



PHASE ANGLE TRANSDUCERS



Transducer Series M100

These transducers are designed to measure the phase angle in single phase or 3 phase, 3 or 4 wire networks at balanced load and to convert it to a standard DC output signal, which is directly proportional to the measured value. High-grade insulation between case, input, output and auxiliary voltage (if applicable) is provided as well as interference immunity. Input and output circuits are galvanically isolated and protected against damage by shock or permanent overload. The floating output signal is additionally fully protected against open or short circuited conditions and voltage transients. All products are supplied in flame retardant cases featuring such properties as self extinguishing, non-dripping and free of halogens.

Application	output signal proportional to phase angle	single phase 4 Quadrants	3-phase balanced load 2 Quadrants	3-phase balanced load 4 Quadrants
Type	case unit	M100-PA1	M100-PA2	M100-PA3
Weight	approx.	0.6 kg	0.6 kg	0.6 kg
Input	rated value $U_N \cdot I_N$	57 ... 500V	$57.8 \leq 100 / 110 / 230 / 400 / 500 \leq 600 \text{ V} \cdot 0.5 \leq 1 / 5 \leq 10 \text{ A}$	
	power consumption	voltage < 1.5 VA · current < 0,5 VA		
	working range	75-125 % U_N (self powered) · 15-125 % I_N		
	measuring range	$\pm 45 / \pm 60 / \pm 90 / \pm 180^\circ$	$\pm 45 / \pm 60^\circ$	$\pm 90 / \pm 180^\circ$
	rated frequency	50 / 60 / 400 Hz		
	frequency influence	0,005 % / Hz		
Overload	continuous	$1.5 \times U_N$ & $4 \times I_N$		
	for 1 sec	$4 \times U_N$ & $50 \times I_N$		
Output mA	rated value	0-1 / 5 / 10 / 20 & 4-20mA		
	load resistance	<15 / 3 / 1.5 / 0.75 k Ω		
Output V	rated value	0-5 / 10 V & 1-5 V		
	load resistance	> 1k Ω		
	load influence	< 0.1%		
	ripple	< 0.5 % peak-peak at full load		
	response time	< 200 msec for 0-90 % at full load		
	overload	< 2x rated value at full load		
	no load voltage	< 27 V		
Adjustment	zero	$\pm 2 \%$		
	span	$\pm 10 \%$		
Option Auxiliary	Auxiliary U_H	for working range 0 -125% U_N only		
	Voltage AC	115 / 230 / 400 V ($\pm 25\%$ (45 – 65 Hz) < 2VA)		
	Voltage DC	24 / 48 / 110 V ($\pm 20 \%$ / galv. isolated / <3 W)		
Accuracy	Class	$\pm 1^\circ$ comply with IEC 60688		
	calibration temperature	23°C $\pm 2\text{K}$		
	temperature coefficient	0,02 % / °C (200 ppm / °C)		
	stability	$\pm 0,05 \%$ per annum non cumulative		
	warm-up time	$\geq 15 \text{ min.}$		
Case	material	light grey polycarbonate comply with UL 94 V0		
	connection	screw terminals for 2x0.5 – 2.5 mm ²		
	terminal marking	numbering comply with DIN 43807		
	fixing	snap-on to rail 35x7.5 mm comply with DIN-EN 50022 / BS 5584		
	mounting	any position		
	enclosure code	case IP 50 / terminals IP 30 comply with IEC 529 / BS 5490 / DIN 40050		
Insulation	test voltage	4 kV RMS 50 Hz for 1 min.		
	impulse test	EMC 5 kV transient comply with IEC 801 / EN 55020		
	HF interference test	EHF 2.5 kV, 1 MHz comply with IEC 255-4		
	protection class	II. comply with IEC 348 / BS 4753 / DIN 57411/VDE 0411		
Climatic	working temperature	0 to +60 °C		
	function temperature	-25 to +70 °C		
	storage temperature	-55 to +85°C		
	humidity	$\leq 95\%$ RH non condensing		
	class of climate	HSE comply with DIN 40040 - 3 comply with VDE / VDI 3540		
Applied standards	general	IEC 60688 / BS 6253 / VDI/VDE 2192		
	safety	IEC 348 / BS 4753 / DIN 5741 1/VDE 0411 / ANSI C37		
	surge withstand	IEC 801 / EN 55020 / ANSI C37-90a		
	radio screening	RFI degree N comply with VDE 0875		

subject to change without notice

Order specification:

Phase angle transducer, 3-phase, balanced load, 2 Quadrants
 Range: $\pm 60^\circ$, Output: 0-20 mA, Power supply: 230V AC
 Class of accuracy: $\pm 1^\circ$

