MÜLLER ZIEGLER
Elektrische Messgeräte

MEASURING TRANSDUCERS MAINS AND LIMIT MONITORING

TECHNICAL INFORMATION

www.mueller-ziegler.de Product groups 1 and 2

made in germany


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

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

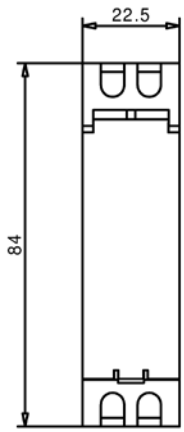
Test report

Measuring transducer	X
Universal measuring transducer:	
Multi-E11-MU	X
Multi-E4-MU	X
Multi-E-MU	X

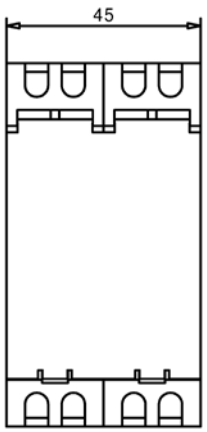
Dimensions

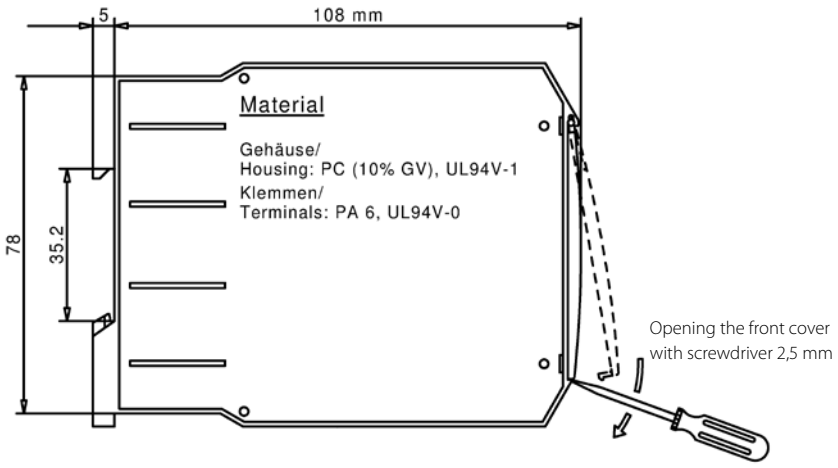
for measuring transducers

Housing "A"

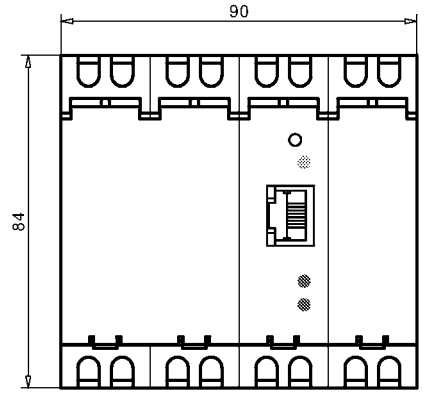


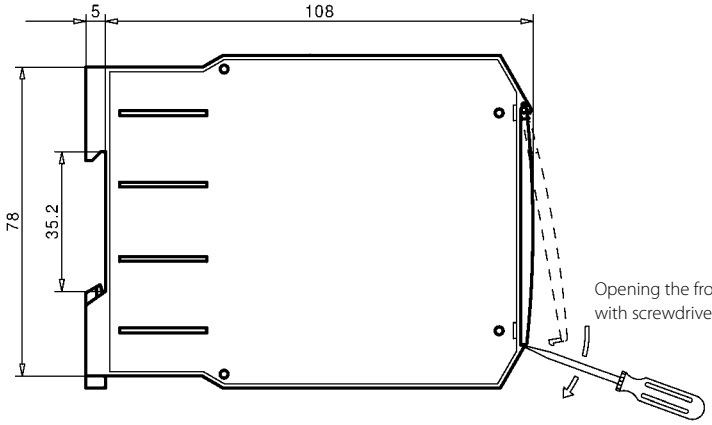
Housing "B"



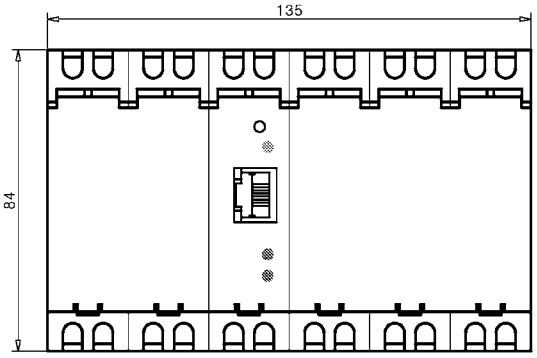


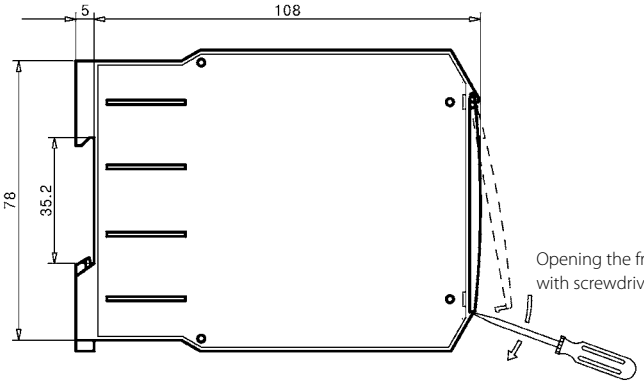
Housing "C"



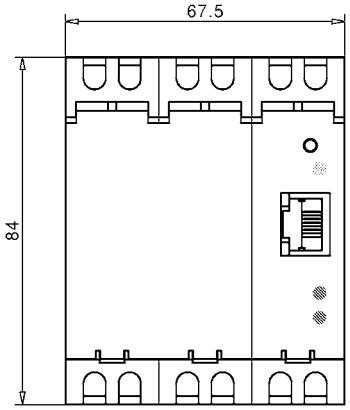


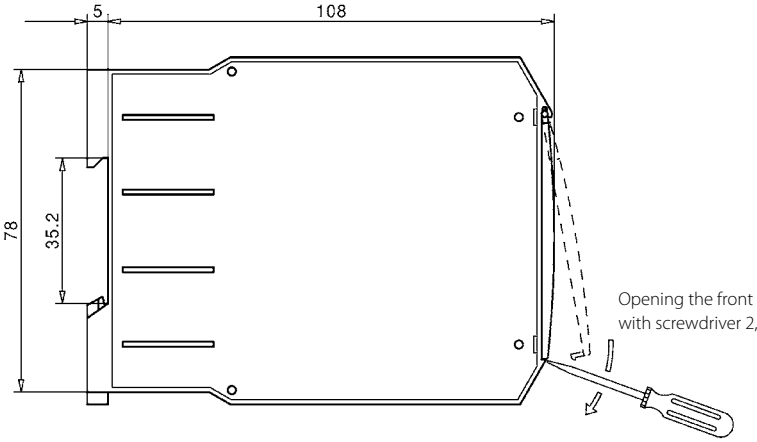
Housing "D"





Housing "E"





Frequency output for measuring transducers

(frequency module)

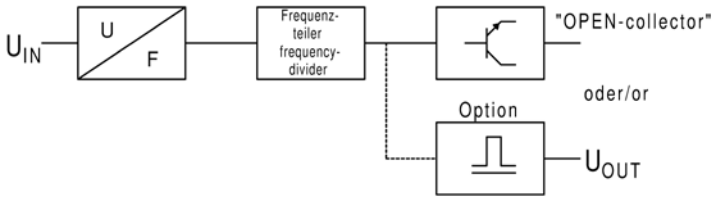
Type:
FM

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!.

Types and variants

FM

Price group B

Relay module for measuring transducers

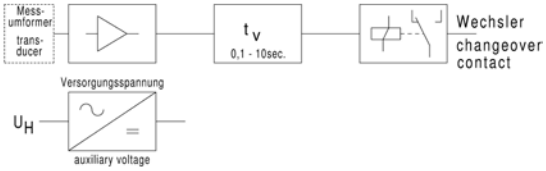
for limit value monitoring

Type:
GWM

Application

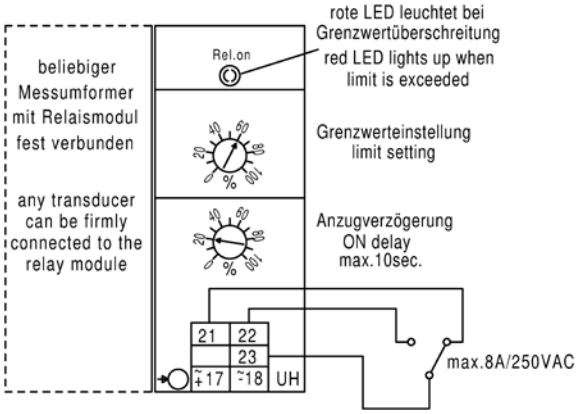
The relay module can only be used in connection with a measuring transducer and serves for monitoring of a set limit value triggering a relay when being exceeded.

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 5
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

Types and variants

GWM

Price group B

Measuring transducer for alternating current (AC)

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

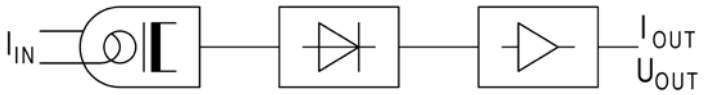
Type:
DIw-MU

Application

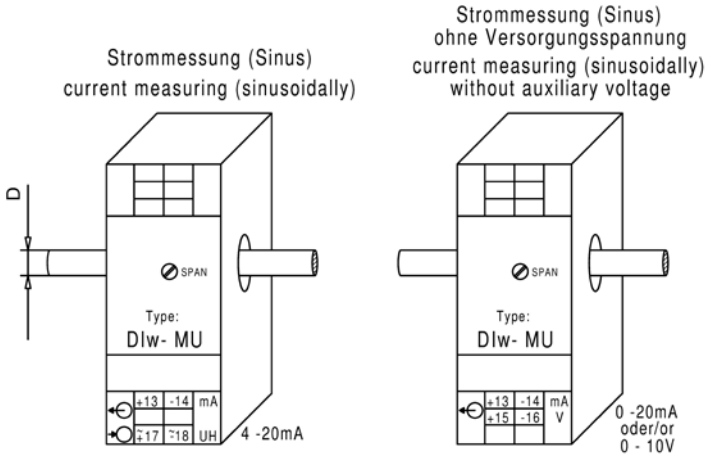
The measuring transducer DIw-MU is used for the direct transformation of a sinusoidal alternating current into an impressed direct current or direct voltage signal.

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

Types and variants

Input	50 A or 60 A (please specify value in case of order)
Output	0-20 mA (without auxiliary voltage)
	0-10 V (without auxiliary voltage)
	4-20 mA (with auxiliary voltage)
Input	100 A oder 150 A (please specify value in case of order)
Output	0-20 mA (without auxiliary voltage)
	0-10 V (without auxiliary voltage)
	4-20 mA (with auxiliary voltage)
Surcharges	Auxiliary voltage other than 230 V AC:
	24 V DC
	6-30 V AC + DC
	36-265 V AC + DC
	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 (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	< 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) page5
	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

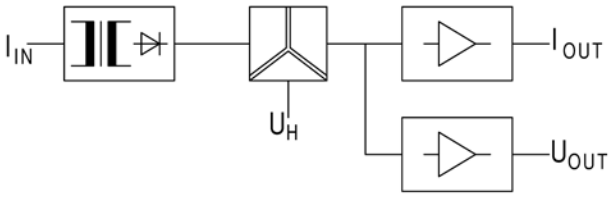
Type:
Iw-MU

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.



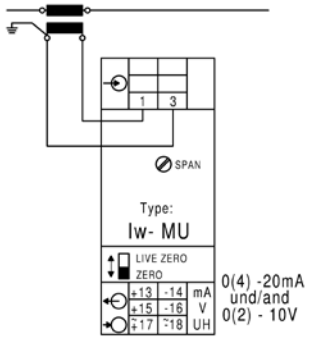
Types and variants

Input	1 A or 5 A (please specify value in case of order)
Output	0-20 mA (without auxiliary voltage)
	0-10 V (without auxiliary voltage)
	4-20 mA (with auxiliary voltage)
	0-20 mA and 0-10 V as well as 4-20 mA and 2-10 V switchable on front side (with auxiliary voltage)
Surcharges	Input directly up to 10 A (only with auxiliary voltage)
	Auxiliary voltage other than 230 V AC:
	24 V DC
	6-30 V AC + DC
	36-265 V AC + DC
	110 V AC
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) (Description page 6) can only be realized based on Iw-MU and double output
Relay module	For limit monitoring type GWM (Description page 7) can only be realized based on Iw-MU and double output

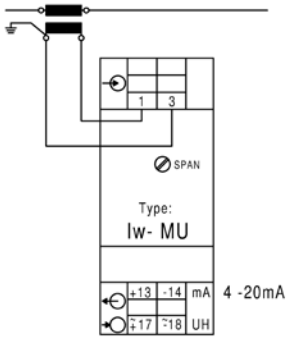
Price group B

Connection

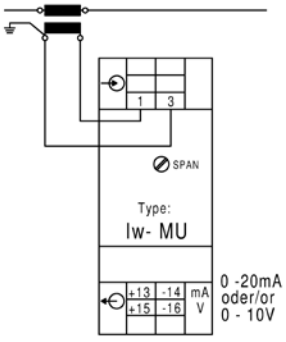
Strommessung (Sinus) mit Versorgungsspannung
current measuring (sinusoidally) with auxiliary voltage



Strommessung (Sinus) mit Versorgungsspannung
current measuring (sinusoidally) with auxiliary voltage



Strommessung (Sinus) ohne Versorgungsspannung
current measuring (sinusoidally) without auxiliary voltage



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 5
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)

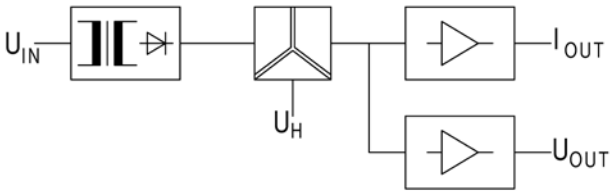
Type:
Uw-MU

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.



