



**POWER
MEASUREMENT**

creator of ION® technology

Installation Guide

ION®

7500

7600

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 7500 / ION 7600 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 7500 / ION 7600 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 7500 / ION 7600 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 7500 / ION 7600 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 7500 / ION 7600 meter offers a range of hardware options that affect input ratings. The ION 7500 / ION 7600 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 7500 / ION 7600 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 7500 / ION 7600 optional internal modem is 0.6. Connection to the ION 7500 / ION 7600 internal modem should be made via an FCC Part 68 compliant telephone cord (not supplied). The ION 7500 / ION 7600 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/ Certified to CE: approved
CSA C22.2 No. 1010-1 UL 3111

Limitation of Liability

Power Measurement Ltd. ("Power Measurement") reserves the right to make changes in the device or its specifications identified in this document without notice. Power Measurement advises customers to obtain the latest version of the device specifications before placing orders to verify that the information being relied upon by the customer is current.

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Covered by one or more of the following patents:

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

ION 7500 / ION 7600 Models

Integrated Display Model

Comes with front infrared (IrDA) port.

TRAN (transducer) Model

The TRAN model has no display.

RMICAN Model

RMICAN-certified for revenue metering in Canada. RMICAN meters have different security options available (including a factory-sealed version), and can only be ordered with the 60 Hz system frequency option.

Available Options

		Option				
		Form Factor	Current Inputs	COM	I/O	Security
Model	ION 7500	<ul style="list-style-type: none"> ◆ Integ. Display ◆ TRAN 	<ul style="list-style-type: none"> ◆ Standard (5 Amp) ◆ 1 Amp 	<ul style="list-style-type: none"> ◆ Standard (RS-232 and RS-485) ◆ Ethernet RJ45 ◆ Ethernet Fiber ◆ Modem 	<ul style="list-style-type: none"> ◆ Standard (8 digital inputs, 3 Form C relays, 4 Form A outputs) ◆ Extra 8 digital inputs ◆ Four 0-1 mA analog inputs ◆ Four 0-20 mA analog inputs ◆ Four -1 to 1 mA analog outputs ◆ Four 0-20 mA analog outputs 	<ul style="list-style-type: none"> ◆ Standard¹ ◆ RMANSI²
	ION 7500 RMICAN	<ul style="list-style-type: none"> ◆ Integ. Display ◆ TRAN 	<ul style="list-style-type: none"> ◆ Standard (5 Amp) ◆ 1 Amp 	◆ Same as ION 7500	◆ Same as ION 7500	<ul style="list-style-type: none"> ◆ RMICAN ◆ RMICAN sealed
	ION 7600	<ul style="list-style-type: none"> ◆ Integ. Display ◆ TRAN 	<ul style="list-style-type: none"> ◆ Standard (5 Amp) ◆ 1 Amp 	◆ Same as ION 7500	◆ Same as ION 7500	<ul style="list-style-type: none"> ◆ Standard ◆ RMANSI
	ION 7600 RMICAN	<ul style="list-style-type: none"> ◆ Integ. Display ◆ TRAN 	<ul style="list-style-type: none"> ◆ Standard (5 Amp) ◆ 1 Amp 	◆ Same as ION 7500	◆ Same as ION 7500	<ul style="list-style-type: none"> ◆ RMICAN³ ◆ RMICAN sealed⁴

Notes

- ¹ Standard = password protected, no locking or sealing.
- ² RMANSI = ANSI C12.16 approved; meets ANSI C12.20 class 0.2 accuracy standards.
- ³ Meets Industry Canada Locking Requirements.
- ⁴ Meets Industry Canada Locking Requirements and Factory Sealed (only for delivery to Canada).

Before You Begin

Before installing the meter, familiarize yourself with the steps in this guide and read the safety precautions presented on the "Installation Considerations" page.

 **DANGER**

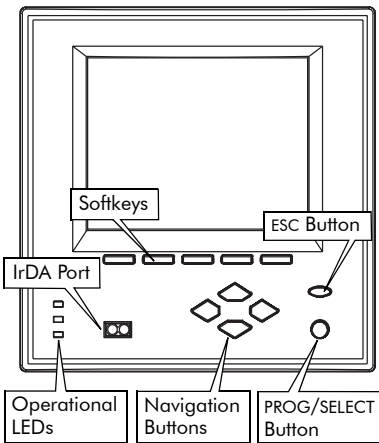
Do not power up the meter until the current and voltage wiring is completed.

Recommended Tools

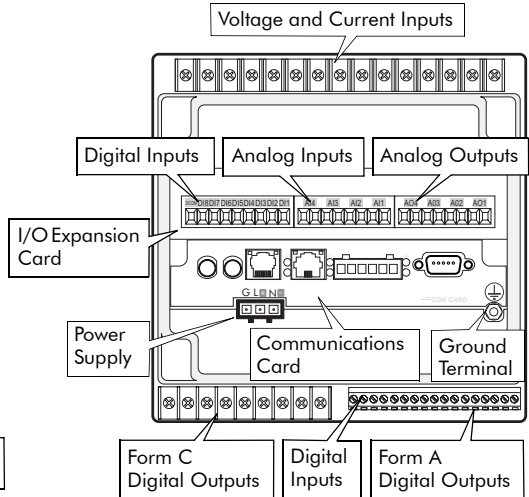
- ◆ Phillips screwdriver
- ◆ Precision flat-head screwdriver
- ◆ Wire cutters / stripper

Meter Overview

Meter Front



Meter Back



Front Panel Button Functions



PROG/SELECT: Press the PROG/SELECT (program or select) button to enter Setup mode. In Setup mode, press the PROG/SELECT button to accept changes.



ESC: Press the ESC (Escape) button to return to a higher menu or discontinue a configuration change.



NAVIGATION: Press the UP / DOWN arrow buttons to highlight menu items, or increment / decrement numbers.

