖNORM E 8701, NEN 3140. The tests must be carried out by technically trained persons.

Function / handling

The device testers of the TG Basic 2 (2+) generation enable complete tests according to DIN VDE 0701-0702 (DGUV regulation 3) of portable equipment. They offer a menu-driven test sequence with block diagrams as well as the storage of measurement data. The data transfer takes place via the integrated Bluetooth 4.1 interface.
The TG Basic 2+ version also has an RCD function test 30 mA, the option of mains-independent battery operation and remote control via tablet or smartphone (Android operating system) with the TestMaster APP; an additional USB-C interface is integrated. The TG Basic 2+ version offers the option of a current clamp connection of up to 40 amps.

Scope of delivery

The scope of delivery of the TG Basic 2 / TG Basic 2+ appliance tester includes:
- 1 safety measuring line each 4 mm² red and black, each 2 m, with test tip
- 1 mains connection cable 1.5 m
- 1 measuring line Schuko cold device plug 0.5 m
- 1 instruction manual
- 1 factory calibration certificate
- 1 soft bag with shoulder strap
- 1 TestMaster-APP with activation for 1 year (only TG Basic 2+)

Accessories

Recommended accessories for appliance testers TG Basic 2 / TG Basic 2+:
- Alligator clip 4 mm² black or red, lockable
- 40 amp clamp meter
- Current clamp adapter 40 ampere (only for TG Basic 2+)
- Drehstromadapter-Set 16/32 A mit Stromzange
- Three-phase adapter set 16/32 A with current clamp
- Three-phase adapter 16 A active
- Three-phase adapter 32 A active
- Brush probe
- Test badges "Next test date", 30 mm round, 144 pieces

Price

TG Basic 2	€ 1.020,00
TG Basic 2+	€ 1.455,00
Alligator clip 4 mm² black	€ 23,80
Alligator clip 4 mm² red	€ 23,80
40 A current clamp	€ 556,50
Current clamp adapter 40 A	on req.
Three-phase adapter set 16/32 A with current clamp	€ 1.505,00
Three-phase adapter 16/32 A passive	€ 411,00
Three-phase adapter 16 A active	€ 1.117,00
Three-phase adapter 32 A active	€ 1.254,00
Brush probe	€ 106,00
Test badges 144 pieces	€ 35,00
Recalibration with specification of measured values	€ 294,00

Features

- Selection of the individual measurements via direct selection buttons
- Automatic limit value recording
- Plain text menu navigation with block diagrams
- Test results in the display OK / Error
- Automatic shutdown in the event of dangerous fault current in the test object
- Bluetooth 4.1 interface
- Mains and battery operation for passive measurements (only TG Basic 2+)
- RCD function test with 30 mA (only TG Basic 2+)
- Current clamp connection (only TG Basic 2+)
- USB-C connection (only TG Basic 2+)
- TestMaster-APP and operation via tablet or smartphone (only TG Basic 2+)

Measurement functions

- Protective conductor resistance
- Insulation resistance
- Substitute leakage current
- Safety extra-low voltage test / ELV measurement
- Differential current
- Touch current
- Protective conductor monitoring
- Mains voltage
- Consumer electricity
- Power
- Voltage measurement
- PRCD functional test (only TG Basic 2+)

