

PowerLogic™ ION7300 series

Power and energy meter

User guide



Notices

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 ION7300 series 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 will result in severe injury or death.

- ◆ During normal operation of the ION7300 series 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.
- ◆ The ION7300 series meter is designed to be used as a permanently installed device. All electrical connections to the meter must be installed with a permanent connection method (screw-type mechanical connection).
- ◆ The ION7300 series meter's chassis ground must be permanently connected to the switchgear earth ground for the noise and surge protection circuitry to function correctly. Failure to do so will void the warranty.
- ◆ 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 ION7300 series meter 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 ION7300 series meter for the maximum voltage level the device can withstand.

CAUTION

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

- ◆ The ION7300 series meter offers a range of hardware options that affect input ratings. The ION7300 series 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.
- ◆ 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 ION7300 series meter's optional internal modem is 0.6. Connection to the ION7300 series meter's internal modem should be made via an FCC Part 68 compliant telephone cord (not supplied). The ION7300 series meter 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 Schneider Electric Technical Support.

Standards Compliance



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



Certified to UL 3111



Made by Power Measurement Ltd.

Covered by one or more of the following patents:

U.S. Patent No's 7010438, 7006934, 6990395, 6988182, 6988025, 6983211, 6961641, 6957158, 6944555, 6871150, 6853978, 6825776, 6813571, 6798191, 6798190, 6792364, 6792337, 6751562, 6745138, 6737855, 6694270, 6687627, 6671654, 6671635, 6615147, 6611922, 6611773, 6563697, 6493644, 6397155, 6236949, 6186842, 6185508, 6000034, 5995911, 5828576, 5736847, 5650936, D505087, D459259, D458863, D443541, D439535, D435471, D432934, D429655, D427533.

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Chapter
1

Introduction

This manual explains how to use all PowerLogic™ ION7300 series meters. Throughout the manual, the term “meter” generally refers to all meter models: ION7300, ION7330 and ION7350. All differences between the models, such as a feature specific to one model, are indicated with the appropriate model number.

Before using this guide, your meter should be installed, most basic setup should have been performed, and communications/basic operation should have been verified.

If the unit is not yet installed and operational, refer to the installation guide shipped with the meter.

This chapter provides an overview of ION7300 series meters, and summarizes many of their key features.

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ION7300 Series Meters

The ION7300 series meters are intelligent metering and control devices suited to a wide range of applications. The meters can be used as stand-alone devices, but their extensive capabilities are fully realized when used as part of an enterprise energy management (EEM) system.

EEM systems give energy suppliers, service providers, and large industrial and commercial energy consumers the tools to meet all the challenges and opportunities of the new energy environment. EEM systems use real-time information and control to directly address a broad range of requirements throughout the power delivery chain and across an entire enterprise. These systems offer an integrated solution to managing new billing structures, distributed generation, energy purchasing, energy cost control, operational efficiency, and power quality and reliability.

ION™ technology uniquely delivers the benefits of enterprise energy management through an efficient, economical, and scalable architecture using web-enabled software and intelligent metering and control devices. ION systems place intelligence everywhere its needed, delivering information and control to everyone that needs it, wherever they are. This gives all parties the necessary information to make the best energy decisions, and the control to act on them. Systems can span widely dispersed geographic locations and multiple points within each site. A single, shared system delivers a broad range of functionality that can satisfy the needs of many different groups within an enterprise, while integrating seamlessly with existing systems.

ION Enterprise™ is a powerful web-ready software suite that can process, analyze, store, and share information from across your entire organization. Its compatibility and flexibility means you can introduce individual components, at a pace you decide, while maintaining your original investments. You can access information and alarms from any workstation, pager, PDA, or cell phone locally or around the world, in the format you require. You can also perform coordinated load and equipment control functions, either manually or automatically. ION software collects data automatically from ION meters and third-party devices, so you can manage a single site or a global network of devices. ION software and hardware products reduce cost of installation and ownership by leverage existing corporate networks and popular networking technologies, including serial, wireless, modem, Ethernet and Internet links.

A wide selection of ION intelligent metering and control devices are available, with choices to meet the specific needs of various key points within an enterprise. Devices offer a range of high accuracy metering, power quality and reliability analysis, data and event logging, alarming, control and communications.

The ION7300 series meters can be used effectively in numerous supply side and demand side operations. Some common meter applications are:

- ◆ Revenue metering
- ◆ Substation automation
- ◆ Replacement of analog transducers
- ◆ Commercial/Industrial metering

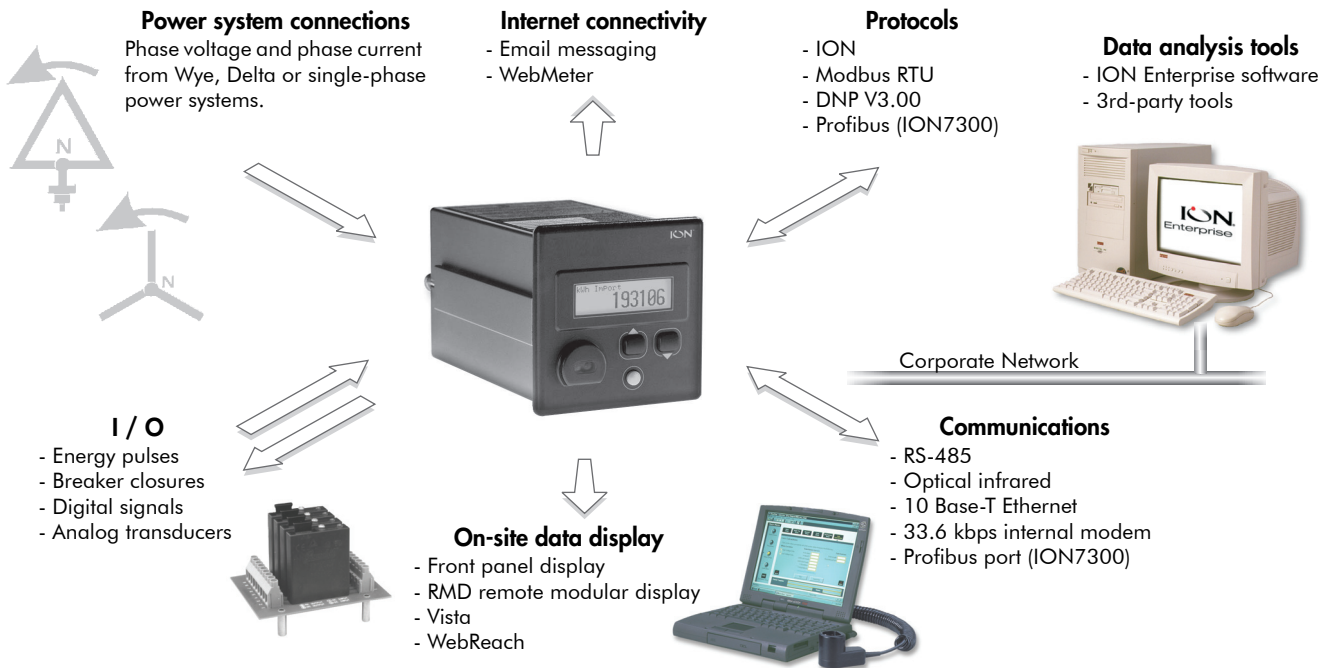
- ◆ Demand monitoring
- ◆ Genset applications
- ◆ Universal metering (ION7330 and ION7350)
- ◆ Utility sub-metering (ION7330 and ION7350)

These are just a few of the many possibilities. Contact Technical Support if you would like assistance with your application.

The ION Meter in an Enterprise Energy Management System

Applications that include the meter typically require additional equipment. Display and analysis software tools are almost always used to manage, interpret and distribute the data measured or logged by a meter. There are usually a variety of tools used, and often these tools are connected using different communications standards and protocols. In many cases, a meter must also provide control capabilities and device-level data sharing.

The meter can adapt to many situations. Advanced communications allow data to be shared simultaneously across multiple networks, built-in I/O provides monitoring and control capabilities, and a variety of display and analysis tools can be used to monitor your power system.



Meter Features

Your meter includes an impressive array of standard features. See below for an overview.

Measured Parameters

ION7300 series meters provide fully bi-directional, 4-quadrant, revenue-accurate or revenue-certified energy metering. The following is a selection of some parameters measured by these meters.

Energy

The meters provide all common active, reactive and apparent energy parameters.

- ◆ kWh, imported, exported, net (imported minus exported), and total (imported plus exported)
- ◆ kVARh imported, exported, net (imported minus exported), and total (imported plus exported)
- ◆ kVAh total
- ◆ kVAh, imported, exported, net (ION7330 and ION7350 meters only)
- ◆ Volt-hours and amp-hours
- ◆ Integration of any instantaneous measurement

All energy parameters represent the total for all three phases. Energy readings are true RMS and are updated approximately once each second. Maximum range of energy readings is 999,999,999. Beyond this value, readings roll over to zero (0).

Demand

ION7300 series meters support rolling block, thermal, and predicted demand. The meters calculate demand on any instantaneous measurement and record peak (maximum) and minimum demand.

