

PowerLogic™ ION8800

Energy & power quality meter

Installation guide

70002-0291-02

07/2016



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Safety information

Important information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages following this symbol to avoid possible injury or death.

DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

Please note

Electrical equipment should be installed, operated, serviced and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

Notices

FCC Part 15 notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures.

- ◆ Reorient or relocate the receiving antenna.
- ◆ Increase the separation between the equipment and receiver.
- ◆ Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- ◆ Consult the dealer or an experienced radio/TV technician for help.

This digital apparatus complies with CAN ICES-3(B) /NMB-3(B).

FCC Part 68 notice

This equipment complies with Part 68 of the FCC rules and the requirements adopted by the Administrative Council for Terminal Attachments (ACTA). On the side of this equipment is a label that contains, among other information, a product identifier in the format US: AAAEQ##TXXXX. If requested, this number must be provided to the telephone company.

This equipment uses the following Universal Service Order Codes ("USOC") jacks: RJ11.

A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. A compliant telephone cord and modular plug or compliant modular jack is provided with this product.

The REN is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. The REN for this product is part of the product identifier that has the format US: AAAEQ##TXXXX. The digits represented by ## are the REN without a decimal point (e.g., 03 is a REN of 0.3).

If this equipment, Digital Power Meter with Internal Modem, causes harm to the telephone network, the telephone company will notify you in advance that service may be temporarily discontinued. When advance notice is not practical, the telephone company will notify you as soon as possible. You will also be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of this equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If you experience trouble with this equipment, Digital Power Meter with Internal Modem, please contact Schneider Electric at 615-287-3400. If this equipment is causing harm to the telephone network, the telephone company may request that you disconnect this equipment until the problem is resolved.

There are no user serviceable parts in this equipment.

Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

If your premises has specially wired alarm equipment connected to the telephone line, ensure that the installation of this Digital Power Meter with Internal Modem does not disable your alarm equipment. If you have questions about what will disable alarm equipment, consult your telephone company or a qualified installer.

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. 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 Schneider Electric Technical Support.

Safety precautions

Installation, wiring, testing and service must be performed in accordance with all local and national electrical codes.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E in the USA, CSA Z462 or applicable local standards.
- Turn off all power supplying this device and the equipment in which it is installed before working on the device or equipment.
- Always use a properly rated voltage sensing device to confirm that all power is off.
- Treat communications and I/O wiring connected to multiple devices as hazardous live until determined otherwise.
- Do not exceed the device's rating for maximum limits.
- Always use grounded external CTs for current inputs.
- Do not perform Dielectric (Hi-Pot) or Megger testing on this device.
- Connect protective ground (earth) before turning on any power supplying this device.
- Do not use the data from the meter to confirm the power is off.
- Replace all devices, doors and covers before turning on power to this equipment.

Failure to follow these instructions will result in death or serious injury.



NOTE

Do not perform Dielectric (Hi-Pot) or Megger testing on the ION8800 because its internal surge protection circuitry starts functioning at levels below typical Hi-Pot voltages. Contact your local Schneider Electric representative for more information on device specifications and factory testing

WARNING

UNINTENDED OPERATION

Do not use the meter for critical control or protection applications where human or equipment safety relies on the operation of the control circuit.

Failure to follow these instructions can result in death or serious injury or equipment damage.

ION8800 Models

Feature Set	Data Recorders	Description
C	5 (80 channels)	Basic Tariff/Energy revenue meter
B	50 (800 channels)	Feature Set C + EN50160 and IEC 61000-4-30 Class S compliant power quality monitoring
A	64 (1024 channels)	Feature Set B + power quality analysis IEC 61000-4-30 Class A (waveforms and transient capture with 1024 samples/cycle resolution)

Available Options

Logging and Recording	Current Inputs	Communications	Security
◆ 5 MB memory ◆ 10 MB memory	◆ Low Current (In=1A, 2A) ◆ High Current (In=5A)	◆ Optical IEC 1107 ◆ RS-485 and optical IEC 1107 ◆ Communications Module (RS-485, RS-232, modem, 10-Base-T/100-Base-TX Ethernet, 100-Base-FX Fiber Ethernet)	◆ Standard ◆ Hardware locked

I/O Options

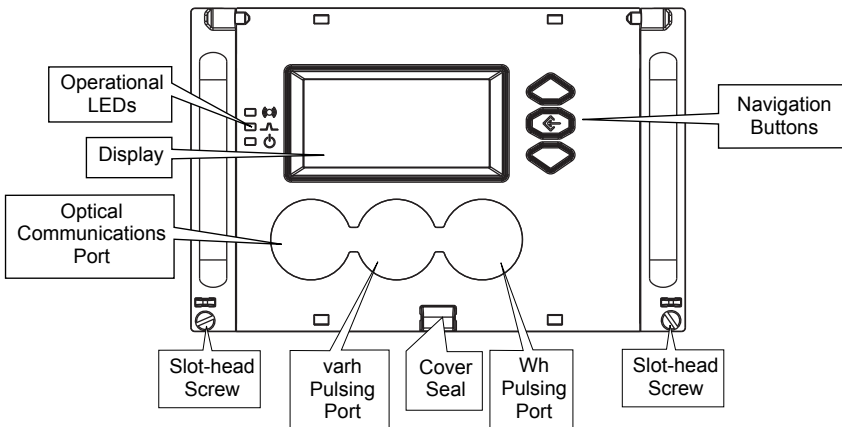
Ordering Code	Outputs	Digital Inputs	Com
A	◆ 8 digital Form A solid-state outputs ◆ 1 Form C mechanical relay ◆ 4 Form C solid-state outputs	None	One RS-485 port on Essailec connector
B	◆ 8 digital Form A solid-state outputs ◆ 1 Form C mechanical relay ◆ 4 Form C solid-state outputs	3 Low voltage	None
C	◆ 8 digital Form A solid-state outputs ◆ 1 Form C mechanical relay ◆ 4 Form C solid-state outputs	3 High voltage	None
D	◆ 1 Form C mechanical relay ◆ 4 Form C solid-state outputs ◆ IRIG-B	3 Low voltage	One RS-485 port on Essailec connector
E	◆ 1 Form C mechanical relay ◆ 4 Form C solid-state outputs ◆ IRIG-B	3 High voltage	One RS-485 port on Essailec connector

Before You Begin

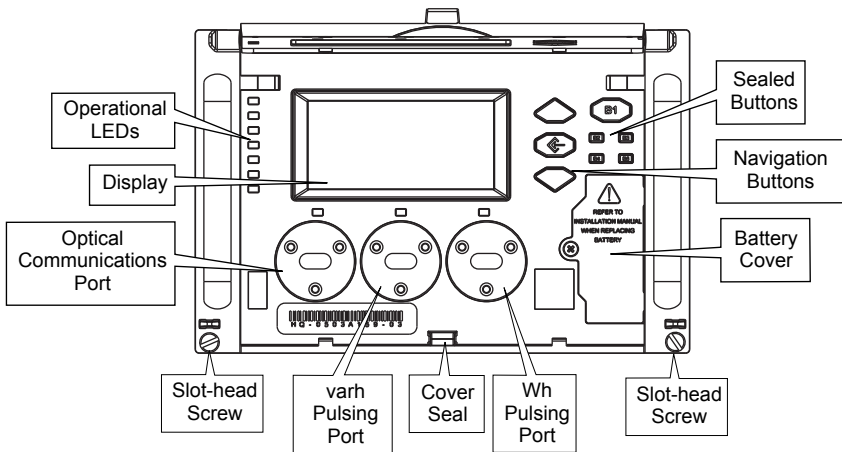
Before installing the meter, familiarize yourself with the steps in this guide and read the safety precautions.

Meter Overview

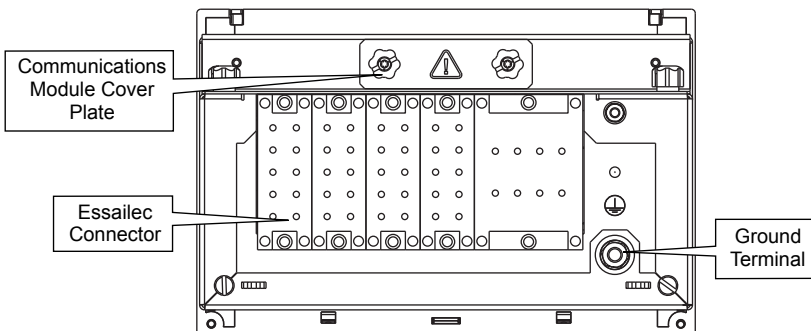
Meter Front (Cover Closed)



Meter Front (Cover Open)



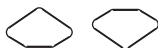
Meter Back



Front Panel Button Functions



ALT/ENTER: Press this button once to enter ALT mode. Press and hold to enter Setup mode. In Setup mode, press this button to accept changes.