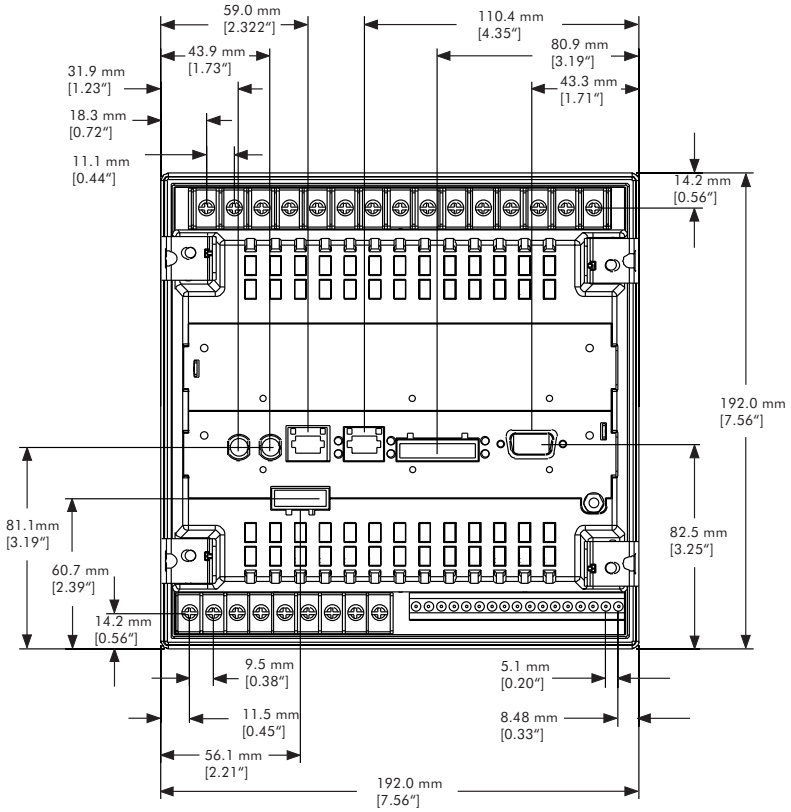
Press the LEFT or RIGHT arrow buttons to move to an adjacent digit.



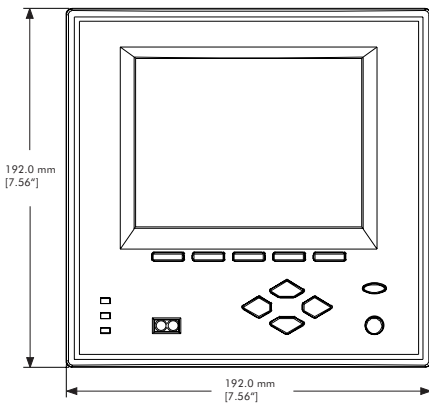
SOFTKEY: Press a SOFTKEY button to select the parameter that you want to configure from the sub-menus.

Unit Dimensions

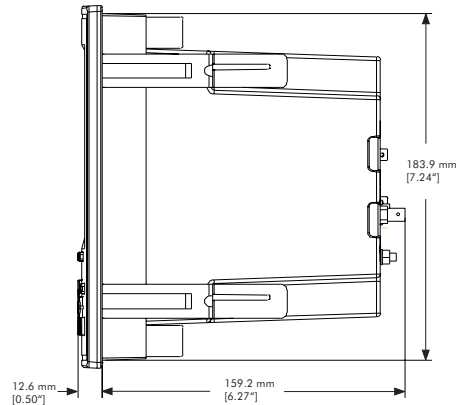
Basic Model – Rear View



Basic Model – Front View



Basic Model – Side View



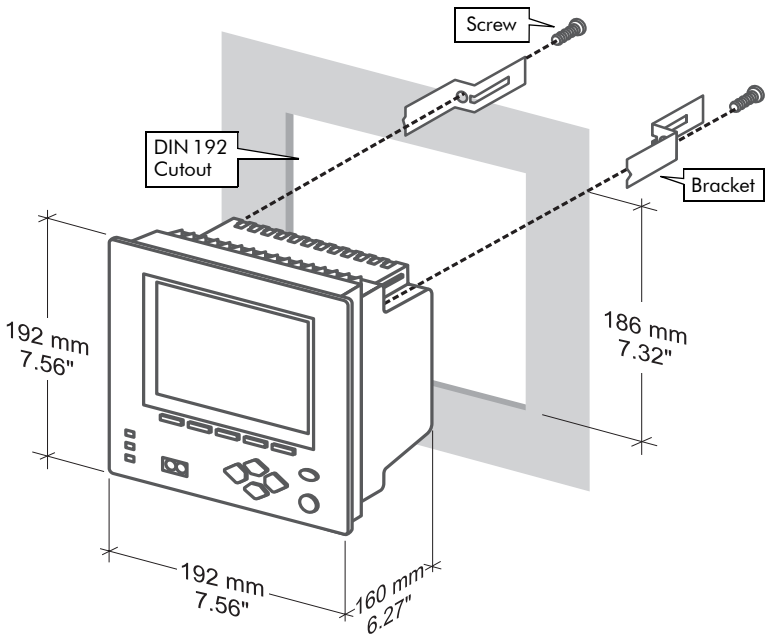
Step 1: Mount the Meter

Environmental Conditions

Mounting Location	Indoor use
Operating Range	-20 to +70°C (-4 to +158°F) No formation of ice
Display Operating Range	0 to +60°C (32 to +140°F)
Storage Range	-40 to +85°C (-40 to +185°F)
Relative Humidity	5 to 95% non-condensing


Integrated Display Model

1. Fit the meter into the DIN standard 192 cutout (186 mm by 186 mm).
2. Slide the four brackets into their slots on the back of the meter and secure using the four Phillips head screws. Do not overtighten.



Step 2: Wire the Ground Terminal



Connect the  terminal to a good earth ground with a 2.1 mm² (14 AWG) wire. Ensure that the terminal nut is tightened down securely onto the ground wire.

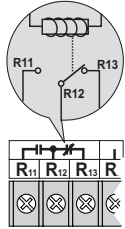
CAUTION

Do not use metal door hinges as a grounding point.

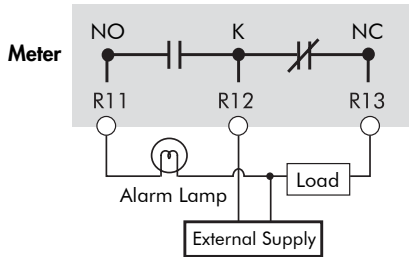
Step 3: Wire the Digital I/O and Analog I/O

Form C Digital Outputs: Mechanical Relays R1 - R3

Internal Form C Mechanical Relay

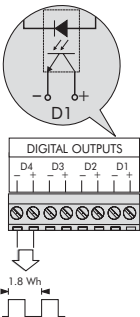


Type	Form C (R1, R2, R3)
Contacts	NO, K, NC
Wire	Use wiring that is appropriate for the application
Connector	Ring or split ring connector
Voltage Rating	250 VAC / 30 VDC
Rated Load @	Resistive: 10 A (AC/DC)
Rated Voltage	Inductive (PF=0.4): 7.5 A (AC) / 5 A (DC)
Max. Voltage	380 VAC / 125 VDC between K and NO/NC
MOV Protection	300 V max. between NO and NC
Max. Load @	3 A (AC) / 0.2 A (DC)
Max. Voltage	
Turn-On Time	15 ms max.
Isolation	5,000 VAC for 60 s
Turn-Off Time	5 ms max.
Lifetime	No load = 10,000,000 operations Rated voltage and load = 100,000 operations
Update time	1/2 cycle or 1 s

