

Description

The PPA Phase Angle Transducer precisely measures the phase angle between a voltage and a current input from a single- or three-phase power circuit. It also is ideal for measuring the phase angle between two isolated voltage circuits.

User-selectable for single- and three-phase operation, the PPA accepts voltage inputs or a combination of voltage and current inputs. It provides a highly accurate milliamp output for interface with a readout device or power monitoring system.

The PPA's linearly proportional dc output may be specified as a bipolar signal to indicate both leading and lagging phase angle, or as a unipolar signal to indicate either leading or lagging only. The PPA has a full four quadrant capability. Phase angle spans are available from $\pm 30^\circ$ to $\pm 180^\circ$.

Control power is derived from the measured input (self-powered). Optionally available are PPA versions that accept ac power from an external source (auxiliary-powered), or dc power in series with the output (loop-powered).

Both single- or three-phase configurations are offered to handle 2-, 3- or 4-wire power systems.

Easy Installation and Maintenance—The PPA is enclosed in a rugged, rustproof extruded aluminum housing that provides superior heat dissipation. Keyhole cutout screw holes allow installation and removal simply by loosening the mounting screws.

All circuitry is attached to the unit's front panel to allow quick access to the circuitry without removing the entire housing. The circuit board slides smoothly out of the housing on PC board guides that run the entire length inside the unit's housing.



Keyhole cutout screw holes make installation and maintenance quick and simple.

Features

- **Highly accurate.** $\pm 0.5^\circ$ of phase angle accuracy makes the PPA ideal for demanding applications. Its high accuracy is an advantage when using the voltage/voltage input for synchronizing two voltages across an open breaker.
- **Integral LCD.** The PPA can be ordered with an easy-to-read LCD (-DSP option) that accurately shows the current phase angle value in degrees. It eliminates the need for test instruments when making local verification of output.
- **Versatile operating parameters.** A wide selection of input spans, outputs, and power configurations make the PPA the perfect choice for almost any application.
- **Transient protected.** Surge limiters provide superior input and output surge protection.
- **Constant current output.** Even if the input load changes, the PPA provides a stable, constant current output.

Specifications

<p>Characteristics</p> <p>Performance Accuracy: ±0.5% or ±0.1 power factor Stability: ±0.1% of reading per year Dielectric Test: 2000 Vrms between input/output/power/case for 1 minute (with -RS232C and RS485 options, 1500 Vrms) Output Ripple: 0.1% peak of full-scale at maximum span and load</p>	<p>Performance (continued)</p> <p>Burden: Voltage = 0.2VA with auxiliary power; 4VA with self-power; Current = 0.4VA Surge Withstand Capability: SWC meets ANSI-C37.90a-1974 (IEEE 472) Response Time: 400ms to 99% of output Output Compliance: 15V Overload: Voltage, 1.5 times nominal input voltage; Current, see Table 1</p>	<p>Ambient Temperature Range: -40°C to 80°C (-40°F to 176°F) Effect: ±0.01%/°C (±0.005%/°F)</p> <p>External Adjustments Type: Multiturn potentiometers Span: Adjusts 10% of span Zero: Adjusts ±2% of span</p> <p>Internal Adjustments Solderless Jumpers allow selection of single-phase or three-phase operation</p> <p>Weight 1 pound, 14 ounces</p>
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Ordering Specifications

Unit	Input	Output	Angle/Factor	Options	Housing
<p>PPA</p> <p><i>CB</i> <i>7D</i></p> <p>1P 3P</p>	<p>Current/Voltage inputs (specify one each Voltage, Current and Circuit Type): <u>Voltage</u> 69AC (50-90Vac) 120AC (85-150Vac) 240AC (170-300Vac) 460AC (300-575Vac) 600AC (425-750Vac) <u>Current</u> 1A (0.05-1A) 2A (0.1-2A) 5A (0.2-5A) 10A (0.3-10A) 25A (1-25A) <u>Circuit Type</u> P1 Single-phase, 2-wire P3 Triple-phase, 3- or 4-wire</p> <p>Voltage/Voltage inputs: 2X69AC Two 50-90Vac 2X120AC Two 85-150Vac 2X240AC Two 170-300Vac 2X460AC Two 300-575Vac 2X600AC Two 425-750Vac</p>	<p>4-20MA (4mA = 0°, 20mA = full lag) 4-20MAB Bidirectional (4mA = full lead, 12mA = 0°, 20mA = full lag) 4-20MALEAD (4mA = 0°, 20mA = full lead) (-1)-1MA (-1mA = full lead, 0 = 0°, 1 = full lag) 0-1MAB* Bidirectional (0 = full lead, 0.5mA = 0°, 1 = full lag)</p>	<p>Phase Angle: 30 (±30°) 45 (±45°) 60 (±60°) 90 (±90°) 180 (±180°)</p> <p>Power Factor (lead-unity-lag): 0 (0-1-0) 0.3 (0.3-1-0.3) 0.5 (0.5-1-0.5) 0.7 (0.7-1-0.7)</p>	<p>-CG Case ground terminal on front panel -DSP 3.5 digit front panel LCD displays phase angle readout in degrees from -180° to 180° -MG Motor or generator contact closure output (rated accuracy guaranteed between -84° to 84°) with LED's to indicate direction of current flow (voltage/current input models only) -RO Reverse output -RS232C output via a 9-pin connector on front of unit -RS485 output via a 9-pin connector on front of unit -TC Terminal Covers -TJ Test jack for monitoring output without disturbing the output loop -2W Two-wire (loop-powered) unit -120AC Auxiliary power -240AC Auxiliary power -50Hz nominal frequency -400Hz nominal frequency</p>	<p>SM Surface-mount housing DM DIN-rail mount housing</p>