NAVIGATION: Press the UP / DOWN arrow buttons to highlight menu items, or increment / decrement numbers. Press and hold to shift cursor left and right.



DEMAND RESET: Press this button to reset all maximum demand registers. Not accessible when cover is sealed.



TEST MODE: Press this button to enter Test Mode. Billable quantities do not accumulate when meter is in Test Mode. Not accessible when cover is sealed.



ALT CONFIG: Press this button to enter the Alternate Configuration menu. Not accessible when cover is sealed.



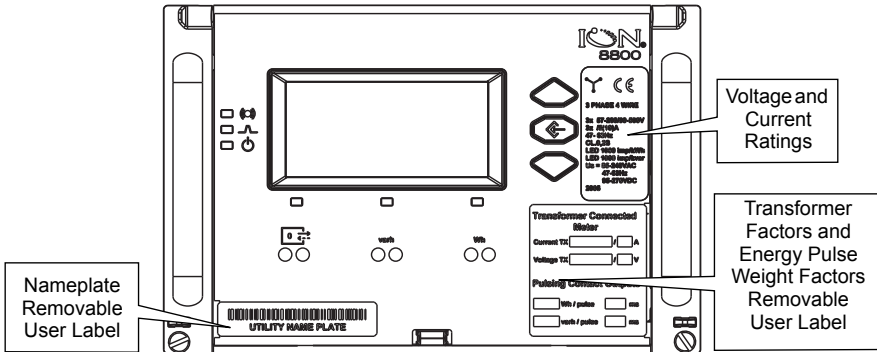
MASTER RESET: Press this button to reset meter quantities. Not accessible when cover is sealed.



SPARE: This button is not currently implemented. Not accessible when cover is sealed.

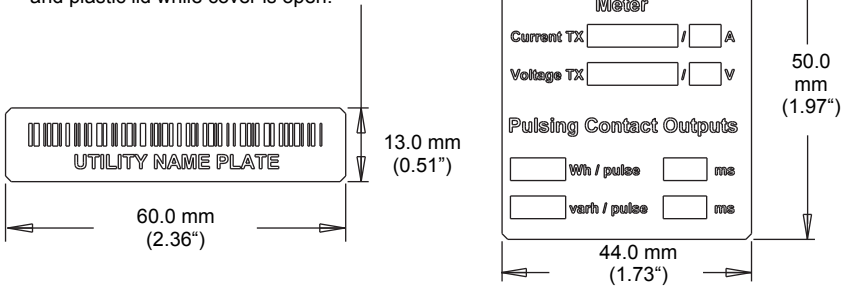
Meter Labels

Front of Meter (Cover Closed)



Removable User Labels

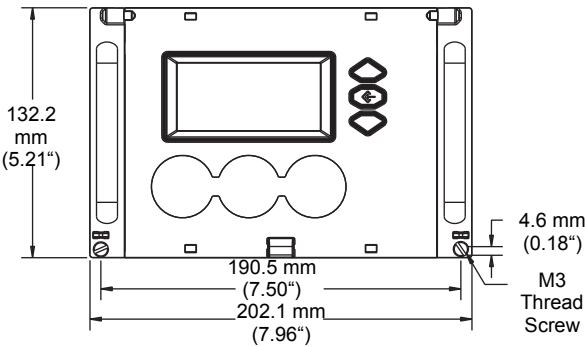
Insert user labels between bezel label and plastic lid while cover is open.



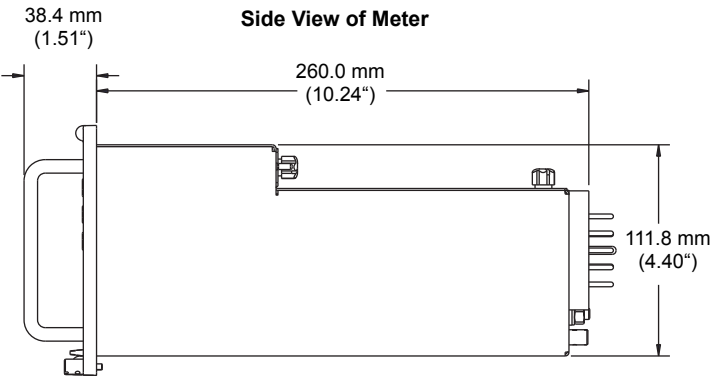
Unit Dimensions

Meter dimensions conform to DIN standard 43862.

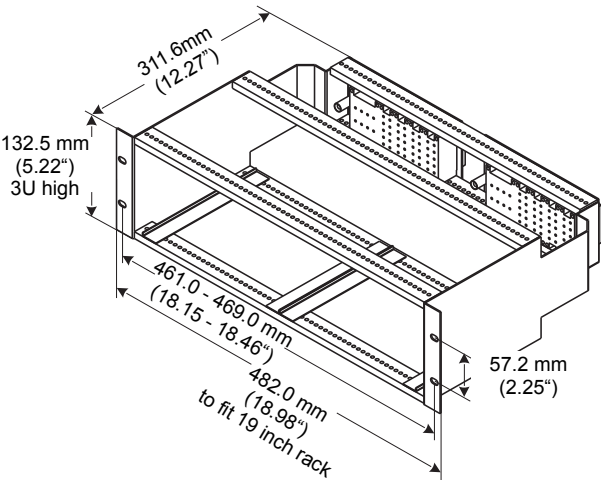
Front View of Meter



Side View of Meter



Front of Rack View



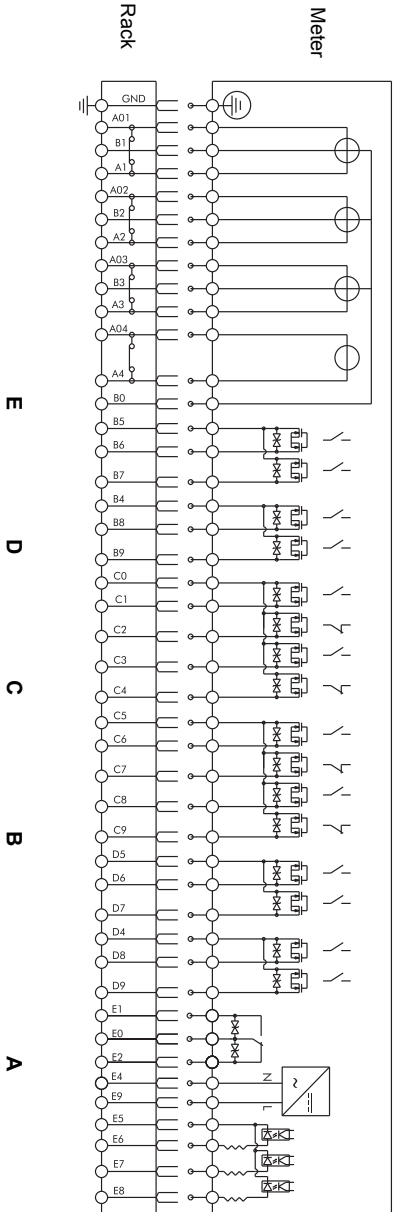
Essailec Connections

Voltage, current, power supply, I/O and communication connections are made via the Essailec connector on the rear of the meter. Meters can be ordered with multiple connector configurations.

Order Options B/C Circuit & Pinout Diagrams

This pinout drawing details the various pins on the meter side of the connector. The table below maps the pins to their corresponding inputs and outputs in the meter.

