



# Power Series<sup>Plus</sup>

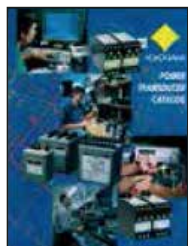
*Digital Switchboard Meters*

# Power SeriesPlus

Digital Switchboard Meters

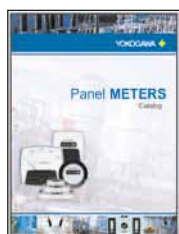
## Other Catalogs Available...

### Power Transducers



Yokogawa Juxta Power Transducers (models 2469, 2489) are UL recognized and enclosed in a rugged case with either 0.2% or 0.5% accuracy.

### Panel Meters



Options Available



Yokogawa has the broadest line of panel meters available today. In many cases, our panel meters are completely interchangeable with other manufacturer's products. UL and IP54 splash resistant models are available.

### Switchboard Instruments



Yokogawa is the world leader in Analog Switchboard Instruments. Our catalog contains the entire switchboard line including AB/DB 14, 16, and 40, and type 180 edgewise. It also includes the 2180 mini-switchboard meters, transducers and digital switchboard meters.

# Power Series<sup>Plus</sup>

## Digital Switchboard Meters

The POWER SERIES<sup>Plus</sup> digital switchboard meter was developed by Yokogawa Corporation of America to provide our customers with a versatile AC digital power meter. The heart of our POWER SERIES<sup>Plus</sup> meter incorporates the latest DSP microprocessor technology. Careful and thoughtful design has resulted in a family of user-friendly, field-adjustable meters. The design of the POWER SERIES<sup>Plus</sup> combines a high accuracy digital switchboard meter with transducer output which can be configured in the field by an end-user, or when installed in new electrical equipment by an OEM. It eliminates requirements for a large inventory of dedicated instruments, and provides flexibility when new panel designs or system upgrades require changes in instrument transformer ratings. Our rugged metal case fits standard panel cutouts for switchboard meters and makes it a perfect replacement for less versatile instruments. The RS-485 communications option allows up to 32 meters to be networked together for remote monitoring and control. In addition, the POWER SERIES<sup>Plus</sup> can be set up and locked out for security via the remote communications option.

### *The 2493 triple display multifunction power meter...*

Ideally designed for easy retrofit into existing switchboard meter panel cutouts. The 2493 features three easy to read LED displays, minimum/maximum values at the touch of a button, scaling up to 9999. Optional 0-1mA DC and 4-20mA DC analog outputs are configurable by the user.



## Features

- Scaling of the instrument for PT (potential transformer) primary ratings up to 9999; and CT (current transformer) primary ratings up to 9999.
- Adjustable transducer output proportionate to the primary input setting.
- Display average setting: Adjustable to obtain a “rolling average” of inputs. Increasing the number of samples reduces annoying “digit bounce” by the least significant digit.
- All settings are stored in non-volatile memory. If there is a loss of power to the instrument, all settings will remain as they were prior to power loss.
- Accuracy of  $\pm 0.2\%$  of reading,  $\pm 0.1\%$  of full scale.
- True RMS current and voltage measuring capability. A most desirable feature when distorted wave forms are present on the line.
- High resolution/ high intensity LED displays that can be viewed from almost any angle.

# Power Series<sup>Plus</sup>

Digital Switchboard Meters

## Set-up and Configuration (2491, 2492)

The POWER SERIES<sup>Plus</sup> can be configured for primary and secondary transformer inputs, legends, outputs and averaging function. At Yokogawa, we program each model according to the specified options required by the user. This minimizes the number of steps to set up the instrument at the job site or on the factory floor.

Each model is programmed only for the options selected, so there are no unnecessary menu items. If you select a Voltmeter without analog output, then set up will be limited to PT ratios, LED display, and average setting. All can be accomplished in less than one minute. If no transformer is required, the ratio entered for PT P and PT S is 1 (1:1).

Set up functions appear on the display as symbols. They are accessible when you press the MODE pushbutton located behind the front cover and beneath the LED display. After pressing MODE, you are in the setting mode "rSET" and can begin setting up. Error codes during set up mean your inputs may be incorrect or outside of the range of the instrument. Refer to the instruction manual for range/span restrictions for each model selected.

The pushbutton setting switches are described below. In order for a setting to be entered into memory, you must complete all entries for that mode such as: "PT P" and "PT S" (PT primary and PT secondary). If the values do not need to be changed from a previous setting, simply push the EN switch several times to go to the next mode.

After auxiliary power connection and removal of the cover, the instruction manual will guide you through set up. Pushbutton switches are located directly below the LED display. The POWER SERIES<sup>Plus</sup> can be set up before, or after installation in a panel. Once set up is complete, replace the cover and make the appropriate input connections.

### PUSHBUTTON SETTING SWITCHES (under the cover)



#### Mode

*Mode switch transfers user back and forth between standard mode (present setting) and "rSET" mode.*



*This switch moves from one unit setting to another, or mode to mode*



*This switch moves digits to selected values and moves decimal position.*



#### EN

*After each setting, this switch enters input data, then proceeds to next sequence.*

## Set-up and Configuration (2493)

The new triple display POWER SERIES<sup>Plus</sup> has front panel pushbuttons which can be used for setting voltage and current inputs from instrument transformers, as well as analog outputs and a rolling average. The exact functions depend on the model options selected by the customer. For example: If you selected a 3 in 1 Voltmeter with no analog output, you would only need to set the PT ratio and average. If you are tied into a network with RS485, then you would also need to identify the network address and baud rate.

All set-up functions can be performed using the four buttons on the front panel (see below). You can also use the buttons to display the minimum and maximum readings and, on some models, to change from phase to phase.

### PUSHBUTTON SETTING SWITCHES (front panel)



*This button starts all operations. When viewing or changing settings it is used to back out of a mode.*



*This button can change the phase being displayed. When viewing or changing settings, it moves between settings or between digits.*



*This button will increment the value being changed. It is also used to display Max readings.*



*This button, when viewing or changing settings, is used to select a mode, save it, and then move to the next mode in the sequence. It is also used to display Min readings.*

All button operations begin with the Mode button. To see the Min or Max, push the Mode button and then the button of the reading you want to see - Min or Max. The values will display for 10 seconds before reverting to the normal display. If you want to reset the values, push the Min or Max button again before 10 seconds have passed.

If the model that you select can change between phases, it is done by pressing the Mode button first, and then the Next button. The display will switch to the next phase in the sequence. For example: A Volt-Amp-Hertz meter with 3P4W connections would cycle A-B-C-AB-BC-CA and then back to A. To view the configuration settings, press Mode twice (Mode-Mode) and then press Set. The first setting will be displayed. For a Triple Amp meter this setting will be the Current Transformer (Ct), for all other models this will be the Potential Transformer (Pt). To see the other settings, press Next. You can scroll through all the settings by pressing Next. To go back to normal operations, press Mode. To change the setting being shown, press Set. See the above paragraphs on the specific settings for details. Once a setting is changed it will display the next setting. At any point while changing settings, pressing Mode will exit without changing anything.