Default setup:

- ◆ kW demand and min/max
- ◆ kVAR demand and min/max
- ◆ kVA demand and min/max
- ◆ Amps demand and min/max
- ◆ Volts demand and min/max
- ◆ Demand on any instantaneous measurement

Real-Time

ION7300 series meters offer a comprehensive array of instantaneous (real-time) measurements. Measurements include true RMS, per phase and total for:

- ◆ Voltage and current
- ◆ kW, kVAR and kVA
- ◆ Power factor
- ◆ Frequency
- ◆ Voltage and current unbalance

Harmonics

ION7300 series meters feature harmonic distortion metering.

- ◆ Total harmonic distortion (THD) and individual harmonics to the 15th, (31st for the ION7350 meter) on voltage and current inputs
- ◆ K-factor for current inputs

Min/Max Recording

The meters record each new minimum and new maximum value with date and time-stamp for the following parameters:

- ◆ Voltage and current min/max
- ◆ kW, kVAR, and kVA min/max
- ◆ Power factor
- ◆ Frequency
- ◆ Voltage unbalance
- ◆ Plus any measured value

Residual Current Calculation (I4)

The Power Meter module provides an output register labeled "I4" which holds the residual current value, derived from the three phase current measurements. As such, I4 represents the ground fault current, or the current flow in the neutral or ground conductor.

NOTE

This quantity is only available when the meter's *Volts Mode* is set to 4-WIRE WYE. If the Power Meter module is set to any other *Volts Mode*, the I4 output will read NOT AVAILABLE.

Data Display and Analysis Tools

Display and analyze meter data with a wide variety of tools.

The Front Panel

Use the meter's front panel interface for local monitoring and standalone applications. The bright LCD display lets you view real-time values and perform device configuration.

NOTE

TRAN (transducer) model meters do not have a front panel.

The RMD Remote Modular Display



The RMD remote modular display can be added to an existing ION7300 series-TRAN model to facilitate local monitoring and standalone applications. The ION7300 series basic model provides an integrated front panel display.

Both the front panel and RMD, when used in combination with ION software, provide an interface for field personnel.

WebMeter™ Embedded Web Server Feature

Ethernet meters include WebMeter functionality; an on-board web server that provides quick and easy access to real-time energy and basic power quality information without special software. The built-in web pages display a range of energy and basic power quality information through the web-enabled device, and even support basic meter configuration tasks.

Email Messaging Feature

The email messaging feature lets you configure the meter to automatically email high-priority alarm notifications or scheduled system-status update messages to anyone, anywhere within the facility or around the world. Specify the type of event that triggers an email alert, such as power quality disturbances or logged data at any pre-determined interval, and have your ION software administrator program the meter to respond with an email message when these events occur. The email messages can be received over a workstation, cell phone, pager, or PDA, and are typically tagged with "MeterM@il" or "metermail" in the subject line.

XML Compatibility

Your meter can exchange information using industry-standard XML format. This simple machine-readable format supports easy integration with custom reporting, spreadsheet, database, and other applications.

Supported Protocols

You can integrate the meter into various industry-standard networks. Meter data can be made available to other devices using the following protocols:

- ◆ ION
- ◆ Modbus RTU
- ◆ DNP 3.0 (ION7330 and ION7350)
- ◆ MV-90 translation system (ION7330 and ION7350).
- ◆ Profibus (optional for ION7300)

You can also configure the meter to import data from other devices on these networks. With these advanced communications functions, the power of the meter can be utilized in most existing power monitoring systems. Any data display and analysis software that works with Modbus RTU or DNP 3.0 devices also functions with the meter.

Communications Options

The standard meter has one infrared port and one or two RS-485 communications ports (the ION7300 has one, the ION7330 and ION7350 have two). These ports are capable of data rates up to 19,200 bps. The infrared port on the front panel is compatible with an ANSI C12.13 Type II magnetic optical communications coupler. It can be used to communicate real-time measurements via ION, Modbus, or DNP protocols. The RS-485 and infrared ports can communicate simultaneously. Ordering options can include a 10Base-T Ethernet port, a 33.6 kbps internal modem, and a Profibus port, depending on the model type of your ION7300 series meter.

Digital and Analog I/O Options

The ION7300 series meter offers a variety of analog and digital I/O combinations. I/O connections to the meter are made via captured-wire terminals on the back of the meter. The analog I/O option can be specified for any ION7300 series meter, allowing you to monitor a wide range of conditions, such as flow rates, device cycles (RPM), fuel levels, oil pressures and transformer temperatures. You can output energy pulses to an RTU or perform equipment control operations.

Digital Outputs

All ION7300 series meters have four programmable digital output ports. These are suitable for pulsing or controlling relays. The infrared data port and/or a rear panel LED can also be used for energy pulsing.

Status Inputs

Four optically isolated digital inputs on the ION7330 and ION7350 meters can monitor status, count transducer pulses, breaker trips and pulses from any external “volts free” dry contact.

Analog Inputs/Outputs

Any meter in the ION7300 series can be equipped with an optional analog I/O card featuring:

- ◆ 4 analog inputs accepting 0–1 mA or 0–20 mA, (scalable to 4-20 mA)
- ◆ 4 analog outputs accepting 0–1 mA or 0–20 mA, (scalable to 4-20 mA)

NOTE

When equipped with analog I/O, TRAN base units cannot be ordered with a remote display (RMD).

ION Enterprise Software Support

The complete ION Enterprise software package integrates the meter into a fully networked information system with other meters and local and wide-area computer networks. ION Enterprise is recommended for all power monitoring systems where advanced analysis and control capabilities are required.

ION Enterprise provides tools for managing your power monitoring network, logging data, analyzing real-time and logged data, generating power system reports, and creating custom functionality at the meter level.

Vista

Vista presents a graphical view of your power system, allowing you to view and analyze real-time data from power meters and historical data from the ION database. Vista reports on the status of your system components, informing you of alarm conditions and providing you with control capabilities for initiating intelligent device functions or actuating field machinery. Vista includes sophisticated tools for analyzing real-time and logged power data and system events.

For more information, refer to the Vista section in the online *ION Enterprise Help*.

WebReach

The WebReach component of ION Enterprise adds thin-client support functionality to the ION Enterprise software. With the WebReach feature you can use the web browser from any machine on your network to view the Vista diagrams of all the meters on your network, regardless of whether they are located locally or across the country. You can create custom screens in Vista for display in your web browser, including real-time numeric data, background graphics or diagrams, and basic views of event, data and waveform logs.

Reporter

Reporter lets you define and create comprehensive database reports using Microsoft Excel. Configured Power Quality, Load Profile, and Energy and Demand reports are included with Reporter.

For more information, refer to the Reporter section in the online *ION Enterprise Help*.

Management Console

Management Console is used to build your ION Enterprise power-monitoring network to reflect the way the physical communications network is wired, so ION Enterprise software can communicate with your devices. The network is created using sites, servers, modems, and intelligent devices that can be added, removed, configured, or duplicated.

You can access the following tools from the Management Console menus:

- ◆ **Diagnostics Viewer** is the primary source of troubleshooting information in ION Enterprise.
- ◆ **Device Upgrader** lets you upgrade the operating software inside an ION meter.
- ◆ **Remote Modem Setup** lets you set up modems for remote sites.
- ◆ **Database Manager** lets you manage your ION Enterprise databases with both manual tasks and scheduled tasks.
- ◆ **User Manager** lets you configure ION Enterprise software user accounts that define different operations permitted within the ION software, such as viewing meter data, performing control actions, or configuring the meters.
- ◆ **License Manager** lets you upgrade the number of devices you can have without re-installing the software.

For more information, refer to the Management Console section in the online *ION Enterprise Help*.

Designer

Designer lets you customize the operation of hardware nodes, such as ION meters, and software nodes, such as the Virtual Processor, the Log Inserter, and the Query Server. Designer uses a WYSIWYG graphical user interface to pictorially represent a node's configuration (i.e., how the different ION modules are linked together in a framework). In addition to giving you the ability to change the settings of any ION module, Designer also lets you change existing links between modules, add new links, add new modules or delete modules. Designer helps you visualize the logic when you are programming custom functionality in an ION device.

For more information, refer to the Designer section in the online *ION Enterprise Help*.

ION Setup Software Support

ION Setup is a software tool designed specifically to configure and test meters. ION Setup offers an intuitive graphical interface for performing basic meter setup, installing templates into meters, viewing real-time and reset accumulated values, and verifying meter calibration and measurements.

Getting More Information

Additional information is available from Schneider Electric:

- ◆ visit our web site at www.powerlogic.com
- ◆ contact your local Schneider Electric representative
- ◆ contact Schneider Electric directly

Documents that are related to the installation, operation and application of the meter are as follows:

ION7300 Series Installation Guide

This brief manual is shipped with each meter. It details the mounting, wiring and basic setup of the device.

ION Reference

The ION Reference describes ION architecture (the common software architecture in all ION devices) and provides an explanation for each of the ION modules.

Online ION Enterprise Help & Online ION Setup Help

In-depth online help systems for ION Enterprise and ION Setup software.

Technical Notes

Technical notes provide instructions for using meter features and for creating custom configurations.

Product Option Documents

These documents include instructions on how to retrofit your current product with your new option, and how to utilize the option.