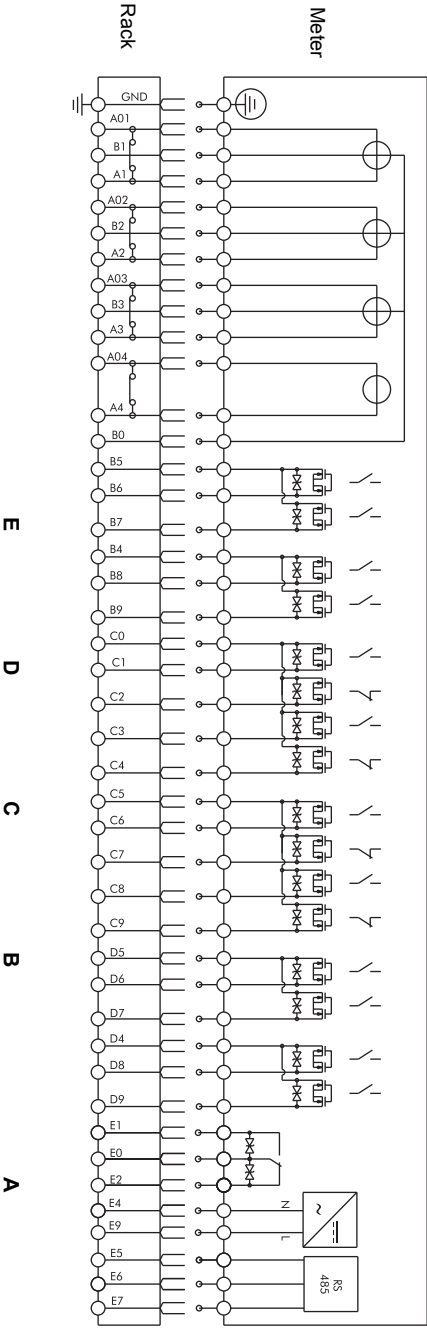
Code 13	Code 17	Code 15	Code 13	
5 ●	5 ●	5 ●	5 ●	●
6 ●	6 ●	6 ●	6 ●	●
7 ●	7 ●	7 ●	7 ●	●
8 ●	8 ●	8 ●	8 ●	●
9 ●	9 ●	9 ●	9 ●	●
0 ○	0 ○	0 ○	0 ○	●
1 ○	1 ○	1 ○	1 ○	●
2 ○	2 ○	2 ○	2 ○	●
3 ○	3 ○	3 ○	3 ○	●
4 ○	4 ○	4 ○	4 ○	●
Code 07	Code 05	Code 03	Code 01	
5 ●	5 ●	5 ●	5 ●	●
6 ●	6 ●	6 ●	6 ●	●
7 ●	7 ●	7 ●	7 ●	●
8 ●	8 ●	8 ●	8 ●	●
9 ●	9 ●	9 ●	9 ●	●
0 ○	0 ○	0 ○	0 ○	●
1 ○	1 ○	1 ○	1 ○	●
2 ○	2 ○	2 ○	2 ○	●
3 ○	3 ○	3 ○	3 ○	●
4 ○	4 ○	4 ○	4 ○	●



Order Option A Circuit & Pinout Diagrams

This pinout drawing details the various pins on the meter side of the connector. The table below maps the pins to their corresponding inputs and outputs in the meter.

Code 15		Code 17		Code 15		Code 13		 04	 03	 02	 01
5 ●	● 0	5 ●	● 0	5 ●	● 0	5 ●	● 0				
6 ●	● 1	6 ●	○ 1	6 ●	● 1	6 ●	● 1				
7 ●	● 2	7 ●	○ 2	7 ●	● 2	7 ●	● 2				
8 ○	○ 3	8 ●	○ 3	8 ●	● 3	8 ●	● 3				
9 ●	● 4	9 ●	● 4	9 ●	● 4	9 ●	● 4				
Code 07		Code 05		Code 03		Code 01					



Order Options A/B/C Essailec Connector Arrangement

	Meter Port	Essailec Connector Pin	Description
Current Measurement Inputs	I11	A01	standard
	I12	A1	standard
	I21	A02	standard
	I22	A2	standard
	I31	A03	standard
	I32	A3	standard
	I41	A04	optional
	I42	A4	optional
Voltage Measurement Inputs	Uref	B0	standard
	U1	B1	standard
	U2	B2	standard
	U3	B3	standard
Form A Outputs	DO7 & DO8 K	B4	standard; Common
	DO5 & DO6 K	B5	standard; Common
	DO5	B6	standard; NO
	DO6	B7	standard; NO
	DO7	B8	standard; NO
	DO8	B9	standard; NO
Form C Solid-state Relays	DO1 & DO2 K	C0	standard; Common
	DO1	C1	standard; NO
	DO1	C2	standard; NC
	DO2	C3	standard; NO
	DO2	C4	standard; NC
	DO3 & DO4 K	C5	standard; Common
	DO3	C6	standard; NO
	DO3	C7	standard; NC
	DO4	C8	standard; NO
	DO4	C9	standard; NC
Unused	-	D0	Unused
	-	D1	Unused
	-	D2	Unused
	-	D3	Unused
Form A Outputs	DO11 & DO12 K	D4	standard; Common
	DO9 & DO10 K	D5	standard; Common
	DO9	D6	standard; NO
	DO10	D7	standard; NO
	DO11	D8	standard; NO
	DO12	D9	standard; NO
Form C Mechanical Relay	Alarm K	E0	standard; Common
	Alarm	E1	standard; NO
	Alarm	E2	standard; NC

	Meter Port	Essailec Connector Pin	Description
Digital Inputs or RS-485 Com	DI-SCOM (or RS-485 Shield)	E5	standard; Common
	DI1 (or RS-485 +)	E6	RS-485 +
	DI2 (or RS-485 -)	E7	RS-485 -
	DI3 (or unused)	E8	standard
	-	E3	Unused
Power Supply Inputs (AC/DC)	Power Supply N/-	E4	Power Supply neutral (-)
	Power Supply L/+	E9	Power Supply line (+)

Order Options D/E Circuit & Pinout Diagrams

This pinout drawing details the various pins on the meter side of the connector. The table below maps the pins to their corresponding inputs and outputs in the meter.

 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	 0	 1	 2	 3	 4	 5	 6	 7	 8	 9	
---	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

	Meter Port	Essailec Connector Pin	Description
Current Measurement Inputs	I11	A01	standard
	I12	A1	standard
	I21	A02	standard
	I22	A2	standard
	I31	A03	standard
	I32	A3	standard
	I41	A04	optional
	I42	A4	optional
Voltage Measurement Inputs	Uref	B0	standard
	U1	B1	standard
	U2	B2	standard
	U3	B3	standard
Digital Inputs	DI-SCOM	B5	standard; Common
	DI1	B6	standard
	DI2	B7	standard
	DI3	B8	standard
Power Supply Inputs (AC/DC)	Power Supply N/-	B4	Power Supply neutral (-)
	Power Supply L/+	B9	Power Supply line (+)
Form C Solid-state Relays	DO1 & DO2 K	C0	standard; Common
	DO1	C1	standard; NO
	DO1	C2	standard; NC
	DO2	C3	standard; NO
	DO2	C4	standard; NC
	DO3 & DO4 K	C5	standard; Common
	DO3	C6	standard; NO
	DO3	C7	standard; NC
	DO4	C8	standard; NO
	DO4	C9	standard; NC
Form C Mechanical Relay	Alarm K	D0	standard; Common
	Alarm	D1	standard; NO
	Alarm	D2	standard; NC
	-	D3	Unused
RS-485 Com	RS-485 Shield	D5	RS-485 Shield
	RS-485 +	D6	RS-485 +
	RS-485 -	D7	RS-485 -
	-	D8	Unused
IRIG-B Clock Synchronization Input	IRIG-B input common	D4	optional; clock synch input Common
	IRIG-B input	D9	optional; clock synch input

Step 1: Mount the Meter

Meter Battery Considerations

The meter's battery life expectancy depends on both temperature and the amount of time the meter is without power. For typical installations, the battery should last 10 years minimum at 25°C meter ambient operating temperature. The battery is field replaceable (see "Replacing the Battery" on page 47).

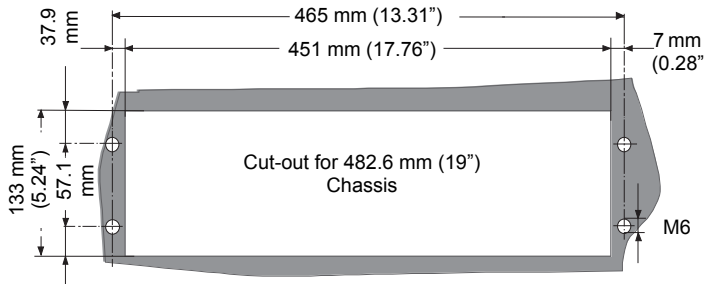
Environmental Specifications (IEC62052-11)

Mounting Location	Indoor use
Metrological	-10 to +45°C (14 to +113°F)
Operating Range	-25 to +55°C (-13 to +131°F) No formation of ice
Max. Altitude	2000 metres (6562 feet) above sea level
Display Operating Range	-10 to +60°C (14 to +140°F)
Storage Range	-25 to +70°C (-13 to +158°F)
Relative Humidity Range	5 to 95% non-condensing
Enclosure Rating	IP51 (IEC60529)

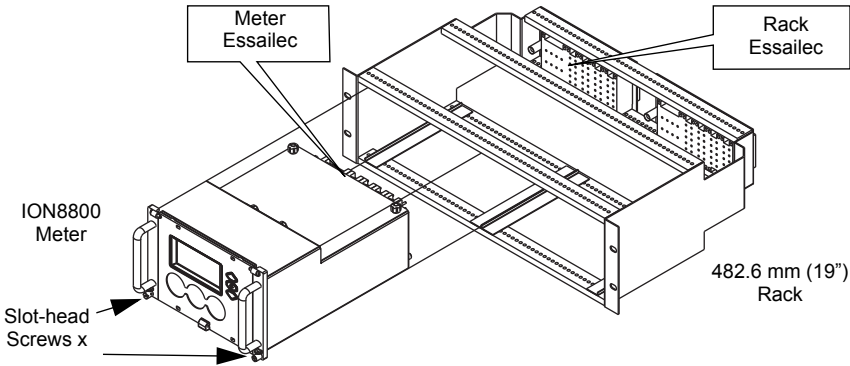
Installation



1. Connect the ground terminal on the rear of the meter to a good earth ground on the rack, using a 3.3 mm² (12 AWG) wire. Ensure that the terminal nut is tightened down securely onto the ground wire. The wire must be a minimum of 30 cm long (11.8") to allow racking and unranking.
2. Slide the meter into the DIN standard 43862 rack (half-width 19 inch/ 482.6 mm rack with plug-in Essailec connector).