# Power SeriesPlus

Digital Switchboard Meters

## Model Types and Rated Inputs

MEASURING CAPABILITY	MODEL NUMBER	CONNECTION AVAILABLE*	MAXIMUM INPUT RATING	ELECTRICAL LEGEND	ORDER INFO.
<b>DC VOLT</b>	2491-25		0-600V DC	Volts	Page 8
<b>AC AMPERES</b>	2491-11 2493-05	Single phase Three phase	0-1/0-5 Amp AC 0-1/0-5 Amp AC	Amps AC/Kiloamps AC Amps/Kiloamps	Page 9 Page 17
<b>AC VOLTAGE</b>	2491-21 2493-01 2493-02	Single phase 3P3W Delta 3P4W Wye	0-150/300/600 Volt AC 0-150/300/600 Volt AC 0-150/300/600 Volt AC	Volts AC/Kilovolts AC Volts/Kilovolts	Page 9 Page 17
<b>FREQUENCY</b>	2491-81	Single phase	150/300/600 Volt AC	Hertz	Page 9
<b>WATTS</b>	2491-51 2491-52 2491-53 2491-54 2491-55	1P2W 1P3W 3P3W 3P4W (2 1/2 Element) 3P4W (3 Element)	<b>(select one)</b> 120V/240V/480V AC 1 Amp 120V/240V/480V AC 5 Amp	Watts Kilowatts Megawatts	Page 10
<b>VARs</b>	2491-61 2491-62 2491-63 2491-64 2491-65	1P2W 1P3W 3P3W 3P4W (2 1/2 Element) 3P4W (3 Element)	<b>(select one)</b> 120V/240V/480V AC 1 Amp 120V/240V/480V AC 5 Amp	Vars Kilovars Megavars	Page 10
<b>POWER FACTOR</b>	2491-71 2491-72 2491-73 2491-74 2491-75	1P2W 1P3W 3P3W 3P4W (2 1/2 Element) 3P4W (3 Element)	<b>(select one)</b> 120V/240V/480V AC 1 Amp 120V/240V/480V AC 5 Amp	Power Factor Lag Lead	Page 11
<b>PHASE ANGLE</b>	2491-91 2491-92 2491-93 2491-94 2491-95	1P2W 1P3W 3P3W 3P4W (2 1/2 Element) 3P4W (3 Element)	<b>(select one)</b> 120V/240V/480V AC 1 Amp 120V/240V/480V AC 5 Amp	Phase Angle Lag Lead	Page 11
<b>VOLT / AMP DUAL FUNCTION</b>	2492-12	Single phase	150V/300V/600V 1 Amp 150V/300V/600V 5 Amp	Volts Kilovolts Amps Kiloamps	Page 12
<b>VOLT / HERTZ DUAL FUNCTION</b>	2492-22	Single phase	150V/300V/600V & 50/60Hz 150V/300V/600V & 400Hz	Volts Kilovolts Hertz	Page 13
<b>VOLT / AMP / Hz</b>	2493-07 2493-08 2493-09	1P2W 3P3W Delta 3P4W Wye	<b>(select one)</b> 150V/300V/600V AC 1A or 5A AC 50/60Hz or 400Hz	Amps/Kiloamps Volts Kilovolts Hertz	Page 18
<b>WATT / VAR DUAL FUNCTION</b>	2492-40 2492-41 2492-42 2492-43 2492-44	1P2W 1P3W 3P3W 3P4W (2 1/2 Element) 3P4W (3 Element)	<b>(select one)</b> 120V/240V/480V AC 1 AMP 120V/240V/480V AC 5 AMP	Watts/Kilowatts Megawatts Vars/Kilovars Megavars	Page 14
<b>WATT / PF DUAL FUNCTION</b>	2492-45 2492-46 2492-47 2492-48 2492-49	1P2W 1P3W 3P3W 3P4W(2 1/2 Element) 3P4W(3 Element)	<b>(select one)</b> 120V/240V/480V AC 1 AMP 120V/240V/480V AC 5 AMP	Watts Kilowatts Megawatts Power Factor Lag Lead	Page 15
<b>WATT / VAR / PF</b>	2493-34 2493-35 2493-36 2493-37 2493-38	1P2W 1P3W 3P3W 3P4W(2 1/2 Element) 3P4W(3 Element)	<b>(select one)</b> 120V/240V/480V AC 1 AMP 120V/240V/480V AC 5 AMP	Watts/Vars Kilowatts/Kilovars Megawatts/Megavars Power Factor Lag Lead	Page 16

\*see pages 17 through 21 for connection diagrams

## General Specifications

<b>DISPLAY</b>	Type	4 digit red LED (9999 counts) for 2493 readouts (3 displays) 4 1/2 digit red LED for 2491, 2492
	Digit height	0.56 inch or 14mm
	Response time	250ms min. update time for V/V/V, A/A/A, 2491 and 2492 Less than 500ms min. update time for V/A/Hz, Watt/VAR/PF 2493
<b>AUXILIARY POWER</b>		120V or 240V AC (+/- 15%), 45-65 Hz, 4.5VA max. or select 24, 48, 125V DC
<b>INPUT RATING</b>	Current:	0 to 1 A AC; 0 to 5A AC
	Voltage:	0-120V AC; 0-240V AC, 0-480V AC (W/VAR/PF/PA) 0-150V AC; 0-300V AC; 0-600V AC (Volt/Freq) 0-150V DC; 0-300V DC; 0-600V DC
	Frequency	50/60 Hz and 400 Hz (only V/A/Hz units)
<b>INPUT RANGE</b>	Rated Current:	A/W/VAR: 0-200%; PF/PA: 20-200%
	Rated Voltage:	V/W/VAR: 0-120%; PF/PA: 50-120%; Frequency: 20-120%
<b>INPUT FREQUENCY RANGE</b>	Volts, Amps, Hertz	45-65 Hz up to the 9th harmonic measuring capability ±2% of specified accuracy
<b>SUSTAINED INPUT</b>	Rated Current: Rated Voltage:	A/W/VAR/PF/PA: 200% continuous; 10x rating for 5 seconds V/W/VAR/FREQ: 120% continuous; PF/PA: 150% continuous
<b>BURDEN</b>	Current: Voltage:	<0.2 VA per element <0.2 VA per element; 240V: <0.4VA per element
<b>ACCURACY</b>	Reference condition: 25°C, 45-74%RH, at rated input 60 Hz sine wave, 30 min. warmup	Voltage Current Watt/VAR
		Power Factor Phase Angel Frequency
		+/- 0.2% of reading +/- 0.1% of full scale
		+/- 0.05 Power Factor +/- 0.5° Phase Angle +/- 0.1 Hz @ 40-70 Hz, +/- 0.5 Hz @ 300-500 Hz
<b>ANALOG OUTPUT AND RESPONSE TIME</b>	0 to 1 mA, 4 to 20 mA, 12+/-8 mA	10V DC compliance into 10k ohm load maximum 15V DC compliance into 750 ohm maximum 1 second maximum response time within ±1% of final value
<b>OUTPUT RIPPLE</b>		0.5% peak-to-peak maximum of output span
<b>COMMUNICATIONS</b>		RS-485 half duplex interface with networking up to 32 units Selectable Baud Rate
<b>ISOLATION VOLTAGE AND INSULATION RESISTANCE</b>	Input to output/case:	2500V AC for 1 minute / more than 10 Megohm @ 500V DC
	Aux. power to case:	2000V AC for 1 minute / more than 10 Megohm @ 500V DC DC: 500V DC minimum / 10 Megohm minimum @100V DC
	Aux. power to output:	AC: 2000V AC for 1 minute / more than 10 Megohm @ 500V DC DC: 500V DC minimum / 10 Megohm minimum @ 100V DC
	Output to case:	1000V AC for 1 minute . more than 10 Megohm @ 500V DC
<b>TEMPERATURE RANGE</b>	Operating: Storage:	-20 to +60°C at 90% RH maximum (non-condensing) -40 to +85°C
<b>TEMPERATURE COEFFICIENT</b>	Display and Comm: Analog Output:	±150 PPM/°C maximum of full scale ±250 PPM/°C maximum of full scale
<b>INFLUENCE OF:</b>	Magnetic field:	0.5% maximum at 400 ampere turns/meter
	Input voltage:	<0.05 Power Factor (10-120% of rated voltage)
	Influence of:	Shock/Vibration: per ANSI C39.1
	Unbalanced current:	<0.2% of full scale
	Input frequency:	<0.05 Power Factor (45-65 Hz)
	Load resistance:	0 to 1 mA: 0-10K ohm within ±0.05% of full scale 4 to 20 mA, 12 ± 8 mA: 0-750 ohm within ±0.05% of full scale
<b>DIMENSIONS: WEIGHT:</b>		W x D x H = 4.33 x 6.54 x 4.33 inches 1000g (2.2 lbs) or less

