MOORE INDUSTRIES

PVT, PWT & PWV

AC Power Transducers

April 1993 Data Sheet 15.20

Description

Moore Industries' AC Power Transducers continuously track the amount of power being consumed by an electric device or a system.

Available models accept an ac input from a "load" device such as a motor, pump, or heater. They provide a proportional milliamp output for determining equipment power use and operating efficiency. They can also be used to trip automatic power control equipment to initiate energy conservation measures.

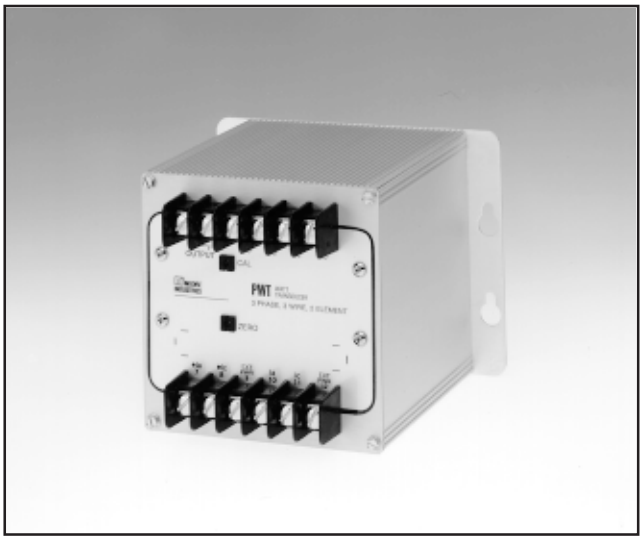
Moore Industries' ac power transducers are available in 1, 1-1/2, 2, 2-1/2, and 3 element versions. They may be either self- or externally-powered.

Easy Installation and Maintenance—All Moore Industries power transducers are enclosed in rugged and rustproof extruded aluminum housings that provide 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 boards slide smoothly out of the housing on PC board guides that run the entire length inside the unit's housing.

Table 1. Available AC Power Transducer Models.

Model	Function
PWT Watt Transducer	Monitors RMS (Root Mean Square) active power to accurately measure watts
PVT VAR Transducer	Measures RMS reactive power
PWV Watt/VAR Transducer	Combined-function unit calculates both RMS active power and RMS reactive power



***Unique keyhole-slotted mounting flanges** allow these power monitors to be removed and reinstalled by loosening the mounting screws.*

Features

- **High accuracy.** ±0.2% of reading accuracy makes the PVT, PWT and PWV ideal for applications where precision is demanded.
- **Measure true RMS power.** Moore Industries' ac power transducers measure the true RMS (Root Mean Square) of voltage and current for exceptionally accurate computation of power in watts and VARs.
- **No Zero adjustment required.** The zero adjustment never needs readjustment from its initial factory setting.
- **Complete isolation.** Full input/output isolation eliminates signal inaccuracies caused by ground loops.

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AC Power Transducers

Specifications

Performance

Accuracy @ 25°C, ±-2°C: Watt: 0.19% of reading/ Cos ø ±0.01% full scale
VAR: 0.19% of reading/ Sin ø ±0.01% full scale
Operating Frequency: 60Hz standard
Output Ripple (peak): <0.5% of full scale
Burden:
Input Current: 0.1VA
Input Voltage: 0.02VA
Auxiliary Power Voltage: PVT, 5.0VA; PWT, 4.0VA; PWV, 6.0VA (add this value to the input voltage value to determine burden of self-powered units)
Dielectric Test: 2000V rms for one minute
Response Time: To 90%, <100ms; To 99%, <200ms
Overload Capability: Voltage Input: 1.5 times the nominal input value
Current Input: See Table 2
Surge Withstand Capability: ANSI-C37.90a-1974 (IEEE 472) BEAMA 219, SPECIAL 5KV, 0.6KV B.I.L. (basic insulation level)

Performance (continued)

Ambient Temperature

Range: -20°C to +70°C (-4°F to +158°F)
Effect: 0.005%/°C (±0.003%/°F) typical

Adjustments

Type: External multiturn potentiometers
Span: ±10% of rated output
Zero: ±2% of rated output