Protocol Documents

Each protocol document contains information explaining how our products interact with a protocol, such as DNP 3.0, Modicon Modbus, and MV-90.

Chapter
2

Front Panel

The meter’s front panel is used for both display and configuration purposes. The liquid crystal display (LCD) screen and the selection, navigation, and configuration buttons allow quick access to basic meter configuration provided by special setup screens. Comprehensive meter configuration is also accessible via the Advanced setup menus.

This chapter provides information about the meter’s front panel, including instructions for using the setup menus and for displaying meter values.

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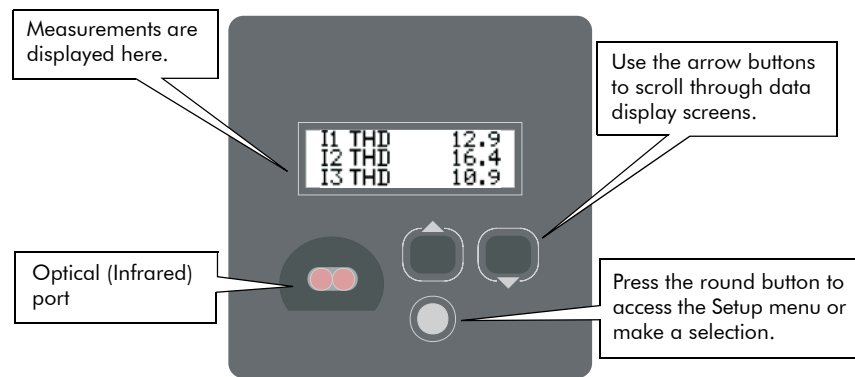
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Displaying Data with the Front Panel

The front panel provides a detailed graphics and text display for the meter. The front panel is configured at the factory with eight displays showing some of the more commonly used power system values measured by the device (refer to “Default Front Panel Display Screens” on page 24).

NOTE

The RMD remote modular display can be added to an existing TRAN meter to provide a front panel display.



The meter’s display shows numeric data screens, event logs, phasor diagrams, bar graphs, and harmonics histograms.



Using the Front Panel Buttons to Display Data

Press the up and down arrow buttons to scroll through the data display screens. You do not require password authorization to view these screens. The round button, when pressed, provides access to the Setup menu. Use the front panel’s three buttons to navigate this menu, and enter settings into the meter.

Front Panel Display Resolution

When displaying numeric values, the front panel display screen can show up to nine digits of resolution. This nine digit resolution is available when the display screen is set to display one parameter. Any multi-parameter screen displays up to five digits of resolution.

If you require more digit resolution than is available, use ION software to display data. If a value is too large to be displayed on your display screen (i.e. greater than 99,999 on a two parameter screen), the front panel uses an abbreviated engineering notation with standard metric prefixes to indicate the magnitude of the reading. The following table provides some examples:

Front Panel Display	Value
124K0	124,000
124M0	124,000,000
1G240	1, 240, 000, 000

Numeric values are displayed in base units; voltages are displayed in volts, while current is displayed in amps. The following values, however, are displayed in kilo units rather than base units since kilo is the most frequently used value range:

- ◆ kW
- ◆ kVA
- ◆ kVAR

When viewing these parameters with the front panel, remember that the values are already multiplied by 1000. For example, the reading below indicates 120,000 kilowatts, *not* 120,000 watts.

kW total	120K0
----------	-------

INVLD and N/A Messages

If the front panel is unable to read a numeric or status value from the meter, it will display either INVLD or N/A in place of the value. INVLD indicates that the value received cannot be displayed because it is too large (above 9G999). N/A appears if the register is not available

Display Screen Types

The meter's front panel displays measurements, configurable settings, and current configuration data in various forms. These data display screens are described below.

Default Front Panel Display Screens

The meter's eight default data displays are as follows:

Display 1 (kWh net)

Net Energy

```
kWh net
1475.35
```

Display 5 (Power)

Total Power (true, reactive, and apparent), Power Factor.

```
kW tot      187
kVAR tot    62
kVA tot     197
PF sign tot -94.9
```

Display 2 (kWh swd / mx)

Present Interval and Maximum Sliding Window Demand

```
kW swd      459
kW swd mx   700
```

Display 6 (Frequency)

Frequency

```
Freq
59.99
```

Display 3 (Volts)

Per-phase and average line-to-line voltage

```
Vll ab      607
Vll bc      601
Vll ca      601
Vll avg     603
```

Display 7 (V-THD)

Per-phase Voltage Total Harmonic Distortion

```
V1 THD      1.1
V2 THD      1.0
V3 THD      1.3
```

Display 4 (Amps)

Per-phase and average current

```
I a         177
I b         184
I c         210
I avg       190
```

Display 8 (I-THD)

Per-phase Current Total Harmonic Distortion

```
I1 THD      12.9
I2 THD      16.4
I3 THD      10.9
```

NOTE

Your default data display screens will differ if the meter is in Fixed mode, or if your meter has custom displays.

Configuring the Meter with the Front Panel

The front panel allows you to setup and configure the meter at its installed location. When you change a setting in the front panel's Setup menu, you are actually altering the setup register value of an ION module.

NOTE

ION module links cannot be added or deleted using the front panel.

You can also use the front panel's Setup menu to quickly reset common cumulative values like kilowatt hours.



Using the Front Panel Buttons for Configuration

Press the round button twice to access the Setup menus. Use the front panel's three buttons to navigate these menus, and enter settings into the meter.

Navigating Menus

Each menu has a title displayed at the top of the display screen and menu items displayed below the title. Use the arrow buttons to scroll through the menu items. To select an item that is highlighted, press the round button. To return to the previous screen, select RETURN. Return to the data display screens by repeatedly selecting RETURN.

Editing Registers

To edit the value of a register, navigate through the registers using the arrow keys until the register you want is highlighted, then press the round button. The register appears in one of two ways: as a number, or as an option selected from a menu. Once you have entered the password (if required), a YES or NO verification screen appears showing the new value of the register. Select YES to change the value of the setup register; select NO to return to the previous screen without changing the value.

Numeric Registers

Use the arrow buttons to change the value of the digit above the ▲ cursor. Change the position of the cursor by holding down an arrow key for about one second. Holding the up arrow button moves the cursor left one position, and holding the down arrow button moves the cursor right one position. Once you have the value you want, press the round button.

Enumerated Registers

Some registers are displayed as a menu of options. The current value of the register will be displayed in the list with an asterisk (*) on either side of it. Use the arrow buttons to highlight the setting you want, and press the round button.

Passwords

All configuration functions in the front panel are password protected. The password is set to 0 (zero) in the factory. The front panel only prompts you for the meter password before you make your first configuration change. See the Security chapter for more information on passwords.

Confirming Configuration Changes

A confirmation screen appears whenever you attempt to change the meter's settings through the front panel. This allows you to abort an unwanted configuration change. The front panel also informs you when an entry is out of range.

Writing Errors

If the confirmation screen does not appear for a valid entry, or the display reports a writing error, repeat the configuration change. If the problem persists, contact Technical Support.

The Front Panel's Main Setup Menu

To access the front panel's main Setup menu, press the round button. The Setup menu appears listing the meter's front panel setup options:

Setup Option	Description
Clear Functions	Resets Min/Max, Sliding Window Demand, Energy, Thermal Demand, Peak Demand Registers, Harmonics Min/Max, Status Counters, Manual Waveform Capture, and Disturbance Counts. See the Resets chapter for more information.
Quick Setup	Changes settings in the Communications, Power Meter, and Sag/Swell modules. See the Communications, Basic Setup and Power Quality chapters for more information.
Adv Meter Setup	Provides access to all the modules in the meter.
Display Setup	Customizes the appearance of the display screen.
Screen Setup	Customizes the style and values appearing on the display screens.
Nameplate Info	Displays information about the device.
Security	Allows you to modify your password. See the Security chapter for more information.
Diagnostics	Screens to aid in troubleshooting.

Advanced Meter Setup Menu

The Advanced Meter Setup menu provides access to the setup registers of every ION module in the meter. To access this menu screen, select ADV METER SETUP from the main Setup menu.

Follow this procedure to access a setup register:

1. From the Feature Manager screen, select the module's type.
2. Select the module you want to configure from the list of available modules.
3. From the list of the module's setup registers, select the one you want to configure.
4. Edit the value of the register (see "Editing Registers" on page 25).

You may be prompted to enter your password. Select YES to the next prompt to change the value of the register. Select NO if you want to leave the screen without making any changes.

Refer to the *ION Reference* for complete details on each setup register's function.

Display Setup Menu

Select DISPLAY SETUP from the main Setup menu to access these settings:

Display Setup Option	Default	Description
Auto Scroll	0 s (Disabled)	Time between automatic display screen advance.
Backlight Time	1800 seconds	Time before display screen backlight automatically turns off.
Display Update	4 s	Period between data display refreshes.
Display Mode	Programmable	Custom or Factory configured display screen option.
Contrast	mid	The display screen's contrast level.

Auto Scroll

Auto Scroll activates each of the enabled display screens in sequence. By default, the Auto Scroll is disabled. Use the arrow buttons to specify the number of seconds that each screen is displayed before it flips to the next display screen, then press the round button to set the value. Any screens that have been disabled will not appear when Auto Scroll is enabled. Set the numeric value to zero (the default value) to disable auto scrolling.

