



Installation Guide



**POWER
MEASUREMENT**

Danger



This symbol indicates the presence of dangerous voltage within and outside the product enclosure that may constitute a risk of electric shock, serious injury or death to persons if proper precautions are not followed.

Caution



This symbol alerts the user to the presence of hazards that may cause minor or moderate injury to persons, damage to property or damage to the device itself, if proper precautions are not followed.

Note



This symbol directs the user's attention to important installation, operating and maintenance instructions.

Installation Considerations

Installation and maintenance of the ION 6200 meter should only be performed by qualified, competent personnel that have appropriate training and experience with high voltage and current devices. The meter must be installed in accordance with all Local and National Electrical Codes.

DANGER

Failure to observe the following instructions may result in severe injury or death.

- ◆ During normal operation of the ION 6200 meter, hazardous voltages are present on its terminal strips, and throughout the connected potential transformer (PT), current transformer (CT), digital (status) input, control power and external I/O circuits. PT and CT secondary circuits are capable of generating lethal voltages and currents with their primary circuit energized. Follow standard safety precautions while performing any installation or service work (i.e. removing PT fuses, shorting CT secondaries, etc).
- ◆ The terminal strips on the meter base should not be user-accessible after installation.
- ◆ Do not use digital output devices for primary protection functions. These include applications where the devices perform energy limiting functions or provide protection of people from injury. Do not use the ION 6200 in situations where failure of the devices can cause injury or death, or cause sufficient energy to be released that can start a fire. The meter can be used for secondary protection functions.
- ◆ Do not HIPOT/Dielectric test the digital (status) inputs, digital outputs, or communications terminals. Refer to the label on the ION 6200 meter for the maximum voltage level the device can withstand.

CAUTION

Observe the following instructions, or permanent damage to the meter may occur.

- ◆ The ION 6200 meter offers a range of hardware options that affect input ratings. The ION 6200 meter's serial number label lists all equipped options. Applying current levels incompatible with the current inputs will permanently damage the meter. This document provides installation instructions applicable to each hardware option.
- ◆ The ION 6200 meter's chassis ground must be properly connected to the switchgear earth ground for the noise and surge protection circuitry to function correctly. Failure to do so will void the warranty.
- ◆ Terminal screw torque: Barrier-type (current, voltage, and relay terminal screws: 1.35 Nm (1.00 ft-lbf) max. Captured-wire type (digital inputs/outputs, communications, power supply: 0.90 Nm (0.66 ft.lbf) max.

FCC Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

The Ringer Equivalence Number (REN) for the ION 6200 optional internal modem is 0.6. Connection to the ION 6200 internal modem should be made via an FCC Part 68 compliant telephone cord (not supplied). The ION 6200 cannot be used on a public coin phone service or party line services.

Network Compatibility Notice for the Internal Modem

The internal modem in meters equipped with this option is compatible with the telephone systems of most countries in the world, with the exception of Australia and New Zealand. Use in some countries may require modification of the internal modem's initialization strings. If problems using the modem on your phone system occur, please contact Power Measurement Technical Support

Standards Compliance



CSA: Certified to CAN/ CSA C22.2 No.1010-1 Certified to UL 3111

Limitation of Liability

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Regardless of whether any remedy set forth herein fails of its essential purpose, except to the extent the following limitation is prohibited by applicable law, Power Measurement shall not, in any event or under any legal claim or theory (whether based on contract, indemnity, warranty, tort (including negligence and strict liability) or otherwise), be liable to the original purchaser or any other person or entity for special, indirect, incidental, punitive, liquidated, special or consequential damages whatsoever with respect to any purchased product, including, without limitation, business interruption, loss of use, profit or revenue, even if Power Measurement has been advised of the possibility of such damages. To the extent that a limitation or exclusion of consequential damages are prohibited by applicable law, then Power Measurement's liability shall be limited to twice the amount of the relevant purchased product.

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For product or service warranty information, please refer to the applicable "Power Measurement Terms and Conditions of Sale - Equipment" or "Power Measurement Terms and Conditions of Sale - Services" at the following internet address:

<http://www.pwrm.com/buy/terms/>

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Covered by one or more of the following patents:

U.S. Patent No's 6825776, 6813571, 6798191, 6798190, 6792364, 6792337, 6751562, 6745138, 6737855, 6694270, 6687627, 6671654, 6671635, 6615147, 6611922, 6611773, 6563697, 6493644, 6397155, 6186842, 6185508, 6000034, 5995911, 5828576, 5736847, 5650936, D459259, D458863, D443541, D439535, D435471, D432934, D429655, D429533, D427533.

ION 6200 Models

Integrated Display Model

The Integrated model has a large, LED front panel display.

TRAN (transducer) Model

The TRAN model has no display. You can connect a Remote Modular Display unit (RMD) to the TRAN to display measurement values.

RMICAN Model

An integrated display meter that is RMICAN-certified for revenue metering in Canada. RMICAN meters have different security options available, including a factory-sealed version.

Available Options

		ION 6200 Product Options					
		Megawatt ¹	Power Supply	COM	I/O	Security	Measurement Package ²
Model	Integrated Display	Optional	<ul style="list-style-type: none"> ◆ Standard ◆ Low Voltage DC ◆ 480V 	Optional	Optional	<ul style="list-style-type: none"> ◆ Standard³ ◆ RMANSI⁴ 	<ul style="list-style-type: none"> ◆ Standard ◆ Enhanced #1 ◆ Enhanced #2
	TRAN	Optional	<ul style="list-style-type: none"> ◆ Standard ◆ Low Voltage DC ◆ 480V 	Optional	Optional	<ul style="list-style-type: none"> ◆ Standard ◆ RMANSI 	<ul style="list-style-type: none"> ◆ Standard ◆ Enhanced #1 ◆ Enhanced #2
	RMICAN	Not available	<ul style="list-style-type: none"> ◆ Standard ◆ Low Voltage DC ◆ 480V 	Optional	Optional	<ul style="list-style-type: none"> ◆ RMICAN⁵ ◆ RMICAN sealed⁶ 	<ul style="list-style-type: none"> ◆ Standard ◆ Enhanced #1 ◆ Enhanced #2

Notes

- ¹ Measures power and energy in millions (e.g. megawatts) and volts in thousands (kilovolts).
- ² See "Standard Measurements and Enhanced Packages 1 & 2" on page 26.
- ³ Standard security consists of a meter password.
- ⁴ Meters with RMANSI security are approved for revenue metering in the United States.
- ⁵ Firmware-based security that meets Industry Canada revenue metering standards.
- ⁶ Firmware-based security plus factory sealed.