When ordering, specify: Unit / Input (Voltage/Current/Circuit or Voltage/Voltage) / Output / Angle or Factor / Options [Housing]

Model number examples: PPA / 120AC-1A-1P / 4-20MA / 90 / -120AC [SM]

PPA / 2X120AC / 0-1MA / 45 / -240 [DIN]

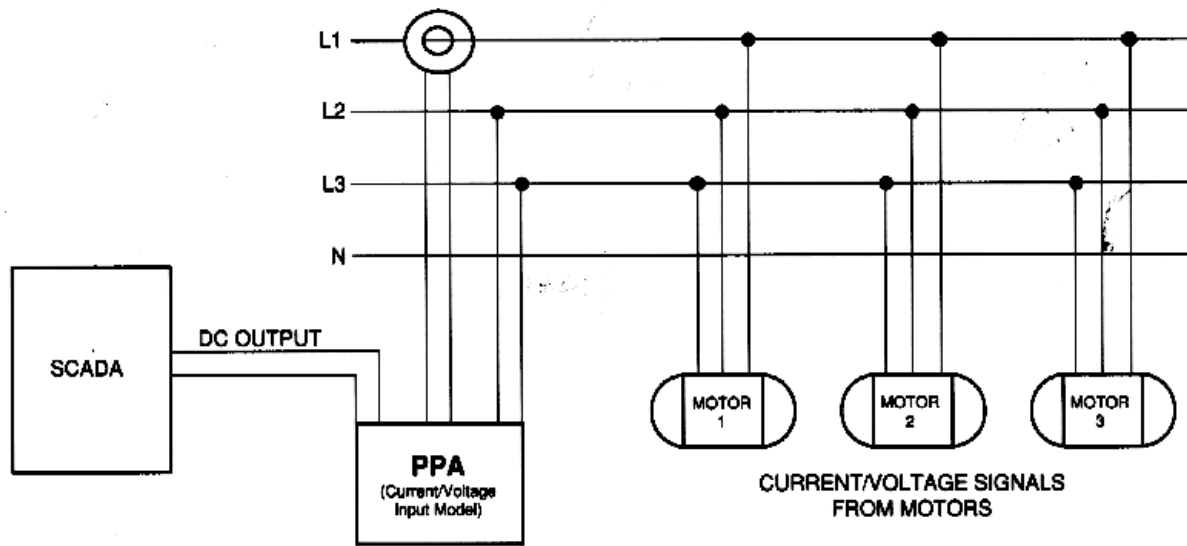


Figure 1. The PPA measuring phase angle to compute the power factor of several motors.

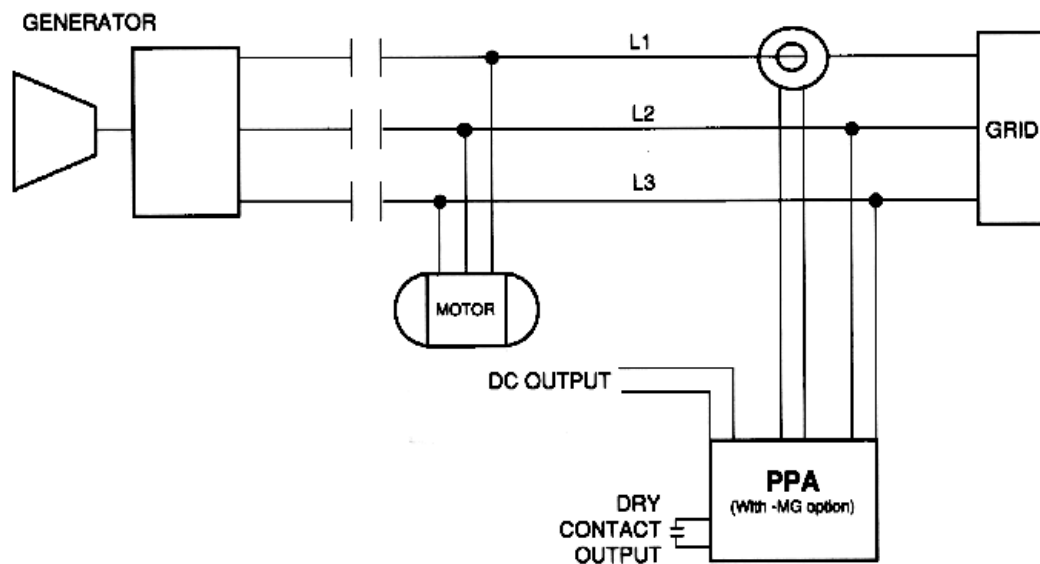


Figure 2. With the -MG option, the PPA outputs a dry contact and local LED output to indicate whether power is flowing from or to the grid.