Technical data

Display	Graficc LCD	240 x 160 Pixel
Display range	Protectic conductor resistance	0,000 - 4,000 Ω
	Test current	200 mA DC
	Open circuit voltage	10 V
	Isolation resistinace	0,100 - 20,0 M Ω
	Test voltage	50, 250, 500 V DC
	Short circuit current	1 mA
	Substitue leakage current	0,00 - 20,00mA
	Test voltage	ca. 200 V AC
	Protectiv extra-low voltage test / ELV-measurement	0 - 60 V AC/DC
	Differential current	0,00 - 20,00 mA
	Touch current	0,00 - 4,00 mA
	Residual current shut-down	Differential current > approx. 20 mA
	Protective conductor monitoring	Voltage N-PE > 30 V electronically Potential free via finger contact
	Line voltage measurement	110 - 250 V AC
	Consumer electricity	0,00 - 16,00 A AC via current clamp up to 40 A AC (only TG Basic 2+)
	Power	total 0 - 4.000 W
	Standby	0,000 - 9,999 W (current max. 50 mA)
	Voltage measurement	0 - 440 V AC / DC (SELV / PELV via probe)
	PRCD functional test	Tripping time 0 - 200 ms at IΔn 30 mA
	Interfaces	Bluetooth 4.1 USB-C (only TG Basic 2+)
	Measurement accuracy	+- 5% of the measured value, + 1% of the final value
General data	Power supply	110 - 250 V AC, 50/60 Hz, approx. 10 VA
	NiMH batteries (only 2+)	4,8 V, 2200 mA/h (4 pcs. AA permanentely installed)
	Operational- / environmental temperature	0 - 40° C
	Pollution degree	2
	Protection class	IP 20
	Dimensions (LxWxH)	210 x 110 x 80 mm
	Weight	TG Basic 2 approx. 1,6 kg TG Basic 2+ approx. 1,8 kg
	Electrical safety acc. to	EN 61010-1 / VDE 0411 / VDE 0413-16 EN 55011 / EN 61000-4-2

Remote control via tablet / smartphone (optional with TG Basic 2+)

The TG Basic 2+ appliance tester can be operated remotely using a tablet or smartphone with an Android operating system using the TestMaster APP with the following functions:

- Measurement data management in a data base
- Barcode scanning via the camera integrated in the tablet / smartphone
- Photo documentation for the examination
- Automatic creation of PDF test reports
- Automatic online synchronisation of data in a work group

Case design appliance tester

Further device testers in case design are available on request.

TG uni 1

TG omni 2

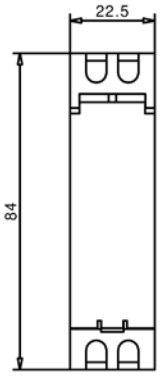
Notice

Annex - dimensional drawings

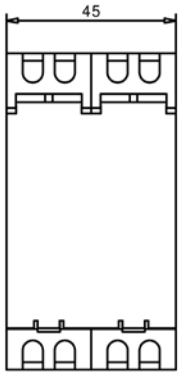
Dimensions

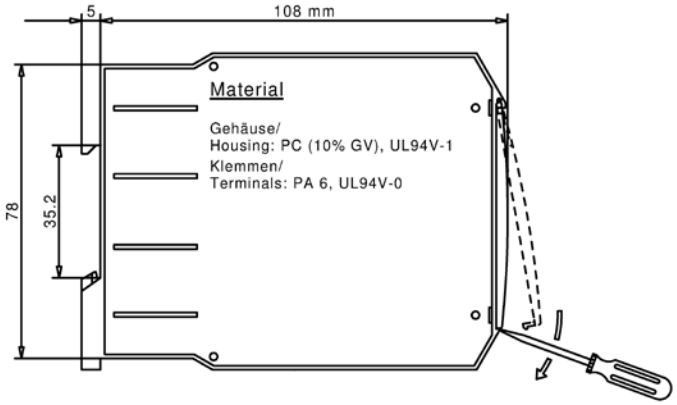
for measuring transducers

Housing "A"