For more information on the different meter options, refer to the *ION 6200 Options Card Retrofit Instructions* on the Power Measurement web site.

NOTE

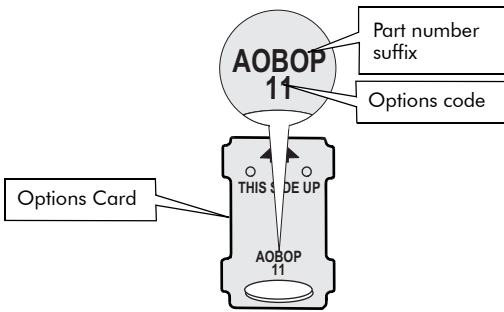
The term "basic meter" refers to Integrated or TRAN models with a standard Options Card (real-time voltage and current measurements).

Quick Install

This section can be used by a licensed electrician to install and perform basic meter setup. For more detailed meter setup and use instructions, see the "Using the Meter" section in this guide.

Before You Begin

1. Familiarize yourself with the steps in this Quick Install section and read the safety precautions presented on the "Installation Considerations" page.
2. Check that you have received all the correct parts for your meter. Ensure that you have the correct Options Card by comparing it to the following table.



Options Card Combinations

Options Code ¹	Part Number Suffix ²	Description
1	ZOA0N	Standard Measurements
2	ZOA0P	Enhanced Package #1
3	ZOA0R	Enhanced Package #2
4	ZOB0N	Standard Measurements, two pulse outputs
5	ZOB0P	Enhanced Package #1, two pulse outputs
6	ZOB0R	Enhanced Package #2, two pulse outputs
7	AOA0N	Standard Measurements, RS-485
8	AOA0P	Enhanced Package #1, RS-485
9	AOA0R	Enhanced Package #2, RS-485
10	AOB0N	Standard Measurements, two pulse outputs, RS-485
11	AOB0P	Enhanced Package #1, two pulse outputs, RS-485
12	AOB0R	Enhanced Package #2, two pulse outputs, RS-485

¹ This is the code number displayed on the meter Options Code screen.

² This is the part number used to order the meter.

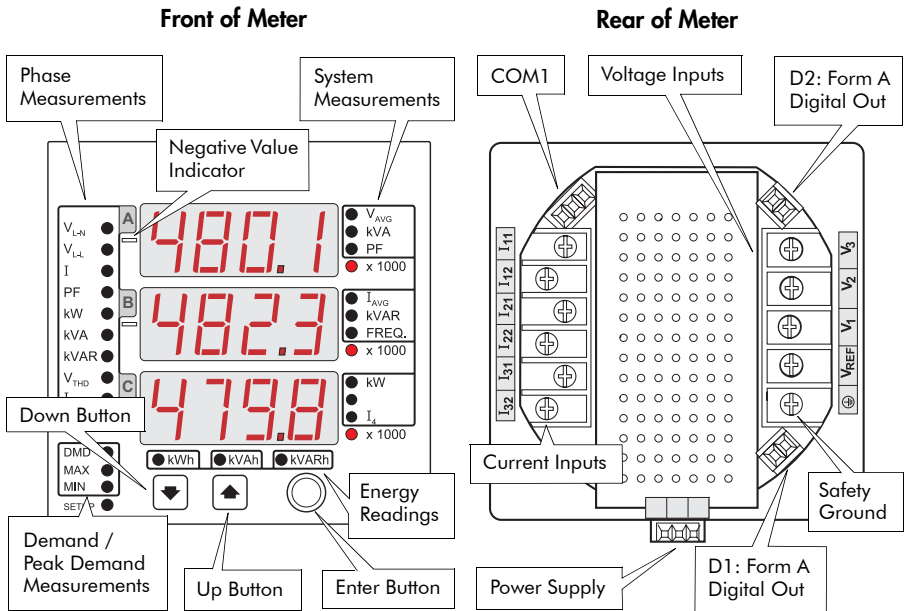
DANGER

Do not power up the meter until the current and voltage wiring is completed.

Recommended Tools

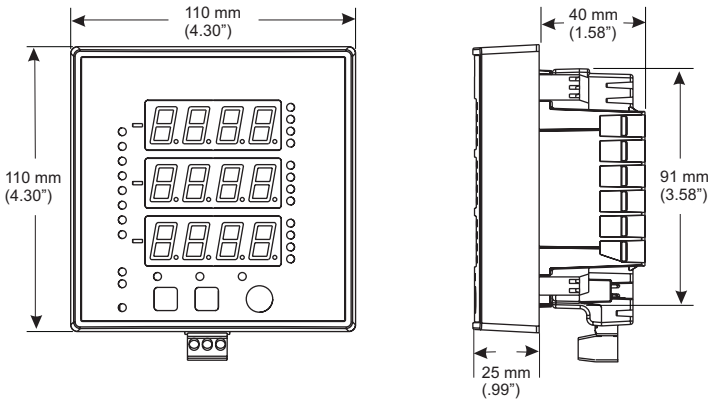
- ◆ #1 and #2 Phillips screwdrivers
- ◆ Precision flat-head screwdriver
- ◆ Wire cutters / stripper