Types and variants

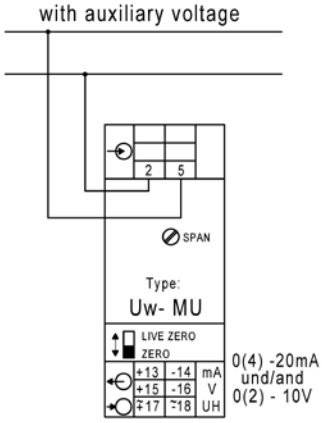
Input	100 V, 250 V, 500 V and 600 V
	(for voltages above 500 V an auxiliary voltage is requested)
Output	0-20 mA (without auxiliary voltage)
	0-10 V (without auxiliary voltage)
	4-20 mA (with auxiliary voltage)
	0-20 mA and 0-10 V as well as 4-20 mA and 2-10 V switchable on front side (with auxiliary voltage)
Surcharges	Auxiliary voltages other than 230 V AC:
	24 V DC
	6-30 V AC + DC
	36-265 V AC + DC
	110 V AC
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz)
	(Description page 6) can only be realized based on Uw-MU and double output
Relay module	For limit monitoring type GWM
	(Description page 7) can only be realized based on Uw-MU and double output

Price group B

Connection

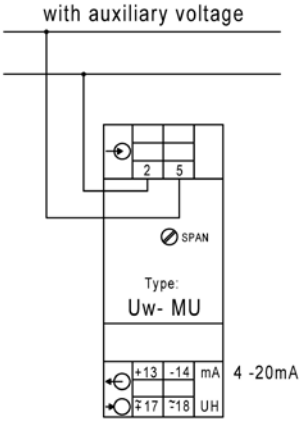
Spannungsmessung (Sinus) mit Versorgungsspannung

voltage measuring (sinusoidally) with auxiliary voltage



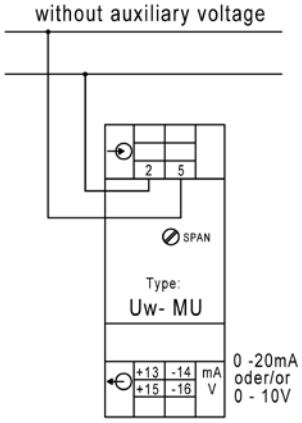
Spannungsmessung (Sinus) mit Versorgungsspannung

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		230 V AC ± 20 %, 45-65 Hz, 2,5 VA
(with „live zero“ and double output and voltages > 500 V 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 5
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

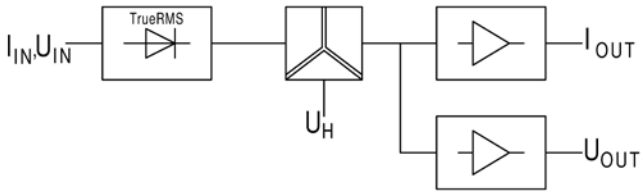
Type:
Ieff-MU / Ueff-MU

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.



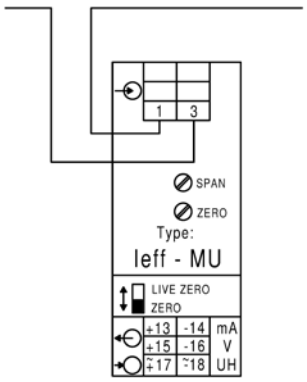
Types and variants

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
Surcharges	Input directly up to 10 A for type Ieff-MU
	Sub-range
	Frequency range DC / 40-1000 Hz
	Response time 70 ms
	Auxiliary voltage other than 230 V AC:
	24 V DC
	6-30 V AC + DC
	36-265 V AC + DC
	110 V AC
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz)
	(Description page 6)
Relay module	For limit monitoring type GWM
	(Description page 7)

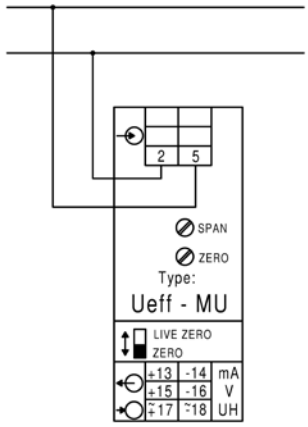
Price group B

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 5
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)

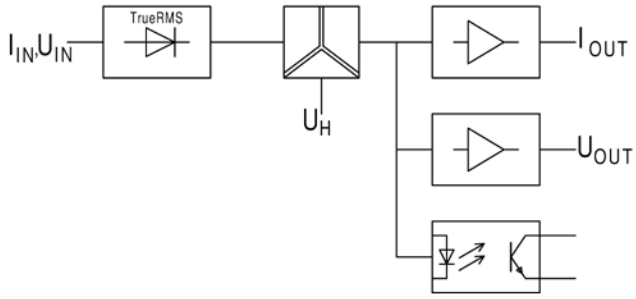
Type:
IeffT-MU / UeffT-MU

Application

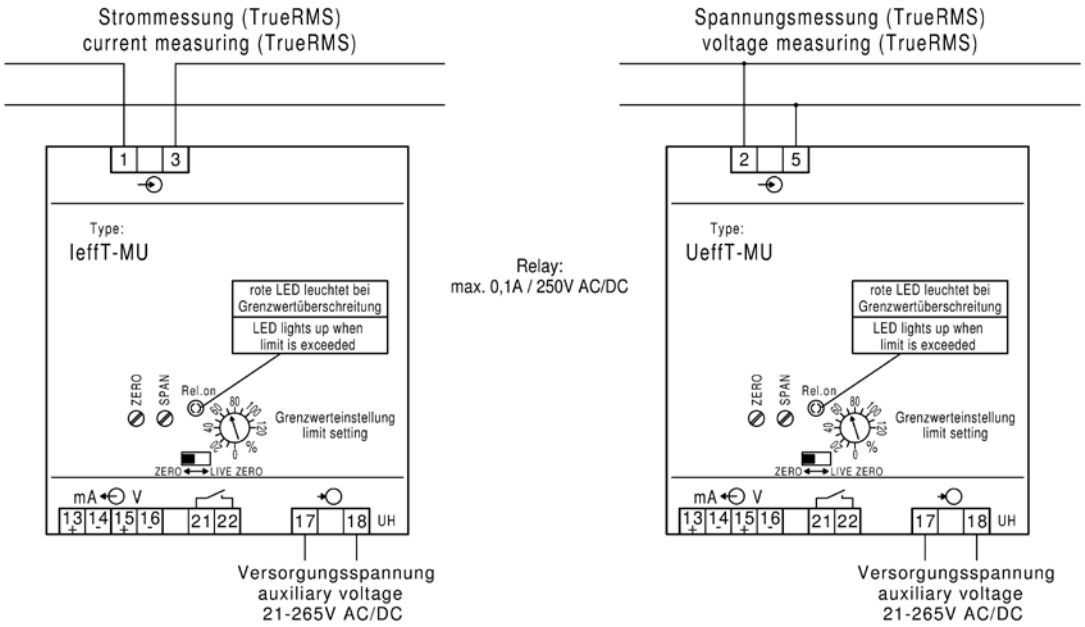
The measuring transducers IeffT-MU and UeffT-MU are used for the transformation and isolation of a current or a voltage into an impressed direct current and direct voltage signal. An integrated limit monitoring serves for monitoring the input signal.

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

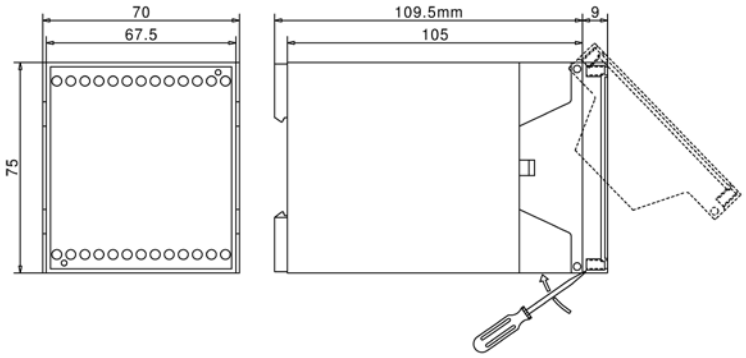


Types and variants

Input	**IeffT-MU** a value from 0-1 mA to 0-5 A
	UeffT-MU 0-1000 V (other values on request)
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

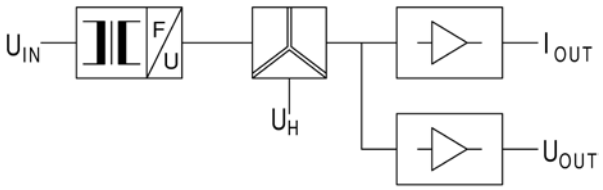
Type:
F-MU

Application

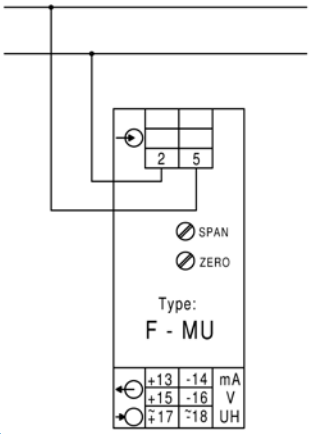
The measuring transducer F-MU is used for the transformation and isolation of a frequency into an impressed direct current and direct voltage signal. Alternating voltages and pulsed direct voltages may be processed.

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



Pr Types and variants ice

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)
	4-20 mA and 2-10 V (with auxiliary voltage)
	Please specify rated voltage (see page 19)!
Surcharges	Auxiliary voltage other than 230 V AC:
	24 V DC
	6-30 V AC + DC
	36-265 V AC + DC
	110 V AC
	Other measuring ranges
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 6)
Relay module	for limit monitoring Type GWM - (description page 7)

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 5
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

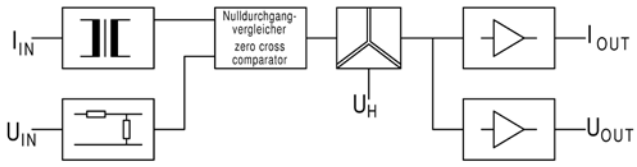
Type:
Phwd-MU

Application

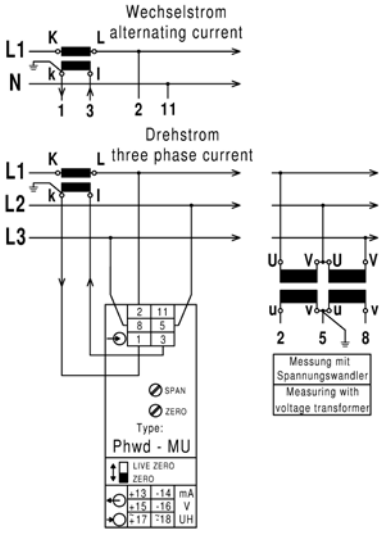
The measuring transducer Phwd-MU is used for the transformation and isolation of the phase angle between current and voltage of an alternating current and three-phase power system of the same load into an impressed direct current and direct voltage signal.

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



Types and variants

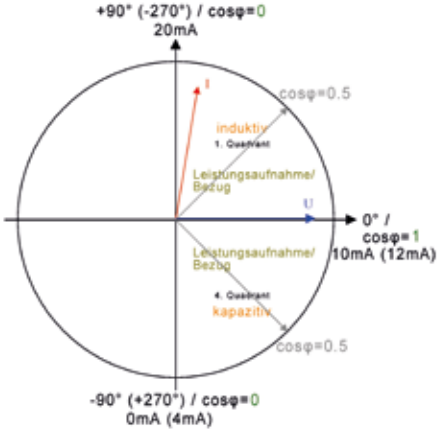
Input	cos φ 0,5 cap - 1 - 0,5 ind or cos φ 0,7 cap - 1 - 0,3 ind for alternating current and three-phase power system of the same load 100 / 110 / 230 / 400 / 500 / 600 V 1 A or 5 A
Output	0-20 mA and 0-10 V as well as 4-20 mA and 2-10 V, switchable on front side
Surcharges	Auxiliary voltage other than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

Price group B

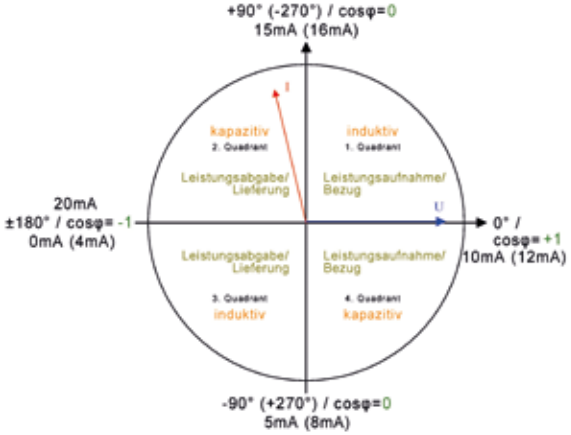
Technical data

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 5
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)



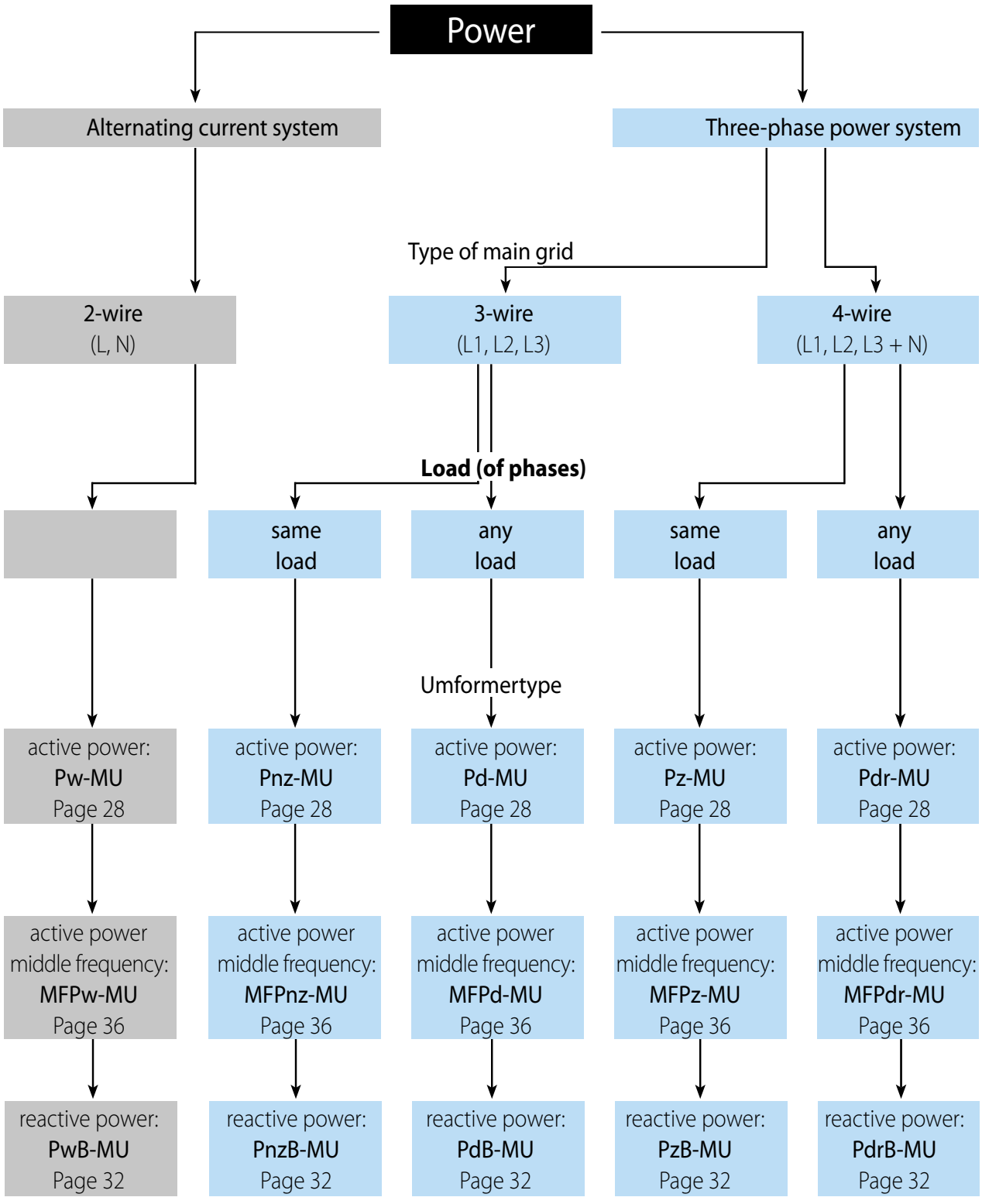
4 - Quadrantenbetrieb (Option)



Notizen

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

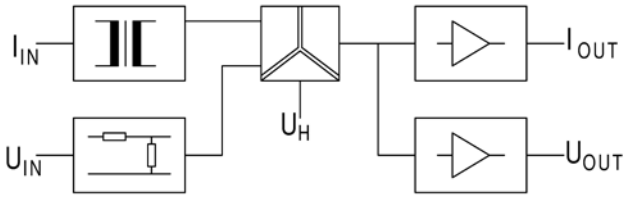
Type:
Pw-MU, Pnz-MU, Pz-MU, Pd-MU, Pdr-MU

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%.