3. Ensure the rear connector fits tightly.
4. Tighten the two slot-head screws (M3 thread) into the front of the meter rack, to hold the meter firmly in place.



Step 2: Wire the Digital I/O

Form C Digital Output: Mechanical Alarm Relay

Contacts	common, NO, NC
Max. Switching Voltage	250 VAC/125 VDC (internally limited to 300 V peak)
Max. Switching Current	1 A AC/0.1 A DC
Operate Time (max.)	8 ms
Release Time (max.)	4 ms
Isolation to Ground	2,000 VAC for 60 s (50 Hz)
Rating	Installation category II (local), Pollution degree 2
Minimum Operations	5,000,000

Form C Digital Output: Solid State Relay Outputs DO1 - DO4

Excitation	External only
Contacts	common, NO, NC
Max. Switching Voltage	250 VDC/ 210 VAC (internally limited to 350 V peak)
Max. Switching Current	100 mA AC/DC
Isolation to Ground	2,000 VAC for 60 s (50 Hz)
Rating	Installation category II (local), Pollution degree 2

Form A Digital Outputs: Solid State Relay Outputs DO5 - DO12

Excitation	External only
Max. Switching Voltage	250 VDC/ 210 VAC (internally limited to 350 V peak)
Max. Switching Current	100 mA AC/DC
Isolation to Ground	2,000 VAC for 60 sec. (50 Hz)
Rating	Installation category II (local), Pollution degree 2

Digital Inputs: Solid State DI1 - DI3

Excitation	External only
Minimum Pulse Width	1 ms
Maximum Pulse Rate	20 Hz
Timing Resolution	1 ms
Updated	½ cycle (does not affect timing resolution)
Isolation to Ground and to Contacts	2,000 VAC for 60 sec. (50 Hz)
Rating	Installation category II (local), Pollution degree 2
Hi-Voltage Range	75 - 280 VDC or VAC (RMS)
Lo-Voltage Range	15 - 75 VDC or VAC (RMS)
Hi-Voltage Input Impedance	100 kΩ
Lo-Voltage Input Impedance	20 kΩ

Step 3: Wire the Voltage and Current Inputs

Voltage Inputs

Inputs	U1, U2, U3, Uref
Accuracy and Rating Range	57 - 288 L-N VAC RMS 99 - 500 L-L VAC RMS
Fault Capture	1200 V peak (L-N)
Overload	1500 VAC RMS continuous
Dielectric Withstand	3320 VAC RMS at 50 Hz for 60 s
Input Impedance	5 M Ω /phase (phase - Vref)
Rating	Measurement category IV

Current Inputs: High Current Option

Accuracy Range	0.05 - 10 A autoranging
Rated Nominal	5 A
Starting Current	0.001 A RMS
Max. Current	10 A
Fault Capture	14 A peak
Max. Voltage	288 V RMS (Cat IV IEC 61010-1)
Overload	200 A RMS for 0.5 s, non-recurring
Dielectric Withstand	3320 VAC RMS at 50 Hz for 60 s
Burden	0.25 VA per phase (at 5 A)
Impedance	10 m Ω per phase
Rating	Measurement category IV

Current Inputs: Low Current Option

Accuracy Range	0.01 - 6 A autoranging
Rated Nominal	1 A and 2 A
Starting Current	0.001 A RMS
Max Current	10 A
Fault Capture	14 A peak
Max. Voltage	288 V RMS (Cat IV IEC 61010-1)
Overload	200 A RMS for 0.5 s, non-recurring
Dielectric Withstand	3320 VAC RMS at 50 Hz for 60 s
Burden	0.01 VA per phase (at 1 A)
Impedance	10 m Ω per phase
Rating	Measurement category IV



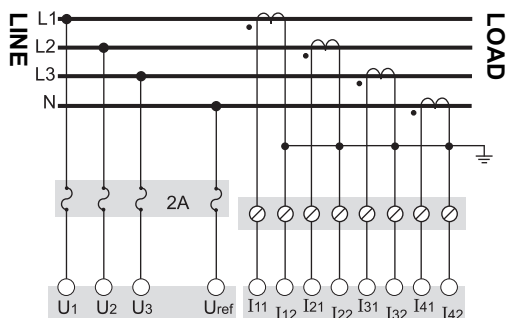
NOTE

The appropriate Volts Mode setting is included with each wiring diagram. Refer to Step 6 to learn how to configure Volts Mode on the meter.

CT & PT Selection

Consult your local instrument transformer expert, either at the local utility or through a vendor or supplier, to obtain CT and PT selection standards for high accuracy revenue metering applications in your regions.

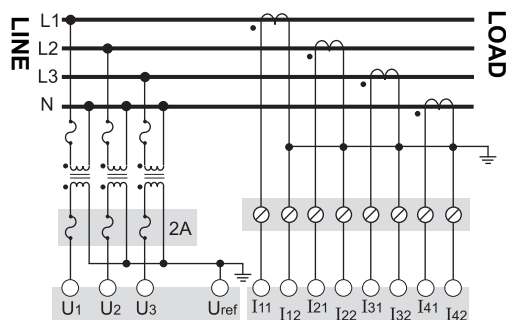
4-Wire Wye, 3-Element, Direct Connection Diagram



288 V L-N / 500 V L-L max.

VOLTS MODE = 4W-Wye

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

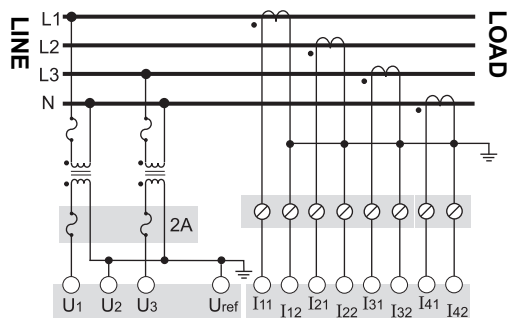


Use PTs for voltages over 288 V L-N / 500 V L-L.

Wye (Star) wiring for PT primaries and secondaries.

VOLTS MODE = 4W-Wye

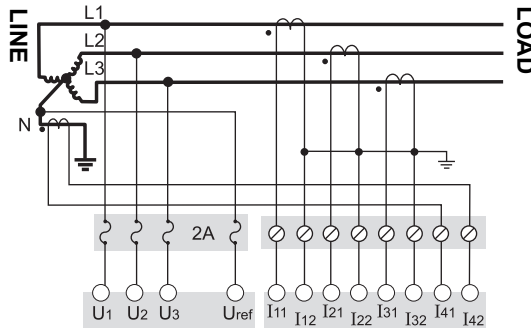
4-Wire Wye, 2½-Element, 2 PTs Connection



Phase 2 voltage (U2) displayed by meter is derived from phase 1 and phase 3, not measured. U2 will display a value even if no voltage is present on Phase 2. U2 values are only accurate for balanced loads.