Meter Overview

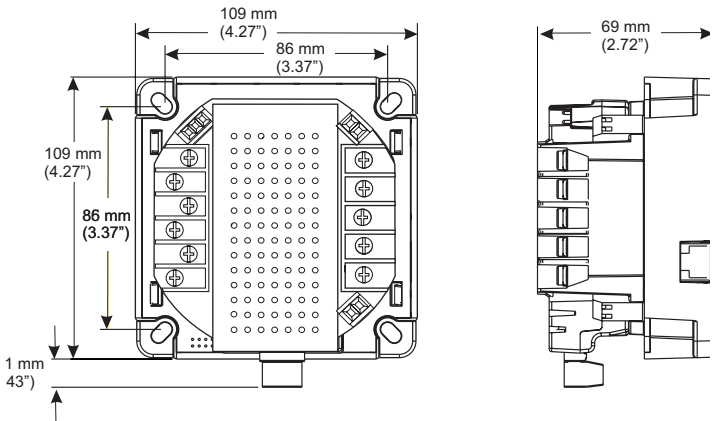


Unit Dimensions

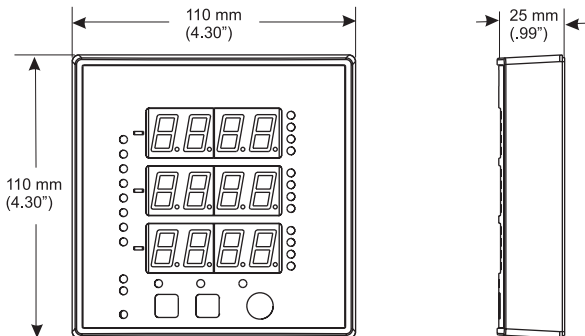
Integrated Model Dimensions



TRAN Model Dimensions

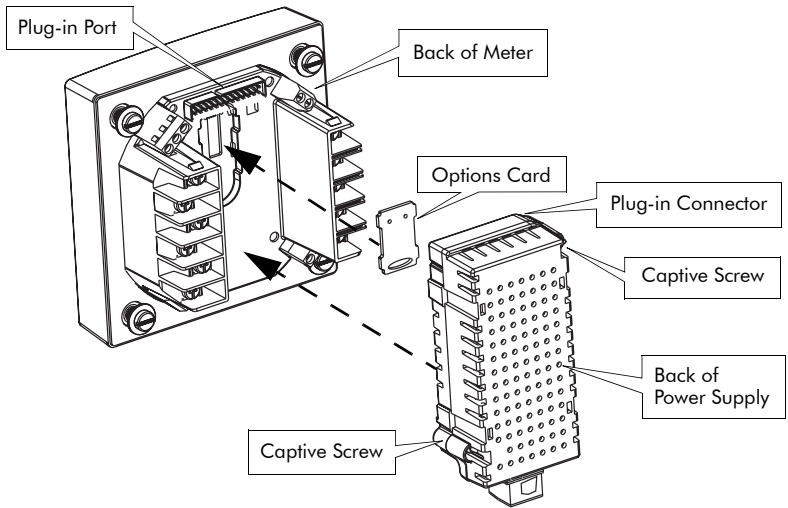


RMD Dimensions



Step 1: Assemble the Meter

1. Insert the Options Card in the slot at the back of the meter, then firmly slide the card up and into place.
2. Insert the power supply's plug-in connector into the meter's plug-in port.
3. Attach the power supply by tightening the captive screws using a #1 Phillips screwdriver. Do not overtighten.



NOTE

If your display screen only shows 0 (zero) Frequency, the Options Card is not inserted correctly. Remove the card and re-insert.

Step 2: Mount the Meter

Mount the meter in a dry location free from dirt and corrosive vapors. Once installed, no cleaning of the device is necessary.

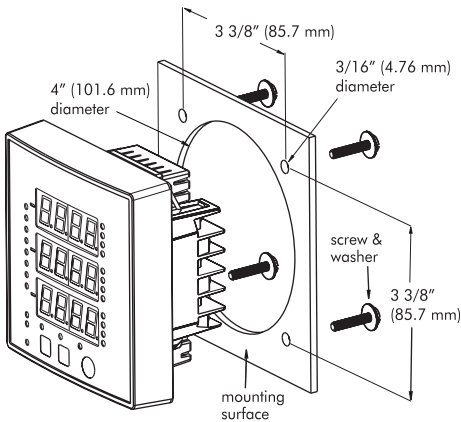
Environmental Conditions

Operation Range	-20°C to 70°C (-4°F to 158°F) ambient air, no ice formation. Maximum 50°C (122°F) with 480 V power supply.
Storage Range	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% non-condensing

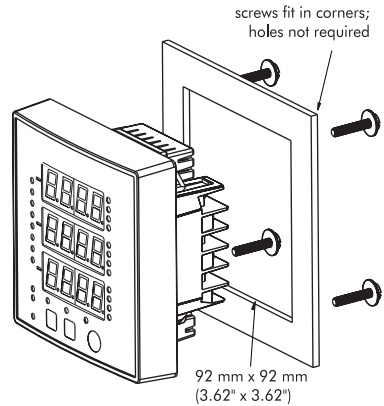
Mounting the Integrated Model

1. Fit the meter into the cutout [DIN 96 standard or ANSI 4"].
2. Insert each screw through the drilled hole on the mounting surface and into its corresponding metal insert located on the back of the meter. Note that the DIN 96 cutout does not require drilled holes.
3. Tighten screws using a #2 Phillips screwdriver. Do not overtighten.

ANSI 4" (4 1/2" Switchboard)



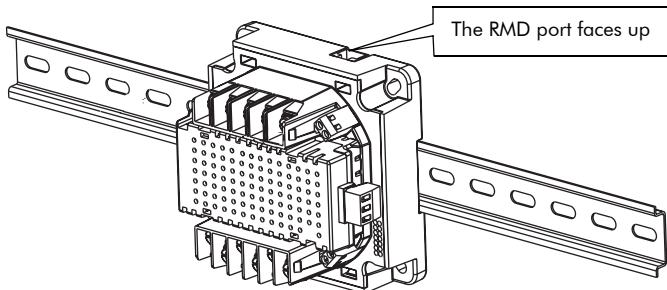
DIN 96



Mounting the TRAN Model

The TRAN can be mounted two different ways:

- ◆ Flush against any flat surface in any orientation with four #8 or #10 size screws.
- ◆ Snapped in place on a standard DIN rail, European Standard EN50022:1977. Ensure the RMD port faces up, as shown in the diagram below. In this orientation, the sliding snap feature has the most strength.



Mounting the RMD (if equipped)

The Remote Modular Display (RMD) is a product option for ION 6200 TRAN meters. The RMD can be mounted in either a standard DIN or ANSI cutout. See the *ION 6200 RMD Retrofit Instructions* for more information.

Remote Modular Display Connections

Connector Type	RJ11
Wire	26 AWG 6 conductor cable

NOTE

Only use the supplied cable to connect the RMD.

Step 3: Wire the Ground Terminal

Wire the meter's ground terminal (⊕) to the switchgear earth ground using a 14 AWG (2.1 mm²) or larger wire.

Connect the power supply G (ground) terminal to the same point as the meter (⊕) terminal.

CAUTION

Do not use metal door hinges as a ground path.