Contrast

To change the contrast of the front panel's display, select CONTRAST. Press an arrow button once, and the display screen's contrast slowly changes. Press an arrow button to stop the process. Press the round button when you are satisfied with the contrast level.

NOTE

Contrast can be adjusted from any screen by holding down the round button for more than ten seconds. Release the round button when the contrast is at a suitable level.

Backlight Timeout

This setting changes the amount of time the front panel's backlight stays on when the front panel is idle. The backlight has a limited life span; to prolong it, you should only have back-lighting on when you are actively using the front panel. Select BACKLIGHT TIMEOUT, then use the front panel's buttons to change the amount of time in seconds that the backlight stays on after a button is pressed.

Display Update

The display update specifies how frequently data on the display screen is refreshed. You may find the values are being updated too frequently, or that the data shown on screen lags too far behind the actual values. The default update rate is four seconds; use the front panel's buttons to change the update rate to suit your needs.

Display Mode

There are two display modes: PROGRAMMABLE MODE and FIXED MODE. The default is programmable mode, which provides eight data display screens which can be configured to meet your requirements (see "Custom Front Panel Displays"). Fixed Mode displays four screens, each with large characters in the display, easily visible from a distance. The four fixed mode screens display Average Volts, Average Amps, kW total, and PF total. You cannot customize the fixed mode displays.

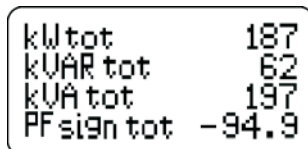
Screen Setup Menu

The SCREEN SETUP menu screen allows you to change the data displayed on the eight display screens. From the SELECT SETUP menu, select SCREEN SETUP. The list of display titles appear that correspond to each of the eight display screens (see "Default Front Panel Display Screens"). The screen number with an asterisk (*) beside it indicates the active display (the screen displayed before you entered SELECT SETUP). Select the screen you want to change, and press the round button. Two settings appear, VALUES and STYLE, that allow you to specify which measurements to display.

Style = One Parameter



Style = Four Parameter



Style

The STYLE setting defines the number of parameters on each screen. This setting has five options for each display screen: ONE PARAMETER, TWO PARAMETER, THREE PARAMETER, FOUR PARAMETER, and DISABLED. Select the number of values you want to display (the fewer values you select for display, the larger the measurement will appear on the display screen).

If you select a large style (for example, one parameter) for a display screen that is already set to display more than one value, the front panel warns you with a message, and displays only the first value — the links to all subsequent values are severed and have to be reprogrammed.

Values

The VALUES setting specifies which of the device's measurements are displayed on each display screen. When you change the value displayed on a screen, you are presented with a complete list of the meter's measurements. Using the lists of modules provided, select the values you want to have displayed on that display screen.

The number of VALUES you can select is a function of the STYLE setting. You cannot select more values than the style is set to display.

Nameplate Info Menu

Select NAMEPLATE INFO to display information about the various options of the device, such as:

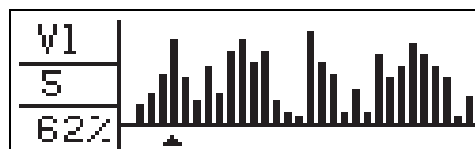
- ◆ manufacturer
- ◆ meter type and class
- ◆ service type
- ◆ voltage and current input ratings
- ◆ auxiliary power
- ◆ operating frequency
- ◆ transformer ratios
- ◆ meter firmware revision
- ◆ digital output information
- ◆ approvals
- ◆ serial number
- ◆ accuracy rating
- ◆ acceptable operating temperature
- ◆ battery life
- ◆ configured demand settings
- ◆ three custom text lines written into the meter's Factory module

Diagnostic Menu

The DIAGNOSTIC menu is accessed from the Setup menu; you can view per-phase voltage and current harmonics screens, verify communications, verify the digital I/O, and check the meter's local time.

Harmonics Diagnostics

Select HARMONICS from the Diagnostics menu to view per-phase voltage and current harmonics to the 31st harmonic. The following is an example of a harmonics display:

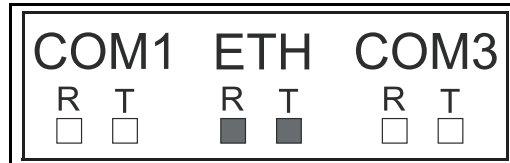


Press and hold the up and down buttons to move the cursor to the harmonic of interest. The percentage of the fundamental is also displayed.

Communications Diagnostics

The Communications diagnostic screen differs depending on your meter's communications options.

- ◆ The RS-485 diagnostic screen shows three boxes labelled COM1, COM2 (or ETH if the meter has the optional Ethernet card) and COM3. The following screen is an example of Ethernet (COM2) communication:



COM1 and COM2 refer to the communications ports on the back panel of the meter. As there is no COM2 port on the ION7300 meter, the COM2 box never appears active. The COM3 box verifies communication through the Infrared port on the front panel (IR1).

- ◆ The Ethernet diagnostic screen displays text similar to what you see in the table below - each label appears with a value next to it. The table below explains the meaning of each possible value.

Label	Possible Values	Description
ETH73 Version	see description	Displays the Ethernet meter's firmware version (e.g. v270)
ETH73 in UPG	YES, NO	YES means the meter is currently being upgraded
ETH73 Setup	N/A, Rec'd	N/A means the Setup/options on the meter have not been transmitted Rec'd means the Setup/options have been received
EtherGate	YES, NO	YES means EtherGate is supported (ION7330 and ION7350) NO means EtherGate is not supported (ION7300)

- ◆ The Ethernet Connection diagnostic screen displays text similar to what you see in the table below - each label appears with a value next to it. The table below explains the meaning of each possible value.

Label	Possible Values	Description
# Power Ups	see description	Displays the number of times the Ethernet card has power cycled
Connection	N/A, ION, Modbus	The type of Ethernet connection: ◆ N/A indicates no connection ◆ ION indicates ION over Ethernet ◆ Modbus indicates either Modbus RTU over Ethernet or Modbus TCP
# WEB Reqs	see description	Displays the number of received WEB Page requests
# MeterM@il	see description	Displays the number of email messages sent

I/O Diagnostics

The I/O diagnostics mode verifies the operation of the digital inputs/outputs you may have connected to the device and, if you ordered the analog I/O option, allows you to monitor the Analog Input or Analog Output ports on your meter. The following diagnostic screens are available:

- ◆ Digital Ins – This screen displays the four digital input values as seen at the low level.
- ◆ Digital Outs – This screen displays the four digital input values as seen at the low level.
- ◆ Analog Ins – This screen displays the four analog input values as seen at each Analog Input module's output register.
- ◆ Analog Outs – This screen displays the four analog output values as seen at each Analog Output module's output register.

Troubleshooting Diagnostics

There are three troubleshooting diagnostic screens available:

- ◆ kiloWatts – This screen shows per-phase and total kilowatts.
- ◆ Volts – This screens shows line to neutral and average volts.
- ◆ Power Factor – This screen shows signed per-phase and total power factor.

Date/Time Screen

For the ION7330 and ION7350 meters, this screen displays the time and date from the device's internal clock.

For the ION7300 meter, this screen displays the date and time sent via a time sync. The ION7300 meter does not increment its internal clock while the meter is powered-down.

Display Setup

The meter's front panel display is controlled by two types of ION modules: the Display Options module and the Display module. Use Designer software to configure your displays.

For more information about these modules, see the *ION Reference*.

Display Options Module Settings

The Display Options module is a core module that cannot be deleted, copied, or linked. Settings in the Display Options module are global and affect the entire set of front panel display screens.

Setup Register	Function	Default
Autoscroll	Sets the time between automatic display scrolling (in seconds).	Disabled
Backlight Timeout	Sets how long the front panel display will stay bright after the last press of a front panel button (in seconds).	1800
Display Update Time	Sets how frequently the screen data values will be updated (in seconds).	4
Display Mode	Sets whether the screens displayed on the front panel are programmable via Display modules or fixed.	Programmable

Display Module Settings

A Display module controls which values are displayed on a display screen, and how these values are presented. Each Display module corresponds to one meter display screen.

The Display module's *Source* inputs are linked to the numeric parameters you want to display. These parameters are sent to the front panel when the Display module's *Show* input is pulsed.

Setup Register	Function	Default
Screen Type	This specifies the way the linked parameters are displayed on the front panel screen.	Defaults vary among display screens.

Screen Type Register

The *Screen Type* setup register has five options: ONE PARAMETER, TWO PARAMETER, THREE PARAMETER, FOUR PARAMETER, and DISABLED. The number of inputs for the Display module should match the *Screen Type* setup register.

If you select a Screen Type with **more** parameters than are currently linked to the Display module, the display screen will show any unavailable inputs as N/A.

If a Screen Type is selected which has **fewer** parameters than are linked to the module, the Display module will only display the number of values allowed by the Screen Type, and will break any links to parameters that it cannot display.

For example, if you have a display screen with four parameters, and you select a Screen Type of ONE PARAMETER, the first parameter is displayed and the other three links to the Display module are severed.