# Power Series<sup>Plus</sup>

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## DC VOLTS



MODEL FORMAT: 2491

Insert model code from the selection below:

MODEL 2491

### 1. FUNCTION

-25 DC VOLTS

### 2. INPUT RATING

-57 150V DC

-67 300V DC

-77 600V DC

### 3. FREQUENCY

-0 NONE

### 4. ANALOG OUTPUT

-AAA NO OUTPUT

-AFA 0 to 1 mA DC

-AHD 4 to 20 mA DC

### 5. COMMUNICATION

-1 YCA Protocol

-2 MODBUS

### 6. AUX. POWER

-1 120/240V AC

-3 24V DC

-4 48V DC

-5 125V DC

### NOTES:

- 1) THESE MODELS HAVE 3 1/2 DIGIT DISPLAY.
- 2) NIST CALIBRATION CERTIFICATE: SPECIFY AND ADD \$50.00 EACH NET PER UNIT.
- 3) NIST CALIBRATION CERTIFICATE WITH TEST DATA: SPECIFY AND ADD \$100.00 EACH NET PER UNIT.
- 4) CERTIFICATE OF CONFORMANCE: NO CHARGE, BUT SPECIFY WITH ORDER.





## AC AMPS / AC VOLTS / FREQUENCY

MODEL FORMAT: 2491

Insert model code from the selection below:

MODEL 2491

1. FUNCTION	2. INPUT RATING	3. FREQUENCY	4. ANALOG OUTPUT	5. COMMUNICATION
-11 AMP AC	-01 1 AMP	-1 50/60 Hz	-AAA NO OUTPUT	-1 YCA Protocol
-21 VOLTS AC	-05 5 AMP	-2 400 Hz	-AFA 0 to 1 mA	-2 MODBUS
-81 FREQUENCY	-10 150V		-AHD 4 to 20 mA	
	-20 300V			
	-30 600V			

### 6. AUX. POWER

- 1 120/240V AC
- 3 24V DC
- 4 48V DC
- 5 125V DC

#### NOTES:

- 1) THESE MODELS HAVE 3 1/2 DIGIT DISPLAY.
- 2) NIST CALIBRATION CERTIFICATE: SPECIFY AND ADD \$50.00 EACH NET PER UNIT.
- 3) NIST CALIBRATION CERTIFICATE WITH TEST DATA: SPECIFY AND ADD \$100.00 EACH NET PER UNIT.
- 4) CERTIFICATE OF CONFORMANCE: NO CHARGE, BUT SPECIFY WITH ORDER.

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## AC WATTS AND VARS

MODEL FORMAT: 2491

Insert model code from the selection below:

MODEL 2491

### 1. FUNCTION/ CONNECTIONS

- 51 WATT 1P2W
- 52 WATT 1P3W
- 53 WATT 3P3W
- 54 WATT 3P4W  
(2 1/2 element)
- 55 WATT 3P4W  
(3 element)
- 61 VARS 1P2W
- 62 VARS 1P3W
- 63 VARS 3P3W
- 64 VARS 3P4W  
(2 1/2 element)
- 65 VARS 3P4W  
(3 element)

### 2. INPUT RATING

- 11 120 VOLT / 1 AMP
- 15 120 VOLT / 5 AMP
- 21 240 VOLT / 1 AMP
- 25 240 VOLT / 5 AMP
- 31 480V / 1 AMP
- 35 480V / 5 AMP

### 3. FREQUENCY

- 1 50/60 Hz

### 4. ANALOG OUTPUT

- AAA NO OUTPUT
- AFA 0 to 1 mA
- AHD 4 to 20 mA
- AHF 12 ± 8 mA

### 5. COMMUNICATION

- 1 YCA Protocol
- 2 MODBUS

### 6. AUX. POWER

- 1 120/240V AC
- 3 24V DC
- 4 48V DC
- 5 125V DC

### NOTES:

- 1) THESE MODELS HAVE 3 1/2 DIGIT DISPLAY.
- 2) NIST CALIBRATION CERTIFICATE: SPECIFY AND ADD \$50.00 EACH NET PER UNIT.
- 3) NIST CALIBRATION CERTIFICATE WITH TEST DATA: SPECIFY AND ADD \$100.00 EACH NET PER UNIT.
- 4) CERTIFICATE OF CONFORMANCE: NO CHARGE, BUT SPECIFY WITH ORDER.



## POWER FACTOR AND PHASE ANGLE

MODEL FORMAT: 2491

Insert model code from the selection below:

MODEL 2491

### 1. FUNCTION/ CONNECTIONS

- 71 POWER FACTOR 1P2W
- 72 POWER FACTOR 1P3W
- 73 POWER FACTOR 3P3W
- 74 POWER FACTOR 3P4W (2 1/2 element)
- 75 POWER FACTOR 3P4W (3 element)
- 91 PHASE ANGLE 1P2W
- 92 PHASE ANGLE 1P3W
- 93 PHASE ANGLE 3P3W
- 94 PHASE ANGLE 3P4W (2 1/2 element)
- 95 PHASE ANGLE 3P4W (2 1/2 element)

### 2. AC INPUT RATING

- 11 120 VOLT / 1 AMP
- 15 120 VOLT / 5 AMP
- 21 240 VOLT / 1 AMP
- 25 240 VOLT / 5 AMP
- 31 480 VOLT / 1 AMP
- 35 480 VOLT / 5 AMP

### 6. AUX. POWER

- 1 120/240V AC
- 3 24V DC
- 4 48V DC
- 5 125V DC

### 3. FREQUENCY

- 1 50/60 Hz

### 4. ANALOG OUTPUT

- AAA No Output
- AFA 0 to 1 mA
- AHD 4 to 20 mA
- AHF 12 ± 8 mA

### 5. COMMUNICATION

- 1 YCA Protocol
- 2 MODBUS

#### NOTES:

- 1) THESE MODELS HAVE 3 1/2 DIGIT DISPLAY.
- 2) NIST CALIBRATION CERTIFICATE: SPECIFY AND ADD \$50.00 EACH NET PER UNIT.
- 3) NIST CALIBRATION CERTIFICATE WITH TEST DATA: SPECIFY AND ADD \$100.00 EACH NET PER UNIT.
- 4) CERTIFICATE OF CONFORMANCE: NO CHARGE, BUT SPECIFY WITH ORDER.