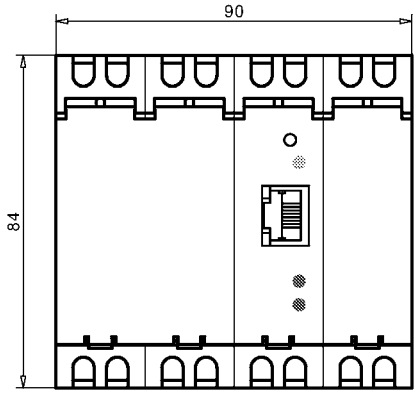


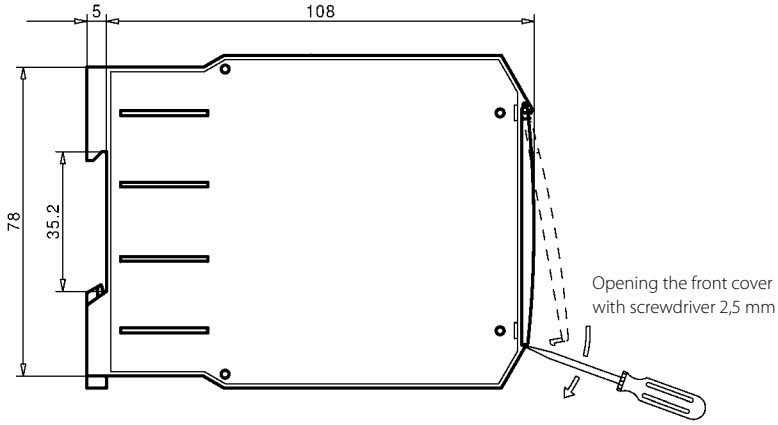
Housing "B"



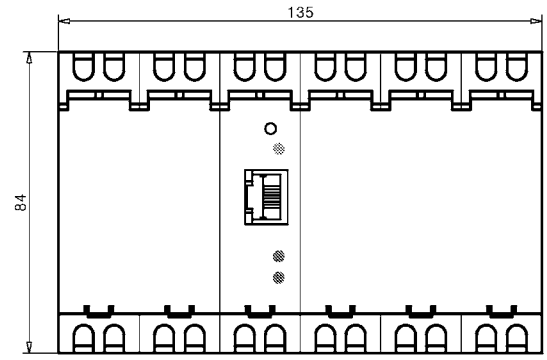


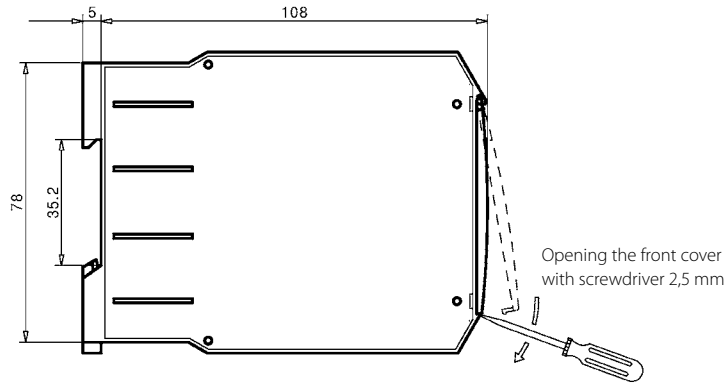
Housing "C"



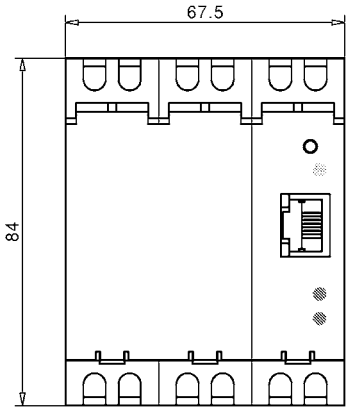


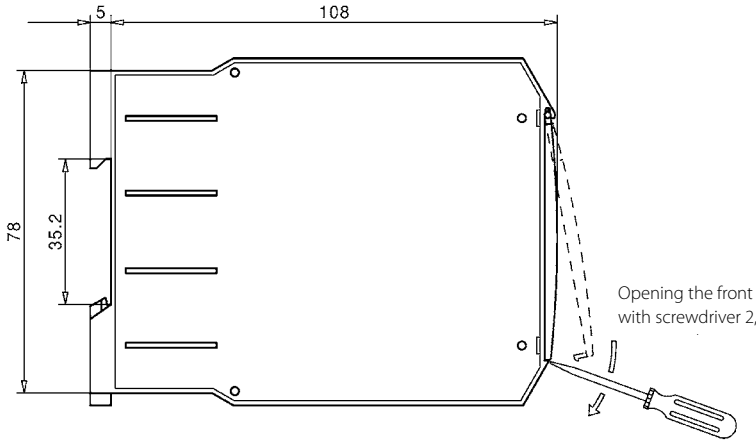
Housing "D"





Housing "E"