VOLTS MODE = 3W-Wye

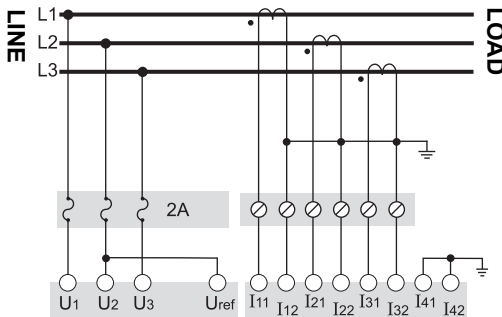
3-Wire Solid-Grounded Wye, 3-Element, Direct Connection



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

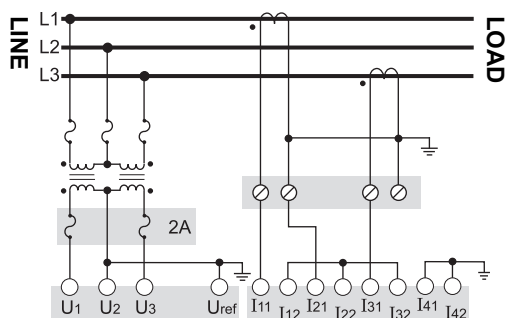
3-Wire Delta, 2½-Element, Direct Connection



500 V L-L max.

VOLTS MODE = Delta

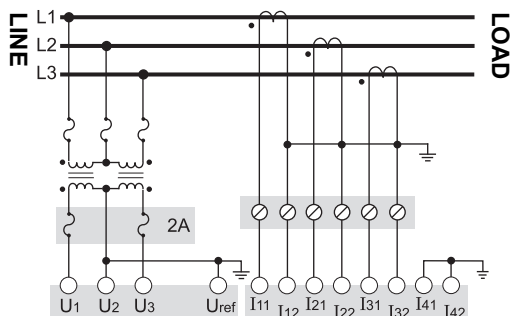
3-Wire Delta, 2-Element 2 PTs & 2 CTs



Use PTs for voltages over 500 V L-L.

VOLTS MODE = Delta

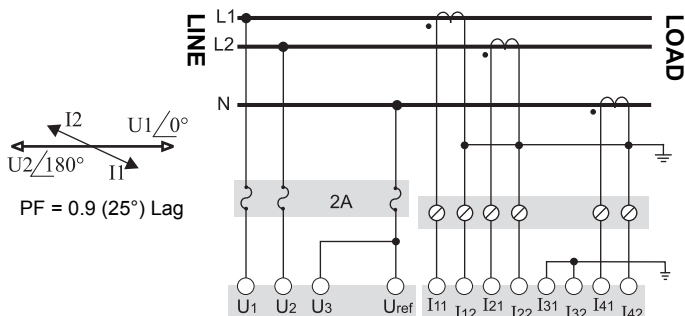
3-Wire Delta, 2½-Element, 2 PTs & 3 CTs



Use PTs for voltages over 500 V L-L

VOLTS MODE = Delta

Single Phase Connection Diagram



288 V L-N / 500 V L-L max. Use PTs for higher voltages.

VOLTS MODE = Single

Using Potential Transformers

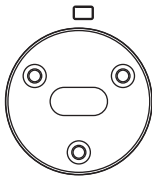
System Mode	Voltage Range	Requires PTs
Wye/ Single Phase	up to 288 V L-N or 500 V L-L	no
	over 288 V L-N or 500 V L-L	yes
Delta	up to 480 V L-L	no
	over 480 V L-L	yes

Step 4: Wire the Communications

ION8800 meters are equipped with one standard optical port. Other communications ports are available as options.

The Communications module cover plate (found on the back of the meter) should never be removed unless a communications module is installed in its place.

Infrared Connections (COM1)



Connect an optical probe cable (not included) to communicate between the meter optical port and a PC serial port.

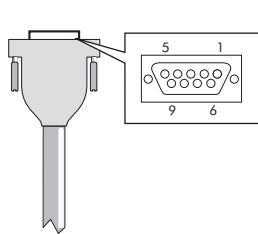
Interface	IEC 1107 optical port
Location	Front of meter
Data Rate	1,200 – 19,200 bps
Isolation	Optical
Duplex	Half

RS-485 Connections (COM2 and COM3)

Ports Available	COM2: optional module or Essaielc COM3: optional module only
Connectors	Captured-wire (+, –, Common*, Shield)
Wire	Shielded 2 or 3-conductor RS-485 cable
Maximum Cable Length	1219 m (4,000 ft) total for entire bus
Data Rate	300 – 57,600 bps
Maximum Devices (per bus)	32
Isolation	Optical
Duplex	Half

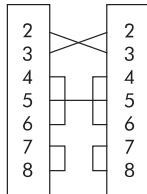
* Use optional Common wire for improved communications performance.

RS-232 Connections (COM3 optional module)



DB9 Null Modem
Wiring Diagram

DTE
(computer)



DTE
(meter)

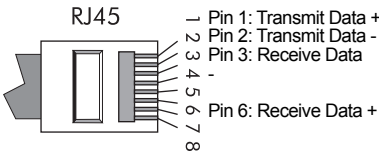
Null modem cable pinout
 Pin 3 - Transmit Data - Pin 2
 Pin 2 - Receive Data - Pin 3
 Pin 7 - Request to Send- Pin 8
 Pin 8 - Clear to Send- Pin 7
 Pin 5 - Signal Ground- Pin 5
 Pin 6 - Data Set Ready- Pin 4
 Pin 4 - Data Terminal Ready- Pin 6

Specification	Meter Connected to Computer	Meter Connected to External Modem
Connector Type	DB9 female end for mating with male connector on the meter	
Wire	Null modem RS-232 cable	Straight-through RS-232 cable
Maximum Cable Length	15.2 m (50 ft)	
Data Rate	300 – 115,200 bps	

Specification	Meter Connected to Computer	Meter Connected to External Modem
Connector Type	DB9 female end for mating with male connector on the meter	
Isolation	Optical	
Duplex	Full	

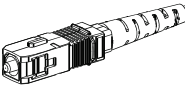
Ethernet Connections (optional module)

10Base-T/100Base-TX



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/100Base-TX for 10/100 Mbps base band CSMA/CD LANs
Data Rate	10/100 Mbps
Isolation	Transformer isolated to 1500 VAC/2250 VDC RMS
Max. Connections Allowed	8 simultaneous

100Base-FX (Fiber)



SC type fiber cables

Wire Type	62.5/125 micrometer multimode fiber optic cable
Connector Type	SC
Maximum Length	2000 m (6562 ft) full duplex 400 m (1312 ft) half duplex
Data Rate	100 Mbps
Isolation	Optical

NOTE

Ethernet connection should be made to either the Fiber port or RJ45 port, not both, or communications conflicts may result.

Only one EtherGate connection per port is allowed at a time

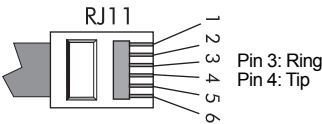
Ethernet TCP/IP Service Ports

Protocol	Port
ION	7700
Modbus RTU	7701
Modbus TCP	502
EtherGate (COM2)	7802
EtherGate (COM3)	7803
DNP TCP	20,000
Web Server	80
Telnet	23

NOTE

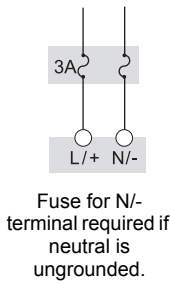
The port number for each protocol can be changed from their existing assignment using ION Setup. See *PowerLogic ION8800 energy and power quality meter user manual* for more information.

Internal Modem Connection (COM4 optional module)



Connector Type	RJ11
Wire Type	Part 68 compliant telephone cord
Data Rate	300 bps – 56 kbps
Error Correction	V.42 LAPM, MNP 2-4, V.44
Data Compression	V.42 bis/MNP 5

Step 5: Wire the Power Supply



ION8800 power supply connections are found on the Essailec connector.

Single Phase Power Supply

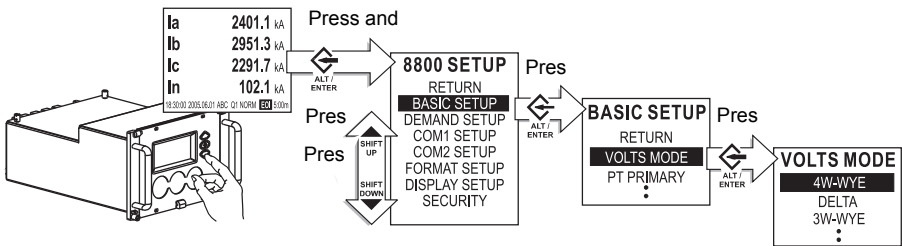
Rated Inputs	85 - 240 VAC $\pm 10\%$ (47 - 63 Hz) 110 - 270 VDC $\pm 10\%$
Rating	Installation category II (local), Pollution degree 2
Dielectric Withstand	2,000 VAC RMS for 60s (50Hz)
Max. Burden	9 W (20 VA) for base unit without comm module
Ride-through	Min: 120 ms (6 cycles @ 50 Hz) Typical: 0.5 - 5 s (depending on input voltage and configuration)

Step 6: Set Up the Meter Using the Front Panel

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

BASIC SETUP
DEMAND SETUP
COM1 SETUP
COM2 SETUP
COM3 SETUP
COM4 SETUP
NETWORK SETUP
FORMAT SETUP
DISPLAY SETUP
SECURITY SETUP

The following example shows Volts Mode setup using the meter front panel.