Changing the Parameters that are Displayed

The meter's default display configuration shows a comprehensive set of parameters. Changing these parameters requires altering the links between various ION modules. Complete details on configuring the front panel displays are provided in the section "Custom Front Panel Displays".

Custom Front Panel Displays

Custom front panel displays can be created to show any data the meter measures or calculates. Each display screen can be configured to display any measurements you require. You can also adjust the size of the characters in each screen so you can easily read the device's display from farther away.

There are only eight display screens available for configuration. Since all eight of the front panel's screen displays are used in the factory configuration, an existing display must be changed if you want a custom display. Refer to "Default Front Panel Display Screens" on page 24 for details on the eight default display screens.

Before Customizing the Front Panel

In order for the customized screens to be displayed in the front panel's display, the meter's *Display Mode* must be properly set. Ensure that the Display Options module's *Display Mode* setup register is set to PROGRAMMABLE. This is the default setting. Use the meter's front panel or ION software to set this register.

Customizing Displays Using the Front Panel

The SCREEN SETUP menu screen allows you to change the data displayed on the eight display screens using the front panel (see "Screen Setup Menu" on page 28).

Customizing Displays Using ION software

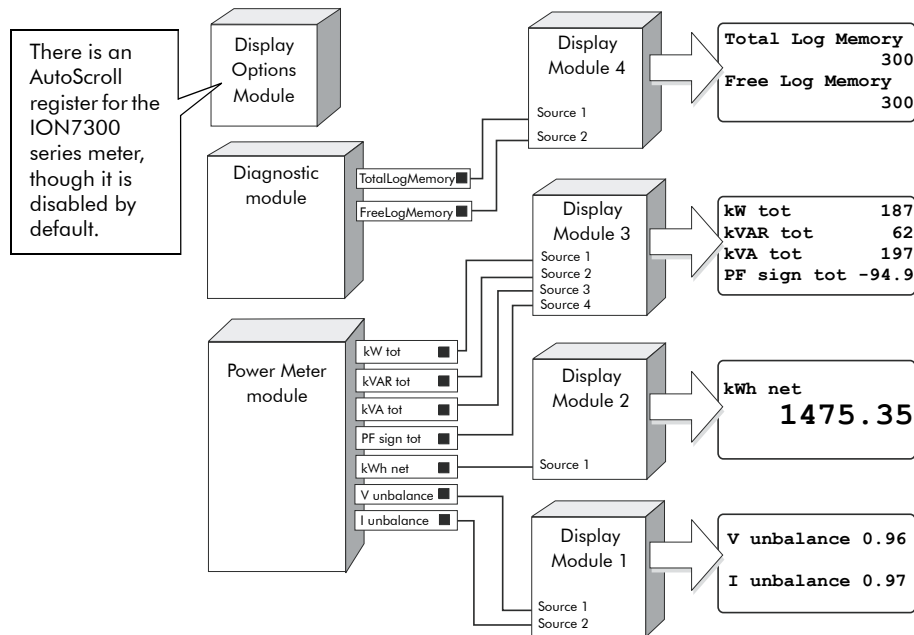
The front panel displays of the ION7300 series are controlled by the Display modules and the Display Options module. Refer to the *ION Reference* for detailed descriptions of these modules.

Links to a Display module can be made using Designer or the front panel. Each Display module has one setup register, *Screen Type*, which sets the number of parameters that the display screen will show.

Display Framework Overview

The following diagrams illustrate how the Display Options module and Display module work together to provide your meter's front panel with the appropriate display screens.

Module Behavior



The order in which data displays depends on the numbering of the Display modules. Therefore, the data linked to Display module 1 is displayed on the first front panel screen and so on. Scrolling between the display screens is done with the up/down arrow buttons on the front of the meter.

Viewing all Display and Display Options modules at once

1. Launch Designer and open your meter.
2. Double-click the Meter Display Setup folder in the main meter configuration screen. The label below the folder reads "Display Modules."

All Display modules and a shortcut to the Display Options module appear.

Changing Default Display Frameworks

Three common customizations are discussed in the following sections:

- ◆ removing a display screen
- ◆ adding a new display screen
- ◆ replacing the parameters in an existing display screen

Making a Framework Backup

Before you reconfigure or delete a framework, you should make a copy. This ensures that you can restore the framework without having to reinitialize the factory configuration.

Making a framework copy

1. Select the desired framework.
2. Choose **Copy to Framework** from the Edit menu.
Give the framework a unique name. Select a location in which to save the framework.
3. Click **Ok**.

For more information on re initializing factory configurations, see “Restoring the Factory Configuration” in Chapter 3.

Removing a Display Screen

Use caution when deleting modules, as any dependant modules are also affected. Designer informs you of dependant modules if they exist on the same node.

Removing a data display screen

1. Launch Designer.
2. Select the Display module responsible for the screen.
3. Press delete. This also deletes all links to that particular Display module.

If the display screen you are deleting is part of the automatic scrolling cycle, you should reconfigure the links from the Scroll module's *Trigger* outputs to the remaining Display modules so that the following considerations hold true:

- ◆ The first Display module in the scrolling cycle is linked to the *Trigger 1* output of the Scroll module.
- ◆ The last Display module in the scrolling cycle (module *n*) is linked to the *Trigger n* output of the Scroll module. For example, if your scrolling cycle consists of 5 screens, then *Trigger 5* should be linked to the fifth module in the cycle.
- ◆ The *Wraparound* setup register of the Scroll module designates the last trigger output (*Trigger n*). Expanding on the previous example, since *Trigger 5* is the last trigger, the Scroll module's *Wraparound* setup register would have a value of 5.

Changing Displayed Parameters in an Existing Screen

You can change displayed parameters in existing screens using Designer software.

NOTE

You must set the Display Options module's *Display Mode* setup register to PROGRAMMABLE before changing displayed parameters in an existing screen.

To change parameters shown in a display screen, link the output register containing the numeric data you want to display to the *Source* inputs of the Display module. If there is not a free *Source* input, you will have to first delete (i.e., “unlink”) an existing link to a *Source* input.

Changing Displayed Parameters using the Meter's Front Panel

You can also change the displayed parameters in an existing screen using the meter's front panel.

Before changing displayed parameters in an existing screen

For customized screens to display on the front panel, you must set the Display Options module's *Display Mode* setup register to PROGRAMMABLE before changing displayed parameters in an existing screen.

On the meter's front panel, go to DISPLAY SETUP > DISPLAY MODE and select PROGRAMMABLE.

Changing displayed parameters in an existing screen

The SCREEN SETUP menu screen allows you to change the data displayed on the eight display screens.

1. From the SELECT SETUP menu, select SCREEN SETUP. The list of display titles appears that correspond to each of the eight display screens. The screen number with an asterisk (*) beside it indicates the active display (the screen displayed before you entered SELECT SETUP).
2. Select the screen you want to change, and press the round button. Two settings appear, VALUES and STYLE, that allow you to specify which measurements to display.
3. Select STYLE if you need to change the number of displayed parameters in the selected screen.

This setting has five options for each display screen: ONE PARAMETER, TWO PARAMETER, THREE PARAMETER, FOUR PARAMETER, and DISABLED. Select the number of values you want to display (the fewer the values you select for display, the larger the measurement will appear on the display screen).

If you select a large style (for example, one value) for a display screen that is set to display more than one value, the front panel will warn you with a message, and will display only the first value — the links to the undisplayable values are severed and will have to be reprogrammed.

4. Select VALUES to change the displayed parameter in the selected screen.

When you change the value displayed on a screen, you are presented with a complete list of the meter's measurements. Using the lists of modules provided, select the values you want to have displayed on that display screen.

The number of VALUES you can select is a function of the STYLE setting. You cannot select more values than the STYLE is set to display.

Chapter
3

Templates, Frameworks and Firmware

Your meter comes installed with a pre-configured default **template**. This template contains various **frameworks** which provide all the power measuring and analyzing functionality of the meter. Templates and frameworks can be used immediately without any user configuration (“right out of the box”). They can also be customized, reconfigured, and pasted from one meter to another.

For more information on templates, frameworks and ION modules, see the *ION Reference*.

Your meter’s operating system is known as **firmware**. When newer firmware is available for your meter, simply upgrade to the latest version for all the added features and functionality.

 **CAUTION**

Early ION7300 series meters (Revision A) are not compatible with Revision B firmware, and vice versa. See the Schneider Electric website for more information.

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Using ION Setup	40
Using Designer	41
◆ Restoring the Factory Configuration	42
Using Designer	42
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◆ Upgrading Your Meter	44

Factory Information

The Factory module displays firmware version, serial number and other device information in read-only setup registers (read-only registers can be viewed but not changed).

Factory Module Settings

The device information provided is as follows:

Setup Register	Description
Device Type	A device type identifier ("7300" for the ION7300)
Compliance	A statement of whether the device is ION compliant or not
Options	Shows model number of meter
Revision	The meter's firmware version
Serial Num	The meter's serial number
ION Version	The ION version supported by the device
Template	The name of the factory default template (framework) installed on the device
Nom Freq	The expected frequency of the power system being monitored

The Factory module also contains numerous read-only setup registers that hold the calibration constants used at the factory.