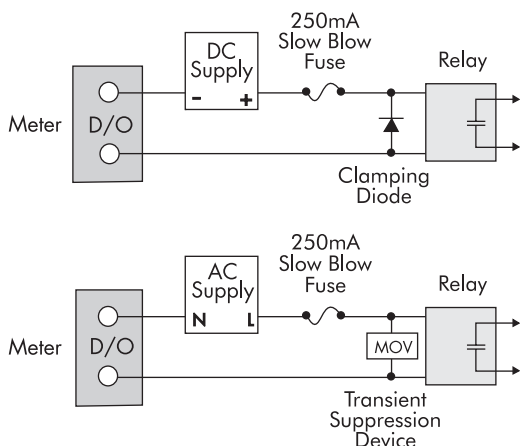
Step 4: Wire the Digital Outputs (if equipped)

Two optional Form A digital relays can be used for energy pulsing and/or control applications.

Digital Output Connections

Connector Type	Captured wire
Wire	24 AWG to 18 AWG wire (0.08 mm ² to 0.82 mm ²)
Maximum Forward Current	150 mA
Maximum Voltage	200 VDC/VAC
Maximum Current	150 mA
Isolation	Optical

Typical Form A Digital Output Use



Select an MOV (metal oxide varistor) or clamping diode that ensures the output terminals do not receive voltage greater than 350 V peak during switching.

Step 5: Wire the Voltage and Current Inputs

Voltage Input Specifications

Connector Type	Ring or split-ring, or bare wire.
Wire	14 to 12 AWG (2.1 mm ² to 3.3 mm ²)
Inputs	V1, V2, V3, V _{REF}
Rated Inputs ¹	60 – 400 LN (103.5 – 690 LL) VAC RMS (three phase) 60 – 400 L-N VAC (single phase)
Compliance	Installation category III (Distribution). Pollution degree 2.
Overload	1500 VAC RMS continuous
Dielectric Withstand	> 3250 VAC RMS, 60 Hz for 1 minute
Impedance	> 2 MΩ/phase to ground

Notes

¹ Accuracy may be affected if the voltage on V1 falls below 50 V.

Potential Transformers

PTs are required for all systems with voltage levels greater than these above. The meter inputs can be used with PTs that have secondaries rated between 50 VAC and 347 VAC +25%.

PTs should comply with IEC 61010-1, Pollution Degree 2, Overvoltage Category III requirements.

⚠ CAUTION

In cases where PTs are required, the secondaries should be fused.

Current Input Specifications

Connector Type	Ring or split-ring, or bare wire.
Wire	14 to 12 AWG (2.1 mm ² to 3.3 mm ²)
Inputs	I1, I2, I3
Rated Inputs	10 A RMS (+ 20% maximum, 300 V RMS to ground)
Compliance	Installation category III (Distribution). Pollution degree 2
Overload	120 A RMS for 1 second, non-recurring
Dielectric Withstand	3000 V RMS, for 1 minute
Starting Current	0.005 A RMS
Burden	0.05 VA (typical) @ 5 A RMS

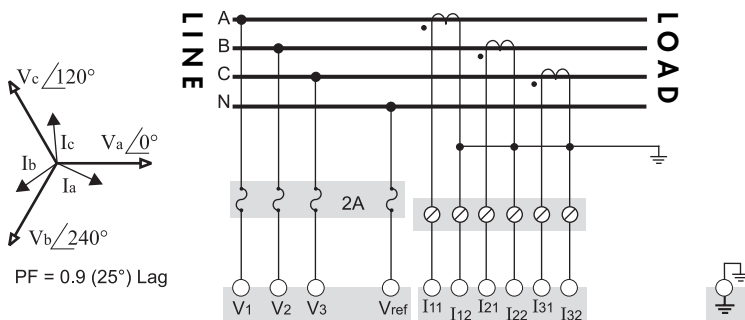
Current Transformers

Use CTs that are compliant with the electrical safety code in your region.

Compliance	UL3111-1; and IEC 61010-1, Pollution Degree 2, Overvoltage Category III
Primary CT Rating	Equal to current rating of the power feed protection device. ¹
Secondary CT Burden Capacity	> 3VA

¹ If the peak anticipated load is considerably less than the rated system capacity, you can improve accuracy and resolution by selecting a lower rated CT.

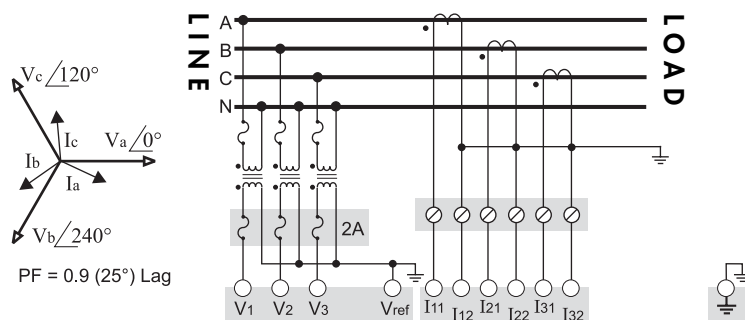
4-Wire Wye, 3-Element Direct Connection



400 VAC L-N / 690 VAC L-L max.

Volts Mode = 4W-Wye

4-Wire Wye, 3-Element, 3 PT, 3 CT

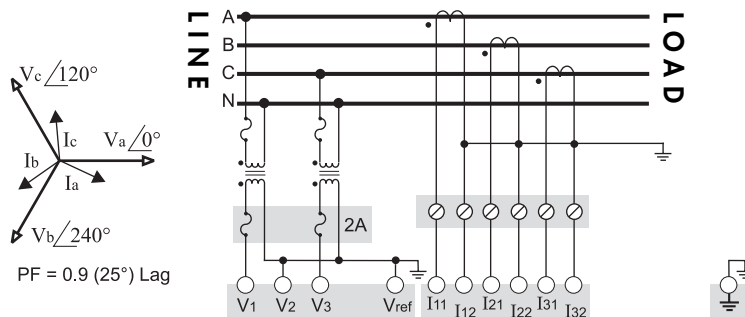


Use PTs for voltages over 400 VAC L-N / 690 VAC L-L

Wye (Star) wiring for PT primaries and secondaries.

Volts Mode = 4W-Wye

4-Wire Wye, 2½-Element, 2 PT, 3 CT

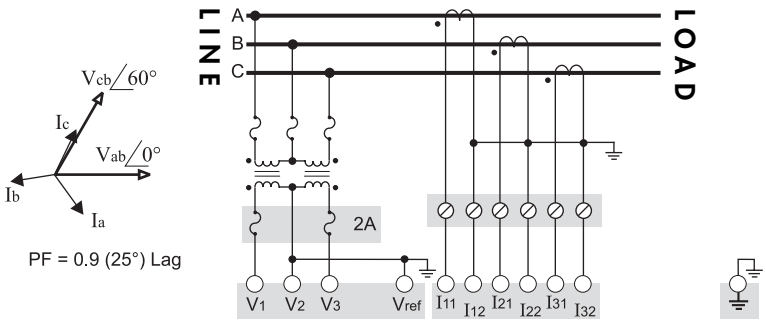


Phase B voltage (V2) is derived from the phase A and C voltages.