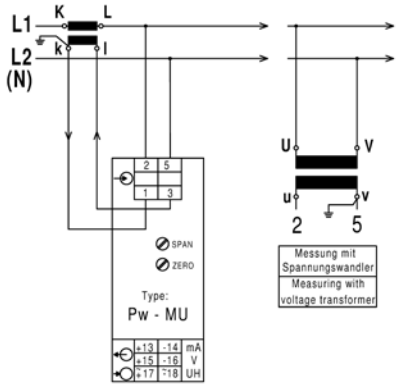
Types and variants

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)
		4-20 mA and 2-10 V (with auxliary voltage)
	Pd-MU	(3-wire 3-phase power system of any load):
		0-20 mA and 0-10 V (without auxiliary voltage)
		4-20 mA and 2-10 V (with auxiliary voltage)
	Pdr-MU	(4-wire 3-phase power system of any load):
		0-20 mA and 0-10 V (without auxiliary voltage)
		4-20 mA and 2-10 V (with auxiliary voltage)
Surcharges	Bidirectional energy directions	
	Auxiliary voltage required in case of rated voltage fluctuation > ± 20 %	
	and voltages > 500 V	
	230 V AC or 110 V AC	
	24 V DC	
	6-30 V AC + DC	
	36-265 V AC + DC	
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 6)	
Relay module	for limit monitoring Type GWM - (description page 7)	

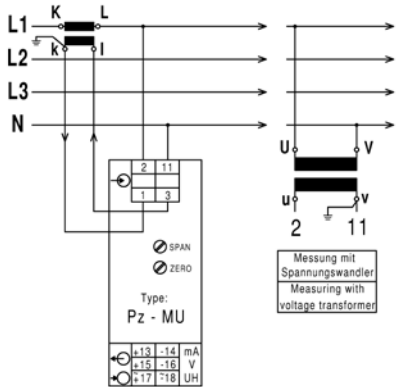
Price group B

Connection

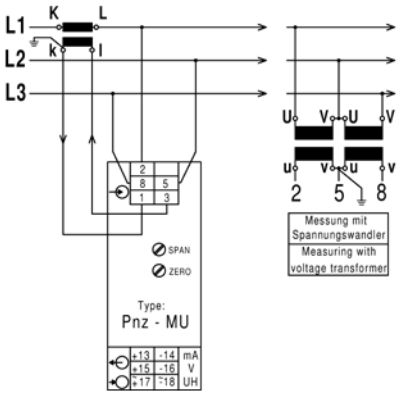
Type Pw-MU (Alternating current)
Working voltage up to 300 V (Phase to neutral L - N)



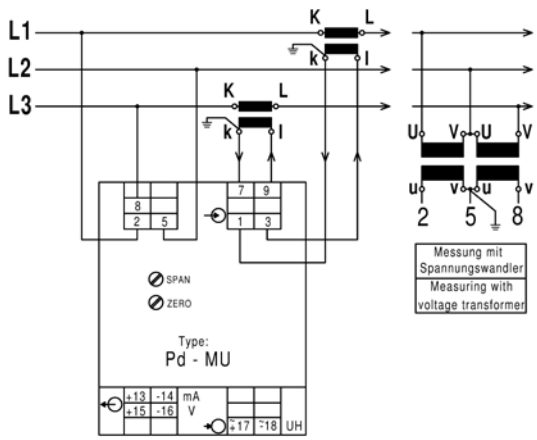
Type Pz-MU (4-wire 3-phase current same load)
Working voltage up to 300 V (Phase to neutral L - N)



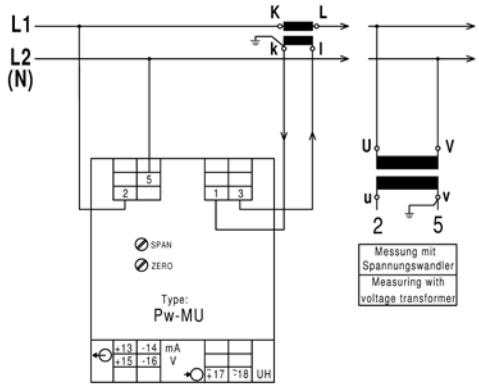
Type Pnz-MU (3-wire 3-phase current same load)
Working voltage up to 300 V (Phase to neutral L - N)



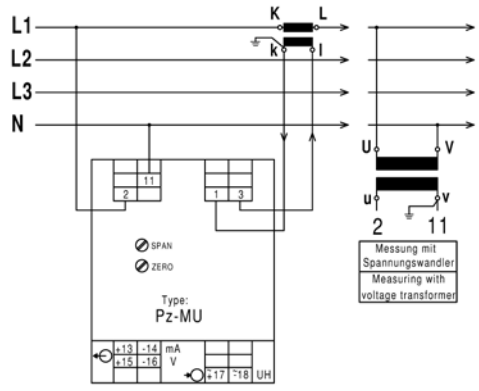
Type Pd-MU (3wire 3-phase current any load)
Working voltage up to 600 V (Phase to neutral L - N)



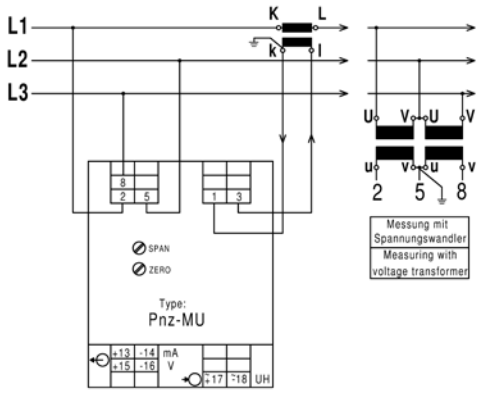
Working voltage up to 600 V (Phase to neutral L - N)



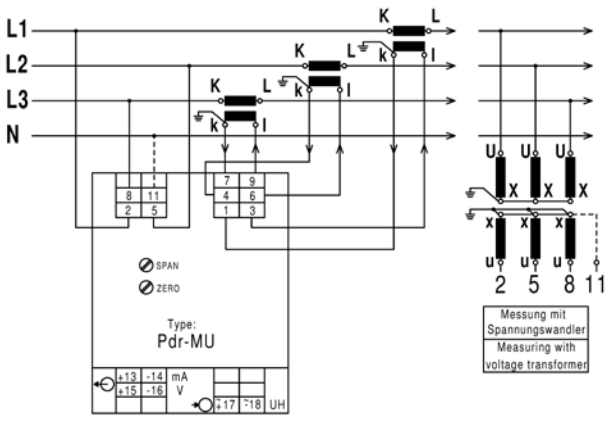
Working voltage up to 600 V (Phase to neutral L - N)



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 5
	> 500 V: Pw-MU, Pz-MU, Pnz-MU:	Housing B, (45 mm wide) Page 5
	Pd-MU, Pdr-MU:	Housing B, (45 mm wide) Page 5
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

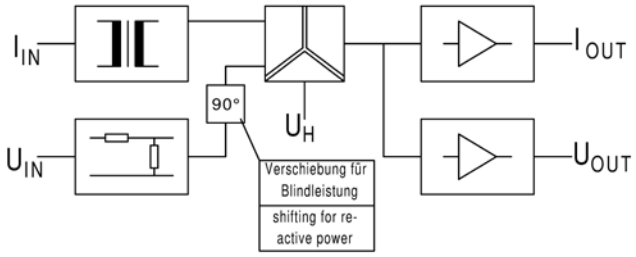
Type:
PwB-MU, PnzB-MU, PzB-MU, PdB-MU, PdrB-MU

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%.



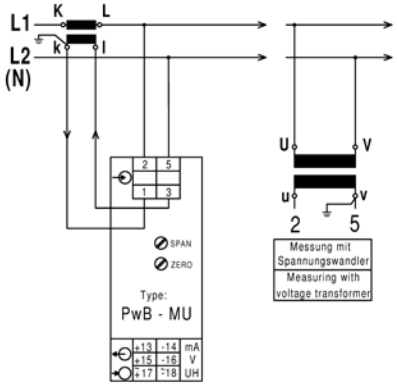
Types and variants

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)
		4-20 mA and 2-10 V (with auxliary voltage)
	PdB-MU	(3-wire 3-phase power system of any load):
		0-20 mA and 0-10 V (without auxiliary voltage)
		4-20 mA and 2-10 V (with auxiliary voltage)
	PdrB-MU	(4-wire 3-phase power system of any load):
		0-20 mA and 0-10 V (without auxiliary voltage)
		4-20 mA and 2-10 V (with auxiliary voltage)
Surcharges	Bidirectional energy directions	
	Auxiliary voltage required in case of rated voltage fluctuation > ± 20 %	
	and voltages > 500 V	
	230 V AC or 110 V AC	
	24 V DC	
	6-30 V AC + DC	
	36-265 V AC + DC	
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 6)	
Relay moduloe	for limit monitoring Type GWM - (description page 7)	

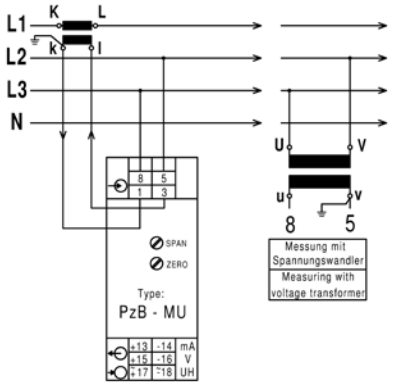
Price group B

Connection

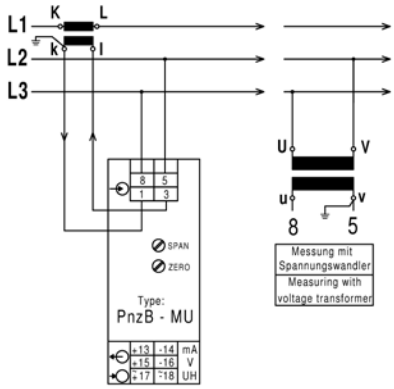
Type PwB-MU (Alternating current)
Working voltage up to 300 V (Phase to neutral L - N)



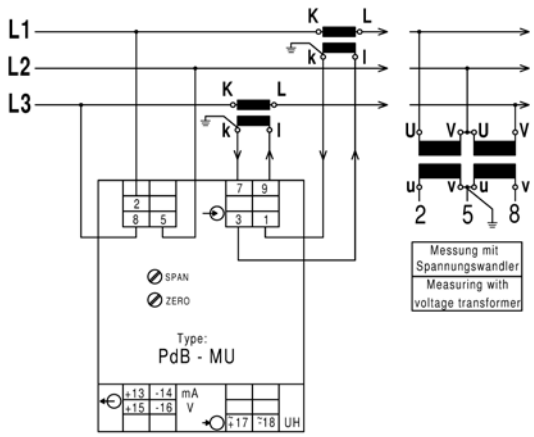
Type PzB-MU (4-wire 3-phase current same load)
Working voltage up to 300 V (Phase to neutral L - N)



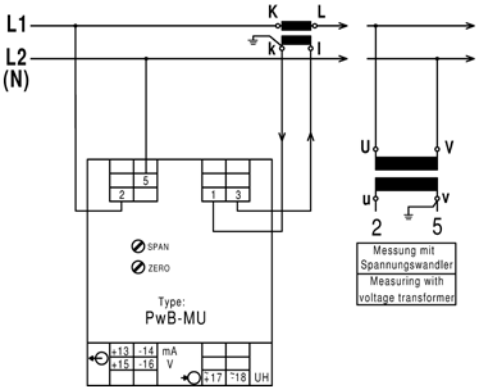
Type PnzB-MU (3-wire 3-phase current same load)
Working voltage up to 300 V (Phase to neutral L - N)



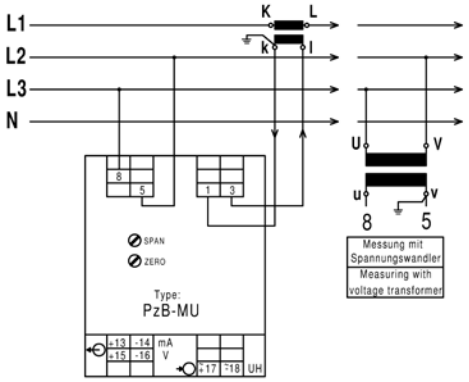
Type PdB-MU (3-wire 3-phase current any load)
Working voltage up to 600 V (Phase to neutral L - N)



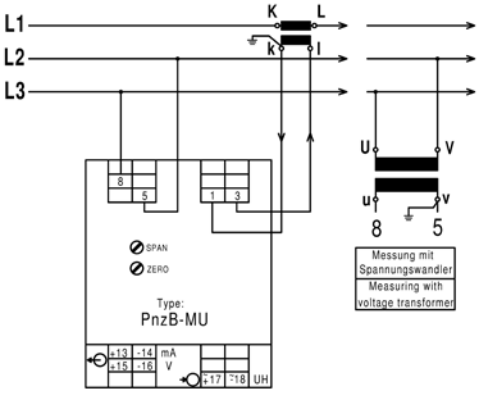
Working voltage up to 600 V (Phase to neutral L - N)



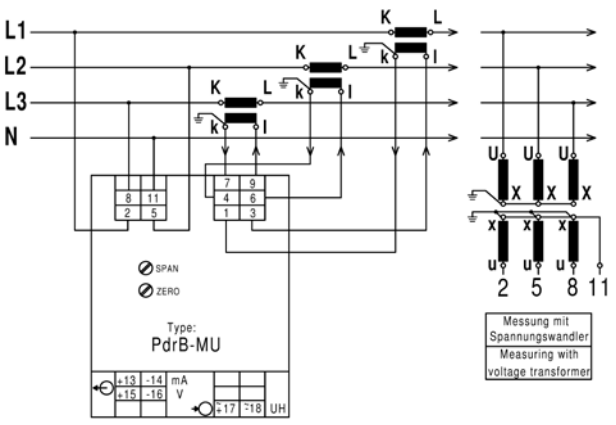
Working voltage up to 600 V (Phase to neutral L - N)



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 (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: PwB-MU, PzB-MU, PnzB-MU:	Housing A, (22,5 mm wide) Page 5
	> 500 V: PwB-MU, PzB-MU, PnzB-MU:	Housing B, (45 mm wide) Page 5
	PdB-MU, PdrB-MU:	Housing B, (45 mm wide) Page 5
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

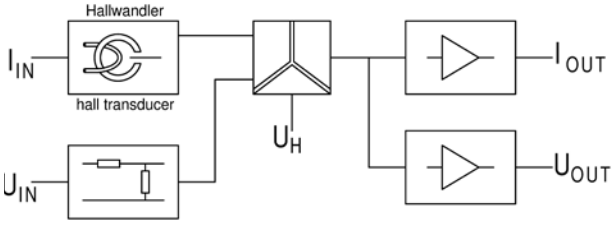
Type:
MFPw-MU, MFPz-MU, MFPnz-MU, MFPd-MU, MFPdr-MU

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.