M100-PA2	$\pm 60^\circ$	0-20 mA	cl. $\pm 1^\circ$	230V AC
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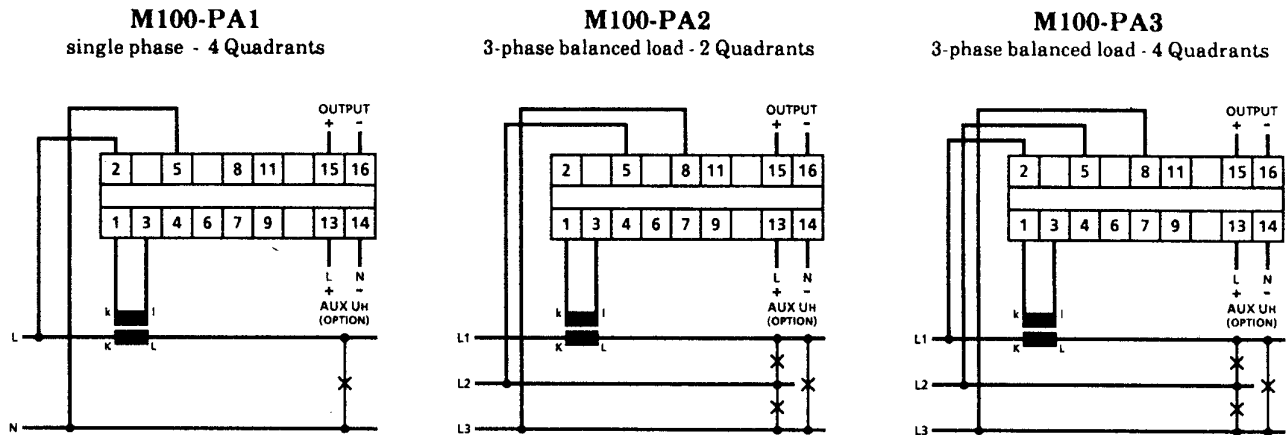


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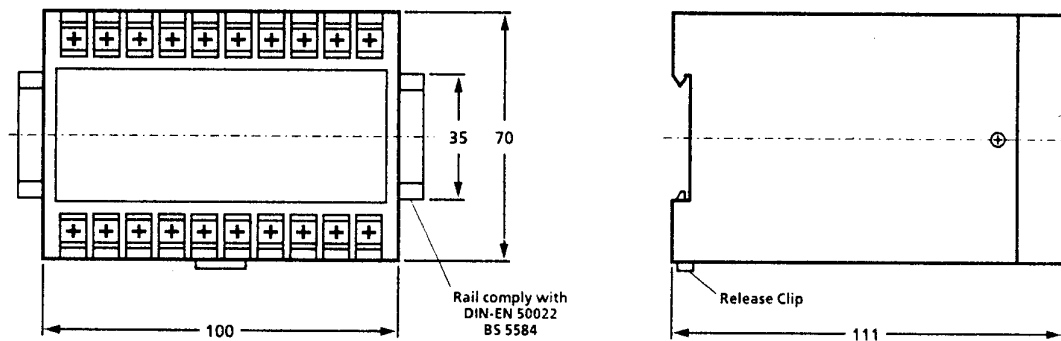


Transducer Series M100

Connection diagrams



dimension drawing in mm



Installation and safety instructions

All units are built and tested for safety, accuracy, quality and reliability according to the technical data and international standards of this specification.

These units are delivered fully calibrated and therefore no further adjustments are normally required. However trimming potentiometers (if applicable) are located under cover bungs on the front panel for adjustment the DC output signal - **ZERO and SPAN** if local conditions are found to be necessary.

Voltage dangerous to human life may be present at some of the terminals of this unit therefore exercise extreme caution. Ensure all supplies are de-energised before attempting any installation, connection or disconnection.

These units are designed for snap-on fixing to 35 mm-DIN-rails.

To snap-on a case on a rail, the top edge of the cutout on the back is hooked over one edge of the rail and the bottom edge carrying the release clip clicked into place. Check that the unit is firmly fixed. Removal or repositioning may be achieved by levering down the release clip and lifting the case up and off the rail.

This product must be installed by a qualified engineer. It is necessary to check label data and plant wiring before commissioning. These units require no service but routine attention. If a malfunction is observed, the unit must be de-energised and forwarded to authorised service facility. The unit must be separated from all voltage sources before opening. If it is necessary to make any service on the open unit with voltage connected, it must be done by a qualified engineer only.