Use PTs for voltages over 400 VAC L-N / 690 VAC L-L

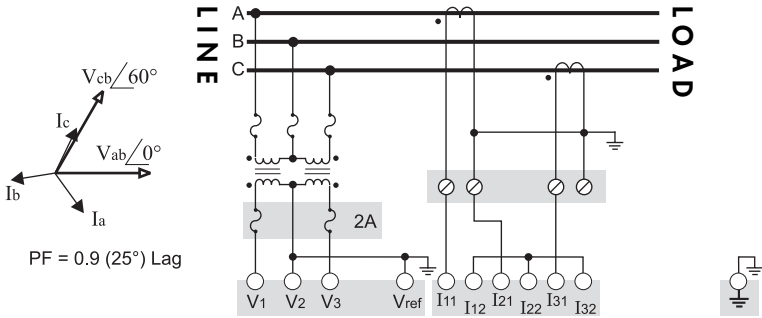
Volts Mode = 3W-Wye

3-Wire Delta, 2½-Element, 2 PT, 3 CT



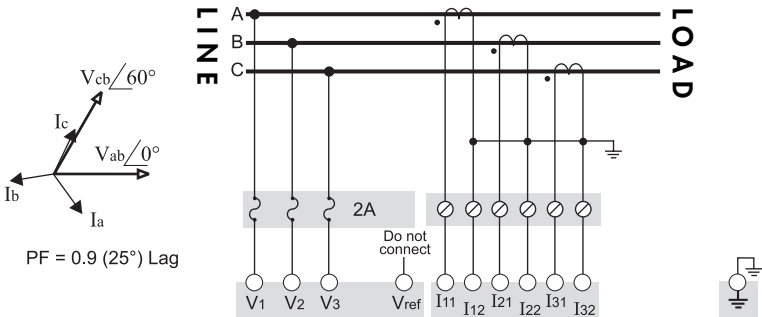
Use PTs for voltages over 690 VAC L-L
Volts Mode = Delta

3-Wire Delta, 2-Element, 2 PT, 2 CT.



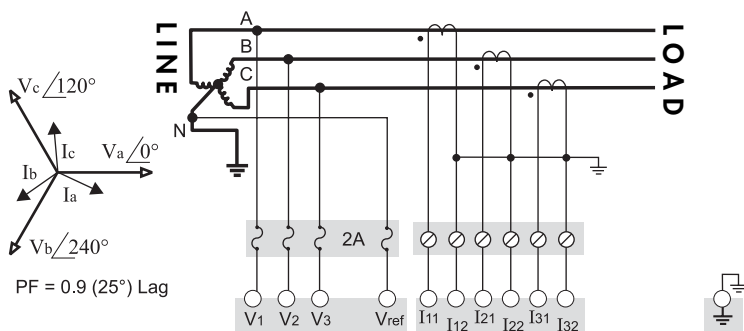
Use PTs for voltages over 690 VAC L-L
Volts Mode = Delta

3 Wire Delta Direct Connection



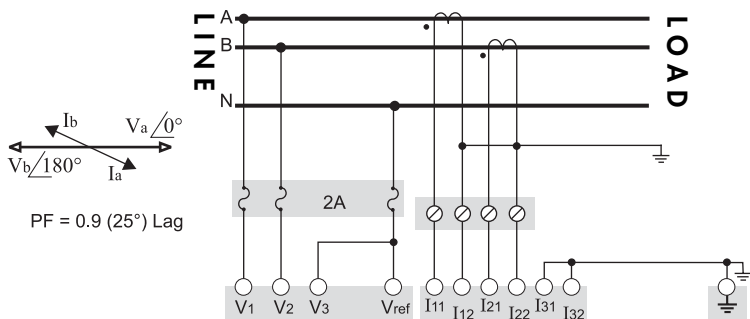
690 VAC L-L max.
Volts Mode = Direct Delta

3-Wire Grounded Wye, 3-Element Direct



The configuration requires that the transformer secondary star-point is grounded. The phase-to-ground voltages must be within the meter's range. Volts Mode = 4W-Wye

Single Phase Connection Diagram



Connect the two voltage phases (180° apart) to the V1 and V2 inputs, and the CT outputs to the I1 and I2 input pairs. Unused meter inputs are grounded.

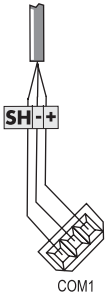
Volts Mode = 2W

For optimum meter performance, ensure phase rotation sequence is respected.

Step 6: Wire the Communications (if equipped)

COM1 Connections

RS-485 cable



Connect SH at one end only.

Connector Type	Captured wire
Wire	Shielded twisted pair RS-485 cable, 22 AWG (0.33 mm ²) or larger
Maximum Cable Length	1219 m (4000 ft)
Maximum Devices (per bus)	32
Input	Optically isolated

Dual Purpose RXD/TXD Indicator

Next to the RS-485 connector ⊕ terminal, a dual purpose RXD/TXD indicator that flashes red when the meter is transmitting, and green when the meter is receiving data.

Available Protocols

The meter protocol can be set to PML or Modbus. Refer to the *ION 6200 Modbus Protocol Document* for Modbus protocol implementation details.

Step 7: Wire the Power Supply

Power supply connections differ depending on the power supply option used. For more detailed information on how to connect your ION 6200 power supply, refer to the *ION 6200 Power Supply Retrofit Instructions*.