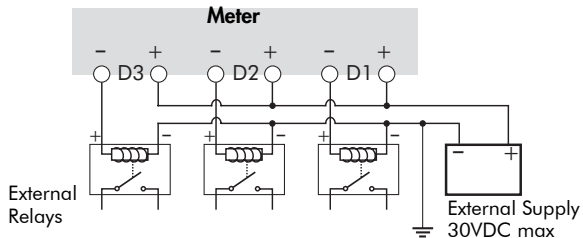


Form A Digital Outputs: Solid State Relays D1 - D4

Internal Form A Solid State Relay

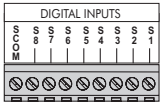


Type	Form A (D1, D2, D3, D4)
Wire	1.3 to 0.1 mm ² (16 to 28 AWG)
Signal Type	Continuous or pulse
Max. Load Voltage	30 VDC
Max. Load Current	80 mA per channel
Isolation	Optically isolated; max. 5,000 V RMS isolation (UL-E91231)
Scan Time	1/2 cycle or 1 s



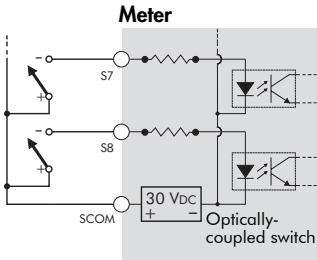
D4 output is factory-configured to pulse once every 1.8 Wh for Class 20 meters, or once every 0.18Wh for Class 2 meters (for calibration testing purposes).

Digital Inputs: S1 - S8

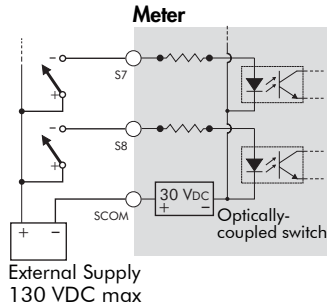


Type	Self-excited (internal 30 VDC supply)
Application	Dry contact sensing, or with external excitation
Wire	1.3 to 0.1 mm ² (16 to 28 AWG)
Min. Pulse Width	1 ms
Max. Pulse Rate	20 pulses per second
Timing Resolution	1 ms
Updated	½ cycle (after timing resolution)
Isolation to Ground	max. 200 VDC for 10s
Max. External Voltage	130 VDC continuous

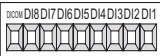
Internal Excitation



External Excitation

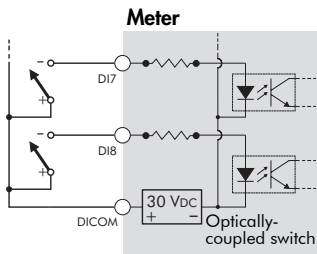


Digital Inputs (Meter Ordering Option): DI1 - DI8

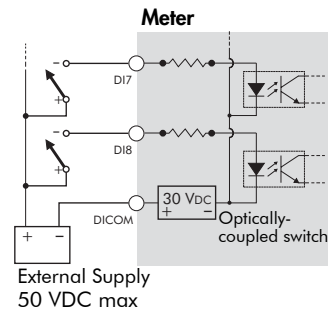


Type	Self excited (internal 30 VDC supply)
Application	Dry contact sensing, or with external excitation
Wire	1.3 to 0.1 mm ² (16 to 28 AWG)
Min. Pulse Width	20 ms
Max. Pulse Rate	25 pulses per second
Timing Resolution	2 ms
Updated	½ cycle (after timing resolution)
Isolation to Ground	750 VDC
Max. External Voltage	50 VDC continuous

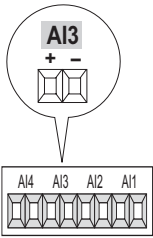
Internal Excitation



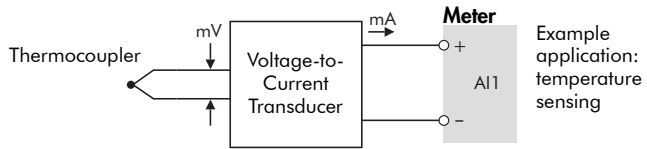
External Excitation



Analog Inputs (Meter Ordering Option): AI1 to AI4



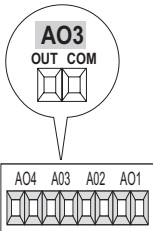
Type	Captured wire connector
Wire	1.3 to 0.1 mm ² (16 to 28 AWG)
Signal Type	DC current
Available Options	0 to 20 mA (scalable 4-20 mA) or 0 to 1 mA
Input Impedance	24 Ω (0-20 mA option) or 475 Ω (0-1 mA option)
Accuracy	+/- 0.3% of full scale
Update Rate	1 s
Isolation to Ground	750 V
Isolation Impedance	max 400 kΩ (channel/channel)



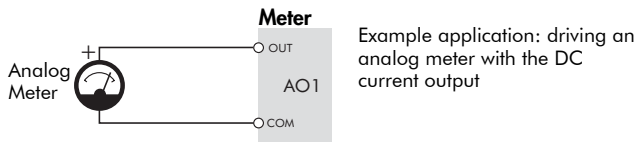
NOTE

Do not connect the analog inputs of the I/O card to the analog outputs on the same I/O card.

Analog Outputs (Meter Ordering Option): AO1 to AO4



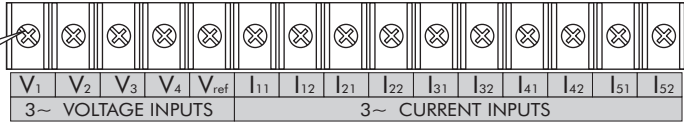
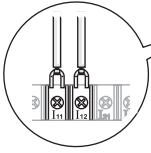
Type	Captured wire connector
Wire	1.3 to 0.1 mm ² (16 to 28 AWG)
Signal Type	DC current
Available Options	0 to 20 mA (scalable 4-20 mA) or -1 to 1 mA (scalable 0-1 mA)
Driving Capability	500 Ω (0-20 mA option) or 10 kΩ (-1 to 1 mA option)
Accuracy	+/- 0.30% of full scale
Update Rate	½ cycle or 1 s
Latency	min. 1 cycle for measurement + ½ cycle for ION + 1 s delay for hardware
Isolation to Ground	750 V



NOTE

Do not connect the analog outputs of the I/O card to the analog inputs on the same I/O card.