How to TAG Your Meter

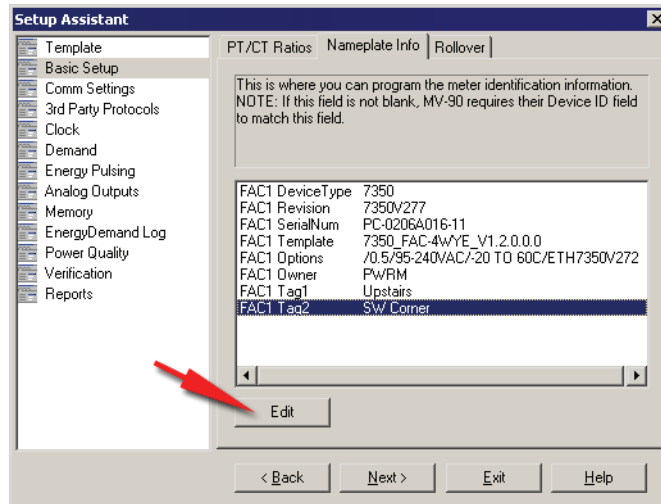
Three configurable setup registers are provided for you to enter your company name and other text information you want stored in the meter:

- ◆ *Owner* - This is a text register for storing user information (e.g. company name); it can be up to 255 characters in length.
- ◆ *Tag 1* - This is a text register for storing user information (e.g. device location); it can be up to 15 characters in length.
- ◆ *Tag 2* - This is a text register for storing user information (e.g. device number or identifier); it can be up to 15 characters in length. If this field is not left blank, MV-90 requires their Device ID field to match this field.

Using ION Setup

1. Connect to your meter in ION Setup, using Basic Mode.
2. Navigate to Setup Assistant > Basic Setup

3. Click the Nameplate Info tab.



4. Select the register you want to configure and click Edit.

Using Designer

Open your meter in Designer and navigate to the main Configuration screen. Right-click on the Factory module to edit.

Restoring the Factory Configuration

If you have made changes to the default functionality and want to return to the factory configuration, you can re-initialize the factory configuration in the meter using ION software. The basic setup of the device can be retained, so the meter does not need to be taken out of service for a long period of time.

NOTE

If you restore the factory configuration, all custom features you have created are lost.

Using Designer

1. Display the meter's main Configuration screen in Designer.
2. Choose Select All from the Edit menu, then press Delete.

The confirmation dialog box appears explaining that some modules will not be deleted (core modules cannot be deleted — scroll down in the dialog to see which standard modules will be deleted).

3. Click OK on the confirmation dialog box.

After a brief wait the modules are deleted, and the main meter Configuration screen is blank except for the Frameworks folder in the Advanced Setup area. (The Frameworks folder contains the folder of Core modules which cannot be deleted.)

4. Choose Select All from the Edit menu to select the Frameworks folder. This selects all subfolders and modules within the folder.
5. In the Edit menu, choose Paste from Framework, then select the appropriate .fwn file from the folder \ION Enterprise\config\fmwk\nd\. Click OK.

The Factory module's *Default Template* register tells you the filename for the default factory framework. (For details about framework files, contact Technical Support or visit the Support area of the Schneider Electric web site.)

6. Click Open. The Paste Summary window appears.
7. Click on the first module, scroll down to the last module, hold the Shift key and click on the last module. This selects all of the modules.
8. While holding the Shift key, click on the check box to the left of the module name until you see a lock icon with a green check mark.

CAUTION

Persistent modules can be overwritten in Designer. When pasting a default framework onto a meter, use lock-paste on the Persistent modules, not free-paste. A list of Persistent modules is available from Technical Support.

9. Check "Maintain external inputs" and click OK on the confirmation dialog box.

A message appears indicating that Designer is pasting modules. All modules are selected when the paste is complete. Click anywhere in the background of the node diagram to deselect all of the modules.

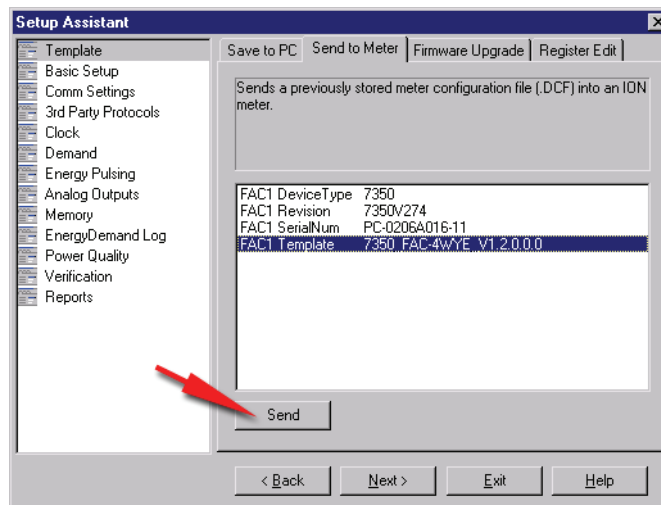
10. Click the Power Meter shortcut in the Basic Configuration area to select it. Once selected, click Reset in the Designer toolbar, or select Reset from the Edit menu. This reverts the Power Meter to the settings it had before you deleted any modules (retaining the basic setup you previously had).
11. Choose Send & Save from the File menu. The factory configuration is now restored and any custom functionality you created before is removed.

NOTE

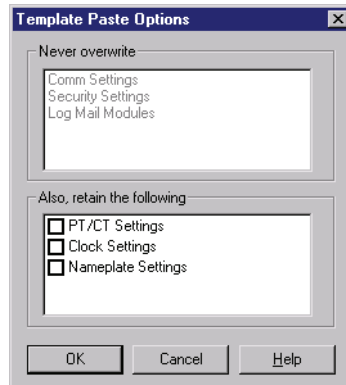
The time required to complete steps 3, 5, and 11 may vary depending on your connection and the meter configuration.

Using ION Setup

1. Download your device's latest template from <http://www.powerlogic.com/support/downloads/>. Save the .DCF file in the .../ION Setup/TEMPLATE folder for easy access.
2. Connect to your meter in ION Setup, using Basic Mode.
3. Navigate to Setup Assistant > Template
4. Click the Send to Meter tab and click the Send button.



5. Select the .DCF file from the TEMPLATE folder and click OK.
6. The Template Paste Options screen appears. Select the check boxes for the settings you wish to retain (not overwrite) and click OK.



ION Setup pastes the template onto your meter. A dialog box confirms the paste was successful.

Upgrading Your Meter

See the *Upgrading ION Device Firmware* technical note for details.

Chapter
4

Basic Setup

This chapter explains how to perform basic meter setup.

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- ◆ **Configuring Basic Setup** **46**
 - Using the Front Panel 46
 - Using ION Setup 47
 - Using Designer 47
 - Power Meter Module Settings 48

Introduction

Basic configuration of the meter is provided by the Power Meter module. The Power Meter module is the main connection between the power system measurements and all other ION modules in the device. This module reports the values for all voltage, current and power measurements. The Power Meter module's setup registers describe details of the power system being monitored. Many of the Power Meter module's setup registers are configured when the meter is initially put into service, although the device cannot operate properly until the Volts Mode and PT and CT ratios are set. Some registers may need to be changed to refine the device's operation.

See the *ION Reference* for more details on the Power Meter module.

Configuring Basic Setup

Use the front panel or ION software to perform basic meter setup.

Using the Front Panel

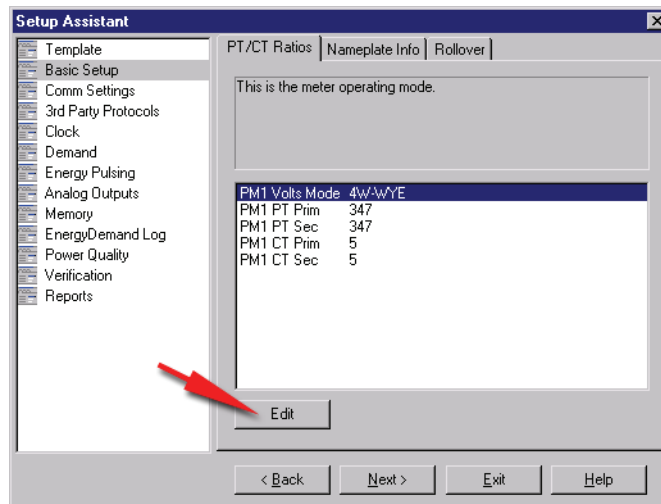
Navigate to Quick Setup > Power Meter to access to the following power system settings:

Menu	Setting	Description	Range (Values)	Default
Power Meter	Volts Mode	The power system's configuration – WYE, DELTA, etc.	4W-WYE DELTA SINGLE DEMO 3W-WYE DIRECT-DELTA	4W-WYE
	PT1 (Primary)	The Potential Transformer's primary winding voltage rating	1 to 999,999,999	347
	PT2 (Secondary)	The Potential Transformer's secondary winding voltage rating	1 to 999,999,999	347
	CT1 (Primary)	The Current Transformer's primary winding current rating	1 to 999,999,999	5
	CT2 (Secondary)	The Current Transformer's secondary winding current rating	1 to 999,999,999	5
	V1 Polarity	The polarity of the Potential Transformer on V1	Normal or Inverted	Normal
	V2 Polarity	The polarity of the Potential Transformer on V2	Normal or Inverted	Normal
	V3 Polarity	The polarity of the Potential Transformer on V3	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

Using ION Setup

The Basic Setup Assistant helps you configure the Power Meter module and energy rollover settings.