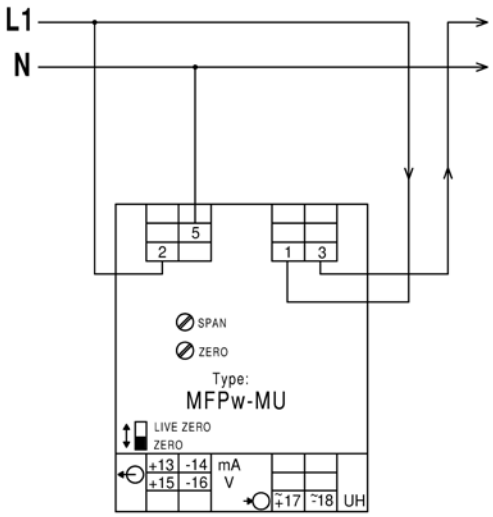
Types and variants

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):
	MFPd-MU	(3-wire 3-phase power system of any load):
	MFPdr-MU	(4-wire 3-phase power system of any load): 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	
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 6)	
Relay module	for limit monitoring Type GWM - (description page 7)	

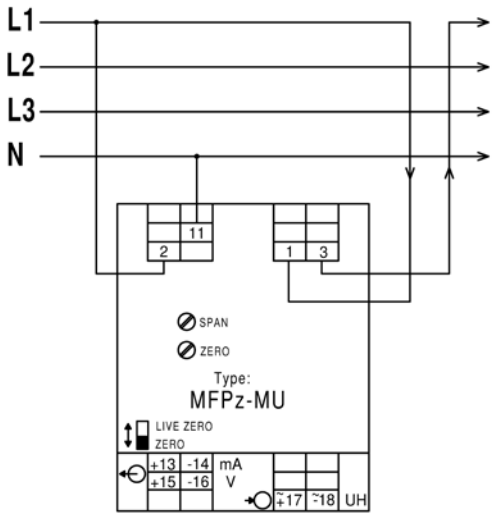
Price group B

Connection

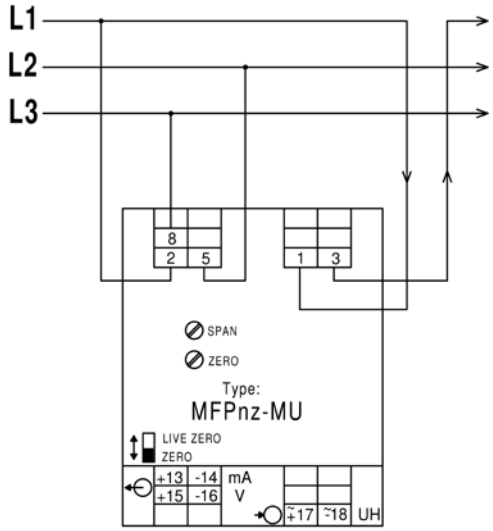
Type MFPw-MU (Alternating current)



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



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

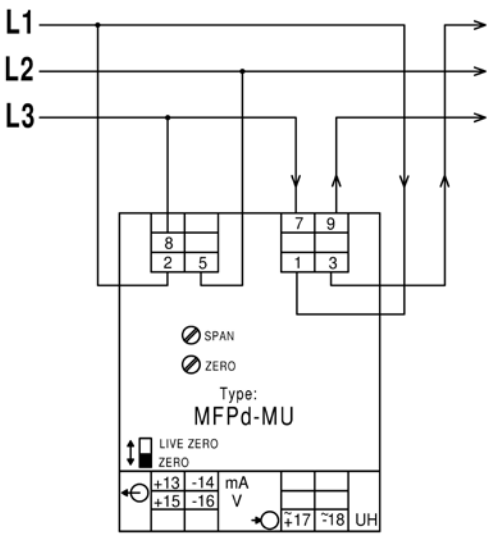


For devices with frequency module further outputs are not available. At terminal +13 and -14 the frequency output is available.

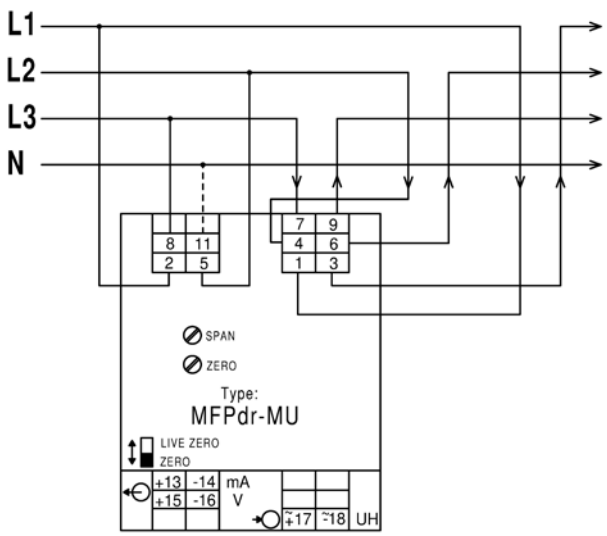
Current transformers for Power Quality Application up to 20 kHz XCTB-Series can be found in our individual catalog "XCTB" on our homepage at:

www.mueller-ziegler.de

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



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



Technische Daten

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 5
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

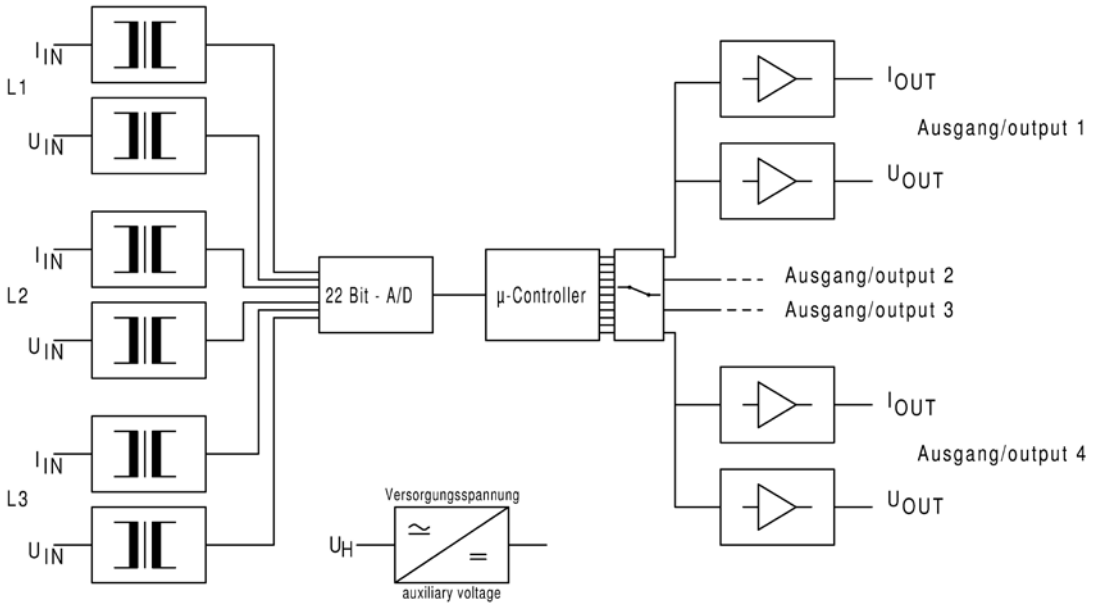
Type:
Multi-E4-MU

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.



Types and variants

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

Price group B

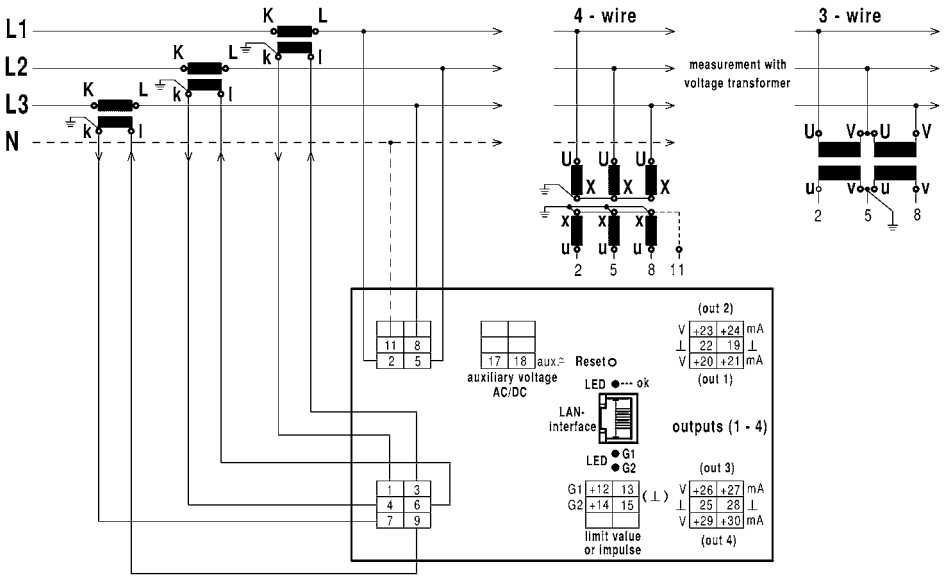
Technical data

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 5
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

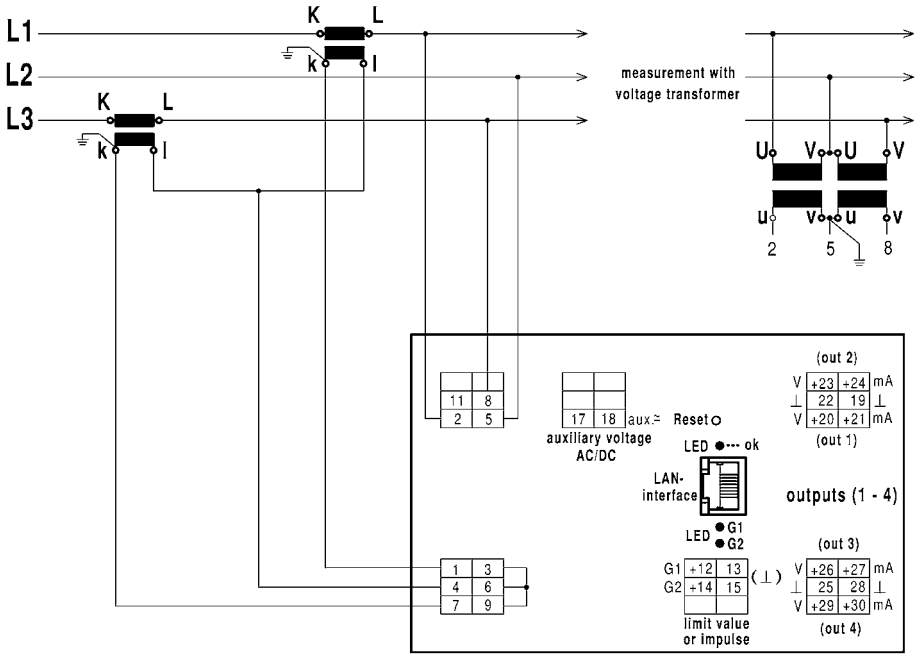
Calibration	The measuring transducer is factory-calibrated. The calibration should be renewed in the manufacturers plant every two years
Configuration	The measuring transducer is configured in the factory if the required data are known. A reconfiguration is possible at any time. This will require the 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

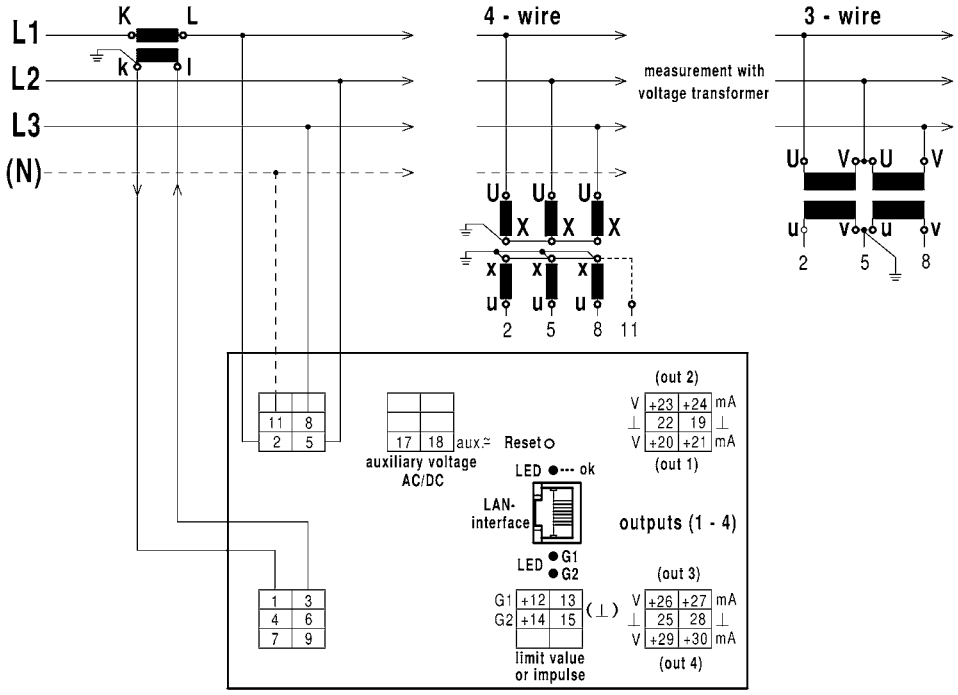
3-/ 4-wire 3-phase current, any load (inputs and outputs not used remain unconnected)



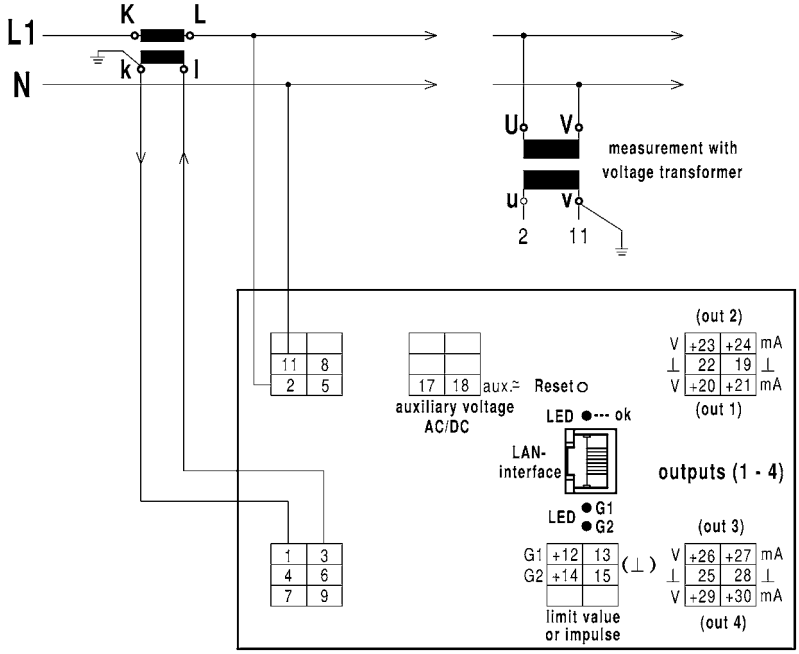
3-wire 3-phase current any load (inputs and outputs not used remain unconnected)



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

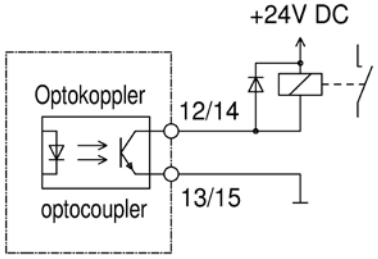


Alternating current (inputs and outputs not used remain unconnected)

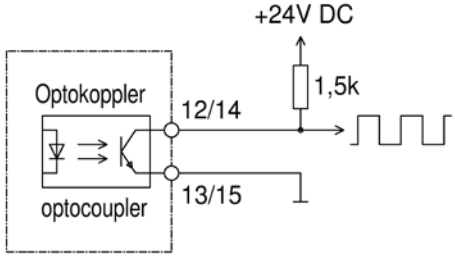


Limit value or pulsed output G1 and G2

Schaltausgang mit externem Relais
switching output with external relay



Impulsausgang mit Lastwiderstand
pulse output with load resistor



Notice

Notice

Notice

Notice

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

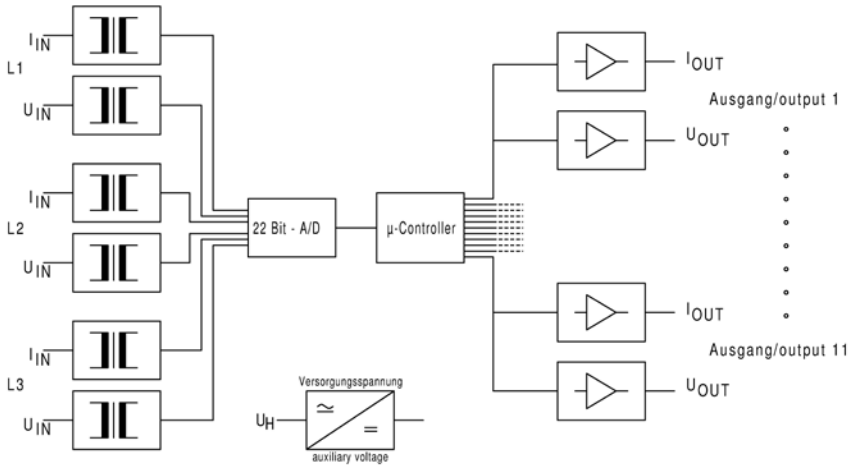
Type:
Multi-E11-MU

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.