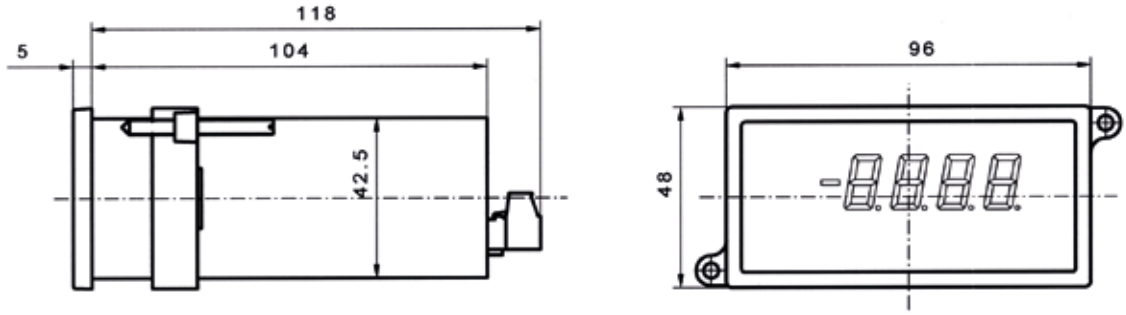


A1

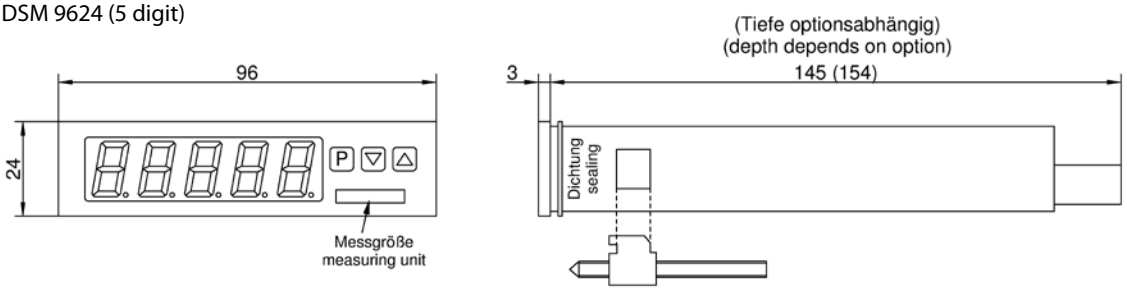
Dimensions

for panel meters digital

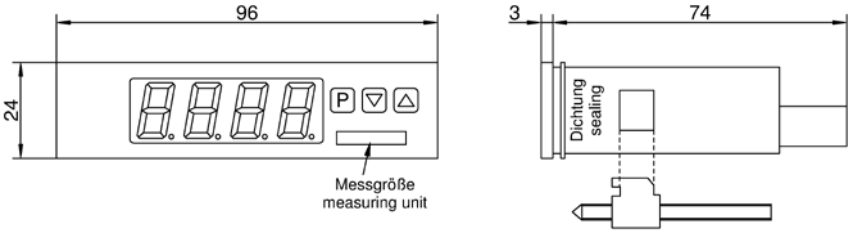
DSM 96



DSM 9624 (5 digit)



DSM 9624 (4 digit)