Press ALT/ENTER and hold for 3 seconds to enter Setup Mode from Display Mode.

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

Use arrow buttons to move up and down in list. Press ALT/ENTER to select Volts Mode.

Use arrow buttons to move up and down in list. Press ALT/ENTER to select 4W-WYE.

The following table lists all settings that can be configured via the front panel, with the meter cover seal in place.

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 999 999 999	120,00
	PT Secondary	The Potential Transformer's secondary winding voltage rating	1 to 999 999 999	120,00
	CT Primary	The Current Transformer's primary winding current rating	1 to 999 999 999	5
	CT Secondary	The Current Transformer's secondary winding current rating	1 to 999 999 999	5
	I4 Primary	Primary rating for the I4 current transformer	1,0 - 999 999,00	5
	I4 Secondary	Secondary rating for the I4 current transformer	1,0 - 999 999,00	5
	U1 Polarity	The polarity of the Potential Transformer on U1	Normal or Inverted	Normal
	U2 Polarity	The polarity of the Potential Transformer on U2	Normal or Inverted	Normal
	U3 Polarity	The polarity of the Potential Transformer on U3	Normal or Inverted	Normal
	I1 Polarity	The polarity of the Current Transformer on I1	Normal or Inverted	Normal
	I2 Polarity	The polarity of the Current Transformer on I2	Normal or Inverted	Normal
	I3 Polarity	The polarity of the Current Transformer on I3	Normal or Inverted	Normal
	I4 Polarity	The polarity of the Current Transformer on I4	Normal or Inverted	Normal
	Phase Rotation	Power system's phase rotation	123, 132	123
Demand	SWD Subinterval	Intervals used to compute your Sliding Window Demand values	1 to 5 940	600
	SWD # Subintervals	The number of SWD periods in use	1 to 15	3
	SWD Pred Resp	-	0,00 to 99,00	70
COM1	Protocol	Specifies which protocol is active	None, ION, Modbus RTU, DNP, DLMS, Factory	ION
	Baud Rate	Specifies COM port baud rate during serial communications	1 200 to 19 200	9 600
	Transmit Delay	Specifies the meter's transmit delay setting (in seconds)	0 to 1,0	0,010
	Unit ID	Identifies the meter during serial communications	1 to 9 999	From serial number ²
	Serial Port	Parity and stop bits for the port	8N1,8N2,8E1,8E2,8O1, 8O2	8N1

Menu	Setting	Description	Range (Values)	Default
COM2	Protocol	Specifies which protocol is active	None, ION, Modbus RTU, Modbus Master ³ , DNP, DLMS, EtherGate, ModemGate, GPS: Truetime/Datum GPS: Arbiter, Factory	ION
	Baud Rate ¹	Specifies COM port baud rate during serial communications	300 to 57 600	9 600
	Transmit Delay	Specifies the meter's transmit delay setting (in seconds)	0 to 1,0	0,010
	Unit ID	Identifies the meter during serial communications	1 to 9 999	From serial number ²
	Serial Port	Parity and stop bits for the port	8N1,8N2,8E1,8E2,8O1, 8O2	8N1
	Port Location	Specifies physical connection point for COM2	Essailec or Comm Module	Essailec
	RS-485 Bias	Specifies whether or not RS-485 bias is applied to port	On or Off	Off
COM3	Protocol	Specifies which protocol is active	None, ION, Modbus RTU, Modbus Master ³ , DNP, DLMS, EtherGate, ModemGate, GPS: Truetime/Datum GPS: Arbiter, Factory	ION
	Baud Rate ¹	Specifies COM port baud rate during serial communications	300 to 115 200 (RS-485 limited to 57 600 bps)	9 600
	Transmit Delay	Specifies the meter's transmit delay setting (in seconds)	0 to 1,0	0,010
	Unit ID	Identifies the meter during serial communications	1 to 9999	From serial number ²
	Serial Port	Parity and stop bits for the port	8N1,8N2,8E1,8E2,8O1, 8O2	8N1
	RS-232 or RS-485	Specifies RS-232 or RS-485	RS-232, RS-485	RS-232
	RTS/CTS Handshake	Specifies if hardware flow control is used during RS-232 communication	RTS with delay RTS/CTS	RTS + delay
	RS-485 Bias	Specifies whether or not RS-485 bias is applied to port	On or Off	Off
COM4	Protocol	Specifies which protocol is active	None, ION, Modbus RTU, DNP, DLMS, GPS: Truetime/Datum GPS: Arbiter, Factory	ION
	Baud Rate ¹	Specifies COM port baud rate during serial communications	300 to 115 200	9 600
	Transmit Delay	Specifies the meter's transmit delay setting (in seconds)	0 to 1,0	0,010
	Unit ID	Identifies the meter during serial communications	1 to 9 999	From serial number ²

Menu	Setting	Description	Range (Values)	Default
Network Setup	IP Address	Specifies TCP/IP Ethernet address	000.000.000.000 to 255.255.255.255	None
	Mask	Specifies Subnet Mask	0.0.0.0 to 255.255.255.0	None
	Gateway	Specifies Ethernet gateway (if used)	000.000.000.000 to 255.255.255.255	None
	SMTP Address	Specifies location of SMTP Server	000.000.000.000 to 255.255.255.255	None
	10/100 BT Config	Set Ethernet connection speed	Base10-T, Base100-TX, Auto	Auto
	100 FX Config	Sets the duplex	Half-duplex, Full-duplex	Half-duplex
	Port Enable	Specifies if the port is enabled or disabled	Webserver, FTP, DNP over TCP, ION over TCP, Modbus over TCP, Modbus TCP, Telnet	Enabled
Format	Phase Labels	Specifies how phases are labelled	ABC, RST, XYZ, RYB, 123	123
	PF Symbol	LD (leading)/LG (lagging)	LD/LG, +/-, CAP/IND	LD/LG
	Digit Group	Specifies symbols used to delimit thousands and decimal place holder	1000.0 or 1,000.0 or 1000,0	1000,0
	Date Format	Specifies how dates are displayed	MM/DD/YYYY, DD/MM/YYYY, YYYY/MM/DD	MM/DD/YYYY
	Show DST	Determines if DST is shown or not	Yes or No	Yes
	Volts Decimal	Number of decimal places displayed for voltages	1. to 123 456 789,XXX	1,XX
	Current Decimal	Number of decimal places displayed for currents	1. to 123 456 789,XXX	1,XXX
	Power Decimal	Number of decimal places displayed for power measurements	1. to 123 456 789,XXX	1,XXX
Display	Update Rate	Sets when the display updates (in seconds)	1 to 6	1
	Contrast	Higher numbers are sharper	0 to 9	7
	Backlight Timeout	Specifies the time it takes (in seconds) for the backlight to turn off (0 = the display stays lit indefinitely)	0 to 7 200 (two hours)	300 (five minutes)
	DMD Lock	Controls the minimum allowable time between consecutive demand resets (in seconds)	0 (disabled) to 5 184 000 (60 days)	216 000 (25 days)
	TEST Mode TO	Defines how long the meter remains in TEST mode before switching back to NORM mode	—	30 minutes
	Display Scale	Determines the scale applied to displayed parameters	1 to 999 999	1000
	Scaling Mode	Specifies whether parameters are divided or multiplied by the scale before being displayed	Multiply or Divide	Divide
	Delta Vectors	Specifies how vector diagrams are displayed when in Delta mode	System or Instrument	System

Menu	Setting	Description	Range (Values)	Default
Security	Modify Passwd	Modifies standard password	0 to 999 999 999	0
	Disable Security	Disables meter security	Disabled or Enabled	Enabled
	Web Config	Allow configuration via web server	Disabled or Enabled	Enabled
	Ack Alarms	Sends a pulse to acknowledge alarms when selected	—	—

¹ A baud rate of 300 bps is only intended for paging applications.

² Serial number = PA-030**2B222**-01, Unit ID = **2222**

³ Available on ION8800A and B meters only.

The following table lists all settings that can be configured using the ALT CONFIG menu (not available when meter cover is sealed).

Setting	Description	Range (Values)	Default
IR Config	Allows meter configuration via the front optical port	Disabled or Enabled	Enabled
Meter Lock ¹	When meter is locked, most meter configuration is prevented, as are meter resets	Locked or Unlocked	Locked ²
Clear Alarms	Sends a pulse to clear alarms when pushed	—	—

¹ After a meter is unlocked, it automatically relocks if you do not perform any configuration for 30 minutes. This function is not available on non-hardware lockable meters.