Step 4: Wire the Voltage and Current Inputs



Voltage Inputs

Connector Type	Ring or split ring connector
Wire Gauge	3.3 to 2.1 mm ² (12 to 14 AWG)
Rated Inputs	347 V L-N RMS /600 V L-L RMS
Fault Capture	1400 V L-N peak
Overload	1500 VAC RMS continuous
Dielectric Withstand	2500 VAC RMS at 60 Hz for 60 s
Input Impedance	5 MΩ per phase

Current Inputs: Class 20 Current Inputs (5A Option)

Connector Type	Ring or split ring connector
Wire Gauge	5.3 to 3.3 mm ² (10 to 12 AWG): Use 8.4 mm ² (8 AWG) for 10-20 A applications
Input Rating	5 A, 10 A, and/or 20 A RMS
Starting Current	0.005 A RMS
Fault Capture	70 A peak
Max. Voltage	600 V RMS (CAT III IEC61010-1)
Overload	500 A RMS for 1 s, non-recurring
Dielectric Withstand	2500 VAC RMS at 60 Hz for 60 s
Burden	0.05 VA per phase (at 5 A)
Impedance	0.002 Ω per phase

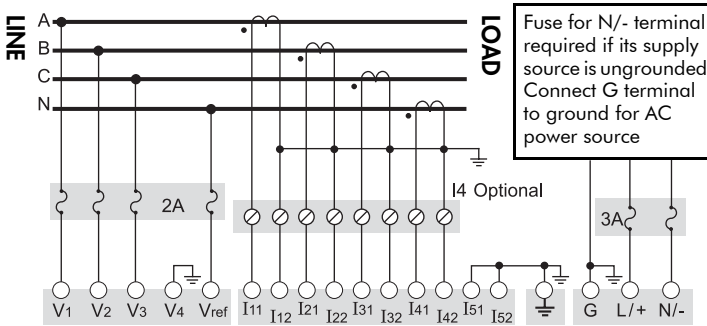
Current Inputs: Class 2 Current Inputs (1A Option)

Connector Type	Ring or split ring connector
Wire Gauge	5.3 to 3.3 mm ² (10 to 12 AWG)
Input Rating	1 A, 2 A, 5 A, and/or 10 A RMS
Starting Current	0.001 A RMS
Fault Capture	17.5 A peak
Max. Voltage	600 V RMS (CAT III IEC61010-1)
Overload	50 A RMS for 1s, non-recurring
Dielectric Withstand	2500 VAC RMS at 60 Hz for 60 s
Burden	0.015 VA per phase (at 1 A)
Impedance	0.015 Ω per phase

NOTE

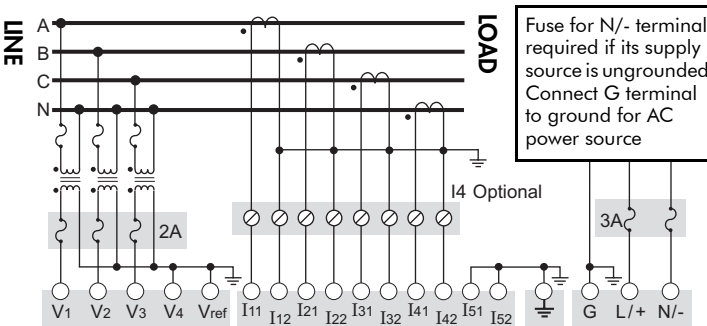
The appropriate Volts Mode setting is included with each wiring diagram. Refer to Step 8 to learn how to configure Volts Mode on the meter.

4-Wire Wye, 3-Element, Direct Connection Diagram



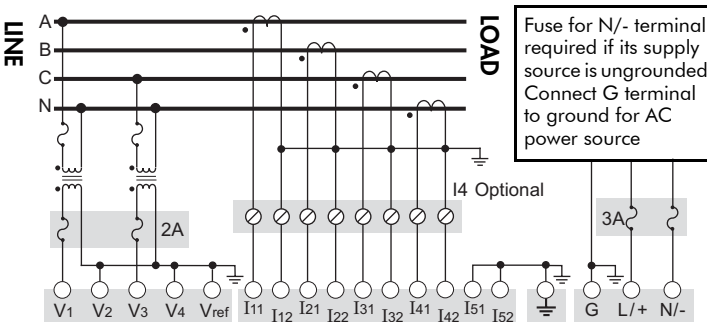
347 V L-N / 600 V L-L max.
VOLTS MODE = 4W-Wye

4-Wire Wye, 3-Element, 3 PTs Connection Diagram



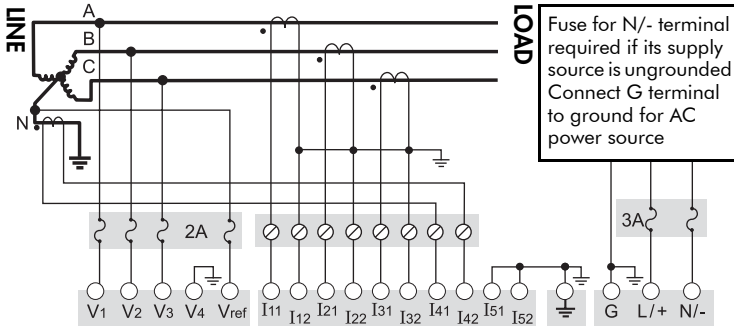
Use PTs for voltages over 347 V L-N / 600 V L-L.
Wye (Star) wiring for PT primaries and secondaries.
VOLTS MODE = 4W-Wye

4-Wire Wye, 2½-Element, 2 PTs Connection



Phase B voltage (V2) displayed by meter is derived from phase A and phase C, not measured. V2 will display a value even if no voltage is present on Phase B. V2 values are only accurate for balanced loads.
VOLTS MODE = 3W-Wye

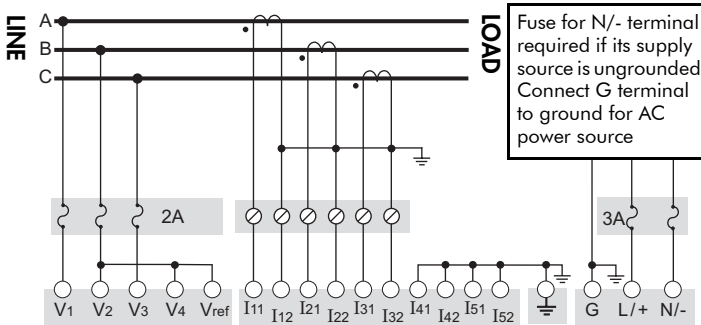
3-Wire Solid-Grounded Wye, 3-Element, Direct Connection



When the common or star point of a 3-wire Wye system is grounded, the meter may be connected directly without using PTs, provided that the phase voltages are within the meter's range.