Types and variants

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

Price group B

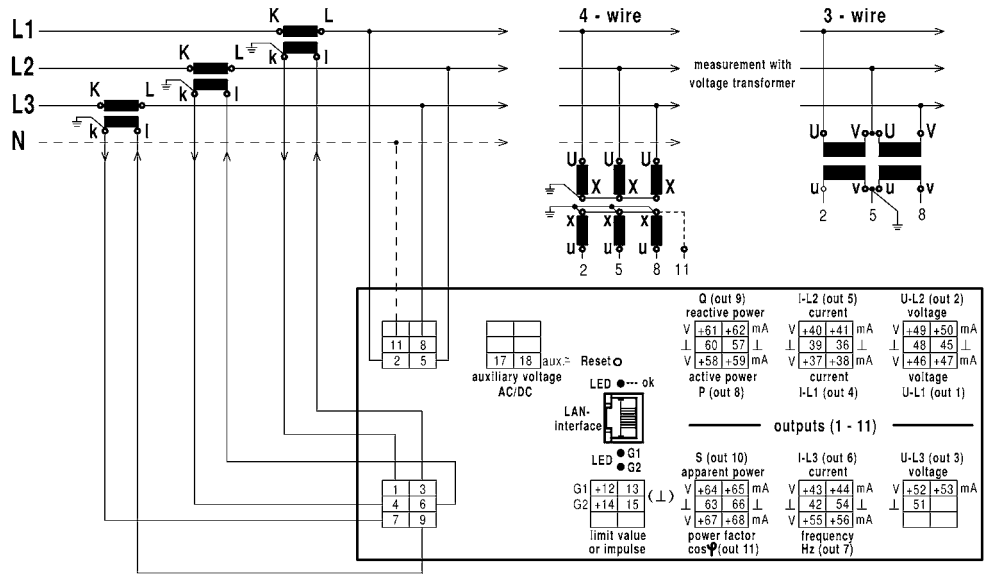
Technical data

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 5
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

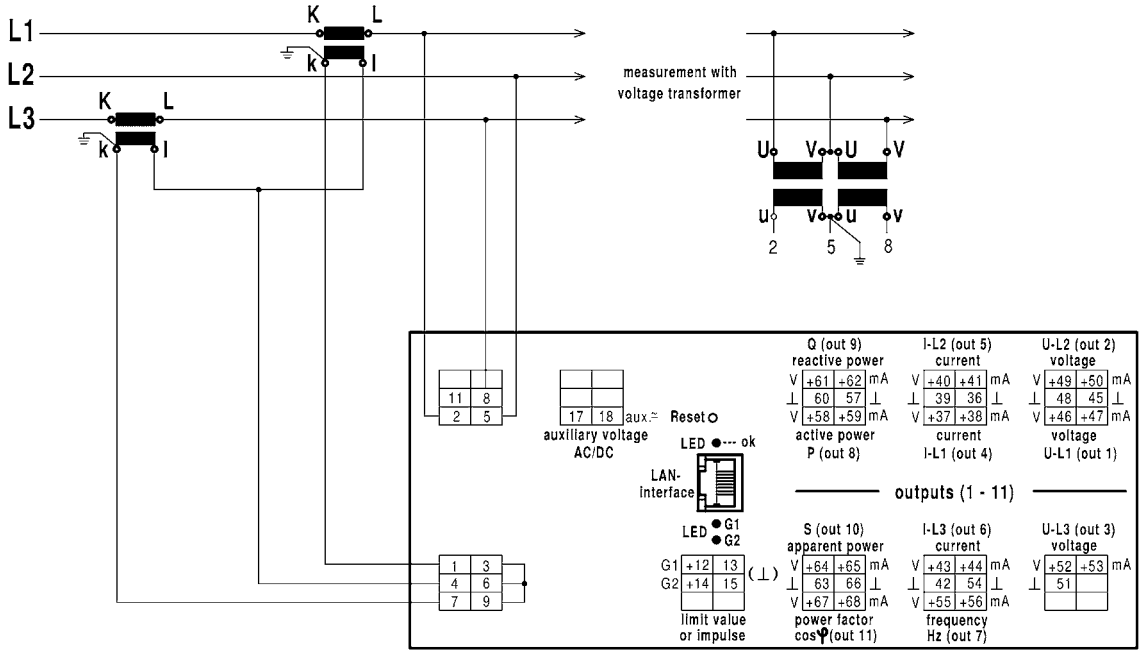
Calibration	The measuring transducer is factory-calibrated. The calibration should be renewed in the manufacturers plant every two years
Configuration	The measuring transducer is configured in the factory if the required data are known. A reconfiguration is possible at any time. This will require the 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

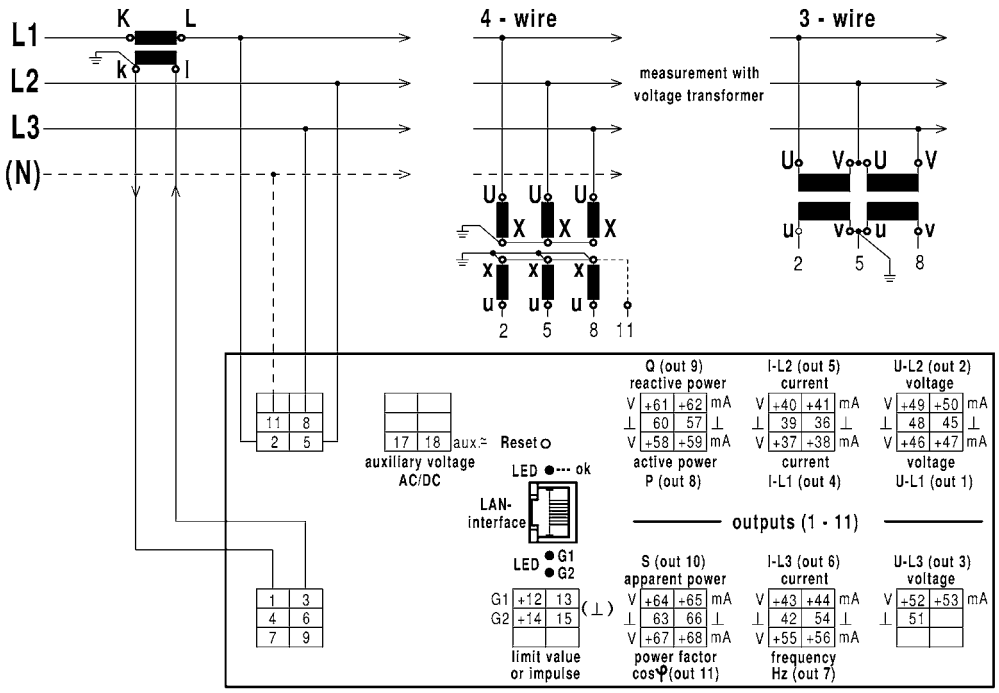
3-/ 4-wire 3-phase current, any load (inputs and outputs not used remain unconnected)



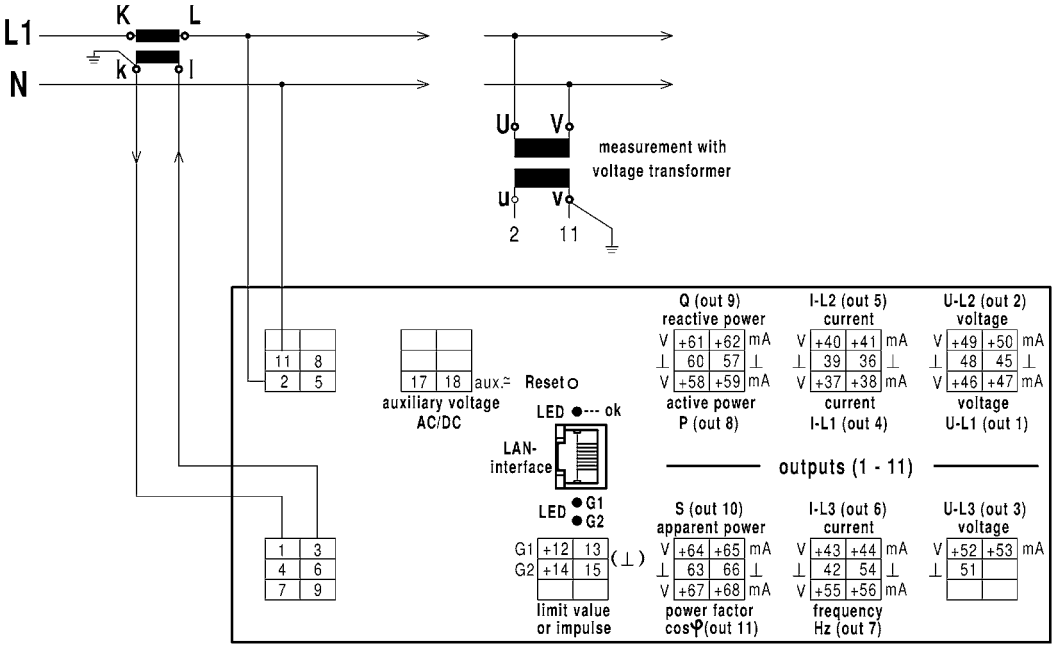
3-wire 3-phase current any load (inputs and outputs not used remain unconnected)



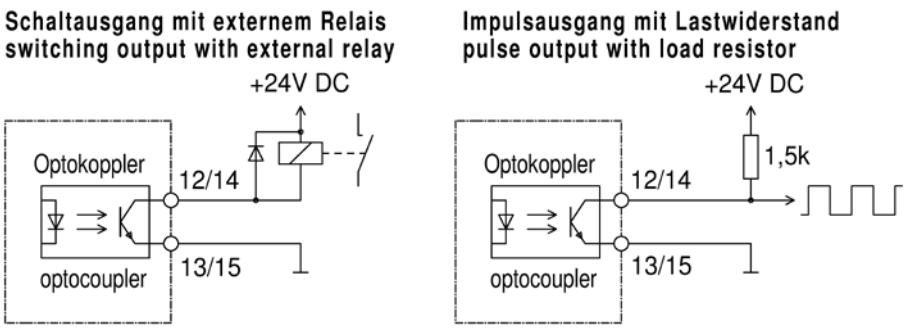
3- /4-wire 3-phase current same load (inputs and outputs not used remain unconnected)



Alternating current (inputs and outputs not used remain unconnected)



Limit value or pulsed output G1 and G2



Universal measuring transducer with Ethernet interface

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

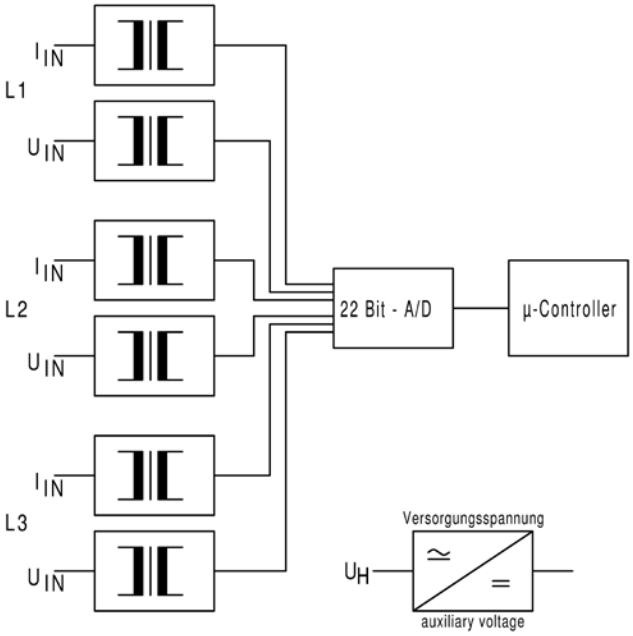
Type:
Multi-E-MU

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.