1. Open ION Setup and connect to your meter, using Basic Mode.
2. In the Setup Assistant, navigate to Basic Setup and click on the PT/CT Ratios tab.



3. Configure each register as required by selecting the parameter and clicking Edit.
4. Click the Rollover tab to configure Energy Rollover. This register determines how many energy values (for example, kilowatts) accumulate before the number “rolls over” to zero. The default setting is ten million.

Using Designer

Open your meter in Designer and navigate to the Basic Configuration Framework. Right-click on the Power Meter module to edit.

Power Meter Module Settings

The Power Meter module contains the following setup registers:

Setup Register	Function	Default
Volts Mode	The power system's configuration – WYE, DELTA, Single, etc	4W-WYE
PT Prim	The Potential Transformer's primary winding rating for V1, V2 and V3	347
PT Sec	The Potential Transformer's secondary winding rating for V1, V2 and V3	347
CT Prim	The Current Transformer's primary winding rating for I1, I2 and I3	5
CT Sec	The Current Transformer's secondary winding rating for I1, I2 and I3	5
Vn Polarity	The polarity of the Potential Transformer on Vn	Normal
In Polarity	The polarity of the Current Transformer on In	Normal
Phase Order	The expected rotation of the voltage phases (ABC or ACB)	ABC
Phase Lbls	The phase label format assigned to the outputs (ABC, RST, XYZ, RYB, RWB or 123)	ABC

Chapter
5

Security

ION7300 series meters offer Front Panel meter security, which is enabled from the factory. This chapter explains Front Panel meter security and how to change the meter password. It also details some security features available for revenue meters.

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Changing the Meter Password	51
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Meter Security Features

Your meter includes the following security features:

Front panel security

Anytime you make configuration changes to your meter through the front panel you must enter a password.

Anti-tamper sealing

Your revenue meter can be protected by anti-tamper sealing.

Software security

ION software security brings access-level security to the meter. With ION software, you can configure multiple users with different passwords and specify access rights. ION software security only applies to users who are accessing the meter via ION software.

For more information on security, refer to the *ION System Security* technical note.

Front Panel Security

Front panel meter security lets you configure the meter through the front panel using a meter password.

Entering the Meter Password

Front panel meter security is enabled by default on all ION7300 series meters; all configuration functions in the front panel are password-protected. The password is factory-set to 0 (zero).

If you make configuration changes to the meter via the front panel, the meter prompts you for a password before accepting any configuration changes. Once you enter the correct meter password and confirm the new configuration, the change is set on the meter.

Note that the front panel will prompt you for the meter password before you make your first configuration change. You will not need to re-enter the password for each subsequent change.



NOTE

The password enables users to change the configuration of the meter. It is recommended that you change your password from the default when you put the meter into service.

If you enter an incorrect password, the front panel will display an “invalid password” message and you must try again.

New Password 00000

Changing the Meter Password

1. Select SECURITY from the main Setup menu.
2. You will see that the screen displays 00000. Enter the current password. If you have not previously changed your password, the default is 00000.
3. Choose MODIFY PASSWORD to alter your password (the FACTORY USE ONLY option is for factory purposes and is not accessible).
4. Enter your new numeric password.
 - ◆ To change the value of the highlighted digit use the **up** and **down** arrow buttons.
 - ◆ To change the position of the cursor one space to the *left*, hold the **up** arrow button for about one second.
 - ◆ To change the position of the cursor one space to the *right*, hold the **down** arrow button for about one second.

Select YES to accept your new password and return to the main Setup menu.

Device Security Access for ION Services

Many ION Services need constant access to your meter. These services include the Log Inserter, Query Server, the Virtual Processor and Site Server that perform the following type of functions:

Service	Function
Log Inserter Query Server	Reads the ION meter Data Recorder or waveform modules and can automatically rearm recorders that are configured as Stop-When-Full
Virtual Processor	Can be configured to read from a meter or perform control action using Distributed Control.
Site Server	Broadcasts time signals to the meter.

NOTE

You may want to configure a separate user for accessing services. If you observe trouble with ION software accessing the meter, it is likely that these services either do not have access rights or the original user name and password have changed.

Allowing ION Services access to security enabled meters

1. Launch the Management Console and click Devices on the Management Console's System Setup Pane.
2. Highlight your meter, right-click and select Security... .
3. Select Standard Security from the drop down menu. Click the check box if you want to allow this user to send time synchronization signals to the meter. Click OK.
4. Enter the valid meter password for Standard Security, re-type the password to confirm, and click OK.

Additional Revenue Metering Security

To meet government regulations and utility security requirements, the revenue meter incorporates additional security systems:

- ◆ a hardware-locked security system that prevents modification of revenue quantities after the meter is sealed.
- ◆ a traditional anti-tamper mechanical seal on the meter base unit.

Hardware Lock Security Option

ION7300 series meters offer a hardware-locked security feature. To make configuration changes on a hardware-locked meter, you must first unlock the meter.

See the *ION7300 Series Revenue Meter* product option document for more information.

Hardware Lock and Protected Values

The revenue-related settings on meters with the Hardware Lock option are factory configured and cannot be changed while the meter is locked.

Typical values that are protected include:

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

In certain countries revenue certification is void if the hardware lock is broken.

Locked Module Listings

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

Anti-Tamper Seals

ION7300 series revenue meters incorporate sealing tabs through which traditional lead/wire seals are inserted. These seals effectively prevent unauthorized personnel from gaining access to meter internals, and are provided with the meter.

Chapter
6

Communications

This chapter includes general instructions for connecting and configuring all the communication ports on your meter.

For specific installation steps and meter specifications, consult your Installation Guide.

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Communications Overview

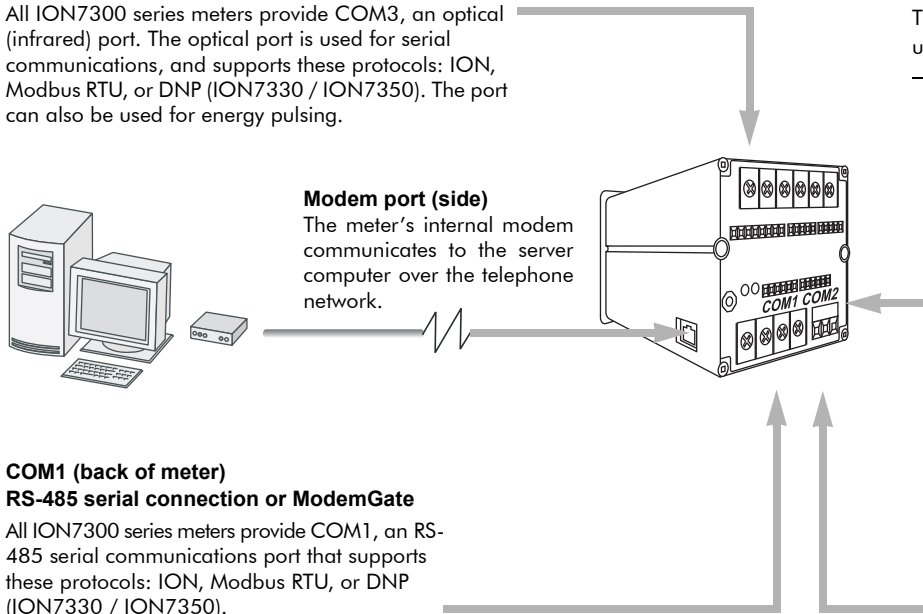
The following illustration shows all the possible communications connections to the meter.

**COM3 (front of meter)
Optical serial connection**

All ION7300 series meters provide COM3, an optical (infrared) port. The optical port is used for serial communications, and supports these protocols: ION, Modbus RTU, or DNP (ION7330 / ION7350). The port can also be used for energy pulsing.

NOTE

The Profibus meter option for the ION7300 uses special communications connections.



Modem port (side)
The meter's internal modem communicates to the server computer over the telephone network.

Ethernet port (side)
All ION7300 series meters support the optional Ethernet card. An Ethernet connection supports ION, Modbus RTU, or Modbus/TCP protocols.

**COM1 (back of meter)
RS-485 serial connection or ModemGate**

All ION7300 series meters provide COM1, an RS-485 serial communications port that supports these protocols: ION, Modbus RTU, or DNP (ION7330 / ION7350). ION7330 and ION7350 meters with an internal modem can use the ModemGate protocol on COM1, allowing the meter's internal modem to communicate with the meter, the ION Enterprise server computer, and any devices that are wired to the meter's COM1 port.

**COM2 (back of meter)
RS-485 serial connection or EtherGate**

The ION7330 or ION7350 meter provides COM2. If your meter has an Ethernet card, then COM2 functions as an Ethernet gateway (EtherGate) — EtherGate transfers data directly between an Ethernet network and any devices that are wired to the meter's COM2 port. If there is no Ethernet card, then COM2 functions as a serial communications RS-485 port, and supports ION, Modbus RTU, or DNP protocols.

ION7300 series meters have numerous communication possibilities depending on your ordering preferences. However, not all communications options are available to each model.