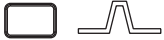
² Default = 'Locked' on meters ordered with Hardware Lock option.
Default = 'Unlocked' on all other meters (setting is non-functioning).

Step 7: Verify Meter Operation

Three LEDs on the left-hand side of the Front Panel indicate the following:



Alarm (red) Top LED is user programmable; by default, it flashes to indicate serious meter faults. Contact Technical Support if this occurs.



Indicator (green) Middle LED is user programmable.



Power (green) Bottom LED indicates the meter is powered. The light should always remain on when the meter is in service.

Phasor Diagrams

You can also view the meter's phasor diagram in real time. Use the Phasor Viewer available in ION Setup v2.1 and later (free to download from the website) to verify your meter's wiring. See the ION Setup online help for details.

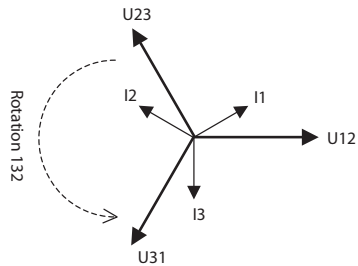
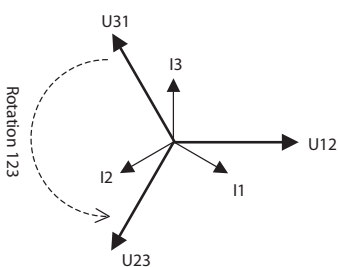


NOTE

The following DELTA phasor diagrams are represented in system mode.

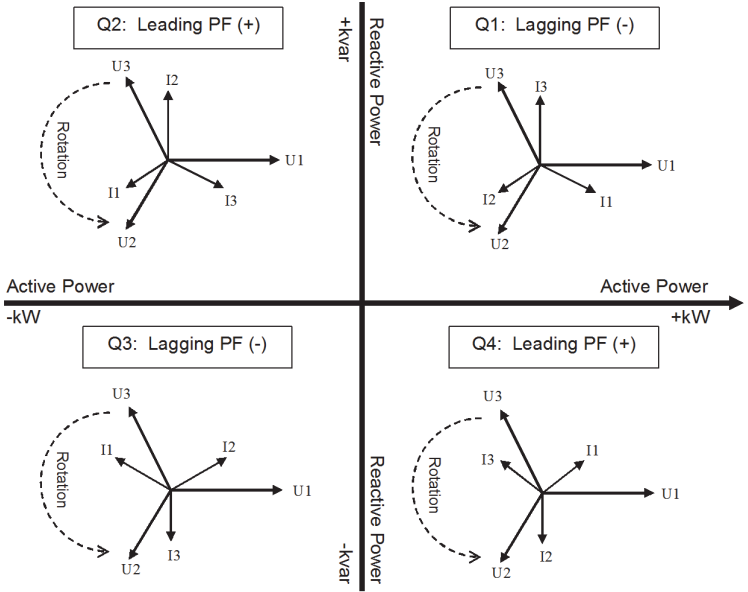
DELTA phasors for UNITY Power Factor (resistive load)

Applicable Volts Mode = DELTA



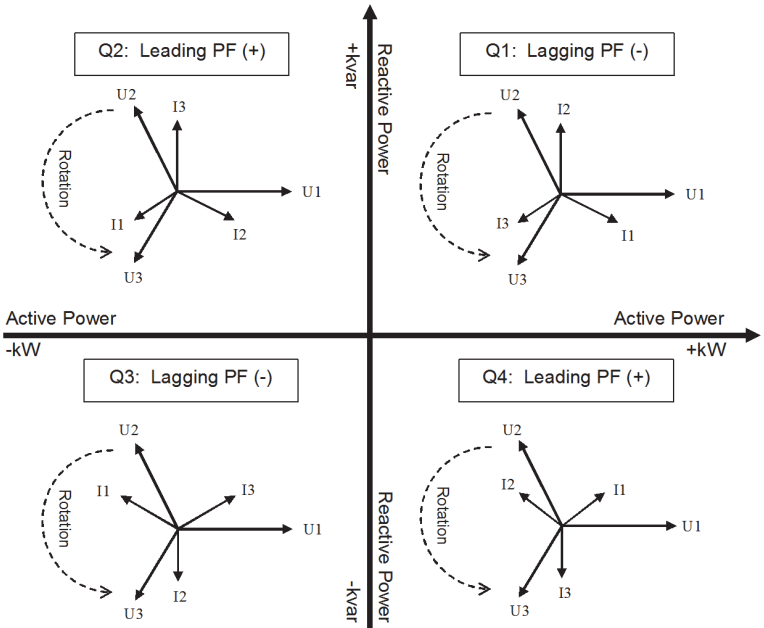
WYE - 123 Rotation

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



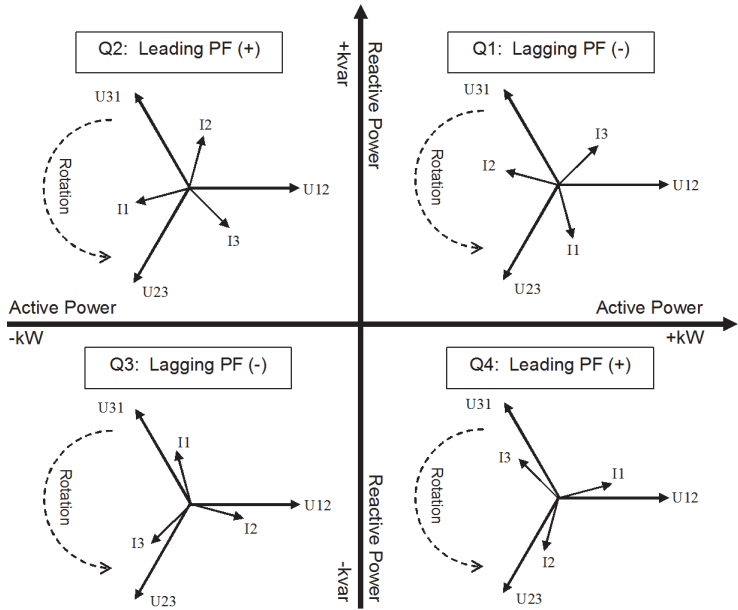
WYE - 132 Rotation

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



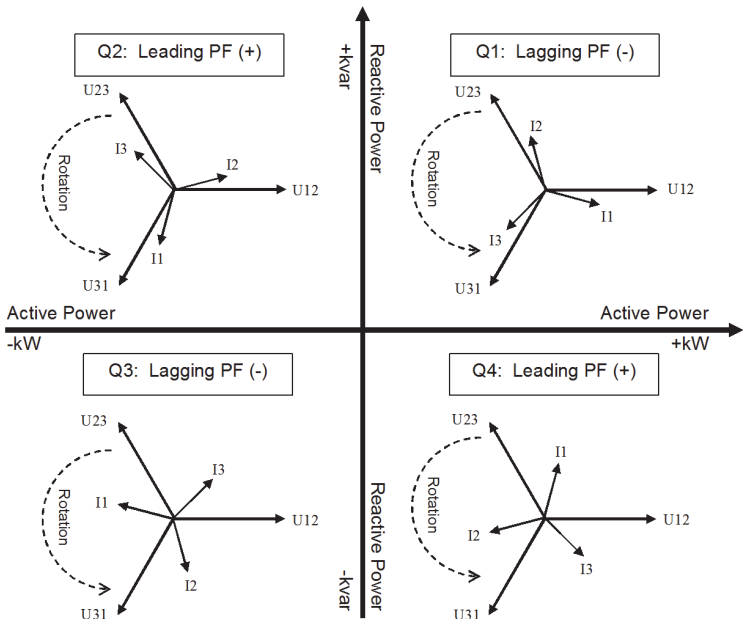
2 Element (3Wire) DELTA - 123 Rotation

Applicable Volts Mode = DELTA



2 Element (3Wire) DELTA - 132 Rotation

Applicable Volts Mode = DELTA



Step 8: View Meter Data

NORM mode

Use the **Up** and **Down** buttons to scroll through **NORM** mode display screens.

NORM Screen	Contents
kWh	kWh delivered/received
kvarh	kvarh delivered/received
kVAh	kVAh delivered/received
Peak Demand Delivered	Maximum delivered kW value (timestamped)
Peak Demand Received	Maximum received kW value (timestamped)
Peak Demand Reset	Number of Demand Resets (timestamped)
Q Metering	Approximated varh measurements
Disk Simulator	Simulates mechanical watt-hour meter disk
All Segments	Black screen to indicate functioning display

ALT mode

Press the **Alt/Enter** button once for **ALT** display modes. Press the **Up** or **Down** buttons to scroll through displays.