Types and variants

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

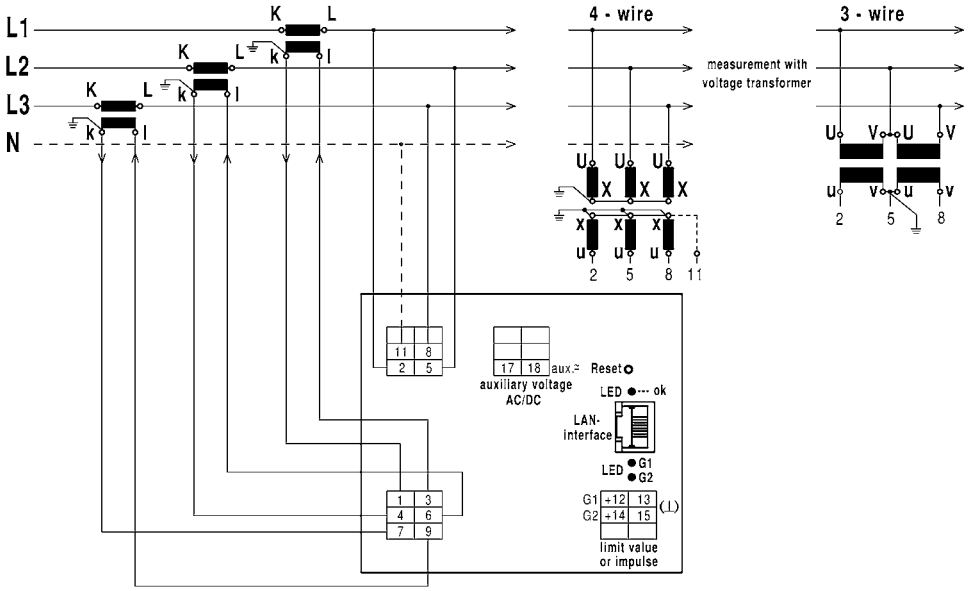
Price group B

Technische Daten

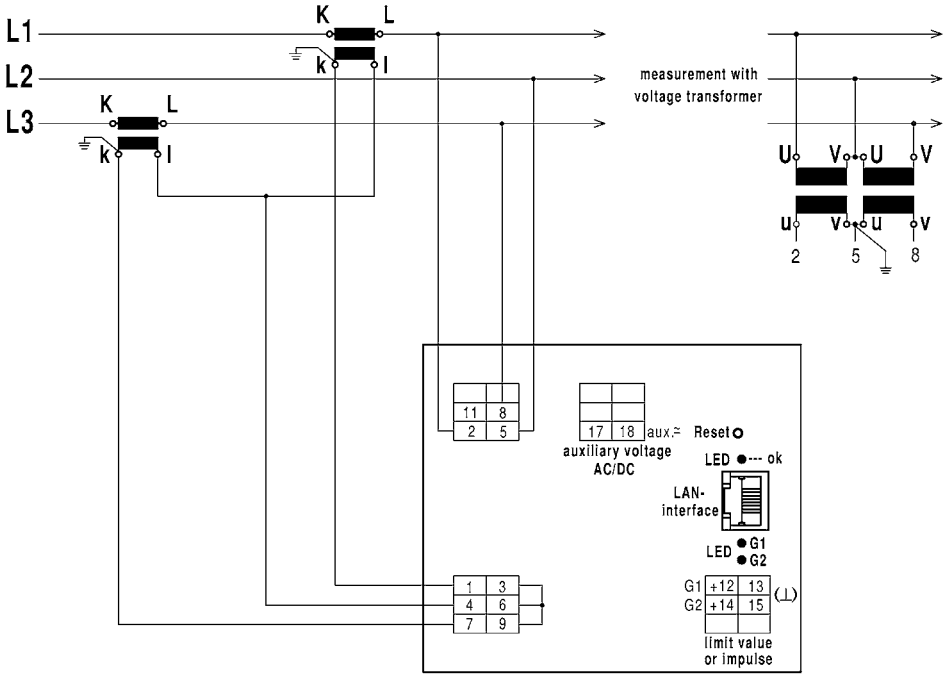
Input	Input variables	Alternating current and voltage, frequency, active power, reactive power apparent power and power factor in alternating current systems, 4-wire and 3-wire 3-phase power systems with same and any load, unidirectional and bidirectional energy direction, configurable
	Rated current	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 5
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

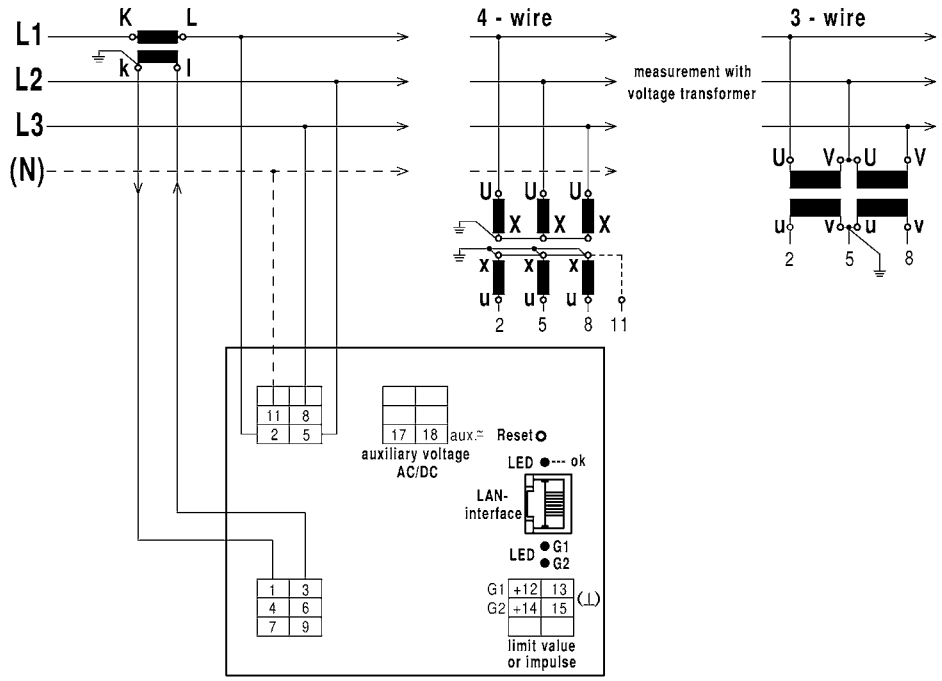
3-/ 4-wire 3-phase current, any load (inputs and outputs not used remain unconnected)



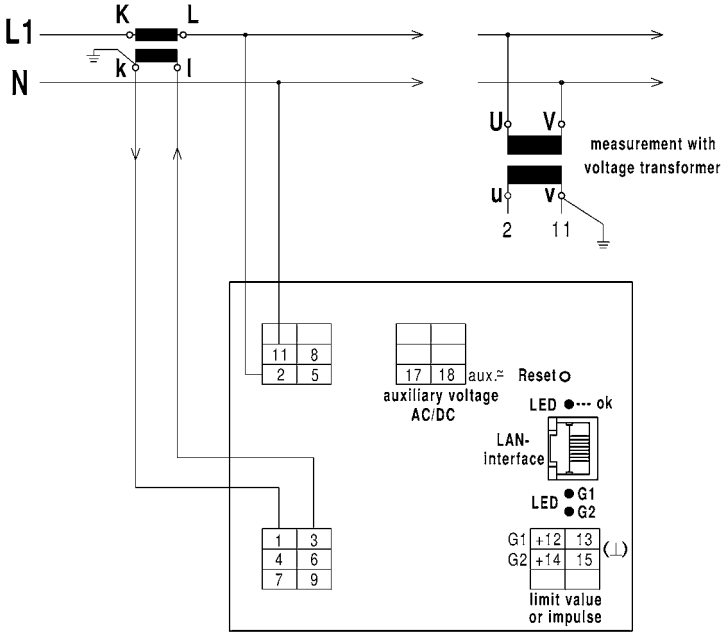
3-wire 3-phase current any load (inputs and outputs not used remain unconnected)



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

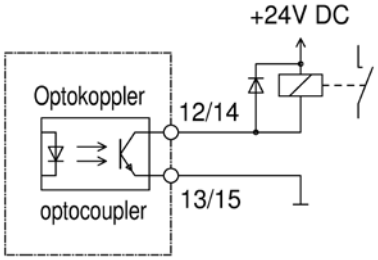


Alternating current (inputs and outputs not used remain unconnected)

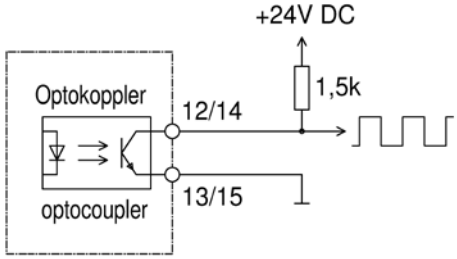


Limit value or pulsed output G1 and G2

Schaltausgang mit externem Relais
switching output with external relay



Impulsausgang mit Lastwiderstand
pulse output with load resistor



Measuring transdurcer for direct current power

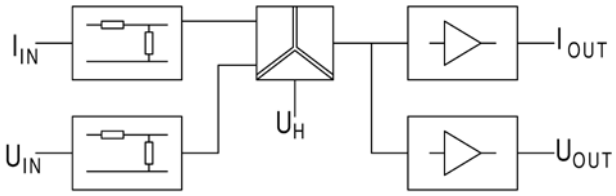
Type:
PGs-MU

Application

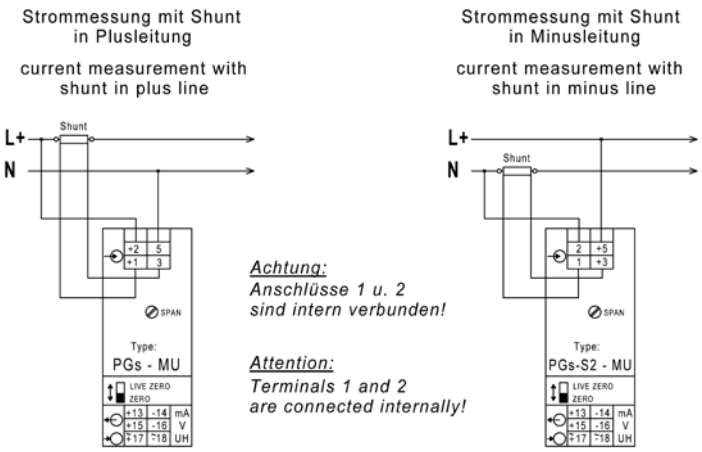
The measuring transducer PGs-MU is used for the transformation and isolation of a DC power into an impressed direct current and direct voltage signal. The calibrated double outputs are switchable between 0-20 mA and 0-10 V or 4-20 mA and 2-10 V.

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



Types and variants

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
Surcharges	Auxiliary voltage other than 230 V AC:
	24 V DC
	6-30 V AC + DC
	36-265 V AC + DC
	110 V AC
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 6)
Relay module	for limit monitoring Type GWM - (description page 7)

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 5
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 transdurcer for direct current power installations up to 1000 V (CAT III)

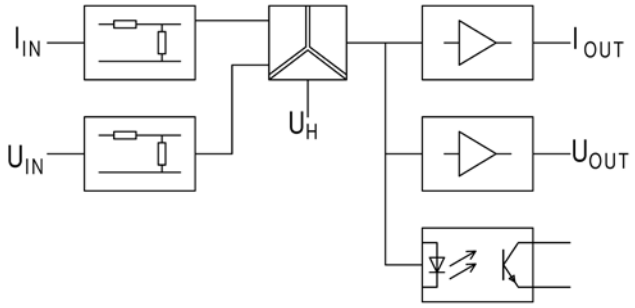
Type:
PGsT-MU

Application

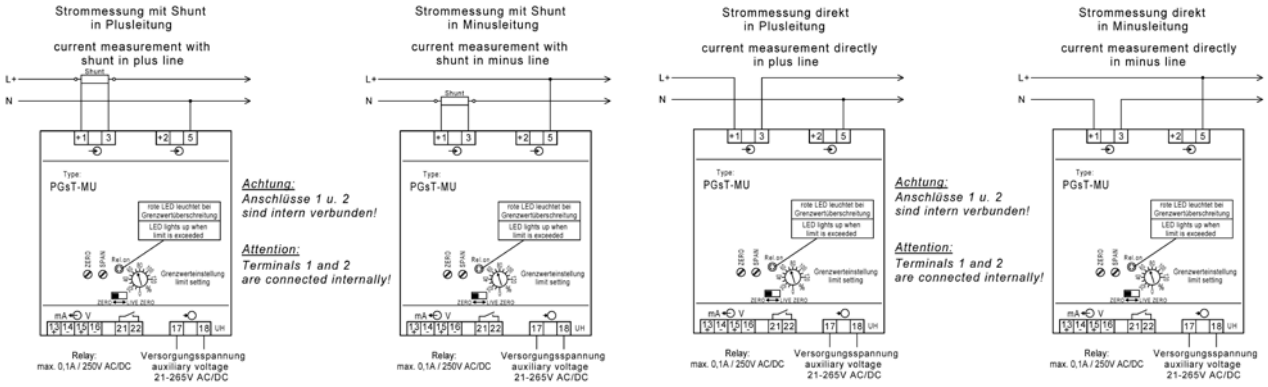
The measuring transducer PGsT-MU is used for the transformation and isolation of a DC power into an impressed direct current and direct voltage signal. An integrated limit monitoring serves for monitoring the input signal.

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



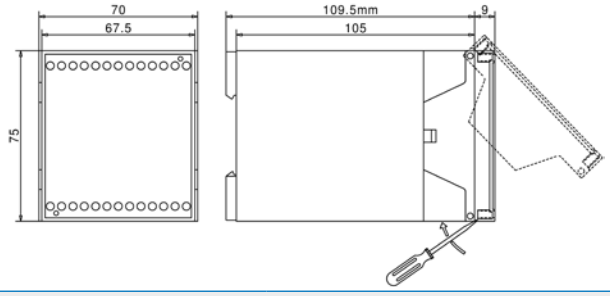
Types and variants

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
Surcharge	Bidirectional energy directions
	Note: There is no limit value monitoring with bidirectional energy direction!

Preisgruppe 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

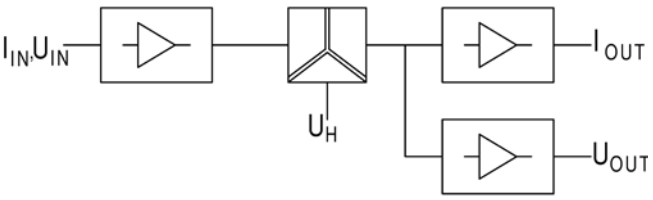
Type:
IgT-MU, UgT-MU

Application

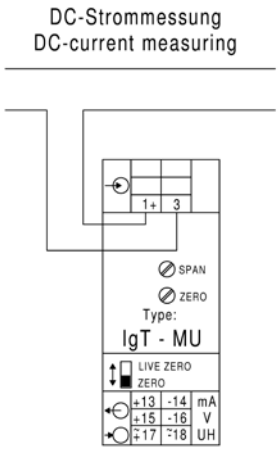
The measuring transducers IgT-MU and UgT-MU are used for the transformation and isolation of a direct current or a direct voltage into an impressed direct current and direct voltage signal. The calibrated double outputs are switchable between 0-20 mA and 0-10 V or 4-20 mA and 2-10 V.

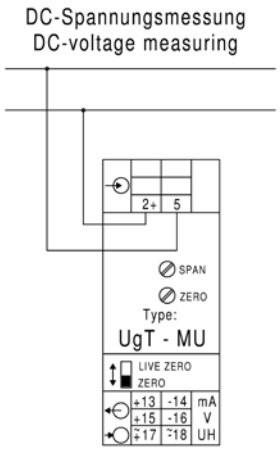
Function

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





Types and variants

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	
Surcharges	Input directly up to 10 A for Type IgT-MU	
	Sub-range	
	Response time < 200 µs	
	Input 4-20 mA	
	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)
	Class 0,2	
	Auxiliary voltage other than 230 V AC:	
	24 V DC	
	6-30 V AC + DC	
	36-265 V AC + DC	
	110 V AC	
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 6)	
Relay module	for limit monitoring Type GWM - (description page 7)	

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 5
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 direct current and direct voltage for installations up to 1000 V (CAT III)

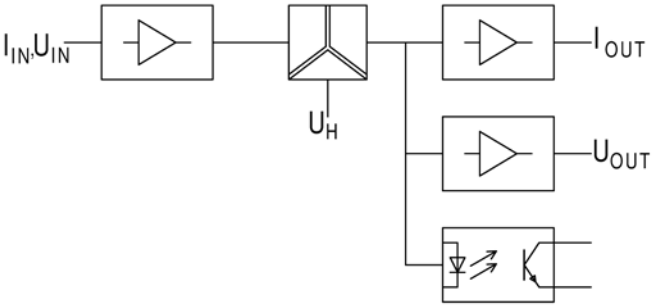
Type:
IgTT-MU / UgTT-MU

Application

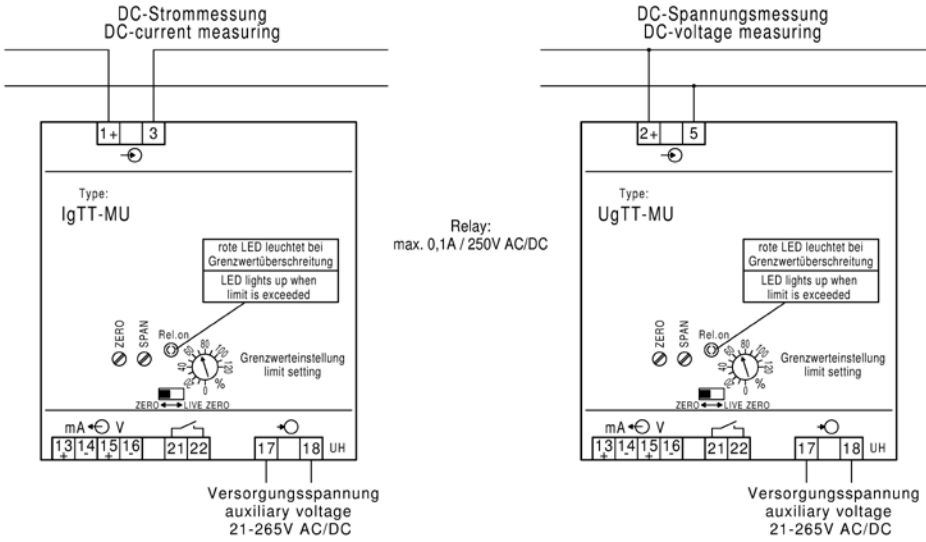
The measuring transducers IgTT-MU and UgTT-MU are used for the transformation and isolation of a direct current or a direct voltage into an impressed direct current and direct voltage signal. An integrated limit monitoring serves for monitoring the input signal.