Ordering Specifications

Unit	Input	Output	Configuration	Options	Housings
PVT VAR Transducer **PWT** Watt Transducer **PWV** Watt/VAR Transducer	Specify both Voltage Input and Current Input from Table 3; (See Table 4 for factory calibration information; see the -SPC option if special calibration is required)	**(–1)-1MA** (0, ±1mA) into 15,000 ohms, where 0mA = 0% **(–10)-10MA** (0, ±10mA) into1500 ohms, where 0mA = 0% **4-20MA** into 750 ohms; uni-directional, where 4mA = 0% (PWV Watt output is 4-20mA. VAR output is 4-12-20mA, where 12mA = 0%) **4-20MAB** (12mA, ±8mA) into 750 ohms, where 12mA = 0 Watts **1-5V** unidirectional, where 1V = 0 Watts **–(5)-5V** (0, ±5V)	See Table 5	**-.09** Provides ±0.09% of reading, ±0.02% of full scale accuracy **-50H** 50Hz input/operating frequency **-400H** 400Hz input/operating frequency **-120AC** 85-150Vac auxiliary power **-240AC** 170-300Vac auxiliary power **-CAL** Provides adjustment of output signal from 25% to 125% of full scale **-CG** Case ground terminal **-Q** Replaces VAR output with Q output, Q = EIcos (ø-60) **-SPC** Special calibration to values other than listed in Table 3	**SM** Surface-mount housing **DM** DIN-rail mount housing

When ordering, specify: Unit / Input (nominal input voltage, full scale input current) / Output / Configuration / Options [Housing]
Model number example: PWT / 120AC, 5A / 4-20MA / 2E / -120AC [SM]

Ordering Information

To order, use the bold face data from the Ordering Specifications table. For assistance, refer to the model number example located at the bottom of the table.

Table 2. *Current Input Overload Capability.*

Input	Overload Continuous	Overload 10 Sec/Hour	Overload 1 Sec/Hour
0-1A	3A	6A	100A
0-2A	6A	12A	150A
0-5A	15A	30A	250A
0-10A	35A	75A	300A
0-25A	35A	75A	300A

Specifications subject to change Printed in U.S.A.

Table 3. *Input Selection*

Voltage Input (nominal)*			Current Input (nominal)		
Ordering Code	**Range with Self-Power**	**Range with Auxiliary Power**	**Ordering Code**	**Nominal Range**	**Maximum Range**
69AC	50-80Vac	0-90Vac	**1A**	0-1 amp	0-2 amps
120AC	85-135Vac	0-150Vac	**2A**	0-2 amps	0-5 amps
240AC	170-300Vac	0-300Vac	**5A**	0-5 amps	0-10 amps
460AC	325-515Vac	0-575Vac	**10A**	0-10 amps	0-20 amps
600AC	425-675Vac	0-750Vac	**25A**	0-25 amps	0-35 amps

*Specify line to neutral voltage on 3-phase, 4-wire circuits (e.g., specify 240AC for a 480Y277 circuit)

Table 4. *Standard Calibration*

Watts or VARs Per Element*:					
Voltage Input	**Current Input**				
	1A	**2A**	**5A**	**10A**	**25A**
69AC	65	130	325	650	1625
120AC	100	200	500	1000	2500
240AC	200	400	1000	2000	5000
460AC	400	800	2000	4000	10000
600AC	500	1000	2500	5000	12500

*A unit with 120AC, 5A indicated in the input field of the model number will be calibrated to 500 watts or VARs per element. (i.e., with a 1-1/2 or 2 element unit 20mA will represent 1000 watts or VARs)

Table 5. *Configuration Selection*

Ordering Code	Application	Circuit Type (number of elements)	Restrictions	
			Voltage	Load
1E	1 Element	1-Phase, 2-Wire	None	None
1.5E*	1-1/2 Element	3-Phase, 3-Wire	Balanced	Balanced
2E	2 Element	3-Phase, 3-Wire	None	None
2.5E*	2-1/2 Element	3-Phase, 4-Wire	Balanced	None
3E	3 Element	3-Phase, 4-Wire	None	None

*1.5 element units are calibrated as 2 element units; 2.5 element units are calibrated as 3 element.