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## AC VOLT / AMP DUAL FUNCTION

MODEL FORMAT: 2492

Insert model code from the selection below:

MODEL 2492



### 1. INPUT RATING

-12 VOLT / AMP AC

### 2. RATING CODE

-51 150V AC / 1 AMP

-61 300V AC / 1 AMP

-71 600V AC / 1 AMP

-55 150V AC / 5 AMP

-65 300V AC / 5 AMP

-75 600V AC / 5 AMP

### 3. FREQUENCY

-1 50/60 Hz

-2 400 Hz

### 4. ANALOG OUTPUT

-AAA NO OUTPUT

-AFA 0 to 1 mA

-AHD 4 to 20 mA

### 5. COMMUNICATION

-1 YCA Protocol

-2 MODBUS

### 6. AUX. POWER

-1 120/240V AC

-3 24V DC

-4 48V DC

-5 125V DC

### NOTES:

1) THESE MODELS HAVE 3 1/2 DIGIT DISPLAY.

2) NIST CALIBRATION CERTIFICATE: SPECIFY AND ADD \$50.00 EACH NET PER UNIT.

3) NIST CALIBRATION CERTIFICATE WITH TEST DATA: SPECIFY AND ADD \$100.00 EACH NET PER UNIT.

4) CERTIFICATE OF CONFORMANCE: NO CHARGE, BUT SPECIFY WITH ORDER.

## AC VOLT / FREQUENCY DUAL FUNCTION

MODEL FORMAT: 2492

Insert model code from the selection below:

MODEL 2492



### 1. FUNCTION

-22 VOLT AND Hz

### 2. INPUT RATING

-10 150V AC

-20 300V AC

-30 600V AC

### 3. FREQUENCY

-1 50/60 Hz

-2 400 Hz

### 4. ANALOG OUTPUT

-AAA NONE

-AFA 0 to 1 mA

-AHD 4 to 20 mA

### 5. COMMUNICATION

-1 YCA Protocol

-2 MODBUS

### 6. AUX. POWER

-1 120/240V AC

-3 24V DC

-4 48V DC

-5 125V DC

### NOTES:

1) THESE MODELS HAVE 3 1/2 DIGIT DISPLAY.

2) NIST CALIBRATION CERTIFICATE: SPECIFY AND ADD \$50.00 EACH NET PER UNIT.

3) NIST CALIBRATION CERTIFICATE WITH TEST DATA: SPECIFY AND ADD \$100.00 EACH NET PER UNIT.

4) CERTIFICATE OF CONFORMANCE: NO CHARGE, BUT SPECIFY WITH ORDER.

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## AC WATT / VAR DUAL FUNCTION

MODEL FORMAT: 2492

Insert model code from the selection below:

MODEL 2492



### 1. FUNCTION/ CONNECTIONS

- 40 WATT / VAR 1P2W
- 41 WATT / VAR 1P3W
- 42 WATT / VAR 3P3W
- 43 WATT / VAR 3P4W  
(2 1/2 element)
- 44 WATT / VAR 3P4W  
(3 element)

### 2. INPUT RATING

- 11 120 VOLT / 1 AMP
- 15 120 VOLT / 5 AMP
- 21 240 VOLT / 1 AMP
- 25 240 VOLT / 5 AMP
- 31 480V AC / 1 AMP
- 35 480V AC / 5 AMP

### 3. FREQUENCY

- 1 50/60 Hz

### 4. ANALOG OUTPUT

- AAA NONE
- AFA 0 to 1 mA
- AHD 4 to 20 mA
- AHF  $12 \pm 8$  mA

### 5. COMMUNICATION

- 1 YCA Protocol
- 2 MODBUS

### 6. AUX. POWER

- 1 120/240V AC
- 3 24V DC
- 4 48V DC
- 5 125V DC

### NOTES:

- 1) WATTS/KILOWATTS/MEGAWATTS AND VARS/KILOVARS/MEGAVARS LEGENDS ARE USER SELECTABLE.
- 2) NIST CALIBRATION CERTIFICATE: SPECIFY AND ADD \$50.00 EACH NET PER UNIT.
- 3) NIST CALIBRATION CERTIFICATE WITH TEST DATA: SPECIFY AND ADD \$100.00 EACH NET PER UNIT.
- 4) CERTIFICATE OF CONFORMANCE: NO CHARGE, BUT SPECIFY WITH ORDER.

**LIST PRICE AND ADDERS**

## AC WATT / POWER FACTOR DUAL FUNCTION

MODEL FORMAT: 2492

Insert model code from the selection below:

MODEL 2492



### 1. FUNCTION/ CONNECTIONS

- 45 WATT / POWER FACTOR 1P2W
- 46 WATT / POWER FACTOR 1P3W
- 47 WATT / POWER FACTOR 3P3W
- 48 WATT / POWER FACTOR 3P4W (2 1/2 element)
- 49 WATT / POWER FACTOR 3P4W (3 element)

### 2. AC INPUT RATING

- 11 120 VOLT / 1 AMP
- 15 120 VOLT / 5 AMP
- 21 240 VOLT / 1 AMP
- 25 240 VOLT / 5 AMP
- 31 480V AC / 1 AMP
- 35 480V AC / 5 AMP

### 3. FREQUENCY

- 1 50/60 Hz

### 4. ANALOG OUTPUT

- AAA NONE
- AFA 0 to 1 mA
- AHD 4 to 20 mA
- AHF 12 ± 8 mA

### 5. COMMUNICATION

- 1 YCA Protocol
- 2 MODBUS

### 6. AUX. POWER

- 1 120/240V AC
- 3 24V DC
- 4 48V DC
- 5 125V DC

NOTES:

- 1) WATTS/KILOWATTS/MEGAWATTS LEGEND IS USER SELECTABLE.
- 2) NIST CALIBRATION CERTIFICATE: SPECIFY AND ADD \$50.00 EACH NET PER UNIT.
- 3) NIST CALIBRATION CERTIFICATE WITH TEST DATA: SPECIFY AND ADD \$100.00 EACH NET PER UNIT.
- 4) CERTIFICATE OF CONFORMANCE: NO CHARGE, BUT SPECIFY WITH ORDER.

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## LIST PRICE AND ADDERS

### 3 in 1 AC WATT / VAR / POWER FACTOR

MODEL FORMAT: 2493

Insert model code from the selection below:

MODEL 2493



#### 1. FUNCTION/ CONNECTIONS

- 34 WATT / VAR / PF 1P2W
- 35 WATT / VAR / PF 1P3W
- 36 WATT / VAR / PF 3P3W
- 37 WATT / VAR / PF 3P4W  
(2 1/2 element)
- 38 WATT / VAR / PF 3P4W  
(3 element)

#### 2. INPUT RATING

- 11 120 VOLT / 1A AC
- 15 120 VOLT / 5A AC
- 21 240 VOLT / 1A AC
- 25 240 VOLT / 5A AC
- 31 480V AC / 1 AMP
- 35 480V AC / 5 AMP

#### 3. FREQUENCY

- 1 50/60 Hz

#### 4. ANALOG OUTPUT

- AAA NONE
- AFA 0 to 1 mA
- AHD 4 to 20 mA

#### 5. COMMUNICATION

- 1 YCA Protocol
- 2 MODBUS

#### 6. AUX. POWER

- 1 120/240V AC
- 3 24V DC
- 4 48V DC
- 5 125V DC

#### NOTES:

- 1) THESE MODELS HAVE 3 1/2 DIGIT DISPLAY.
- 2) NIST CALIBRATION CERTIFICATE: SPECIFY AND ADD \$50.00 EACH NET PER UNIT.
- 3) NIST CALIBRATION CERTIFICATE WITH TEST DATA: SPECIFY AND ADD \$100.00 EACH NET PER UNIT.
- 4) CERTIFICATE OF CONFORMANCE: NO CHARGE, BUT SPECIFY WITH ORDER.