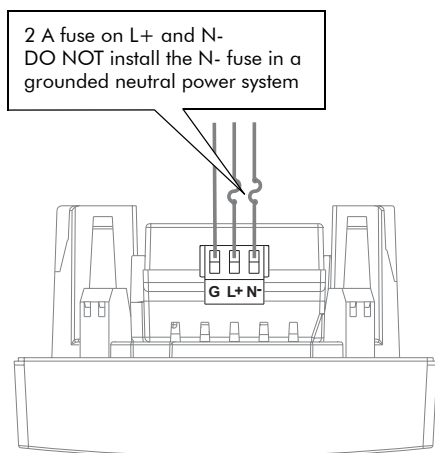
Power Supply Specifications

Power Supply	Rated Inputs	Meter	Maximum		Steady State		Dielectric Withstand
			VA	W	VA	W	
Standard AC / DC power supply	AC: 100 – 240 VAC, 50 – 60 Hz DC: 110 – 300 VDC Installation category II (Local). Pollution degree 2.	Integrated	13	8	8	5	2000 VAC RMS, 60 Hz for 1 minute
		TRAN / RMD	13	8	9	5	
		TRAN	5	3	5	3	
Low Voltage DC power supply	20 – 60 VDC	Integrated		6		4	
		TRAN / RMD		7		5	
		TRAN		3		3	
480 V power supply	480 VAC, 60 Hz Installation category III (Distribution). Pollution degree 2.	Integrated	15	12	12	10	3250 VAC RMS, 60 Hz for 1 minute
		TRAN / RMD	15	12	13	10	
		TRAN	11	9	11	9	

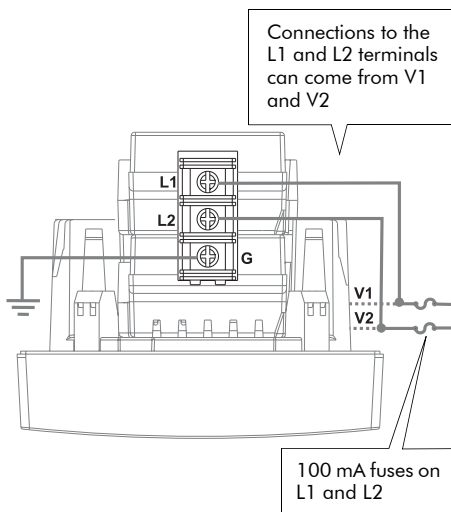
Power Supply Connections

Power Supply	Connector Type	Wire
Standard AC / DC power supply	Captured wire	18 to 14 AWG (0.8 mm ² to 2.1 mm ²)
Low Voltage DC power supply	Captured wire	18 to 14 AWG (0.8 mm ² to 2.1 mm ²)
480 V power supply	<ul style="list-style-type: none"> ◆ Ring ◆ Split-ring ◆ Bare wire 	18 to 14 AWG (0.8 mm ² to 2.1 mm ²)

Standard AC/DC and Low Voltage DC Power Supply



480 V Power Supply



Step 8: Power Up the Meter

1. Close the PT fuses (or direct voltage input fuses).
2. Open the CT shorting blocks.
3. Apply power to the meter.

Step 9: Set Up the Meter Using the Front Panel

See "Configuration Mode" on page 23, in the "Using the Meter" section, for detailed instructions on setting up the meter.

The following settings can be configured on your meter using the front panel.

Configurable Settings

	String	Description	Range (Values)	Default
Mode	<i>TYPE</i>	Volts Mode	4W (4-Wire WYE) dELt (Delta) 2W (Single Phase) dEM (Demonstration) 3W (3-Wire WYE) dELd (Delta Direct)	Delta Direct
	<i>PTs</i>	<i>PT1</i>	PT1 (Primary)	1 to (65.53 x 1000 LED)
<i>PTS</i>		PTS (Scaling) ¹	1 (x 1); 1000 (x 1000)	x1
<i>PT2</i>		PT2 (Secondary)	1 to (65.53 x 1000 LED)	480
<i>CTs</i>	<i>CT1</i>	CT1 (Primary)	1 to (65.53 x 1000 LED)	400
	<i>CT2</i>	CT2 (Secondary)	1 to (65.53 x 1000 LED)	5
Polarity	<i>UPL1</i>	V1 Polarity (Phase 1 voltage polarity)	nor (Normal); inv (Inverted)	Normal
	<i>UPL2</i>	V2 Polarity (Phase 2 voltage polarity)	nor (Normal); inv (Inverted)	Normal
	<i>UPL3</i>	V3 Polarity (Phase 3 voltage polarity)	nor (Normal); inv (Inverted)	Normal
	<i>CPL1</i>	I1 Polarity (Phase 1 current polarity)	nor (Normal); inv (Inverted)	Normal
	<i>CPL2</i>	I2 Polarity (Phase 2 current polarity)	nor (Normal); inv (Inverted)	Normal
	<i>CPL3</i>	I3 Polarity (Phase 3 current polarity)	nor (Normal); inv (Inverted)	Normal
Demand	<i>dPr</i>	Demand Sub Interval	1 – 60 min	15
	<i>ndPr</i>	Number of Demand Periods	1 – 5	1
Communications	<i>Prot</i>	Protocol ²	PML ³ ; Mod (Modbus RTU)	Modbus
	<i>Baud</i>	Baud Rate	1200, 2400, 4800, 9600, 19200	9600
	<i>unit</i>	Unit ID	1 – 247	based on the serial number ⁴
	<i>rTS</i>	RTS Delay	0 – 1000 milliseconds	20

	String	Description	Range (Values)	Default
Modbus Scaling	<i>PUS</i>	Voltage Scale ⁵	0.001, 0.01, 0.1, 1, 10, 100, 1000	10
	<i>PCS</i>	Current Scale ⁵	0.001, 0.01, 0.1, 1, 10, 100, 1000	10
	<i>PPS</i>	Power Scale ⁵	0.001, 0.01, 0.1, 1, 10, 100, 1000	1
	<i>PnS</i>	Neutral Scale ⁵	0.001, 0.01, 0.1, 1, 10, 100, 1000	10
Digital Outputs	<i>out 1</i>	Output Mode Digital #1	(k)Wh Del., (k)VAh, (k)VARh Del., (k)Wh Rec., (k)VARh Rec. See note ⁶ Ext 1 ⁷ , Ext 2 ⁷	(k)Wh ⁶
	<i>tcc 1</i>	Time Constant 1 (kT) ⁸	0.1 – 999.9 (only 1 digit after the decimal pt. permitted)	1.0
	<i>out 2</i>	Output Mode Digital #2	(k)Wh Del., (k)VAh, (k)VARh Del., (k)Wh Rec., (k)VARh Rec. See note ⁶ Ext 1 ⁷ , Ext 2 ⁷	(k)VARh ⁶
	<i>tcc 2</i>	Time Constant 2 (kT) ⁸	0.1 – 999.9 (only 1 digit after the decimal pt. permitted)	1.0
Display	<i>dscr</i>	Display Scroll Time	0 – 30 seconds (0 = disable)	0
	<i>dUPd</i>	Display Refresh Period	1 – 6 seconds	2
Security	<i>PSEt</i>	Password	0 – 9999	0