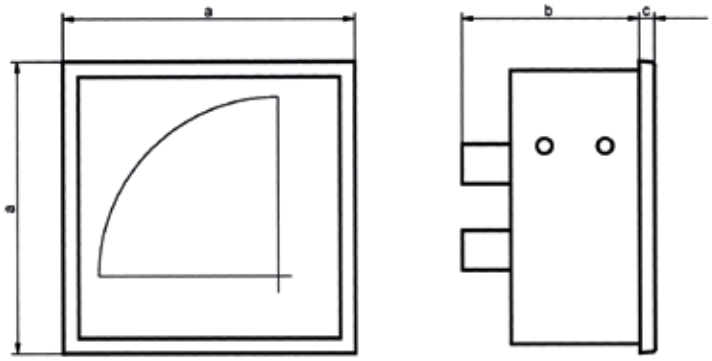


DSM 4824

Dimensions in brackets for DC version

Dimensions

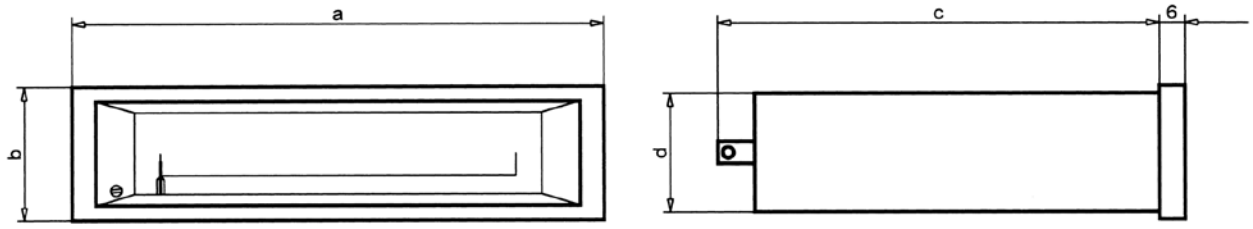
for panel meters analog, square cut-out



Types			a	b	c
NW, NP, NPG, NMW	72	-15 A	72	58	5
		> 15 - 60 A	72	64	5
NW, NP, NPG, NMW	96	-15 A	96	58	5
		> 15 - 60 A	96	64	5
WQ, PQ, PGQ	48 DIN	-15 A	48	47	5
		> 15 - 60 A	48	53	5
WQ, PQ, MQ, Fz, SZ, LWQ	72 DIN	-15 A	72	60	5
Fz, SZ, LWQ		> 15 - 60 A	72	66	5
WQ, PQ, MQ, LWQ, Fz, DWQ, SZ	96 DIN	-15 A	96	60	5
Fz, DWQ, SZ		> 15 - 60 A	96	66	5
WQ, PQ, MQ	144 DIN	-15 A	144	61	7
Fz		> 15 - 60 A	144	66	7
PK, PKG	48 DIN	- 15 A	48	68	5
		> 15 - 60 A	48	73	5
PK, PKG	72 DIN	- 15 A	72	54	5
		> 15 - 60 A	72	54	5
PK, PKG	96 DIN	- 15 A	96	54	5
		> 15 - 60 A	96	54	5
PK, PKG	144 DIN	- 15 A	144	69	7
		> 15 - 60 A	144	75	7
MWQ	72 DIN	/ 5 A	72	102	5
MWQ	96 DIN	/ 5 A	96	102	5
MWQ	144 DIN	/ 5 A	144	99	7
SM 8 / SM 16	96 DIN		96	56	5

