

# TRANSDUCERS

## TRANSDUCER FOR PHASE ANGLE MEASUREMENT

- Unipolar output characteristic
- Bipolar output characteristic
- Live zero output

Complies with IEC60688



Figure 1 - DINA Housing

This transducer produces a DC current or voltage signal proportional to the phase angle between the voltage and current inputs. This signal may be used to drive a number of remotely installed instruments.

Depending on the application, versions of this transducer are available for single phase or three phase measurement (3 or 4 wire balanced load).

The output is protected against over-voltages due to surges, accidental contact with insulation testers or mains supply.

It should be noted that this transducer measures phase angle, NOT power factor (  $\cos(\text{phase angle})$  ). Instruments can be supplied that are calibrated to indicate power factor.

The extremes of measurement are approximately  $\pm 66$  degrees, which corresponds to a power factor of lead 0.4 - 1 - 0.4 lag.

## MODE OF OPERATION

Refer to Figure 2.

The voltage and current signals are transformed in (1) and (2) and fed to the comparator (6). The auxiliary supply is transformed in VT (4), rectified and smoothed in regulator (5) and then used to power the comparator (6) and amplifier (7). The comparator (6) utilizes the zero crossings of the voltage and current waveforms to produce a pulse train, the pulse width being proportional to the phase angle at that instant. The amplifier (7) smooths and amplifies this signal to produce the transducer output.

The voltage phase shift of  $90^\circ$  (3) is required only in the case of single phase measurement.

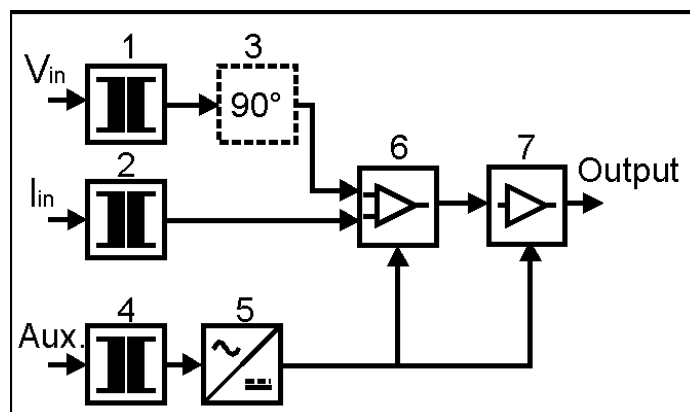
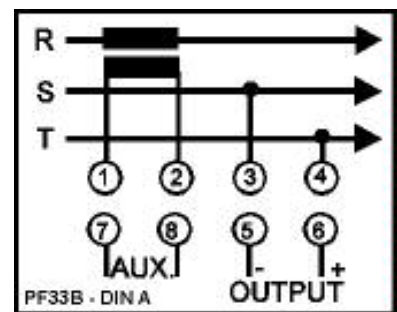
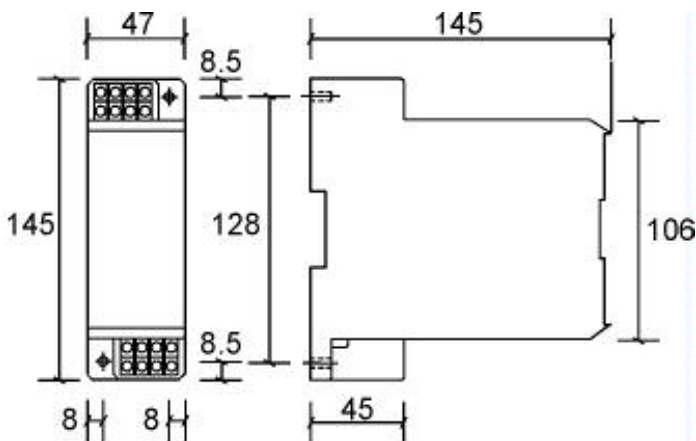


Figure 2 - Block Diagram

## TECHNICAL DATA

<b>1. Input</b>		
Voltage:	All standard values up to 600V. Burden - 2.5mA maximum. Overload in terms of rated input - 1.73x indefinitely 2.5x for 10 secs	Impulse tests between isolated sets of terminals: Voltage withstand rating between sets of terminals: Power voltage across output: Surge across output terminals: Personal hazard:
Current:	0.1 - 1A, 0.5 - 5A (other values on request) Burden - 0.3VA at rated input Overload in terms of rated input - 1.2x indefinitely 40x for 0.5 secs	5kV (0.5J 1.2/50 wave) IEC standard  4kV 50Hz for 1 minute 220V 50Hz indefinitely 5kV 25J 1kV 4J Enclosure IP40 Terminals IP20 Double insulated, no lethal potentials exposed with top cover removed.
Frequency:	45 - 55 - 65 Hz	
<b>2. Output</b>		
Characteristic:	A or B or D or E	Working temperature: -25 to 13 to 33 to 55°C
Output quantity:	Impressed current signal (voltage signal on request)	Storage temperature: -55 to 75°C above dewpoint 80%
Standard values:	1, 5, 20mA unipolar (bipolar on request)	Variation due to external magnetic field (worst case): 0.05% at 400A/m 50Hz
Maximum load:	500 Ohm at 20mA (other values on request)	Position: Surface mounting in any position indoors.
Maximum output voltage:	15VDC (18VDC on request)	
Maximum output current:	1.25x rated (typical) 2.0x rated (maximum)	
Ripple:	0.5% standard	
Response time:	210ms standard	
<b>3. Auxiliary power supply</b>		
Voltage:	110 or 220V 50Hz ±20% (other values and DC on request)	
Burden:	2.0VA at rated output	
<b>4. Accuracy</b>		
Error limit at rated conditions:	±1% of range at 20 C and 45-55 Hz	
Linearity error:	0.1%	
Long term drift:	0.25%	
Temperature shift:	400ppm/ C	
Variation with auxiliary supply:	0.05% for ±20% variation	
<b>5. Protection</b>		
<b>6. Physical constraints</b>		
<b>7. Enclosure</b>		
DIN A:		
Terminals:		ABS Double screw cage. Plated. Rated 10A. 2x2.5mm <sup>2</sup> or 1x6mm <sup>2</sup> cable. DIN rail type 35/15 or chassis
Mounting:		

## Dimension and connection diagrams



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