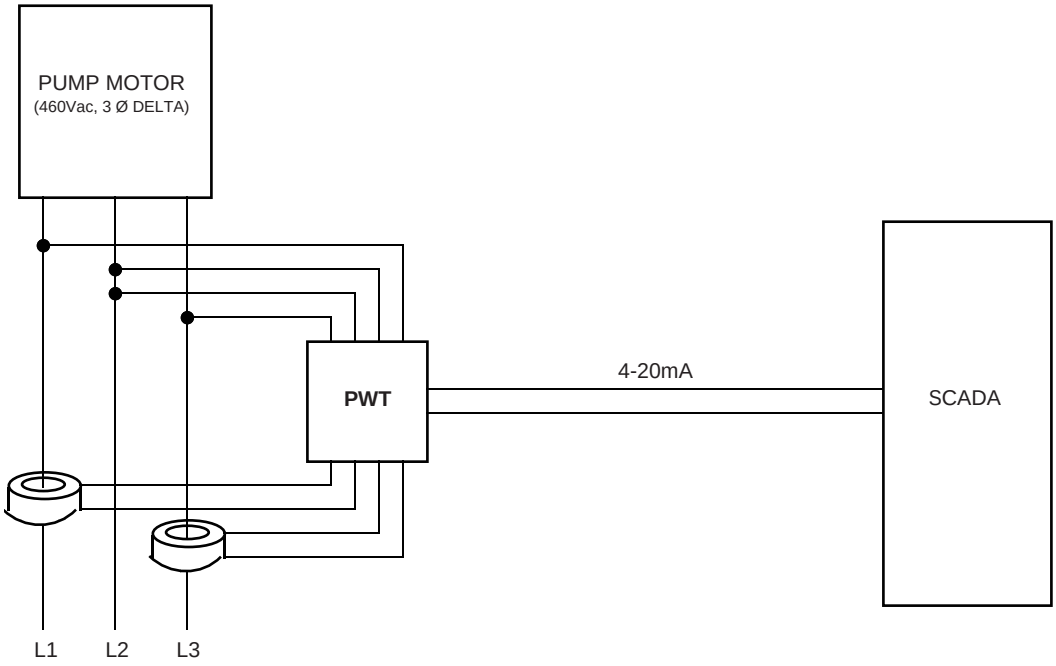


Figure 1. *The PWT's high accuracy allows power usage to be used as an indicator of whether a motor is operating efficiently.*

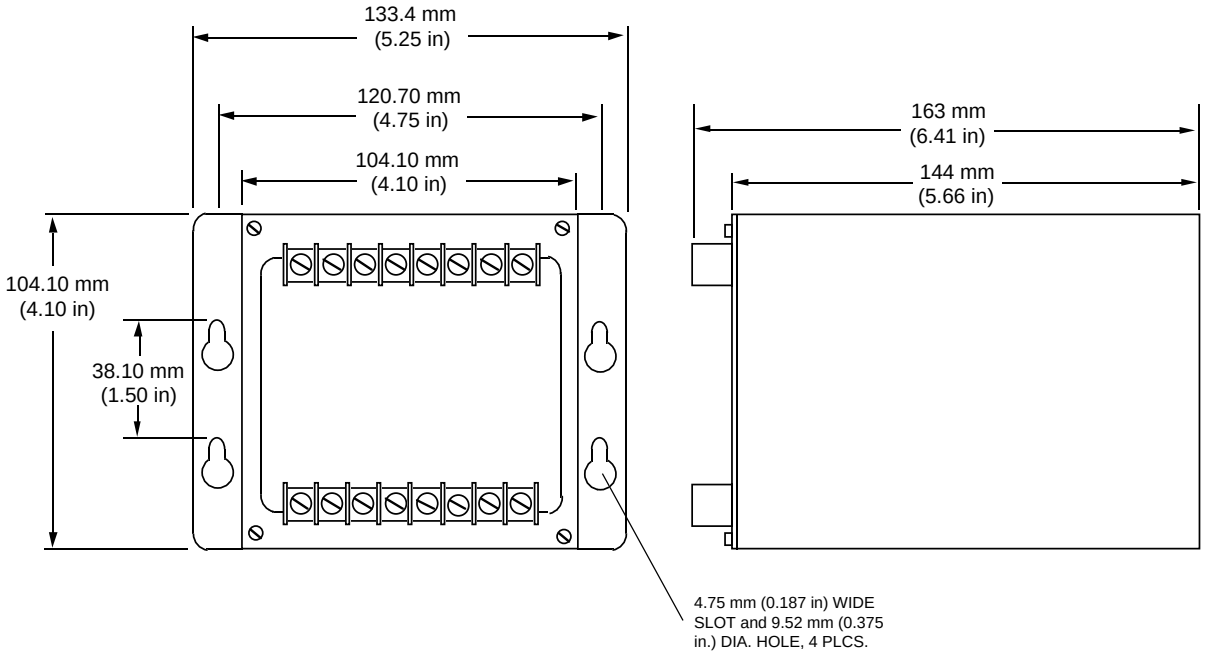
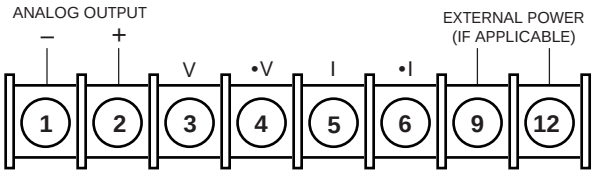
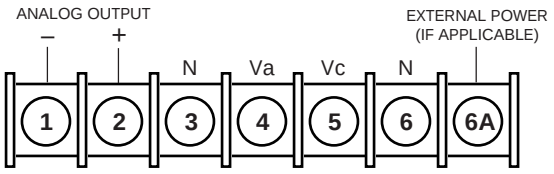