VOLTS MODE = 4W-Wye

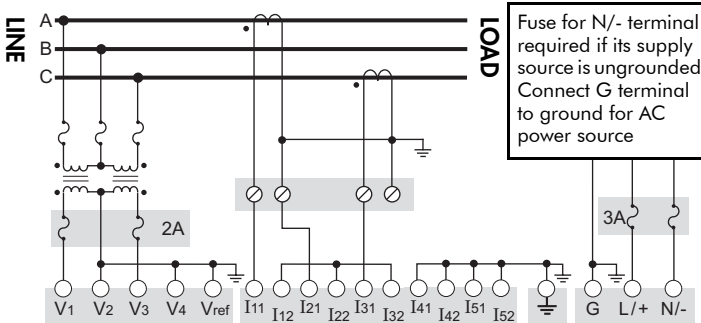
3-Wire Delta, 2½-Element, Direct Connection



600 V L-L max.

VOLTS MODE = Delta

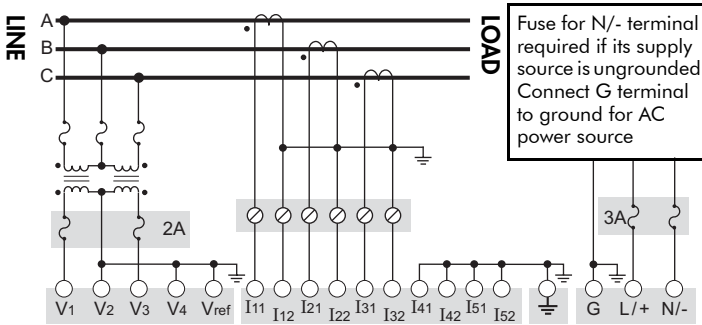
3-Wire Delta, 2-Element 2 PTs & 2 CTs



Use PTs for voltages over 600 V L-L.

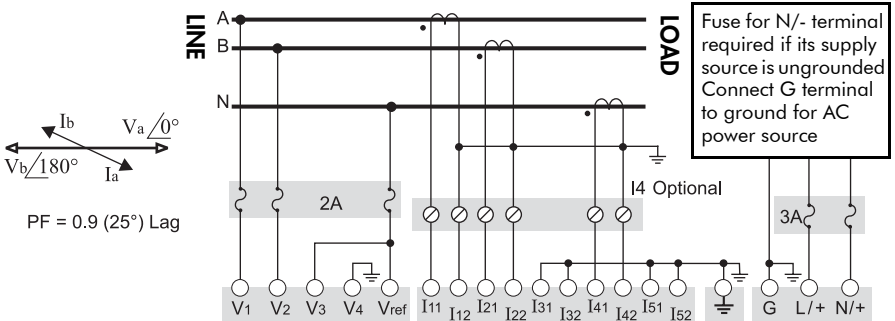
VOLTS MODE = Delta

3-Wire Delta, 2½-Element, 2 PTs & 3 CTs



Use PTs for voltages over 600 V L-L
VOLTS MODE = Delta

Single Phase Connection Diagram



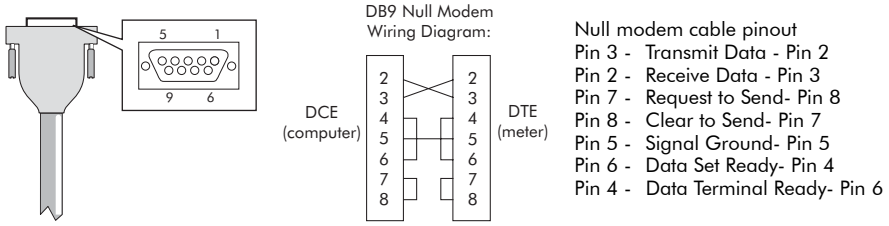
277 V L-N / 554 V L-L max. Use PTs for higher voltages.
VOLTS MODE = Single

Using Potential Transformers

System Mode	Voltage Range	Requires PTs
Wye	120 V L-N or 208 V L-L	no
	277 V L-N or 480 V L-L	no
	347 V L-N or 600 V L-L	no
	over 347 V L-N or 600 V L-L	yes
Single Phase	120 V L-N or 240 V L-L	no
	277 V L-N or 554 V L-L	no
	over 277 V L-N or 554 V L-L	yes
Delta	up to 600 V L-L	no
	over 600 V L-L	yes

Step 5: Wire the Communications

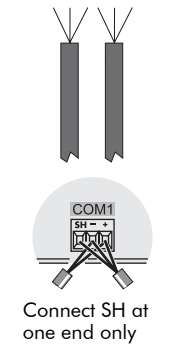
RS-232 Connections (COM1)



Connector Type	DB9 female end for mating with male connector on the meter
Wire	Null modem cable
Maximum Cable Length	15.2 m (50 ft)
Data Rate	300 – 115,200 bps
Isolation	Optical
Duplex	Full
Compliance	ANSI/IEEE C37.90-1989 surge withstand and fast transient tests

RS-485 Connections (COM1 and COM2)

COM 2	COM 1	SH	RS-485 Shield (electrically connected to chassis ground)
		-	RS-485 Data Minus
		+	RS-485 Data Plus



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) total for entire bus
Data Rate	300 – 57,600 bps
Maximum Devices (per bus)	32
Isolation	Optical
Duplex	Half
Compliance	ANSI/IEEE C37.90-1989 surge withstand and fast transient tests

Infrared Connections (COM3)

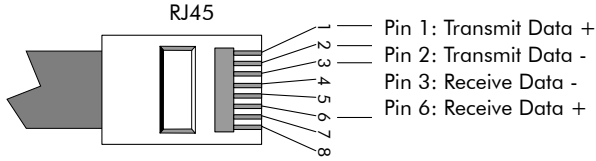
Operating Distance	0 - 1 m (0 - 3.3 ft)
Optical Range	±15° (minimum) ±30° (maximum)
Data Rate	300 – 115,200 bps
Duplex	Half

NOTE

The IrDA port is multiplexed with the internal modem on the COM3 port. These ports cannot be used simultaneously.

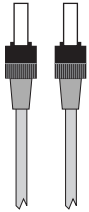
Ethernet Connections (if equipped)

10Base-T



Wire Type	High quality Category 3 or 5 unshielded twisted pair cable
Connector Type	RJ45 modular
Maximum Length	100 m (328 ft)
Type	IEEE 802.3 10Base-T for 10 Mbps base band CSMA/CD LANs
Data Rate	10 Mbps
Isolation	Transformer isolated to 1500 VAC/2250 VDC RMS

10Base-FL (Fiber)



Wire Type	62.5/125 micrometer multimode fiber optic cable
Connector Type	ST
Maximum Length	2000 m (6562 ft)
Data Rate	10 Mbps
Isolation	Optical

NOTE

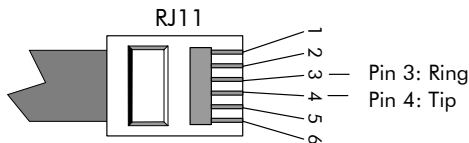
ST type fiber cables

Connecting to the Fiber port automatically disables the RJ45 port.