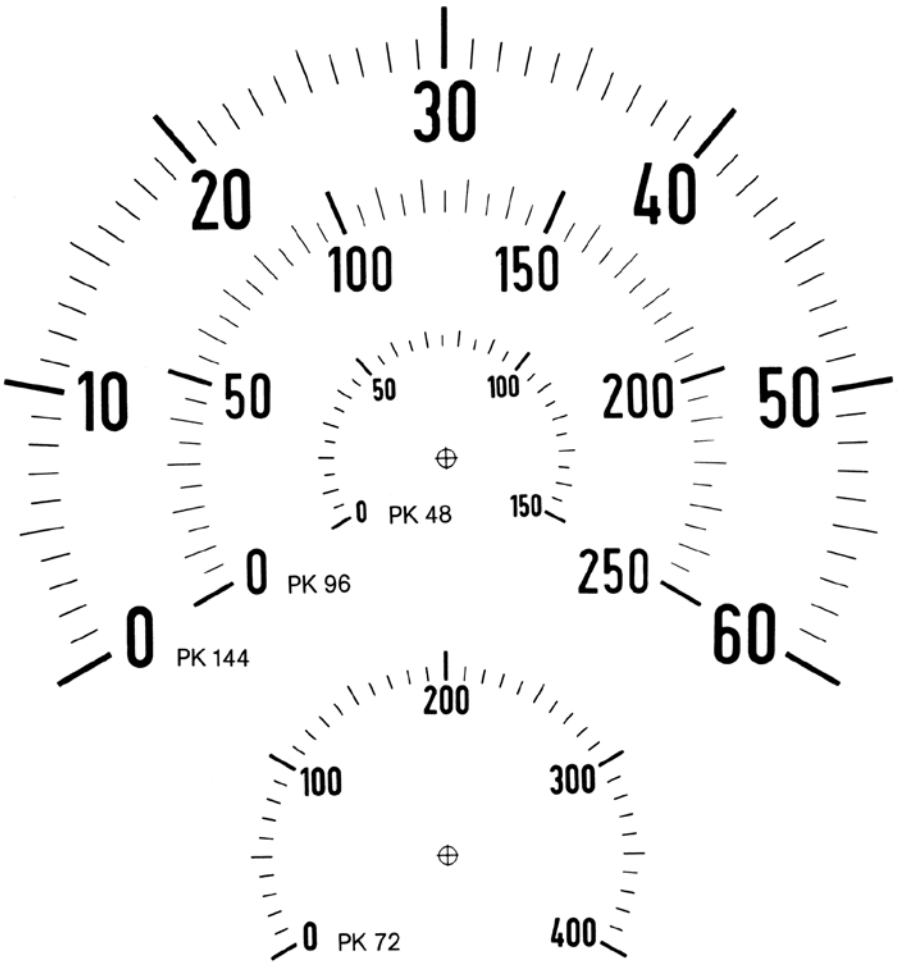
Dimensions

for panel meters analog, rectangular cut-out

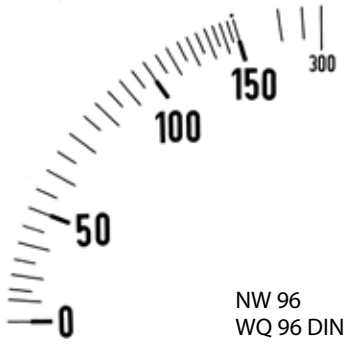


Types	a	b	c	d	cut-out
P 48x24	48	24	70	18	45 x 22
P 72x24	72	24	86	18	68 x 22
P 72x36	72	36	105	32	68 x 34
P 96x24	96	24	102	18	92 x 22
P 96x48	96	48	126	42	92 x 46
P 144x36	144	36	202	32	138 x 33
P 144x72	144	72	168	68	138 x 69