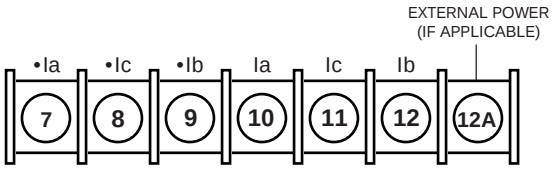
Figure 2. *PVT, PWT, and PWV Installation Dimensions.*

Figure 3. *PVT and PWT Terminal Designations*

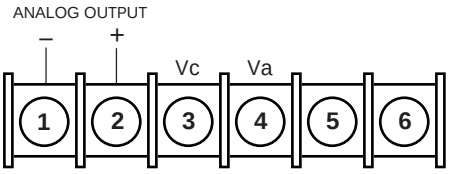


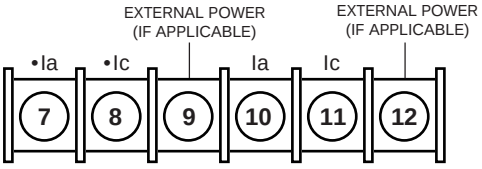
1 Element Configuration



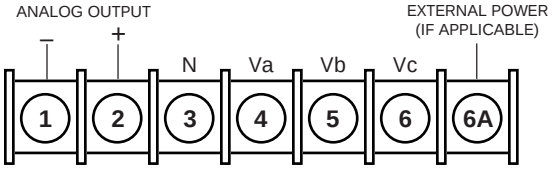


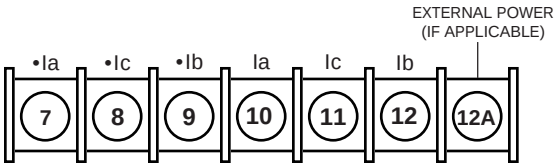
2.5 Element Configuration



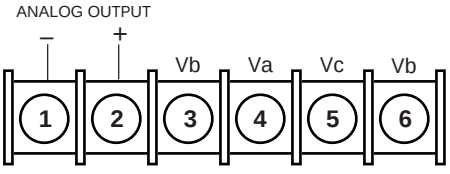


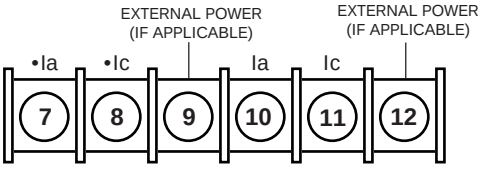
1.5 Element Configuration





3 Element Configuration



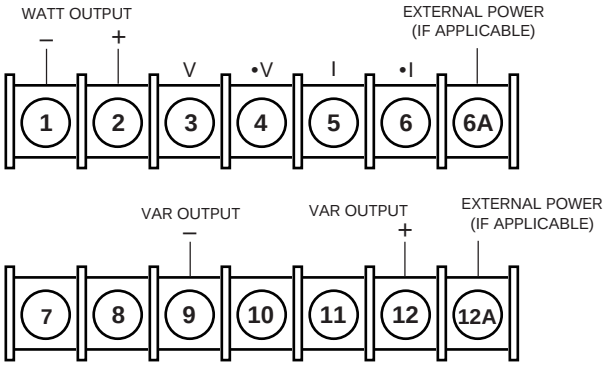


2 Element Configuration

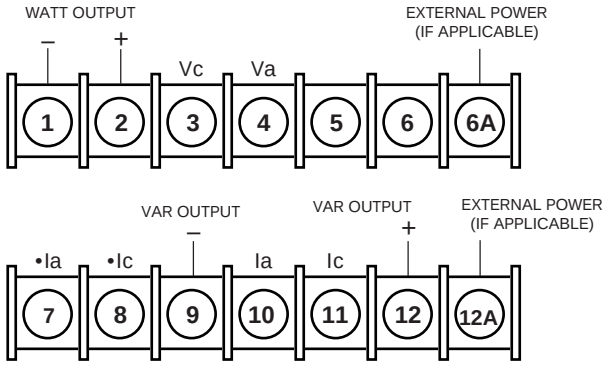