Ethernet TCP/IP Service Ports

Protocol	Port
ION	7700
Modbus RTU	7701
Modbus TCP	502
EtherGate (COM1)	7801
EtherGate (COM2)	7802
DNP TCP	20,000

Internal Modem Connection (if equipped)



Connector Type	RJ11
Wire Type	FCC Part 68 compliant telephone cord (two male RJ11 ends)
Data Rate	300 bps – 33.6 kbps
Error Correction	V.42 LAPM, MNP 2-4, MNP 10
Data Compression	V.42 bis/MNP 5

Step 6: Wire the Power Supply



Type	Captured wire connector
Wire	3.3 to 2.1 mm ² (12 to 14 AWG)
Rated Inputs	85-240 VAC ±10% (47-63 Hz), or 110-300 VDC ±10%
Dielectric Withstand	2500 VAC RMS at 60 Hz for 60 s
Burden	20 VA max. (10 VA typical)
Ride-through	100 ms (6 cycles @ 60 Hz) min.

Step 7: Power Up the Meter

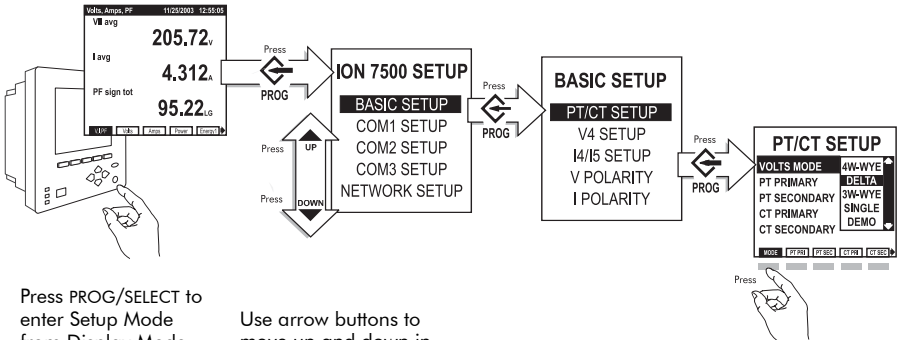
Before you apply power to the meter, ensure that ground is securely connected and that the supply voltage is within the allowed range of the meter’s power supply. Power up the meter.

Step 8: Set Up the Meter Using the Front Panel

The following Setup screens are available for meter configuration via the front panel:

- BASIC SETUP
- COM1 SETUP
- COM2 SETUP
- COM3 SETUP
- NETWORK SETUP
- PQ SETUP
- FORMAT SETUP
- DISPLAY SETUP
- TIME SETUP
- SECURITY SETUP
- METER RESETS

Use the PROG/SELECT, ESC, softkeys and arrow buttons to configure settings. The following example shows Volts Mode setup using the meter front panel.



Press PROG/SELECT to enter Setup Mode from Display Mode.

Use arrow buttons to move up and down in list. Press PROG/SELECT to select Basic Setup.

Use arrow buttons to move up and down in list. Press PROG/SELECT to select PT/CT Setup.

Press Mode softkey. Use arrow buttons to move up and down in list. Press PROG/SELECT to select Delta.

The following table lists all settings that can be configured via the front panel.

Menu	Setting	Description	Range (Values)	Default
BASIC SETUP	VOLTS MODE	The power system's configuration – WYE, DELTA, etc.	4W-WYE DELTA 3W-WYE SINGLE DEMO	4W-WYE
	PT PRIMARY	The Potential Transformer's primary winding voltage rating	1 to 999,999.99	120.00
	PT SECONDARY	The Potential Transformer's secondary winding voltage rating	1 to 999,999.99	120.00
	CT PRIMARY	The Current Transformer's primary winding current rating	1 to 999,999.99	5.00
	CT SECONDARY	The Current Transformer's secondary winding current rating	1 to 999,999.99	5.00
	V4 PRIMARY	The Potential Transformer's primary winding voltage rating on V4	1 to 999,999.99	120.00
	V4 SECONDARY	The Potential Transformer's secondary winding voltage rating on V4	1 to 999,999.99	120.00
	I4 PRIMARY	The Current Transformer's primary winding current rating on I4	1 to 999,999.99	5.00
	I4 SECONDARY	The Current Transformer's secondary winding current rating on I4	1 to 999,999.99	5.00
	I5 PRIMARY	The Current Transformer's primary winding current rating on I5	1 to 999,999.99	5.00
	I5 SECONDARY	The Current Transformer's secondary winding current rating on I5	1 to 999,999.99	5.00
	Va POLARITY	The polarity of the Potential Transformer on Va	Normal or Inverted	Normal
	Vb POLARITY	The polarity of the Potential Transformer on Vb	Normal or Inverted	Normal
	Vc POLARITY	The polarity of the Potential Transformer on Vc	Normal or Inverted	Normal
	V4 POLARITY	The polarity of the Potential Transformer on V4	Normal or Inverted	Normal
	Ia POLARITY	The polarity of the Current Transformer on Ia	Normal or Inverted	Normal
	Ib POLARITY	The polarity of the Current Transformer on Ib	Normal or Inverted	Normal
	Ic POLARITY	The polarity of the Current Transformer on Ic	Normal or Inverted	Normal
	I4 POLARITY	The polarity of the Current Transformer on I4	Normal or Inverted	Normal
	I5 POLARITY	The polarity of the Current Transformer on I5	Normal or Inverted	Normal
CURRENT PROBE TYPE	The type of current probes being used with the meter	Factory Default, User Defined 1, or User Defined 2	Factory Default	

Menu	Setting	Description	Range (Values)	Default
COM1 SETUP	PROTOCOL	The communications protocol	ION, Modbus RTU, Modbus Master, DNP V3.00, GPS:Truetime/Datum,GPS:Arbiter, GPS:Arbiter-Vorne, Factory, Ethergate, ModemGate	ION
	BAUD RATE	The data rate, in bits per second	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	9600
	TRAN DELAY	The transmit delay in seconds	0 to 1	0.010
	UNIT ID	Every meter on an RS-485 network must have a unique Unit ID number	1 to 9999	From serial number ¹
	MODE	Hardware mode for port	RS232 or RS485	RS232
	FLOW CONTROL	Specifies the handshake mode when COM1 is set to RS232	RTS + DELAY or RTS/CTS	RTS + DELAY
COM2 SETUP	PROTOCOL	The communications protocol	ION, Modbus RTU, Modbus Master, DNP V3.00, GPS:Truetime/Datum,GPS:Arbiter, GPS:Arbiter-Vorne, Factory, Ethergate, ModemGate	ION
	BAUD RATE	The data rate, in bits per second	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	9600
	TRAN DELAY	The transmit delay in seconds	0 to 1	0.010
	UNIT ID	Every meter on an RS-485 network must have a unique Unit ID number	1 to 9999	101
COM3 SETUP	PROTOCOL	The communications protocol	ION, Modbus RTU, Modbus Master, DNP V3.00, GPS:Truetime/Datum,GPS:Arbiter, GPS:Arbiter-Vorne, Factory	ION
	BAUD RATE	The data rate, in bits per second	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	9600
	TRAN DELAY	The transmit delay in seconds	0 to 1	0.010
	UNIT ID	Every meter on an RS-485 network must have a unique Unit ID number	1 to 9999	102
	MODE	The communications mode	IRDA or Modem	Modem
	ANSWER HR RINGS	The number of rings during defined answer hours	0 to 255	1
	NON-ANSWER HR RINGS	The number of rings during defined non-answer hours	0 to 255	5
NETWORK SETUP	IP ADDRESS	Sets the IP address for the meter	000.000.000.000 to 999.999.999.999	none
	SUBNET MASK	Used if subnetting applies to your network	000.000.000.000 to 999.999.999.999	none
	GATEWAY	Used in multiple network configurations	000.000.000.000 to 999.999.999.999	none
	DNS PRIMARY	Sets the address for the primary DNS Server that is configured to resolve domain names	000.000.000.000 to 999.999.999.999	none
	DNS SECONDARY	Sets the address for the secondary DNS Server that is configured to resolve domain names	000.000.000.000 to 999.999.999.999	none