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

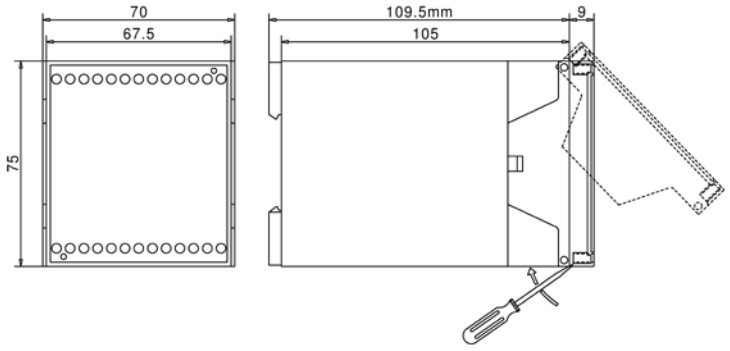


Types and variants

Input	**IgTT-MU**	a value from 0-100 µA to 0-5 A
	UgTT-MU	a value of 0-1500 V (other values on request)
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)

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

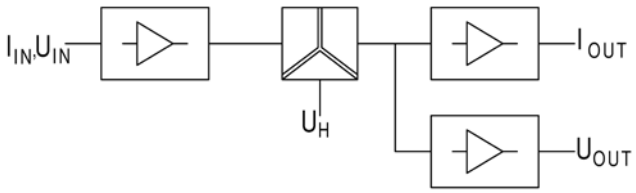
Type:
NgT-MU

Application

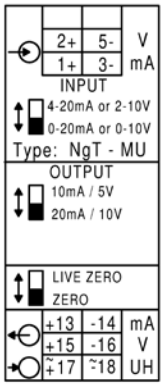
The measuring transducer NgT-MU is used for the transformation and isolation of a direct current or direct voltage standard signal into an impressed direct current and direct voltage signal. The calibrated inputs are selectable between the standard signals 0-20 mA, 4-20 mA, 0-10 V or 2-10 V. The calibrated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

Types and variants

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
	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
	6-30 V AC + DC
	36-265 V AC + DC
	110 V AC
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 6)
Relay module	for limit monitoring Type GWM - (description page 7)

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 5
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

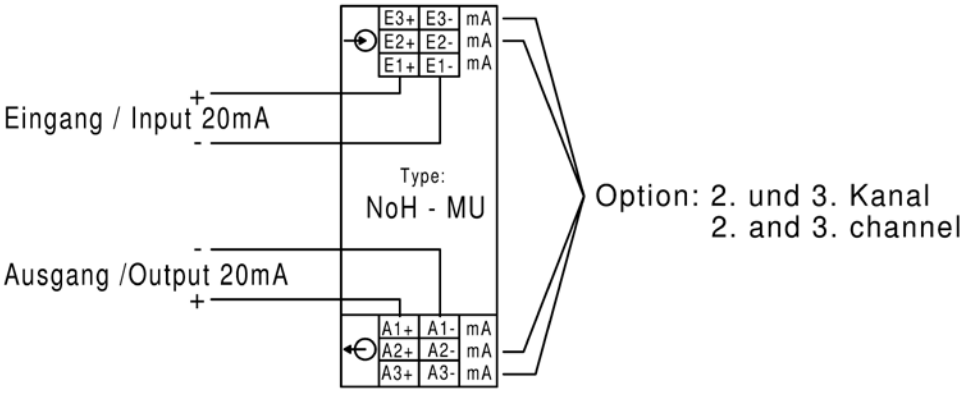
Application

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



Types and variants

NoH-MU	1 transmission channel
NoH-MU	2 transmission channels
NoH-MU	3 transmission channels

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 5
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 transdurcer for temperature

(resistance thermometer)

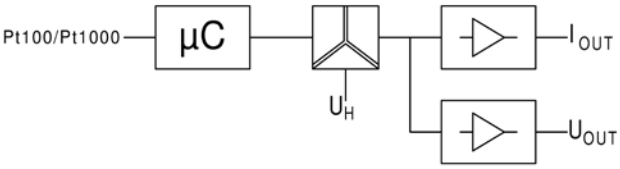
Type:
Pt-MU

Application

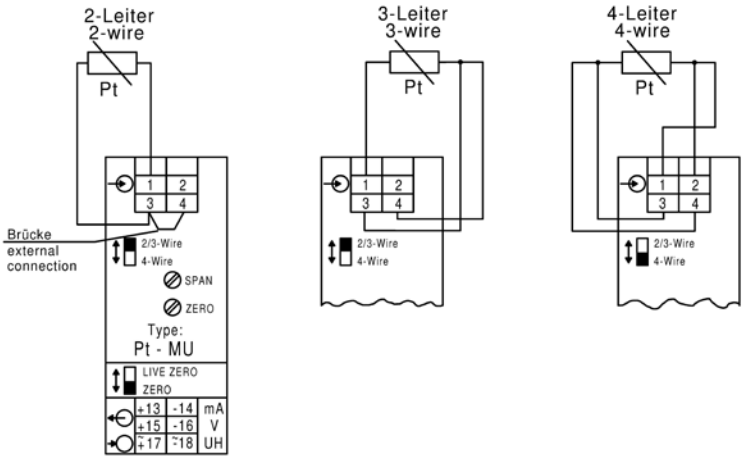
The measuring transducer Pt-MU is used for the transformation and isolation of a change in resistance due to the temperature into an impressed direct current and direct voltage signal. The calibrated double outputs are switchable between 0-20 mA and 0-10 V or 4-20 mA and 2-10 V.

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



Types and variants

Input	arbitrary temperature range between -200 ... +850 °C
	(please specify when ordering, minimum range 40K)
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
	Auxiliary voltage other than 230 V AC:
	24 V DC
	6-30 V AC + DC
	36-265 V AC + DC
	110 V AC
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 6)
Relay module	for limit monitoring Type GWM - (description page 7)

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 5
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 transdurcer for temperature

(thermocouple, according to DIN EN 60 584)

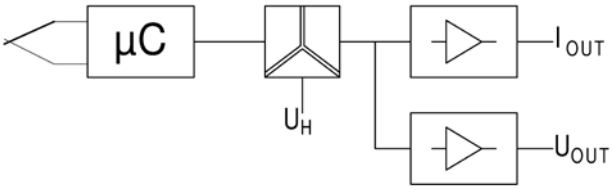
Type:
Th-MU

Application

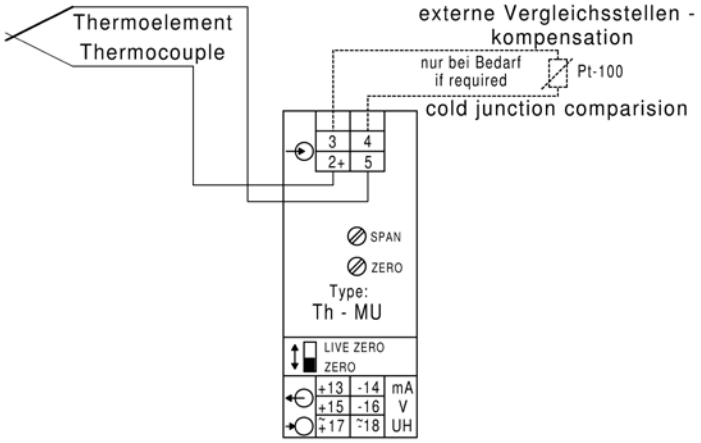
The measuring transducer Th-MU is used for the transformation and isolation of a temperature-dependent voltage of a thermocouple into an impressed direct current and direct voltage signal. The calibrated double outputs are switchable between 0-20 mA and 0-10 V or 4-20 mA and 2-10 V.

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



Types and variants

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)
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
	6-30 V AC + DC
	36-265 V AC + DC
	110 V AC
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 6)
Relay module	for limit monitoring Type GWM - (description page 7)

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 5
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

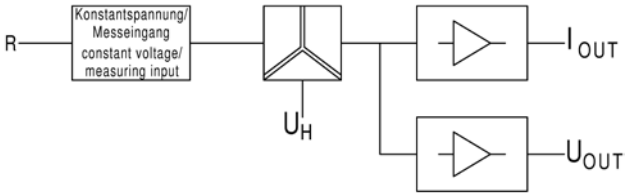
Type:
W-MU

Application

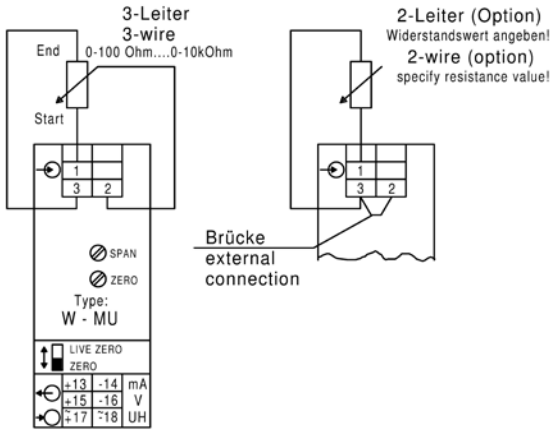
The measuring transducer W-MU is used for the transformation and isolation of a change in resistance into an impressed direct current and direct voltage signal. The calibrated double outputs are switchable between 0-20 mA and 0-10 V or 4-20 mA and 2-10 V.

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



Types and variants

Input	3-wire conductor: 0-100 Ω to 0-10 k Ω
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
	Auxiliary voltage other than 230 V AC:
	24 V DC
	6-30 V AC + DC
	36-265 V AC + DC
	110 V AC
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 6)
Relay module	for limit monitoring Type GWM - (description page 6)

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 5
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

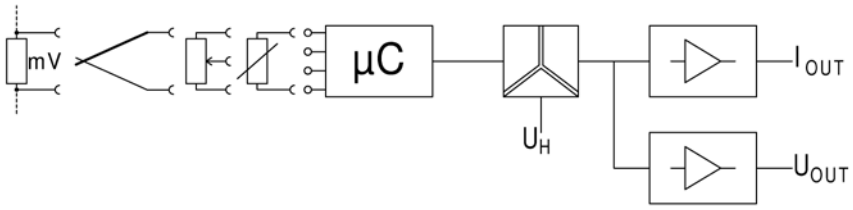
Type:
TSM-MU

Application

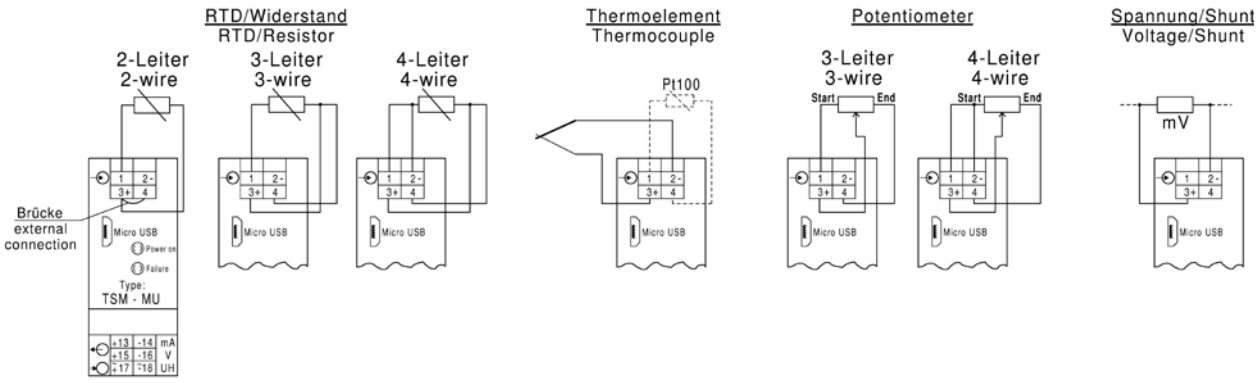
The measuring transducer TSM-MU is used for the transformation and isolation of measurements at thermocouples, resistance thermometers, resistors, potentiometers and voltage measurement (e.g. shunt). In case of measurements at resistors (e.g. Pt100), the connection (2-, 3- or 4-wire connection) is automatically 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



Types and variants

Input	Thermocouples, Pt100, Pt1000, resistor, potentiometer or voltage
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
	6-30 V AC + DC
	36-265 V AC + DC
	110 V AC
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 6)
Relay module	for limit monitoring Type GWM - (description page 7)

Price group B

Technical data

Input	Input variables	**Thermocouples** (DIN 60584-1) Type B +100 … +1820 °C, Type 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 5
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)

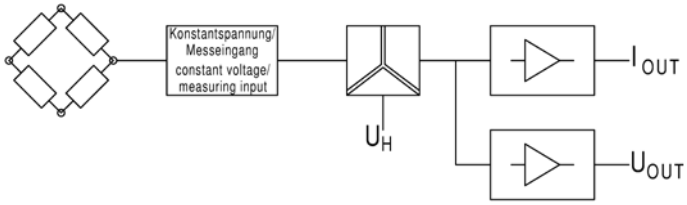
Type:
DMS-MU

Application

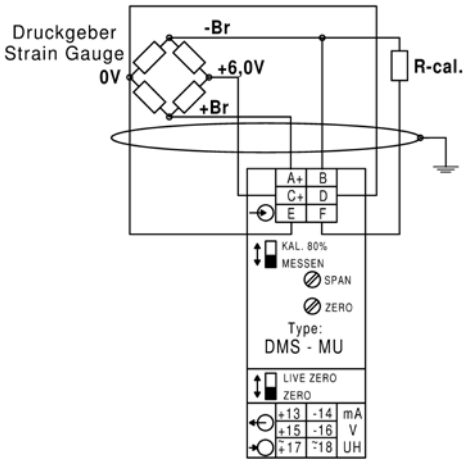
The measuring transducer DMS-MU is used for the transformation and isolation of the change in resistance of a 4-arm strain gauge full bridge into an impressed direct current and direct voltage signal. The calibrated double outputs are switchable between 0-20 mA and 0-10 V or 4-20 mA and 2-10 V.