Table 5. *Key to Terminal Designation Abbreviations.*

Key	Definition
Va	Voltage input, phase A
Vb	Voltage input, phase B
Vc	Voltage input, phase C
N	Neutral
Ia	Current input, phase A
Ib	Current input, phase B
Ic	Current input, phase C
•	Transformer polariity
V	Voltage input
I	Current input

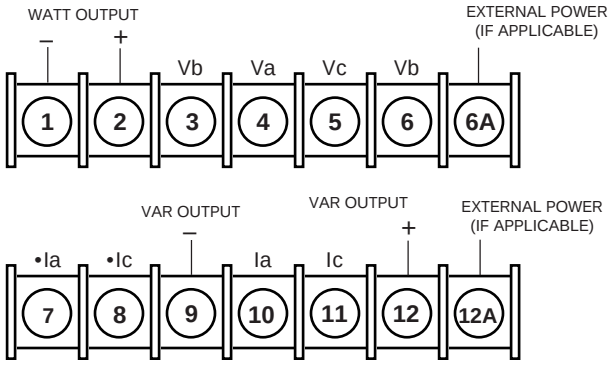
Figure 4. *PWV Terminal Designations*



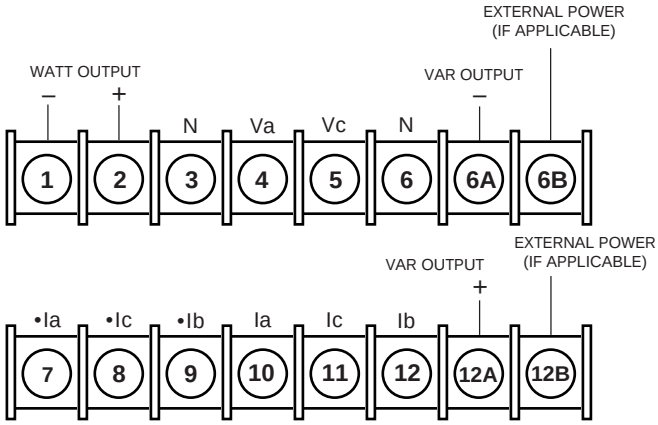
1 Element Configuration



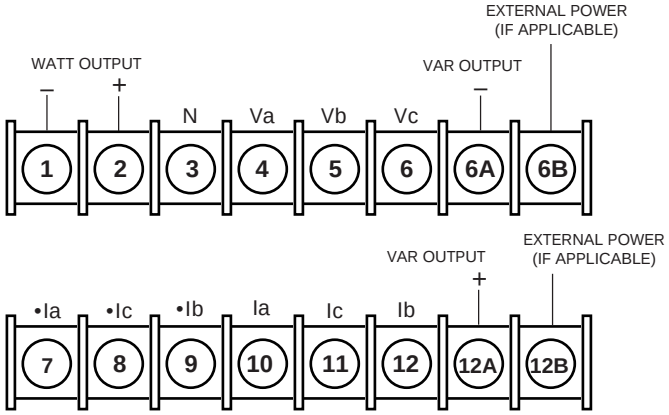
1.5 Element Configuration



2 Element Configuration



2.5 Element Configuration



3 Element Configuration