Ref: IW256TPB/B/S/T – Rev 7 – March 02

Paladin Transducers
Class 0.5 Series 250
Phase Angle

Products Covered

256-TPA - Phase Angle Single Phase 180º - 0 - 180º
256-TPB - Phase Angle 3 Phase 180º - 0 - 180º
256-TPT - Phase Angle 3 Phase 0.5 - 1 - 0.5
or 0.2 - 1 - 0.8
256-TPS - Phase Angle Single Phase 0.5 - 1 - 0.5
or 0.2 - 1 - 0.8

Introduction

The phase angle transducer measures the phase angle between current and voltage and gives an output proportional to the phase angle. Zero and span adjustments are accessible without opening the unit.
The cases may be DIN rail mounted or screw fixed.

Installation

Units should be installed in a dry position, not in direct sunlight and where the ambient temperature is reasonably stable and not outside the range 0 to 60ºC. Mounting will normally be on a vertical surface but other positions will not affect operation. Vibration should be kept to a minimum, These units are designed for mounting on a 35mm rail to DIN 46277. Alternatively, they may be screw fixed.

To mount on a DIN rail, the top edge of the cutout on the back is hooked over one edge of the rail and bottom edge carrying the release clips 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 unit up and off the rail.
Connection diagrams should be carefully followed to ensure correct polarity and phase rotation. External current and voltage transformers may be used to extend the range. Connection wires should be sized to comply with applicable regulations and codes of practice. These products do not have internal fuses therefore external fuses must be used for safety protection under fault conditions.

Fusing and connections

- This unit must be fitted with external fuses in voltage and auxiliary supply lines.
- Voltage input lines must be fused with a quick blow fuse 1A maximum.
- Auxiliary supply lines must be fused with a slow blow fuse rated 1A maximum.
- Choose fuses of a type and with a breaking capacity appropriate to the supply and in accordance with local regulations.

Screw torque

Main terminal screws should be tightened to 1.35Nm or 1.0 ft/lbf only. Detachable terminal connector screws should be tightened to 0.9Nm or 0.7 ft/lbf only. Where fitted, terminal covers are held in place by miniature self tapping screws into plastic. These screws should be tightened by hand only, sufficiently to secure the terminal cover and prevent it vibrating.

Electromagnetic Compatibility

This unit has been designed to provide protection against EM (electro-magnetic) interference in line with requirements of EU and other regulations. Precautions necessary to provide proper operation of this and adjacent equipment will be installation dependent and so the following can only be general guidance:-

- Avoid routing wiring to this unit alongside cables and products that are, or could be, a source of interference.
- The auxiliary supply to the unit should not be subject to excessive interference. In some cases, a supply line filter may be required.
- To protect the product against incorrect operation or permanent damage, surge transients must be controlled. It is good EMC practice to suppress differential surges to 2kV or less at the source. The unit has been designed to automatically recover from typical transients, however in extreme circumstances it may be necessary to temporarily disconnect the auxiliary supply for a period of greater than 5 seconds to restore correct operation.
- Screened communication and small signal leads are recommended and may be required. These and other connecting leads may require the fitting of RF suppression components, such as ferrite absorbers, line filters etc., if RF fields cause problems.
- It is good practice to install sensitive electronic instruments that are performing critical functions in EMC enclosures that protect against electrical interference causing a disturbance in function.

For assistance on protection requirements please contact your local sales office.

Commissioning

The units are calibrated at the factory for full accuracy. No further adjustments are required. Zero and span adjustment where provided are under the bungs on the front panel. Trimming these will degrade the accuracy of this transducer, but may be used to compensate for local conditions.

Typical Applications

For measuring phase angle between current and voltage to ensure power factor correction is optimised. For large variations use the auxiliary powered version. Self-powered units permit voltage variations upto ±20%.

Operation

For use on most single phase balanced systems, this unit measures phase angle and provides milliamp output proportional to angle. Current and voltage inputs are fed to separate zero crossing detectors and resultant pulses are fed to bistable comparator. The output from this is filtered and then amplified to give a dc output directly proportional to the phase angle.

Low Voltage Directive:- This product complies with BSEN61010-1.

Warning

- During normal operation, voltages hazardous to life may be present at some of the terminals of this unit. Installation and servicing should be performed only by qualified, properly trained personnel' abiding by local regulations. Ensure all supplies are de-energised before attempting connection or other procedures.

