



## Measuring transducer for phase angle

Type:  
**Phwd-MU**



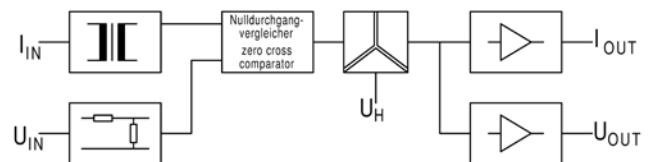
### Application

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.

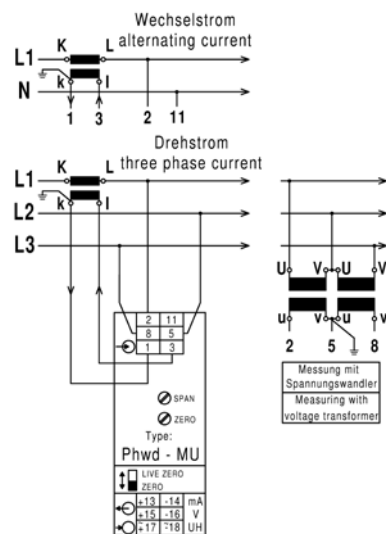


### Function

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

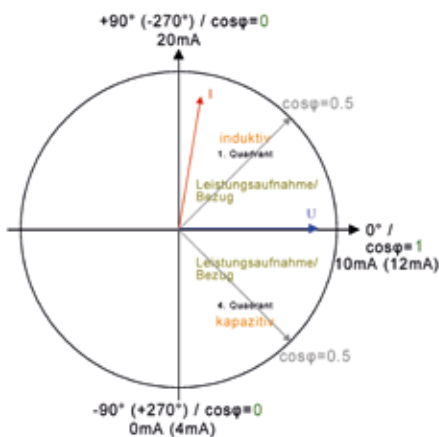
<b>Input</b>	<p><math>\cos \varphi</math> 0,5 cap - 1 - 0,5 ind or <math>\cos \varphi</math> 0,7 cap - 1 - 0,3 ind for alternating current and three-phase power system of the same load</p> <p>100 / 110 / 230 / 400 / 500 / 600 V</p> <p>1 A or 5 A</p>
<b>Output</b>	0-20 mA and 0-10 V as well as 4-20 mA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



## Technical data

<b>Input</b>	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 $\cos \varphi$ 0,5 cap - 1 - 0,5 ind or - 45,6° - 0 - + 72,5°, electrical $\cos \varphi$ 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 $\pm$ 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
<b>Output</b>	Output variables	double output
	Rated values	0-20 mA / 500 $\Omega$ load and 0-10 V / max. load 10 mA as well as 4-20 mA / 500 $\Omega$ load and 2-10 V / max. load 10 mA switchable on front side
<b>Transfer behavior</b>	Accuracy	$\pm$ 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 $\pm$ 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 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	< 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	
<b>Auxiliary voltage</b>		230 V AC $\pm$ 20 %, 45-65 Hz, 2,5 VA
	Options	● 110 V AC $\pm$ 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
<b>Dimensions</b>	Housing	Housing A, (22,5 mm wide) Page A1
<b>Weight</b>		200 g
<b>Installation</b>	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715
	Electrical connection	Screw terminal max. 4 mm <sup>2</sup>

**2 - Quadrantenbetrieb (Standard)**



**4 - Quadrantenbetrieb (Option)**