## 3 in 1 AC VOLT OR AMP



MODEL FORMAT: 2493

Insert model code from the selection below:

MODEL 2493

### 1. FUNCTION

- 01 3P3W AC VOLT
- 02 3P4W AC VOLT
- 05 3 PHASE A, B, C  
AC AMP

### 2. INPUT RATING

- 01 1 AMP
- 05 5 AMP
- 10 150 VOLT
- 20 300 VOLT
- 30 600 VOLT

### 3. FREQUENCY

- 1 50/60 Hz
- 2 400 Hz

### 4. ANALOG OUTPUT

- AAA NONE
- AFA 0 to 1 mA
- AHD 4 to 20 mA

### 5. COMMUNICATION

- 1 YCA Protocol
- 2 MODBUS

### 6. AUX. POWER SUPPLY

- 1 120/240V AC
- 3 24V DC
- 4 48V DC
- 5 125V DC

### NOTES:

- 1) THESE MODELS HAVE 3 1/2 DIGIT DISPLAY.
- 2) NIST CALIBRATION CERTIFICATE: SPECIFY AND ADD \$50.00 EACH NET PER UNIT.
- 3) NIST CALIBRATION CERTIFICATE WITH TEST DATA: SPECIFY AND ADD \$100.00 EACH NET PER UNIT.
- 4) CERTIFICATE OF CONFORMANCE: NO CHARGE, BUT SPECIFY WITH ORDER.

# Power SeriesPlus

Digital Switchboard Meters

## 3 in 1 AC VOLT / AMP / HERTZ

MODEL FORMAT: 2493

Insert model code from the selection below:

MODEL 2493



### 1. FUNCTION/ CONNECTIONS

- 07 VOLT / AMP / Hz 1P2W
- 08 VOLT / AMP / Hz 3P3W
- 09 VOLT / AMP / Hz 3P4W

### 2. INPUT RATING

- 51 150 VOLT / 1A AC
- 55 150 VOLT / 5A AC
- 61 300 VOLT / 1A AC
- 65 300 VOLT / 5A AC
- 71 600V AC / 1 AMP
- 75 600V AC / 5 AMP

### 3. FREQUENCY

- 1 50/60 Hz
- 2 400 Hz

### 4. ANALOG OUTPUT

- AAA NONE
- AFA 0 to 1 mA
- AHD 4 to 20 mA

### 5. COMMUNICATION

- 1 YCA Protocol
- 2 MODBUS

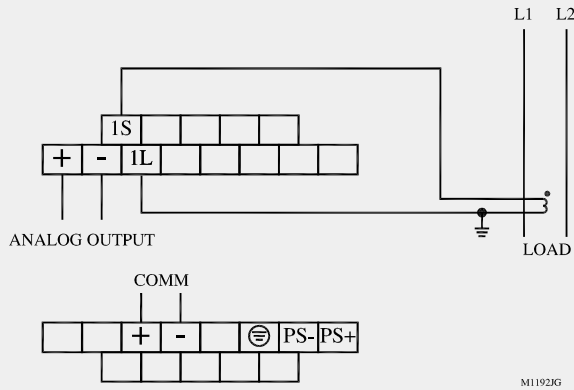
### 6. AUX. POWER

- 1 120/240V AC
- 3 24V DC
- 4 48V DC
- 5 125V DC

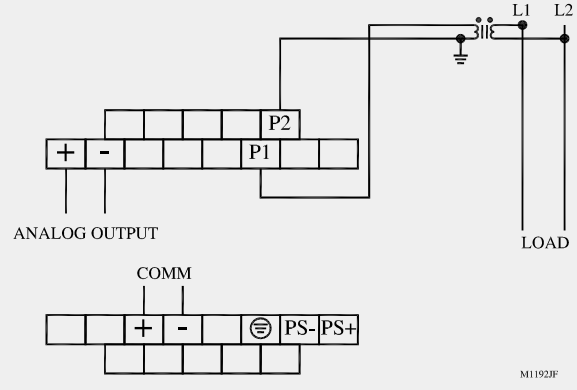
### NOTES:

- 1) THESE MODELS HAVE 3 1/2 DIGIT DISPLAY.
- 2) NIST CALIBRATION CERTIFICATE: SPECIFY AND ADD \$50.00 EACH NET PER UNIT.
- 3) NIST CALIBRATION CERTIFICATE WITH TEST DATA: SPECIFY AND ADD \$100.00 EACH NET PER UNIT.
- 4) CERTIFICATE OF CONFORMANCE: NO CHARGE, BUT SPECIFY WITH ORDER.

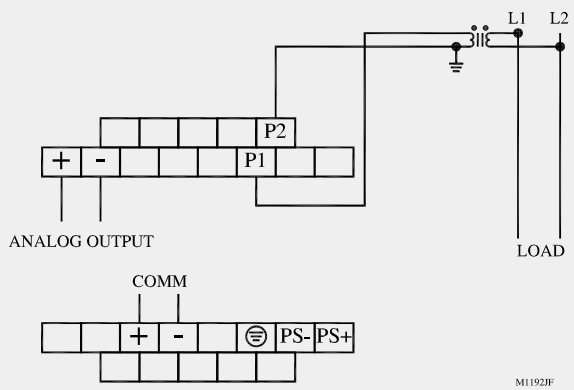
## Terminal Connections



**249111 and 249115 AC Ammeters**

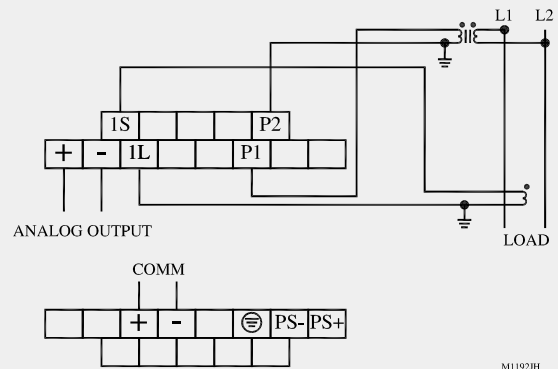


**249121 AC Voltmeters**



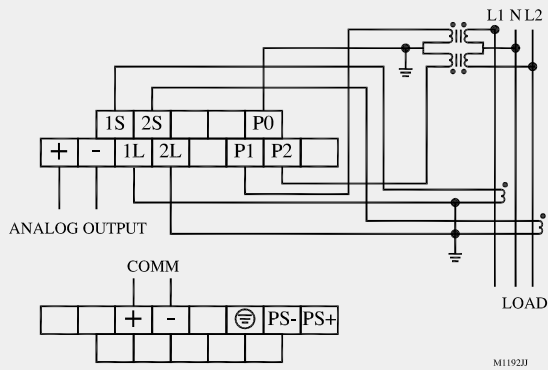
**249181 and 249183 Frequency Meters**

### 1 PHASE, 2 WIRE



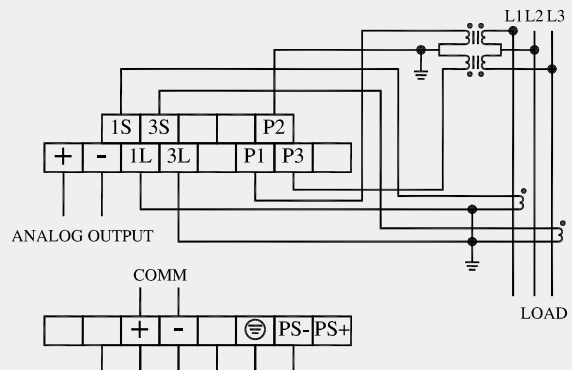
**249151 / 249161 / 249171 / 249191  
Watts / Vars / P.F. / Phase Angle**