Menu	Setting	Description	Range (Values)	Default
PQ SETUP	SWELL LIMIT	Specifies the magnitude above which a power system input must rise for a swell to be recorded	100 to 1000	106
	SAG LIMIT	Specifies the magnitude below which a power system input must fall for a sag to be recorded	0 to 100	88
	CHANGE CRITERIA	Specifies the amount by which an input must change during a disturbance to be considered a new sub-disturbance	0 to 100	10
	NOMINAL VOLTAGE ²	Specifies the nominal voltage of the power system	0 to 1,000,000	0
	EVENT PRIORITY	Assigns a priority level to sag/swell events	0 to 255	200
FORMAT SETUP	DIGIT GROUP	Specifies symbols used to delimit thousands and decimal place holder	1000.0 or 1,000.0 or 1000,0	1000.0
	VOLTS DECIMAL	Number of decimal places displayed for voltages	1. to 123456789.XXX	1.XX
	CURRNT DECIMAL	Number of decimal places displayed for currents	1. to 123456789.XXX	1.XXX
	POWER DECIMAL	Number of decimal places displayed for power measurements	1. to 123456789.XXX	1.XXX
	PHASE LABEL	Specifies how phases are labelled	ABC, RST, XYZ, RYB, RWB, 123	ABC
	PF SYMBOL	LD (leading)/LG (lagging)	LD/LG, +/-, CAP/IND	LD/LG
	DATE FORMAT	Specifies how dates are displayed	MM/DD/YYYY, DD/MM/YYYY, YYYY/MM/DD	MM/DD/YYYY
DISPLAY SETUP	DISPLAY DST	Specifies whether or not DST is displayed	Yes or No	Yes
	UPDATE RATE	Sets when the display updates (in seconds)	1 to 6	1
	CONTRAST	Higher numbers are sharper	0 to 9	5
TIME SETUP	BACKLIGHT TIMEOUT	Specifies when the displays dims (in seconds)	0 to 7200 (two hours)	300
	TZ OFFSET	Sets the time zone of the meter's location, relative to UTC	- 12:00 to +13:00	+00:00
	DST OFFSET	Sets the daylight savings time offset of the meter's location	-3:00 to +3:00	+00:00
	SYNC SOURCE	Sets the port to receive time synchronization signals	Ethernet, COM1, COM2, COM3	COM1
	SYNC TYPE	Specifies whether time sync signals are received in local time or UTC	Local Time or UTC	UTC
	CLOCK SOURCE	Specifies time sync source	Line Freq, Internal or COMM	Line Freq
	LOCAL DATE	Sets the local date	Same format as specified in Date Format setting	
LOCAL TIME	Sets the local time			

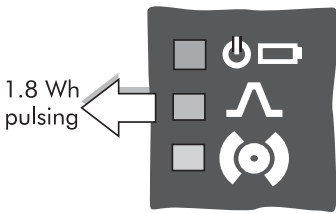
Menu	Setting	Description	Range (Values)	Default
SECURITY SETUP	PASSWORD	Sets the meter password	00000000 to 99999999	00000000
	ENABLED	Enables or disables security on the meter	Yes or No	No
	WEB CONFIG	Enables or disables web browser configuration of the meter	Enabled or Disabled	Enabled
	WEB ACTIVE	Enables or disables internal web server on the meter	Yes or No	Yes

¹ Serial number = PA-0302B222-01, Unit ID = 2222

² NOMINAL VOLTAGE must be set to your system's nominal voltage to activate the meter's power quality features.

Step 9: Verify Meter Operation

The LEDs on the back of the meter flash during communications. The LEDs on the Front Panel indicate the following:



front panel

Top (green) LED indicates the meter is operational. The light should always remain on when the meter is in service.

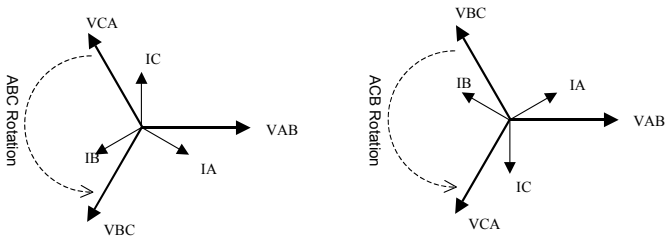
Middle (green) LED is a 1.8 Wh pulser. During normal operations this LED should blink intermittently as the meter measures power.

Bottom (red) LED is user programmable. It can be used for Alarm notification. See the *ION 7500 / ION 7600 User's Guide* for more information.

Phasor Diagrams

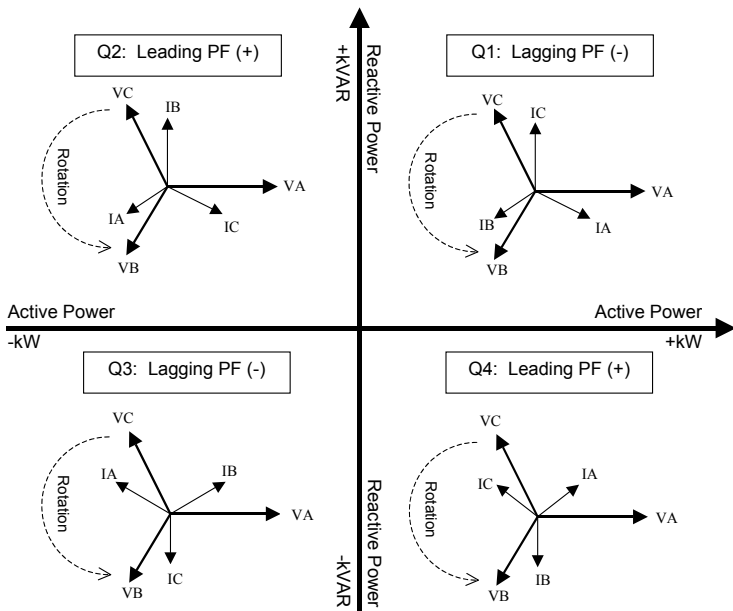
DELTA phasors for UNITY Power Factor (resistive load)