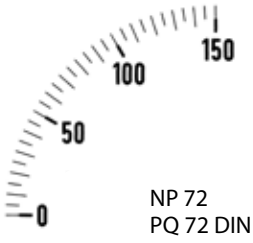
Scale graduation in original size



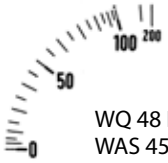
PQ 144 DIN



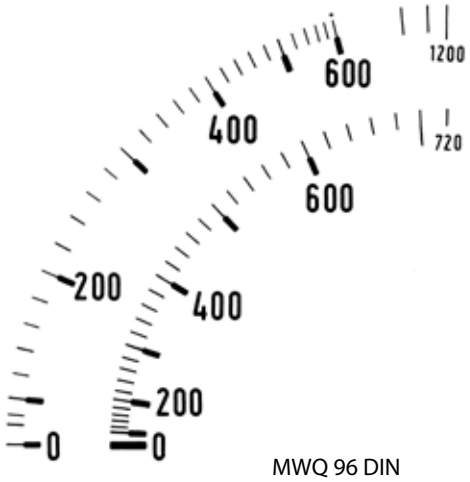
NW 96
WQ 96 DIN



NP 72
PQ 72 DIN

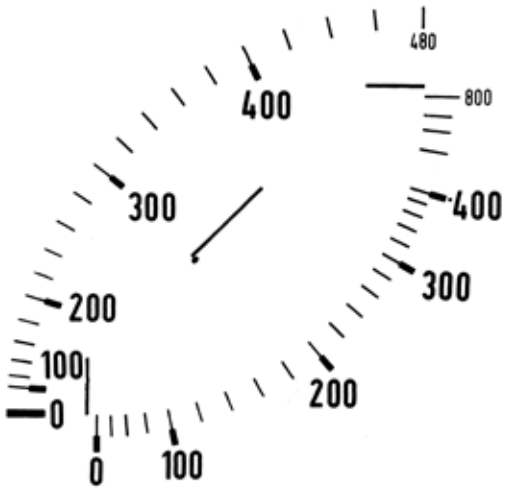


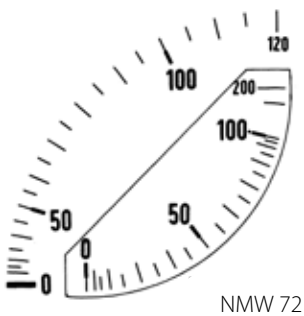
WQ 48 DIN
WAS 45



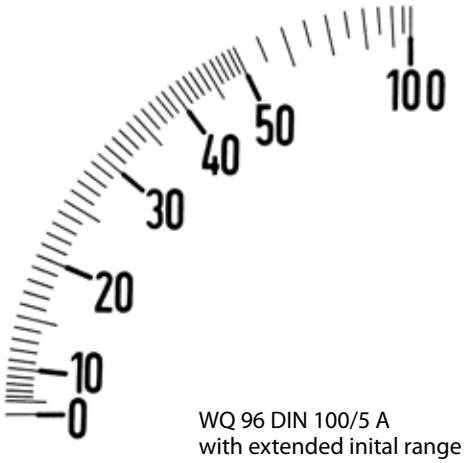
MWQ 96 DIN

MWQ 72 DIN

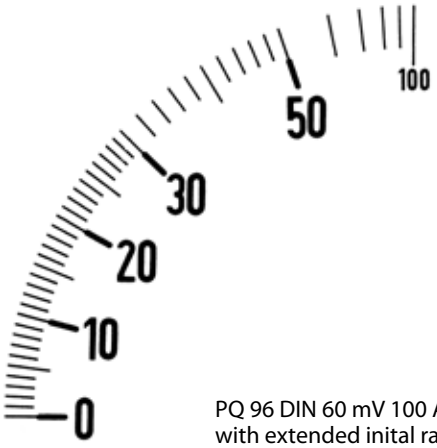




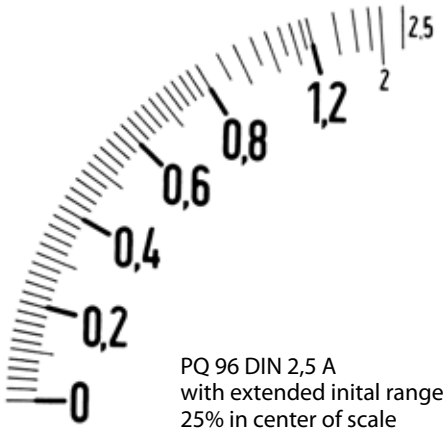
NMW 72



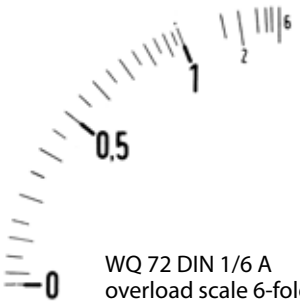
WQ 96 DIN 100/5 A
with extended inital range
30% in center of scale



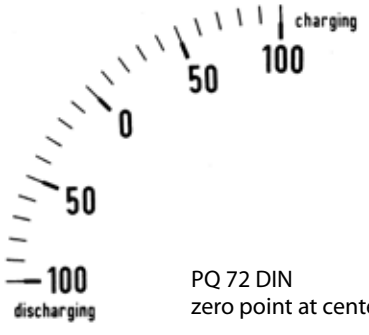
PQ 96 DIN 60 mV 100 A
with extended inital range
30% in center of scale