### 1 PHASE, 3 WIRE



**249152 / 249162 / 249172 / 249192  
Watts / Vars / P.F. / Phase Angle**

### 3 PHASE, 3 WIRE



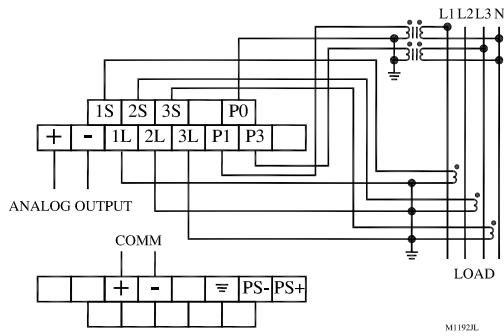
**249153 / 249163 / 249173 / 249193  
Watts / Vars / P.F. / Phase Angle**

# Power SeriesPlus

Digital Switchboard Meters

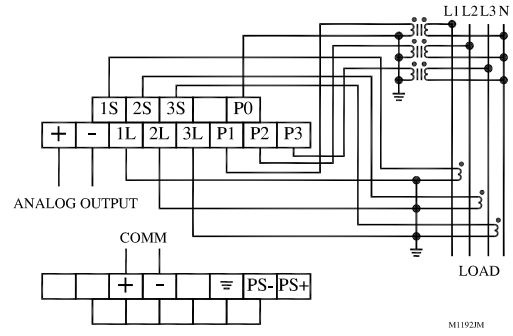
## Terminal Connections

**3 PHASE, 4 WIRE  
(2 1/2 ELEMENT)**

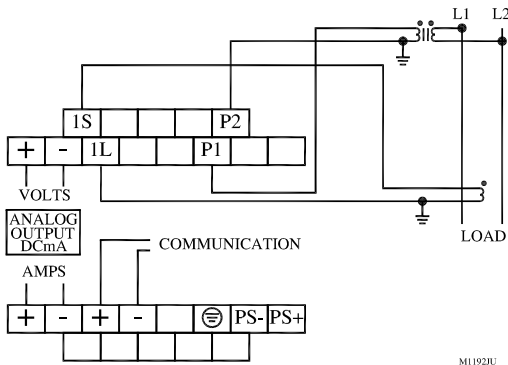


**249154 / 249164 / 249174 / 249194**  
Watts / Vars / P.F. / Phase Angle

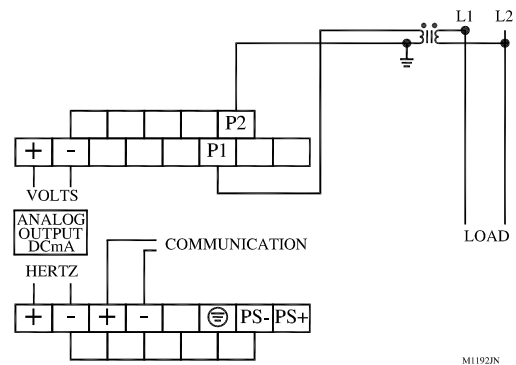
**3 PHASE, 4 WIRE  
(3 ELEMENT)**



**249155/249165/249175/249195**  
Watts / Vars / P.F. / Phase Angle

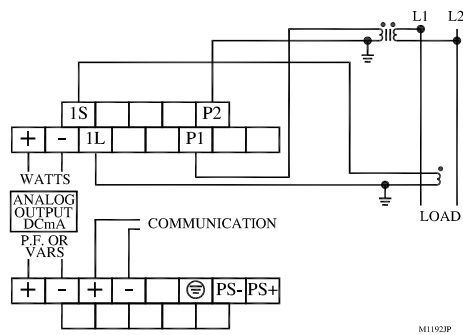


**249212 / 249213 / 249216 / 249217**  
Dual function Volts / Amps



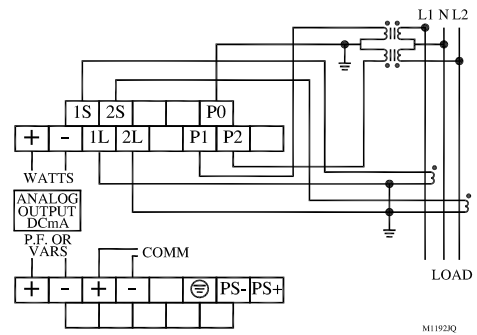
**249222/249223/249226/249227**  
Dual function Volts / Hertz

**1 PHASE, 2 WIRE**



**249240/249245**  
Dual function Watts / Vars, Watts / P. F.

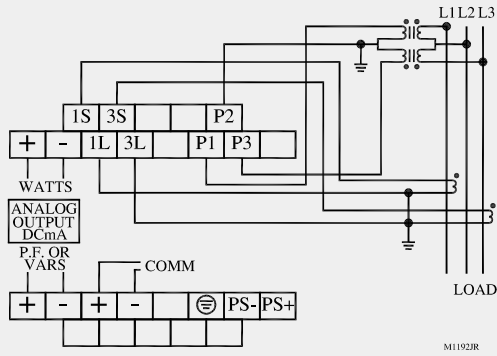
**1 PHASE, 3 WIRE**



**249241/249246**  
Dual function Watts / Vars, Watts / P. F.

## Terminal Connections

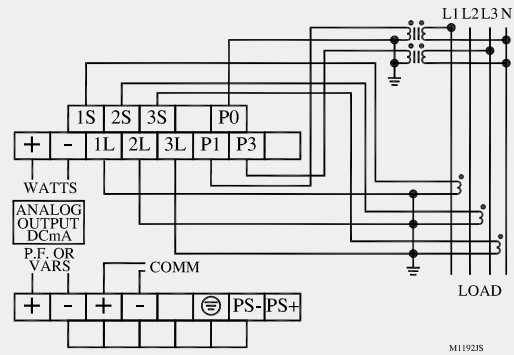
### 3 PHASE, 3 WIRE



249242 / 249247

Watts / Vars and Watts / Power Factor

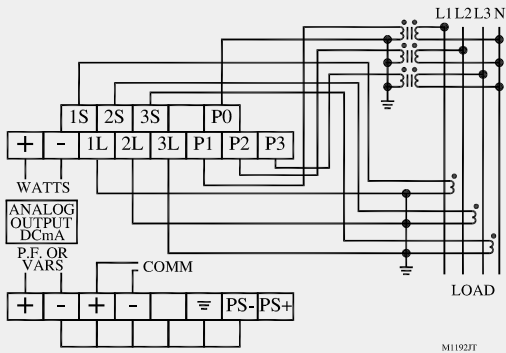
### 3 PHASE, 4 WIRE (2 1/2 ELEMENT)



249243 / 249248

Watts / Vars and Watts / Power Factor

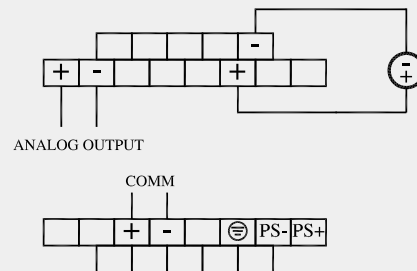
### 3 PHASE, 4 WIRE (3 ELEMENT)



249244 / 249249

Dual Function Watts / Vars & Watts / P.F.