PPA

Phase Angle Power Transducer

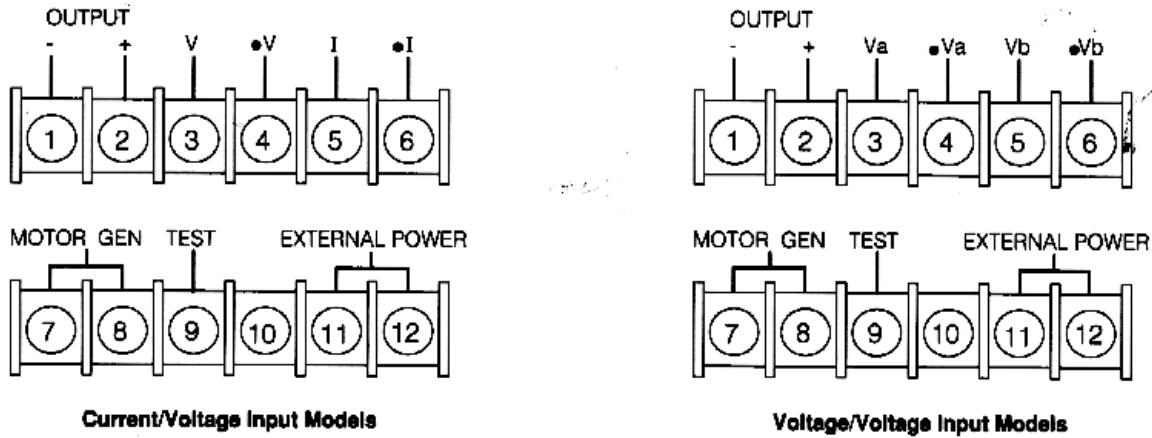


FIGURE 3. Terminal Designations.

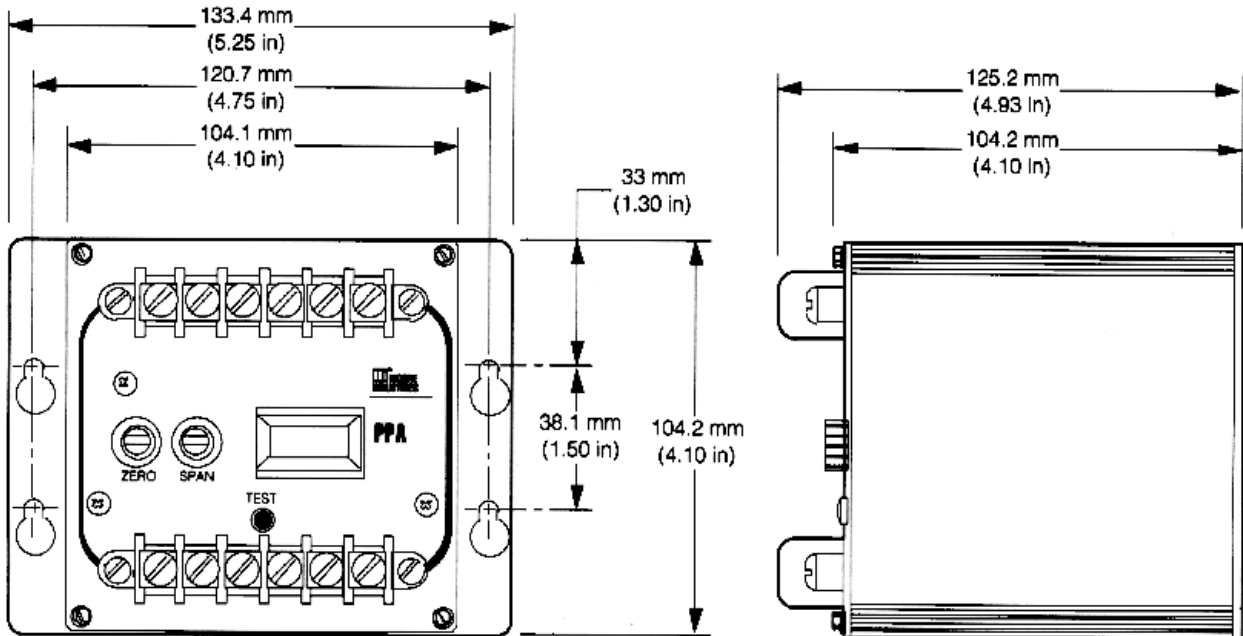


FIGURE 4. Installation Dimensions.



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