ALT Screen	Contents
Name Plate 1	Owner, firmware version, TAG 1 & 2, meter serial number
Name Plate 2	Sliding window settings
Event Log	Most recent high priority (255) events
Vector Diagram	Phasors and values for phase current/voltage
Instantaneous Voltage	Average voltage, L-N or L-L
Instantaneous Current	Phase current, average current
Instantaneous Power	kW total, kvar total, kVA total, power factor
Instantaneous Demand	kW delivered/received
Voltage Harmonics (3 screens)	Per-phase voltage harmonic histograms
Current Harmonics (3 screens)	Per-phase current harmonic histograms
Availability	Number of nines measurement
Instantaneous Demand	kW delivered/received

TOU Display Screen	Contents
TOU Energy by Rate	kWh delivered values for each TOU rate
kW Peak Demand	Maximum kW delivered for each TOU rate
Previous Billing Energy	kWh delivered in PB
Prev Billing Peak Demand	Maximum kW delivered in PB
Previous Season Energy	kWh delivered for each TOU rate in PB
Prev Season Peak Demand	Max kW delivered for each TOU rate in PB
Prev Billing/Season Energy	kWh delivered/received in PB & billing season
Prev Bill/Season Pk Dem	Max kW sd received from PB & billing season
Prev Billing/Season Energy	kvarh del/rec in PB & billing season
Prev Bill/Season Pk Demand	kvar del/rec in PB & billing season
Prev Billing/Season Energy	kVAh del/rec from PB & billing season
Pre Bill/Season Pk Demand	kVA del/rec in PB & billing season
Active TOU Rate	Active TOU billing rate
Active TOU Season	Active TOU billing season
Flicker	Flicker measurements from U1, U2 & U3
Frequency	Frequency information

**NOTE**

PB = Previous Billing period.

TEST Mode

TEST Screen	Contents
kWh Test	TEST mode kWh delivered/received
kvarh/KVAh Test	TEST mode kvarh/KVAh delivered/received
Instantaneous Demand Test	TEST mode kW delivered/received

To Enter TEST Mode

Meter Type	Method
Standard Meter (no hardware lock)	Use ION software
	Open cover and press TEST mode button (see "Front Panel Button Functions" on page 13)
Hardware Locked Meter	Open cover and press TEST mode button (see "Front Panel Button Functions" on page 13)

**NOTE**

The meter always returns to NORM mode after exiting TEST mode.

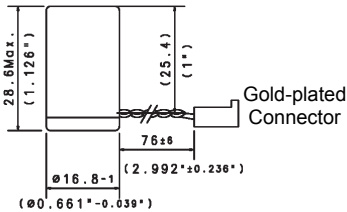
Replacing the Battery

The battery in the ION8800 meter keeps the real time clock running when supply power is lost. Replace the battery if the meter has been stored for an extended period of time without power (longer than two years). If the meter will be without power for an extended length of time, disconnect the battery cable so that the battery maintains its 10-year shelf life.

Battery Specifications

Type	Lithium LiSOCl ₂
Nominal Capacity	1.0 Ah
Rated Voltage	3.6 V
Connector	Gold-plated

Battery



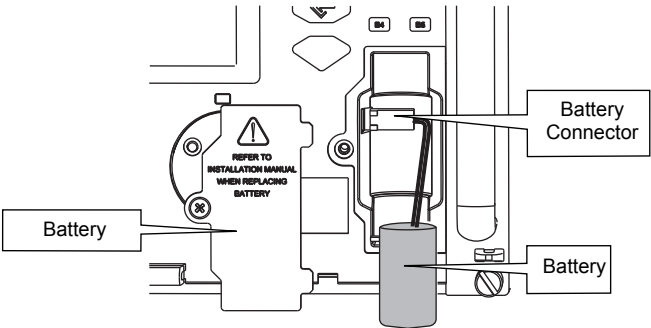
The battery can be changed when the meter is either powered or unpowered.

NOTE

Replacing the battery on an unpowered meter resets the internal clock and may affect revenue parameters.

To replace the battery

1. To prevent electrostatic damage to the unit, make sure you are grounded or wear an anti-static wrist strap during this procedure.
2. Open the front cover of the meter.
3. Remove the Phillips screw that holds the battery cover in place and remove the battery cover.
4. Remove the battery from the housing and disconnect the battery connector from the meter.



5. Connect the new battery's wire to the meter. and place the battery in the housing.
6. Replace the battery cover and the Phillips screw.
7. Close the cover of the meter.

Meter Security

Security features depend on the meter ordering options. See below.

All ION8800 meters

Standard security includes traditional anti-tamper mechanical sealing points on the meter case and cover.

ION8800 meters with Hardware Locked Security Option

Standard security plus a hardware-locked security system that prevents modification of revenue quantities after the meter is sealed.

Hardware Locked Security Option

To make configuration changes to billing parameters on a hardware-locked meter, you must first unlock the meter. The Meter Lock setting is located in the ALT Config menu, which is reached by pressing the ALT Config button under the anti-tamper sealed cover (see “ALT Config Button” on page 13). This button cannot be activated remotely with a Hardware Lock meter.

Typical values that are protected include:

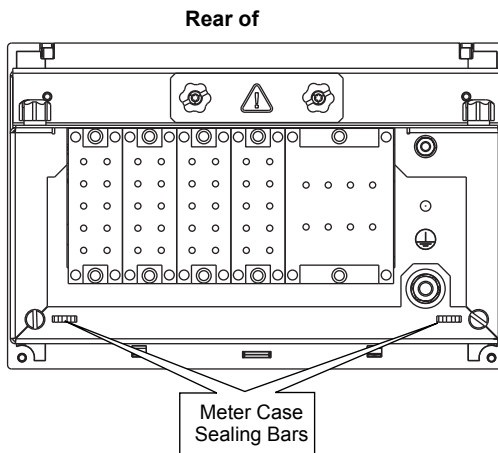
- ◆ kWh, kvarh, kVAh delivered, received, del-rec, del+rec.
- ◆ kW, kvar, kVA and Sliding Window demand min and max values.
- ◆ Digital Outputs controlling the energy pulsing applications.
- ◆ All Power system settings, including PT and CT ratios.

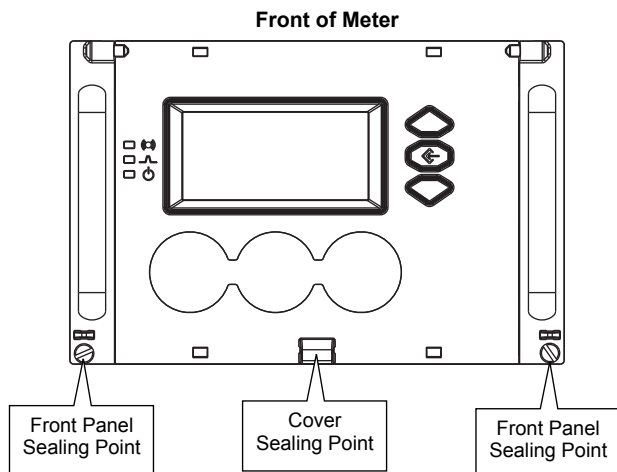
For a complete list of locked values specific to your meter and its firmware, contact Technical Support.

Anti-Tamper Sealing Methods

The ION8800 meter uses the following anti-tamper sealing methods.

Meter Seals

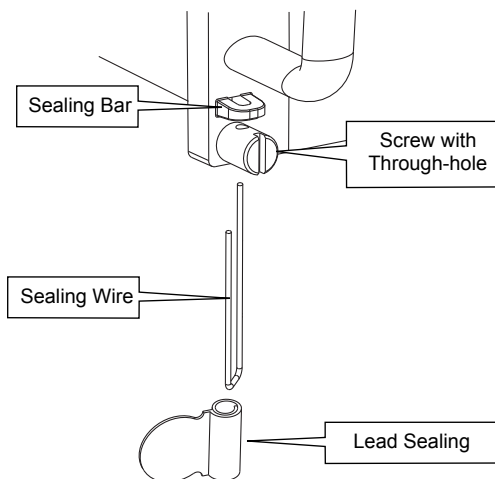




The meter incorporates sealing bars and chassis screws with through-holes, through which traditional lead/wire seals can be inserted. When utilized, these lead/wire seals effectively prevent unauthorized personnel from gaining access to meter internals or to buttons under the cover.

These seals are installed as follows:

1. Insert the sealing wire through **both** the screw hole and sealing bar.



2. Twist the wire and crimp the lead-sealing tab on to the wire.

PowerLogic™ ION8800
Installation guide

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70002-0291-02 07/2016
Replaces 70002-0291-01
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