### DC Volts



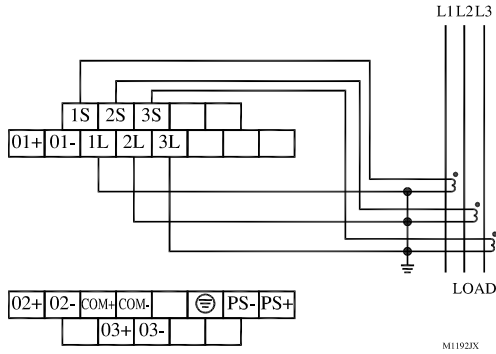
249125  
Volts DC

# Power SeriesPlus

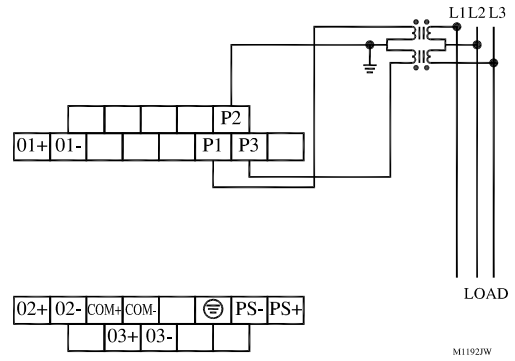
Digital Switchboard Meters

## Terminal Connections (see page 21 for notes)

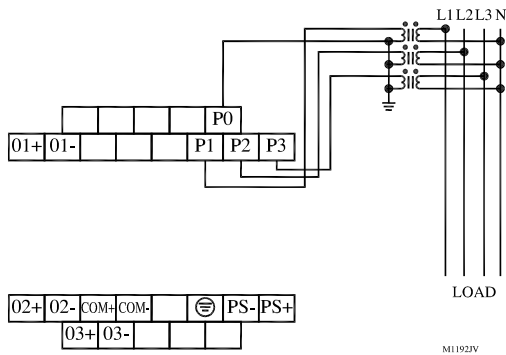
**249305**  
3 in 1 Ammeter



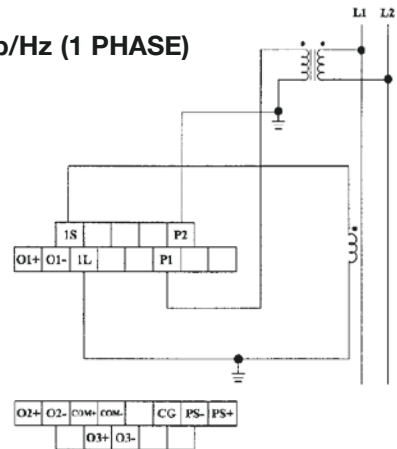
**249301**  
3 in 1 Voltmeter (3P3W)



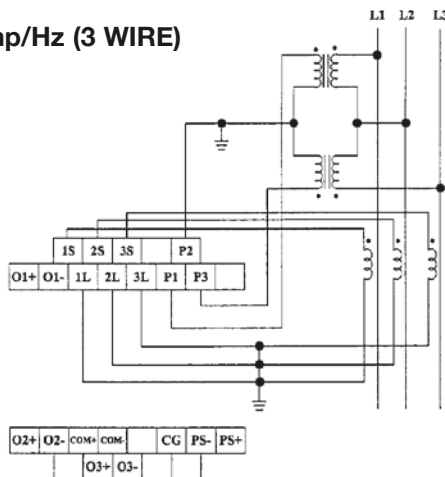
**249302**  
3 in 1 Voltmeter (3P4W)



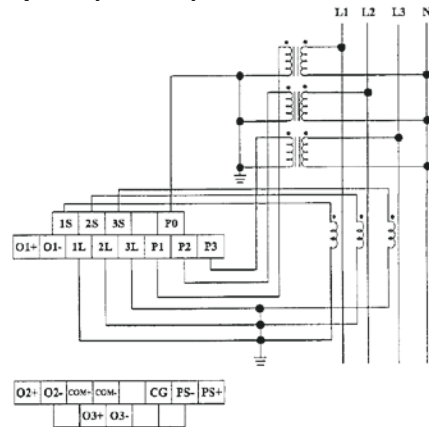
**249307**  
Volt/Amp/Hz (1 PHASE)



**249308**  
Volt/Amp/Hz (3 WIRE)

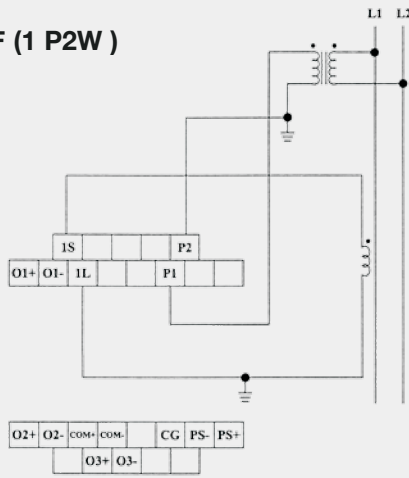


**249309**  
Volt/Amp/Hz (4 WIRE)

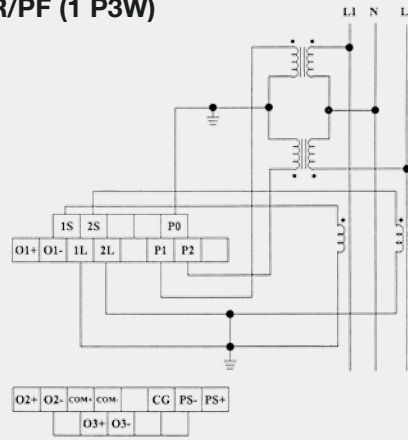


## Terminal Connections (see notes below)

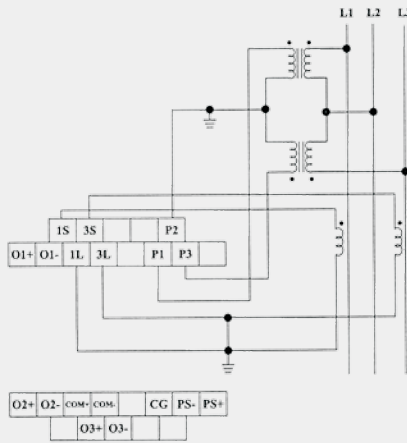
**249334**  
W/VAR/PF (1 P2W)



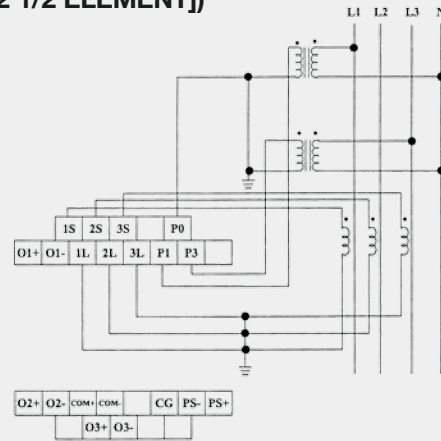
**249335**  
W/VAR/PF (1 P3W)



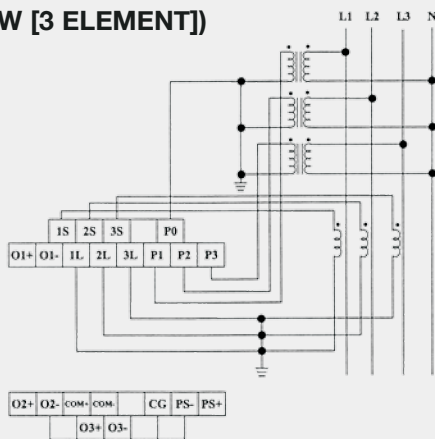
**249336**  
WATT/VAR/PF (3P3W)



**249337**  
WATT/VAR/PF  
(3P4W [2 1/2 ELEMENT])



**249338**  
WATT/VAR/PF  
(3P4W [3 ELEMENT])



### NOTES FOR 2493 CONNECTION DRAWINGS:

PS+ is positive Power Supply connection (line voltage for AC supplies).