Notes

- ¹ For a meter with the Megawatt option, PTS must be set to “x1000.”
- ² Protocol must be set to Modbus for meter to act as Modbus Slave.
- ³ ION compatible protocol for use with an ION Enterprise system and other ION meters.
- ⁴ The default Unit ID is 100 plus the last two digits of the serial number (before the last dash). For example, S/N:HA-050300456-03 Unit ID: 156
- ⁵ These settings should not be changed from default unless the Modbus protocol is being used.
- ⁶ The units displayed on the front panel are Wh, VAh, and VARh with actual values of kWh, kVAh, and kVARh respectively. kWh Rec. and kVARh Rec. are represented by a lit “minus” (negative value) LED.
- ⁷ In Ext 1 or Ext 2 mode, the digital outputs are reserved for digital control.
- ⁸ Time Constant, sometimes called kT, is the number of units (kWh, kVAh, kVARh) per output transition. The digital output uses KY pulsing. This means that the relay changes from open to closed or from closed to open whenever kT units have been measured (20 transitions/second maximum).

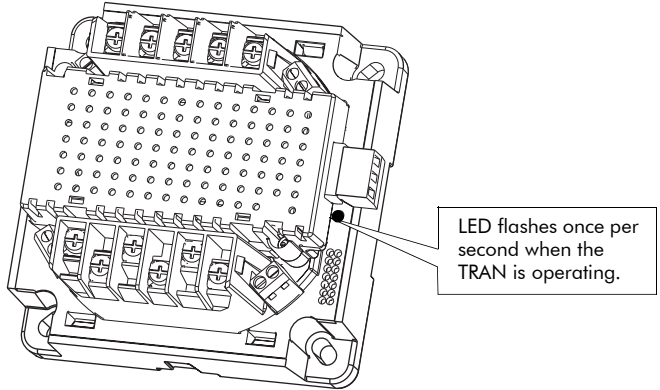
Step 10: Verify Meter Operation

Integrated Model, RMD Model

Ensure that the meter is receiving power, and that the display shows meaningful values.

TRAN Model without RMD

Ensure that the meter is receiving power, and that the LED located below the 3-position power supply connector flashes once per second.



If your meter is not operating properly, see the "Meter FAQs" section at the back of this guide, or consult the Power Measurement Support web site at <http://pwr.com/support/> for troubleshooting tips and frequently asked questions.

Using the Meter

With the meter front panel, you can view parameter values; configure parameters; perform demand resets; perform LED checks; and view meter information. Each of these functions can be accomplished by pressing the Up, Down, and Enter buttons on the front panel. These button actions achieve different results according to the mode that the meter is in:

- ◆ **Display mode** (default): view parameter measurements
- ◆ **Reset mode**: reset demand measurements
- ◆ **Configuration Select/Edit modes**: configure a parameter
- ◆ **Information mode**: verify that the front panel display LEDs operate, and view meter information (e.g. meter options, firmware version, etc.)

This section describes front panel navigation within each mode.

NOTE

You have 60 seconds to move from one screen to another. After 60 seconds, the front panel switches back to the default Display mode.

Display Mode

In Display mode, you can view values from these measurement groups:

- ◆ System (total)
- ◆ Per Phase, Energy, Demand
- ◆ Peak Demand

The values you can view depend on which Options package you ordered.

Display Mode Parameter Measurements

Measurement Group	Parameters Measured (Megawatt meters)	Parameters Measured (all other models)
System (Total)	kV_{AVG} , I_{AVG} , MW, MVA, MVAR, PF ¹ , Frequency, I4	V_{AVG} , I_{AVG} , kW, kVA, kVAR, PF ¹ , Frequency, I4
Phase A, B, and C	kV_{LN}^2 , kV_{LL} , I, PF ^{1,2} , MW ² , MVA ² , MVAR ² , kV_{THD} , I_{THD}	V_{LN}^2 , V_{LL} , I, PF ^{1,2} , kW ² , kVA ² , kVAR ² , V_{THD} , I_{THD}
Energy	MWh, MVAh, MVARh	kWh, kVAh, kVARh
Demand ³	MVA, MVAR, MW, I_{AVG}	kVA, kVAR, kW, I_{AVG}
Peak Demand (Max) ³	MVA, MVAR, MW, I_{AVG}	kVA, kVAR, kW, I_{AVG}

¹ In Power Factor displays, a negative sign (-) indicates lagging.




² These values not available when Volts Mode is set to Delta or Delta Direct.

³ Displays system (total) values.

x 1000 Indicator

When the “x 1000” LED is lit, multiply the displayed value by 1000 for the actual value.

Button Functions in Display Mode

Mode	Button	Function
Display Mode Display mode is the meter default.		View the previous parameter value.
		View the next parameter value.
		Move from one measurement group to the next measurement group.

Reset Mode





In Reset mode, you can perform a Current (Maximum) Demand reset, a Power (Maximum) Demand reset, or an Energy reset.

Screen	String
Current Maximum Demand Reset	<i>Curr</i>
Power Maximum Demand Reset	<i>PLDr</i>
Energy Reset	<i>EnEr</i>

Perform a Power (Maximum) Demand Reset to reset these registers: Real Power Demand Maximum; Reactive Power Demand Maximum; or Apparent Power Demand Maximum.

For revenue sealed meters, Energy resets are not permitted.

Button Functions in Reset Mode





Mode	Button	Function
Reset Mode  ENTER Reset mode by pressing the Enter button and holding for 2 seconds. EXIT Reset mode with the same button sequence.		View the previous reset parameter.
		View the next reset parameter.
		Program the selected (flashing) parameter reset to the meter.

Configuration Mode

In Configuration mode, first use the buttons to **locate** the parameter to be edited (Configuration Select mode), then use the buttons to **edit** the displayed parameter (Configuration Edit mode).








Configuration Select mode: locate a displayed parameter that requires editing by pressing the Up or Down button.

Button Functions in Configuration Select Mode

Mode	Button	Function
Configuration Select Mode  ENTER Configuration Select mode by pressing the Up and Down buttons at the same time and holding for 2 seconds. EXIT Configuration Select mode with the same button sequence.		Move to the previous parameter configuration screen.
		Move to the next parameter configuration screen.
		Enter Configuration Edit mode to configure the displayed parameter value.