Applicable Volts Mode = DELTA



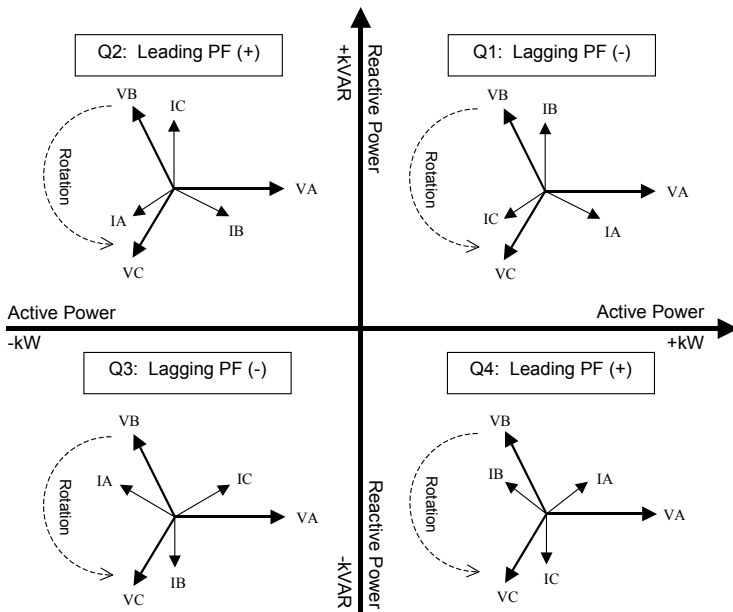
WYE - ABC Rotation

Applicable Volts Mode = 4W-WYE and 3W-WYE



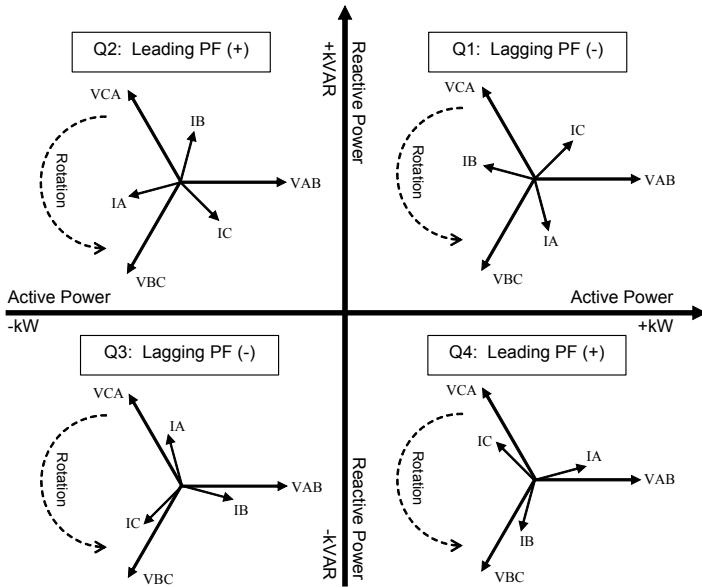
WYE - ACB Rotation

Applicable Volts Mode = 4W-WYE and 3W-WYE



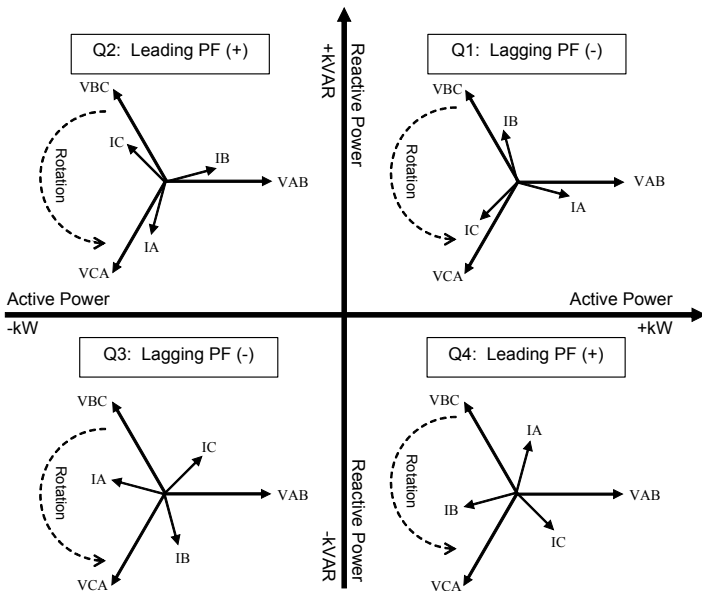
2 Element (3Wire) DELTA - ABC Rotation

Applicable Volts Mode = DELTA



2 Element (3Wire) DELTA - ACB Rotation

Applicable Volts Mode = DELTA



Step 10: View Meter Data

Use the softkeys to select which data to display. Use the left and right arrow buttons to scroll through the available display screens.

Display Screens

Softkey	Contents
V,I,PF	Volts, Amps, Power Factor
Volts	Volts
Amps	Amps
Power	Total Power
Energy1	Energy delivered
Demand1	Demand delivered
Pk Dmd1	Peak Demand delivered
V Bar, I Bar, P Bar	Voltage, Current and Power Bar Graphs
Summary1, Summary2	Volts/Amps Summary, Power Summary
V-Trend, I-Trend, P-Trend	Voltage, Current, Power Trends (ION 7500)
D Inputs	Digital Inputs
DI - I/O	Digital I/O on expansion I/O card
D-Output	Digital Outputs
Anlg - I/O	Analog In and Out
Phasors	Phasors
Name Plt	Nameplate information
Events	Events
Setpoint	Setpoint
Energy2	Energy received
Demand2	Demand received
Pk Dmd2	Peak Demand received
THD	Volts and Amps Total Harmonic Distortion
V1 Harm, V2 Harm,...	V1, V2, V3, V4 harmonics
I1 Harm, I2 Harm,...	I1, I2, I3, I4, I5 harmonics
TOU	Time Of Use Active Rate / Season
TOU Egy	TOU Energy delivered
TOU Dmd1 & TOU Dmd2	TOU Peak Demand 1 and 2

Additional display screens for the ION 7600:

Softkey	Contents
PQ Freq	Power Quality Power Frequency
PQ Vmag1	PQ Supply Voltage 1
PQ Vmag2	PQ Supply Voltage 2
PQ Flk1	PQ Flicker 1
PQ Flk2	PQ Flicker 2
PQ Vdist	PQ Voltage Disturbance
PQ Yunb	PQ Voltage Unbalance
PQ Vhrm1	PQ Voltage Harmonics 1
PQ Vhrm2	PQ Voltage Harmonics 2
Avblty	Power Availability

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