PS- is negative Power Supply connection (neutral for AC supplies).

CG is chassis ground. This connection must be made for 125VDC units only.

O1, O2, O3 are analog outputs corresponding to Top Display (O1), Middle Display (O2), Bottom Display (O3).

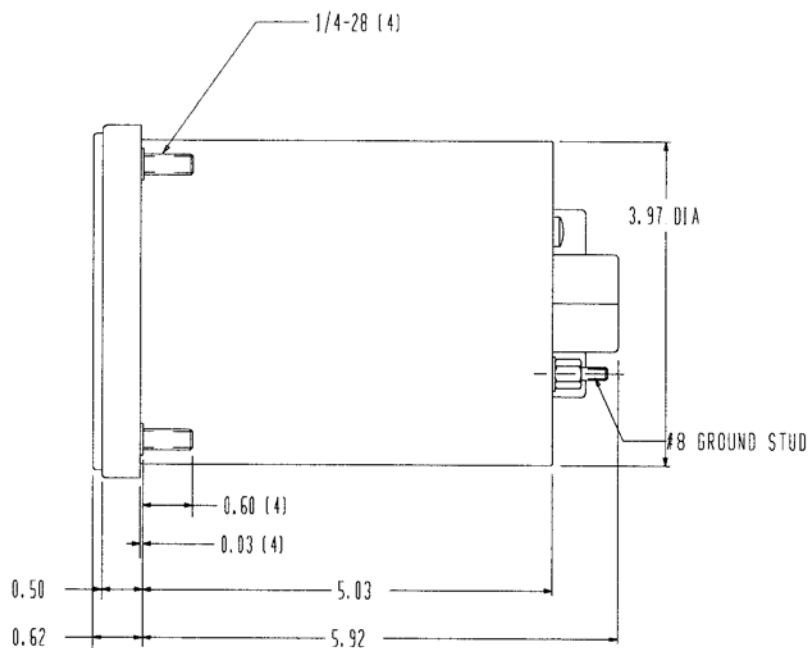
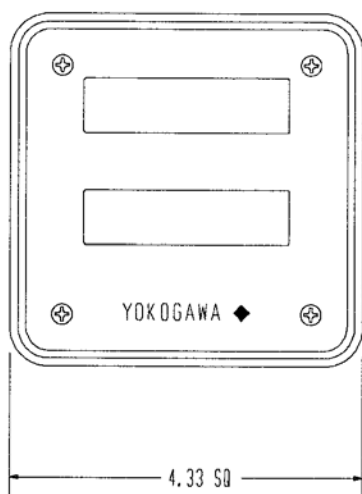
# Power Series<sup>Plus</sup>

Digital Switchboard Meters

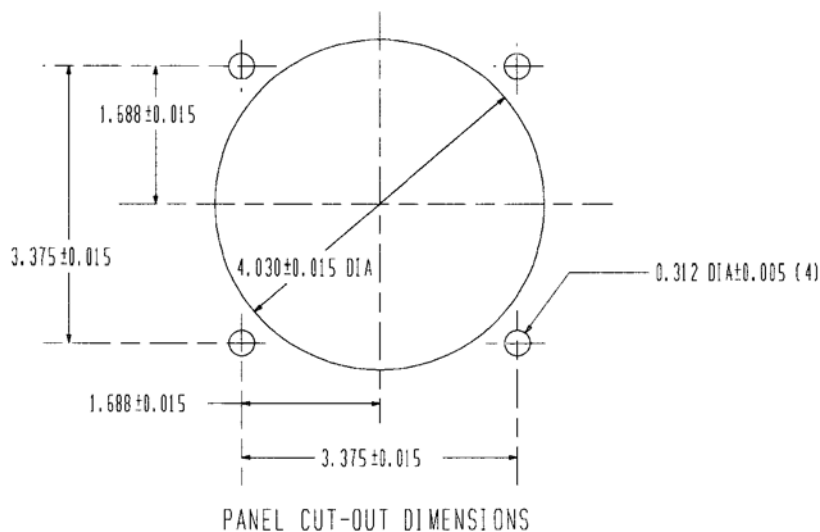
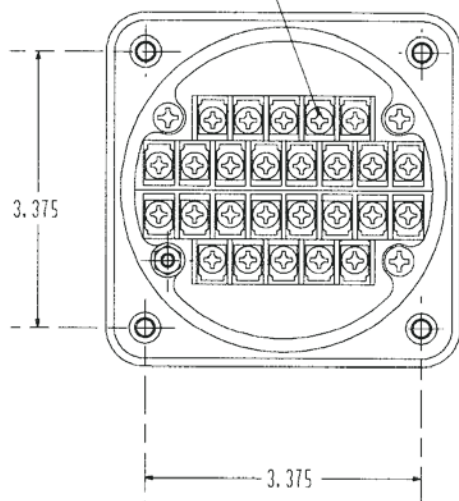
## OUTLINE DIMENSIONS

The POWER SERIES<sup>Plus</sup> is enclosed in a rugged steel case treated with zinc chromate to resist corrosion. The cover assembly and faceplate are constructed of high temperature polycarbonate material and have several gaskets which seal out dust and moisture from the front cover. The 26 position terminal board is a glass-filled polycarbonate material with #8 nickel-plated brass terminals inserted per the connection drawings for the model selected.

front view of 2492



#8 TERMINAL (26 MAX)











## A Commitment to Innovation

Since our establishment in the United States in 1957, Yokogawa Corporation of America (YCA) has become a leading North American manufacturer and supplier of Test and Measurement, Field Instrumentation (Flow, Pressure and Analytical Products), Process Control Equipment, Information Products

Headquartered just south of Atlanta, Georgia, YCA has sales offices across the United States. Our commitment to our customers is our number one priority, and we back it up with a network of representatives and distributors that reflect this commitment. Our 132 manufacturing and service locations give us a presence on every major continent, which means we have the global resources to support all your application needs.

Our parent company, Yokogawa Electric Corporation, is dedicated to developing the most advanced control and instrumentation products and systems in the world. As a major global player, the company anticipates the needs of the times, continually tackling new challenges and exploring new markets in order to provide the best solutions in the world.

Yokogawa's commitment to innovation is reflected in our extraordinary investments in R&D, which ensure development of the most advanced products and services. As a result, we have secured more than 4,500 patents and registrations, representing a number of important innovations, including the world's first distributed control system and the first digital sensors for flow and pressure measurement.

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**Represented By:**