Configuration Edit mode: edit a displayed parameter by pressing the Enter button. The parameter digit, value, or decimal point flashes (the meter automatically determines which option to flash for editing, depending on the parameter). With the Up or Down button, you can increase/decrease the digit value, move the decimal point, or select a value from a pre-programmed list. After editing, press the Enter button to set the value.

Button Functions in Configuration Edit Mode

Mode	Button	Function
Configuration Edit Mode  ENTER Configuration Edit mode from Configuration Select mode by pressing the Enter button. EXIT Configuration Edit mode by pressing the Up and Down buttons at the same time and holding for 2 seconds. 		Flashing Digit: Increase the number. Flashing Value: View the previous list value. Flashing Decimal Point: Move the decimal point to the right.
		Flashing Digit: Decrease the number. Flashing Value: Display the next list value. Flashing Decimal Point: Move the decimal point to the left.
	 Press and hold for 2 seconds.	Flashing Digit: Move the position of the cursor to the right. Flashing Decimal Point: Set the new decimal point location.
	 Press and hold for 2 seconds.	Flashing Digit: Move the position of the cursor to the left. Flashing Decimal Point: Set the new decimal point location.
		Program the edited parameter to the meter; the meter automatically returns to Configuration Select mode.

Password Security

A front panel password is required for the first parameter you configure during an editing session. Once you have entered a valid password, you can configure multiple parameters. The default password is 0 (zero).

Meter Settings

Configurable meter settings are listed in “Configurable Settings” on page 19.

Configuration Software

To monitor, configure, or perform energy resets on your meter, Power Measurement offers a number of software alternatives. For information on the availability of configuration and system software, refer to our web site at www.pwrm.com, or contact Technical Support.

Information Mode

In Information mode, you can verify that the front panel LEDs operate, and view meter information (e.g. firmware version).

Verifying that the LEDs and Display Function




When you enter Information mode, every LED on the front panel lights, and each line of the display flashes with four number eights (“8888”) and four decimal points (“....”) per line. This continues for 3 seconds, and indicates that the front panel LEDs and display are operating.

Information Mode Screens

Screen	String
Manufacturer ID Number	No string; area is used for the meter manufacturer/serial number.
Firmware Version	<i>F L J R</i>
Original Equipment Manufacturer (OEM)	<i>D E P T</i>
Meter Options (e.g. enhanced measurements, digital outputs, communications) ¹	<i>O P L</i>

¹ The options code specifies the type of Options Card that is in your meter. To view a list of Options Cards with corresponding options codes, refer to the table “Options Card Combinations” on page 6.

Button Functions in Information Mode

Mode	Button	Function
Information Mode  ENTER Information mode by pressing the Enter, Up and Down buttons together and holding for 2 seconds. EXIT Information mode with the same button sequence.		Move to the previous Information mode screen.
		Move to the next Information mode screen.

Viewing Meter Information

After the LED and display operation verification is completed, the meter automatically displays the first of four screens that provide meter information. Press the Up or Down buttons to scroll through these screens.

Standard Measurements and Enhanced Packages 1 & 2

Parameter	Standard			Enhanced Pkg. 1			Enhanced Pkg. 2		
	Display	COM	Pulse	Display	COM	Pulse	Display	COM	Pulse
Volts L-N Avg	✓	✓		✓	✓		✓	✓	
Volts L-N Per Phase ¹	✓	✓		✓	✓		✓	✓	
Volts L-L Avg	✓	✓		✓	✓		✓	✓	
Volts L-L Per Phase	✓	✓		✓	✓		✓	✓	
Current Avg	✓	✓		✓	✓		✓	✓	
Current Per Phase	✓	✓		✓	✓		✓	✓	
Current Neutral				✓	✓		✓	✓	
Power Total				✓	✓		✓	✓	
Power Per Phase ¹							✓	✓	
Reactive Power Total							✓	✓	
Reactive Power Per Phase ¹							✓	✓	
Apparent Power Total							✓	✓	
Apparent Power Per Phase ¹							✓	✓	
Energy Del. (Imp.)			✓	✓	✓	✓	✓	✓	✓
Energy Del. Per Phase (Imp.)								✓	
Energy Rec. (Exp.)			✓		✓	✓		✓	✓
Energy Rec. Per Phase (Exp.)								✓	
Reactive Energy Del. (Imp.)			✓			✓	✓	✓	✓
Reactive Energy Del. (Imp.) Per Phase								✓	
Reactive Energy Rec. (Exp.)			✓			✓		✓	✓
Reactive Energy Rec. (Exp.) Per Phase								✓	
Apparent Energy			✓			✓	✓	✓	✓
Apparent Energy Per Phase								✓	
Frequency				✓	✓		✓	✓	
Power Factor Total				✓	✓		✓	✓	
Power Factor Per Phase ¹							✓	✓	
Current Avg. Demand				✓	✓		✓	✓	
Current Demand Per Phase				✓	✓		✓	✓	
Current Avg. Peak Demand				✓	✓		✓	✓	
Current Peak Demand Per Phase				✓	✓		✓	✓	
Power Demand							✓	✓	
Power Peak Demand				✓	✓		✓	✓	
Reactive Power Demand							✓	✓	
Reactive Power Peak Demand							✓	✓	
Apparent Power Demand							✓	✓	
Apparent Power Peak Demand							✓	✓	
THD Voltage Per Phase							✓	✓	
THD Current Per Phase							✓	✓	

¹ These values not available when Volts Mode is set to Delta or Delta Direct.

Meter FAQs

Q: Why is my meter's display screen only showing 0 (zero) or 60 Frequency?

A: The Options Card is not inserted correctly. Remove the card and re-insert.

Q: How do I interpret the front panel displays?

A: Look in Step 9 under Configurable Settings

Q: Can the digital outputs be reprogrammed? What are the ET 1 and ET 2 settings?

A: The digital outputs can each be configured to pulse for one of the following: (k)Wh Del., (k)VAh, (k)VARh Del., (k)Wh Rec., (k)VARh Rec. Ext 1, Ext 2. In Ext 1 and Ext 2 mode, the digital output state is determined by a Modbus register value (1 for ON and 0 for OFF).

Q: How do I view firmware and options card number?

A: Hold down all three buttons at the same time for approximately 5 seconds. Scroll to the desired screen. Hold down all three buttons again to return to normal operation.

Q: The meter is not communicating with the network. What should I check?

A: Check Protocol, Unit ID number, and Baud rate. Ensure only one end of shield is connected to avoid ground loop connections.

For further assistance
please contact us at:



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