PQ 96 DIN 2,5 A
with extended inital range
25% in center of scale



WQ 72 DIN 1/6 A
overload scale 6-fold



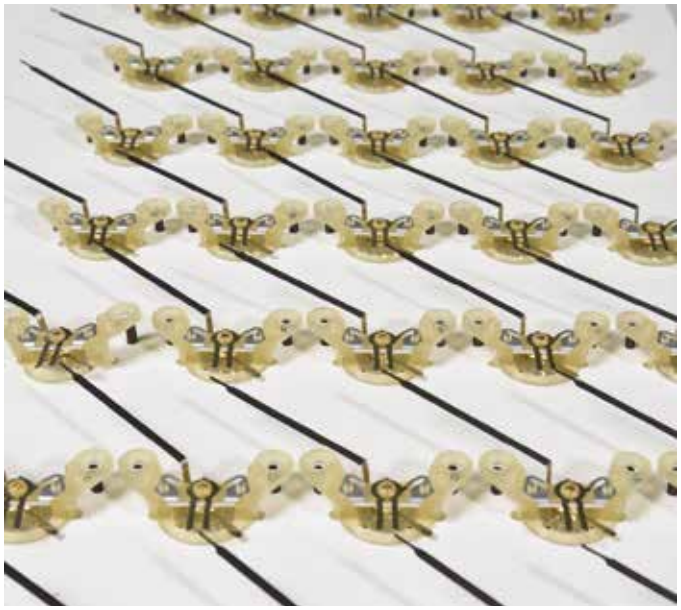
PQ 72 DIN
zero point at center

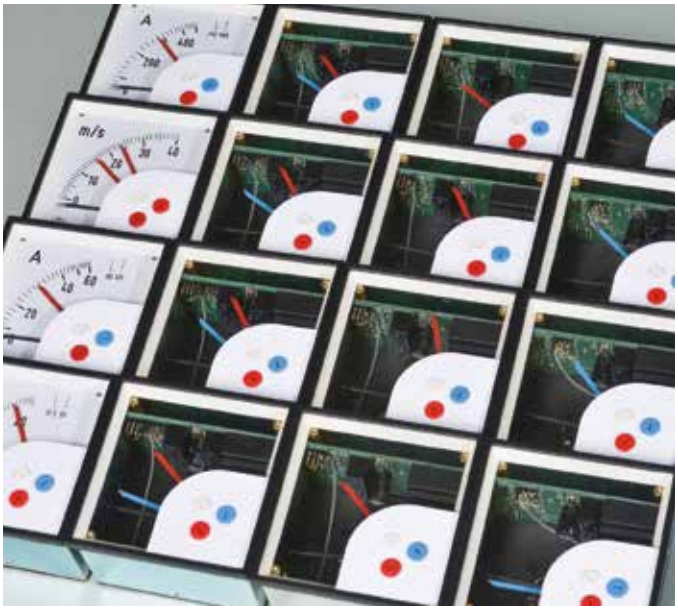
Notice

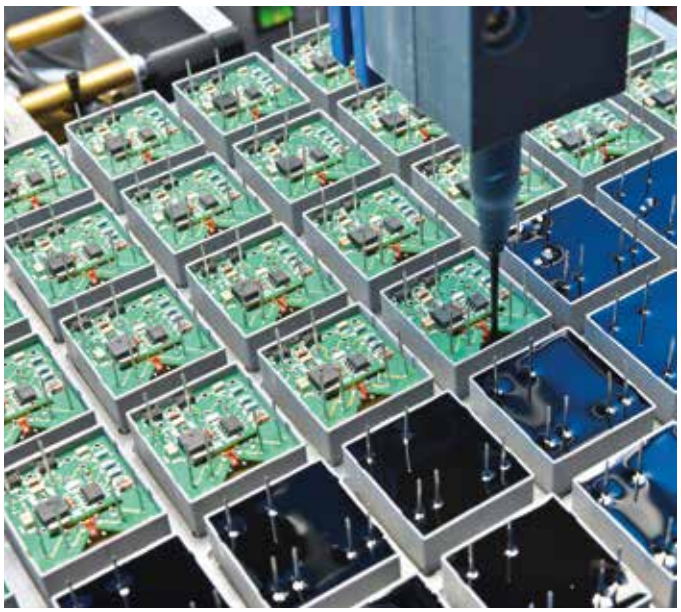
Notice

Notice

Precision and service are the measure of all things







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