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



Types and variants

Input	4-arm strain gauge full bridge with e.g. 350 Ω
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)
	Auxiliary voltage other than 230 V AC:
	24 V DC
	6-30 V AC + DC
	36-265 V AC + DC
	110 V AC
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 6)
Relay module	for limit monitoring Type GWM - (description page 7)

Price group B

Technische Daten

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 5
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

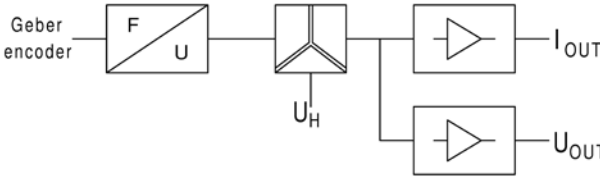
Type:
D-MU

Application

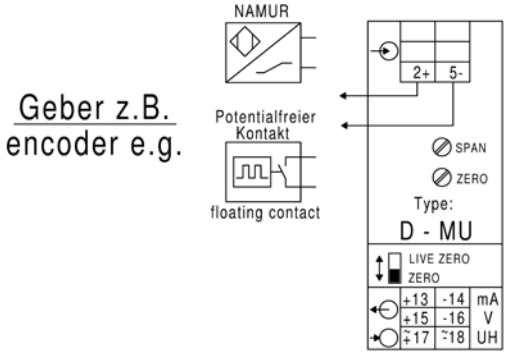
The measuring transducer D-MU is used for the transformation and isolation of a rotation speed into an impressed direct current and direct voltage signal.

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



Types and variants

Input	Rotation speed in a range of 1,6 to 1000 Hz (e.g. 1,6-100 Hz)
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
	6-30 V AC + DC
	36-265 V AC + DC
	110 V AC
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 6)
Relay module	for limit monitoring Type GWM - (description page 7)

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 5
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

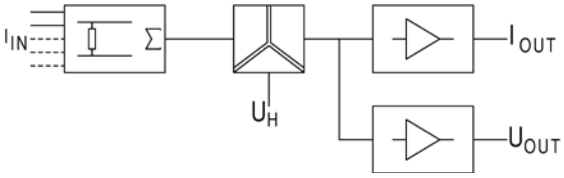
Type:
Sum-MU

Application

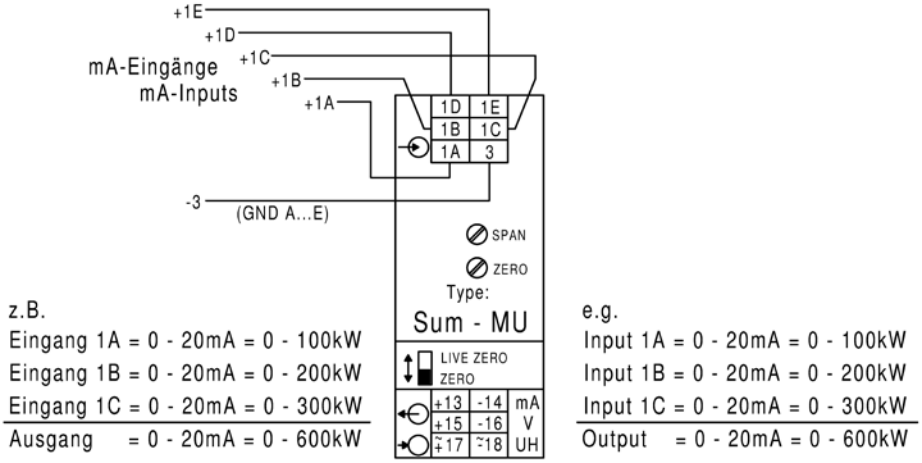
The measuring transducer Sum-MU is used for the transformation and isolation of the sum of several direct currents into an impressed direct current and direct voltage signal. The calibrated double outputs are switchable between 0-20 mA and 0-10 V or 4-20 mA and 2-10 V.

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



Types and variants

Input	(Please specify valences of the inputs to each other in the order)
	2 direct currents of: 0-20 mA
	4-20 mA
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)
	Auxiliary voltage other than 230 V AC:
	24 V DC
	6-30 V AC + DC
	36-265 V AC + DC
	110 V AC
Frequency module	Type FM (frequency output 0-5 Hz up to 0-10 kHz) - (description page 6)
Relay module	for limit monitoring Type GWM - (description page 7)

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 5
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

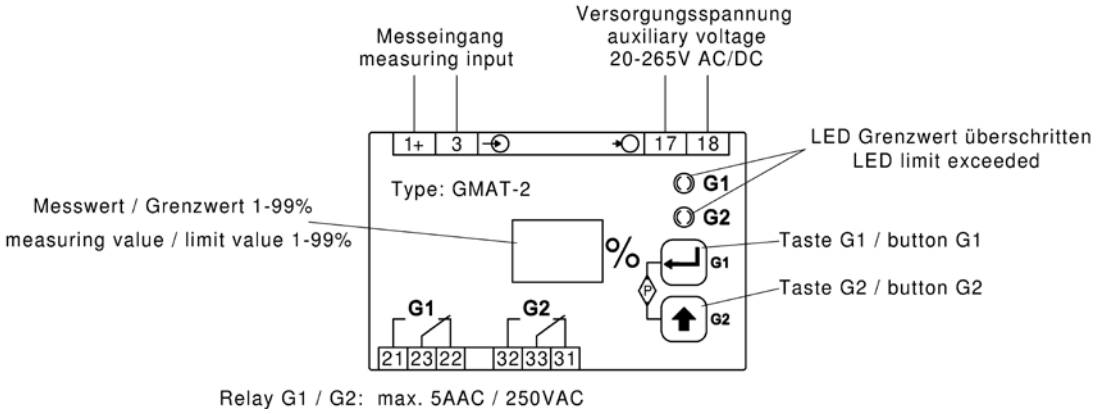
Application

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



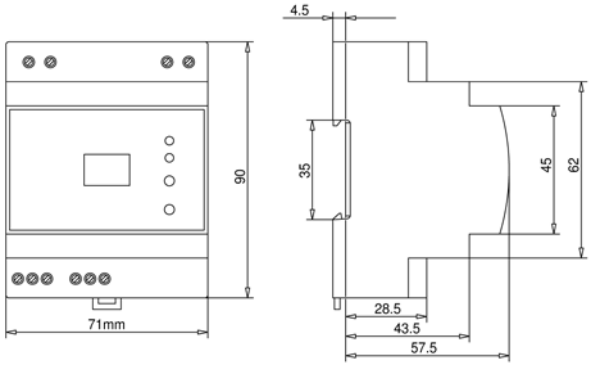
Relay G1 / G2: max. 5AAC / 250VAC

Types and variants

Input	DC
	AC + DC True RMS

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

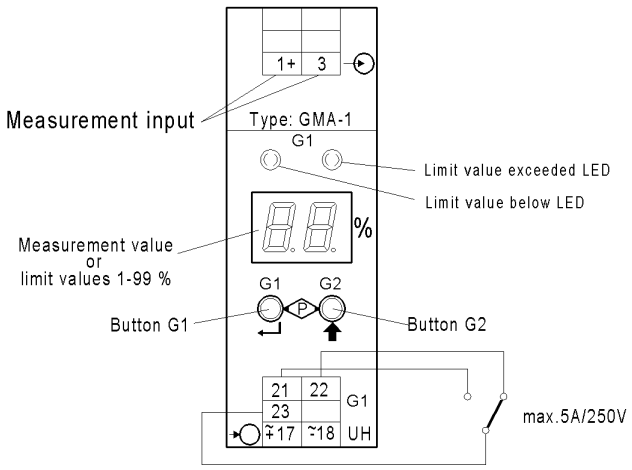
Application

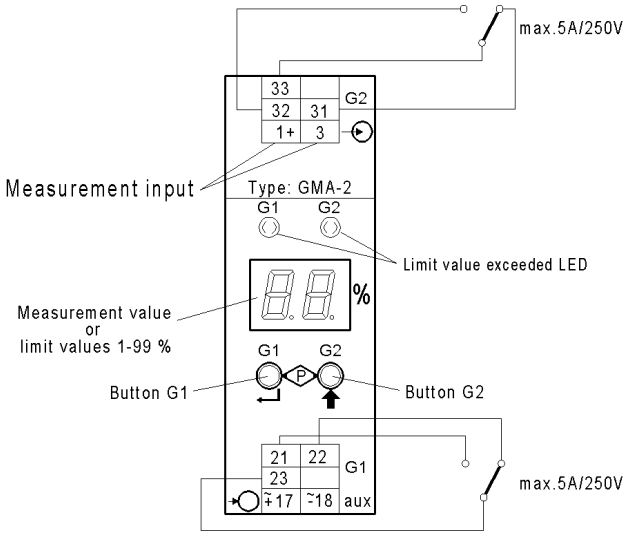
The electronic limit value relay GMA is used for monitoring the alternating or direct current as well as the alternating or direct voltage. The alternating current parameters are measured as TrueRMS value with arbitrary waveform. The measured value or the limit values are indicated in a 2-digit LCD display.

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





Types and variants

Input	**GMA-1**	DC
	(1 limit value)	AC + DC True RMS
	GMA-2	DC
	(2 limit values)	AC + DC True RMS
Surcharges	Auxiliary voltage other than 230 V AC:	
	24 V DC	
	6-30 V AC + DC	
	36-265 V AC + DC	
	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 5			
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 mm²			

Three-phase mains monitor

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

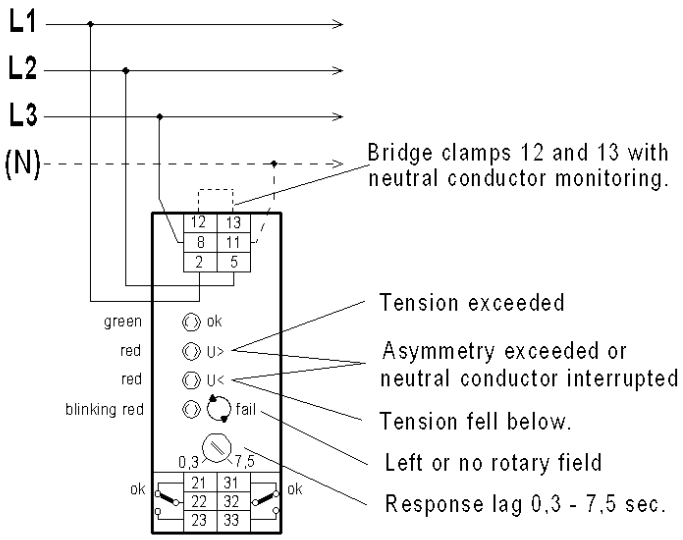
Application

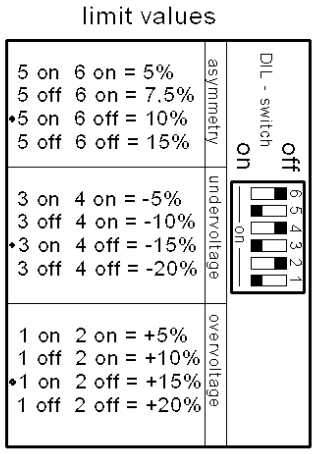
The three-phase mains monitor DNW is used for the comprehensive monitoring of a three-wire or four-wire power supply for phase failure, interruption of neutral, violation of the 3 phase voltages (above/below max/min value), asymmetry of the 3 phase voltages and the phase sequence (rotating field).

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





(•= factory setting)

Types and variants

Input	DNW 100 / DNW 400 / DNW 500 / DNW 690 three-phase mains monitor	€ 178,50

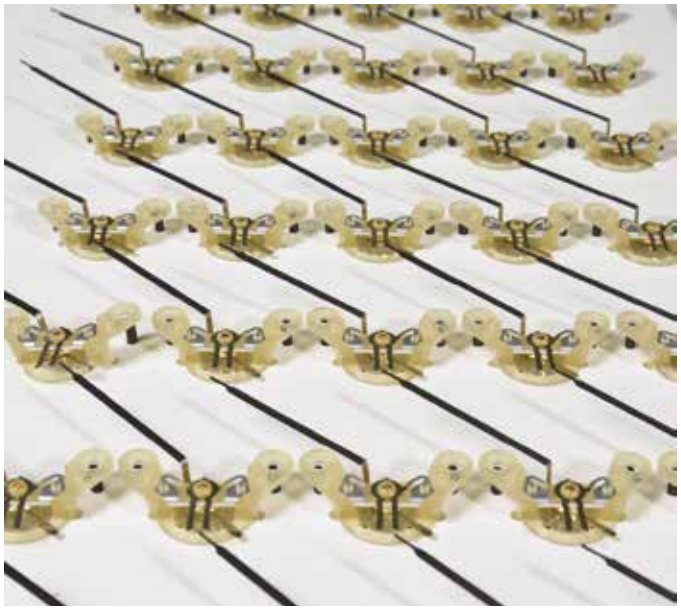
Price group B

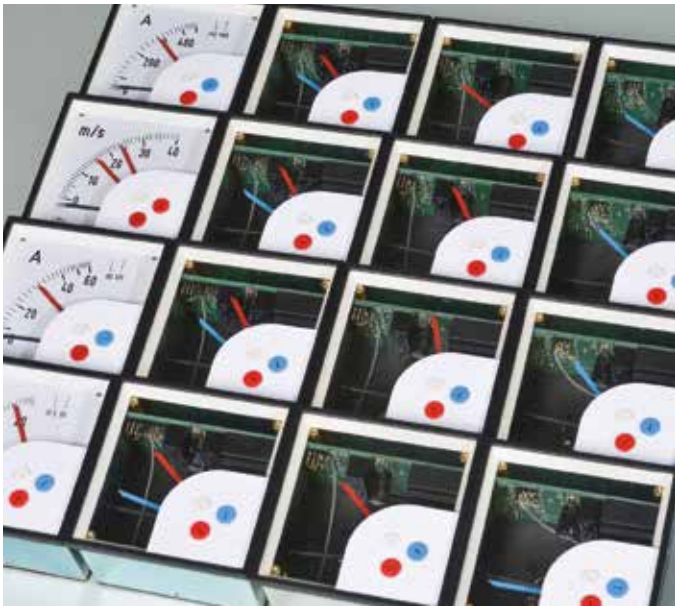
Technical data

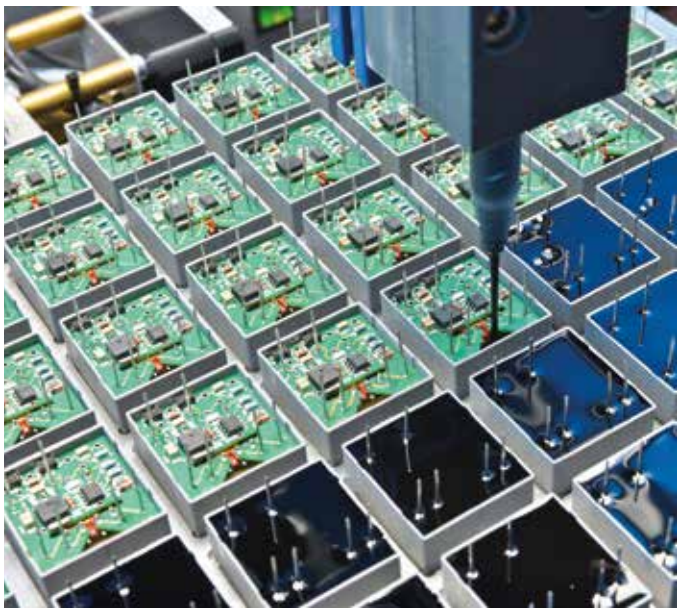
Input	Rated voltages	Type DNW 100 for 3 x 100 V, (without neutral) and 3 x 100/58 V, (with neutral) Type DNW 400 for 3 x 400 V, (without neutral) and 3 x 400/230 V, (with neutral) Type DNW 500 for 3 x 500 V, (without neutral) and 3 x 500/289 V, (with neutral) Type DNW 690 for 3 x 690 V, (without neutral) 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

Notice

Precision and service are the measure of all things







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