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INSTALLATION INSTRUCTIONS

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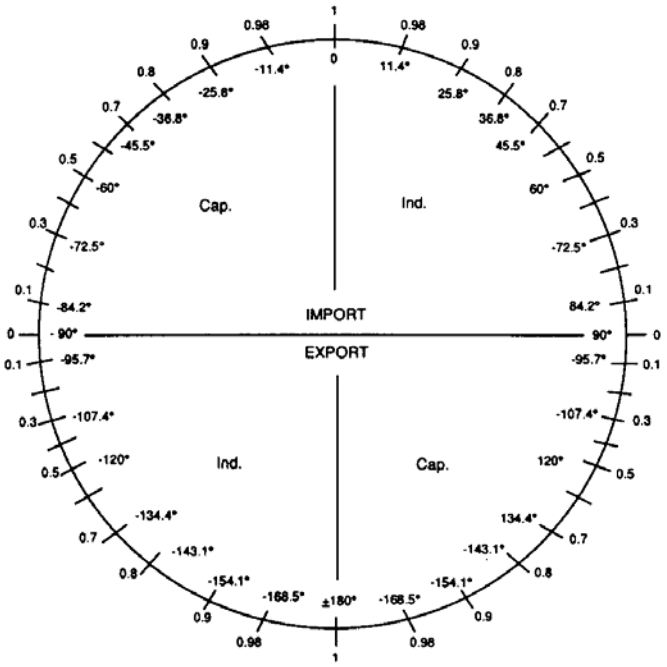
- It is recommended adjustments be made with the supplies de-energised, but if this is not possible, then extreme caution should be exercised.
- Terminals should not be user accessible after installation and external installation provisions must be sufficient to prevent hazards under fault conditions.

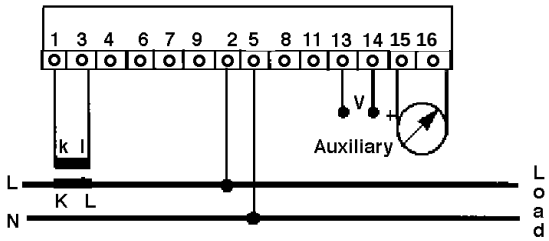
Maintenance
No routine maintenance is required. Should repair be necessary it is recommended that the transducer be returned to the factory or to the nearest Crompton Instrument Service Centre.

Conversion to P.F.
The transducer output, if displayed on an analog meter, produces an inconvenient non-linear scale. Computer users may find the need for a linearising program. Other transducers are available from Crompton Instruments with a linearised output if required.

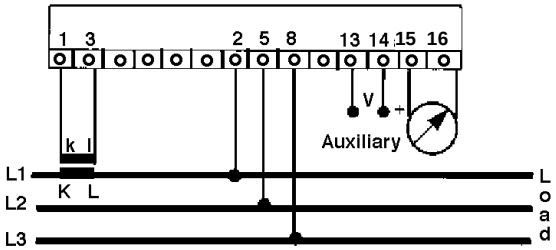


Connection diagrams

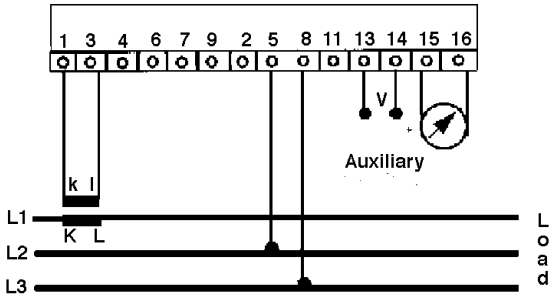
256TPA/TPS
Phase angle single phase

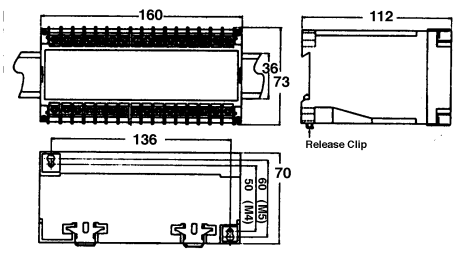


256TPB
Phase angle 3 phase



256TPT
Phase Angle 3 Phase





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