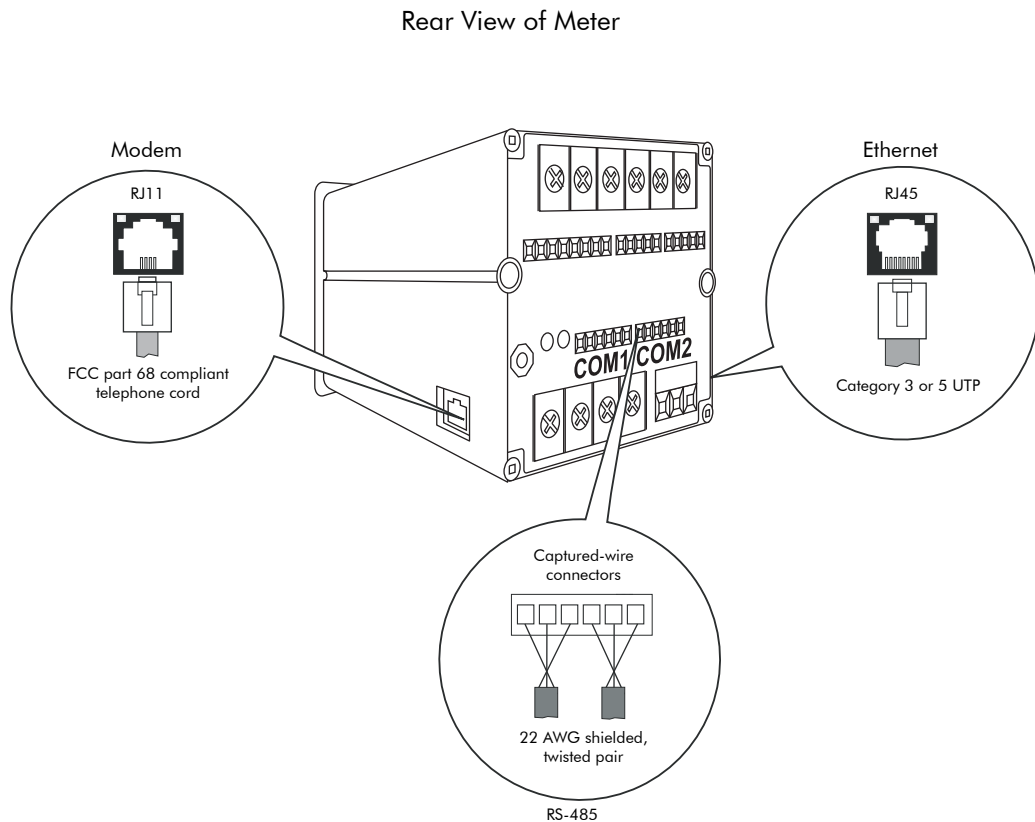
The table below outlines the communication (COM) ports for each ION7300 series meter. The Profibus communication option is available only on the ION7300 meter.

Meter	COM1	COM2	COM3 (Infrared)	Ethernet	EtherGate	Modem	ModemGate
ION7300	Standard	Not Available	Standard	Optional	Not Available	Not Available	Not Available
ION7330	Standard	Standard	Standard	Optional	Optional	Optional	Optional
ION7350	Standard	Standard	Standard	Optional	Optional	Optional	Optional

Communications Connections

The following section provides reference for connecting to the meter's various communication ports. For the most current communication specifications, see your meter's Installation Guide.

RS-485 and Profibus communications connections to the meter are made to the **rear** of the meter. Ethernet and modem connections are made to the **sides**. Optical connections are made to the port on the **front** of the meter. See below for details.



NOTE

The Profibus meter option on the ION7300 meter does not use a COM port.

RS-485 Connections (COM1 and COM2)

COM1 and COM2 are used for RS-485 communications.

NOTE

On ION7330 and ION7350 meters with the Ethernet card, COM2 is hardwired for EtherGate only, and cannot be used for serial communication.

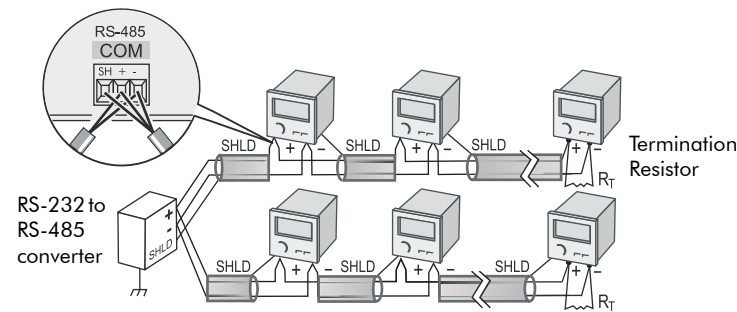
If you have the Modem option on your meter, COM1 will automatically be set to ModemGate, not RS-485.

NOTE

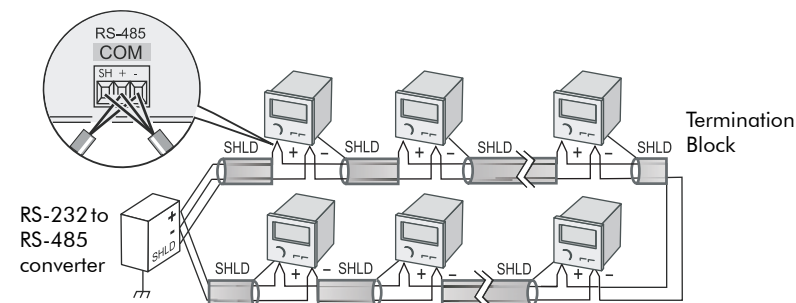
The internal modem option is hardwired to COM1. If you are using ModemGate, then any meter with an internal modem that will reside on the serial loop must connect to the serial loop using COM2. If COM1 is used, then the two modems (gated meter internal modem and serially looped meter internal modem) conflict during communication.

RS-485 connections are made via the captured-wire connectors on the rear of the meter. Up to 32 devices can be connected on a single RS-485 bus. Use a good quality shielded twisted pair cable for each RS-485 bus. The overall length of the RS-485 cable connecting all devices cannot exceed 4000 ft. (1219 m). Configure the RS-485 bus in straight-line or loop topologies.

Straight-Line Topology



Loop Topology



General Bus Wiring Considerations

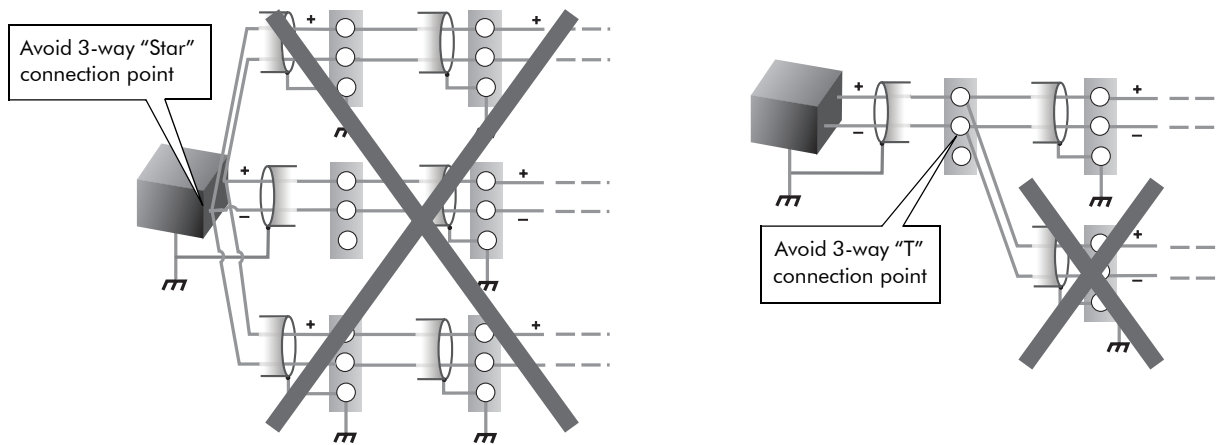
Wire all devices connected on the bus, including the meter, converter(s) and other instrumentation, as follows:

- ◆ Connect the shield of each segment of the cable to ground at *one end only*.
- ◆ Isolate cables as much as possible from sources of electrical noise.
- ◆ Use an intermediate terminal strip to connect each device to the bus. This allows for easy removal of a device for servicing if necessary.

- ◆ Install a ¼ Watt termination resistor (RT) between the (+) and (-) terminals of the device at each end point of a straight-line bus. The resistor should match the nominal impedance of the RS-485 cable (typically 120 ohms – consult the manufacturer’s documentation for the cable’s impedance value).

RS-485 Connection Methods to Avoid

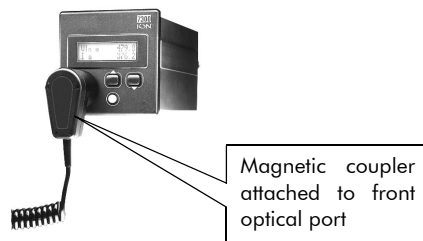
Any device connection that causes a branch in the main RS-485 bus should be avoided. This includes *star* and *tee* (T) methods. These wiring methods cause signal reflections that may cause interference. At any connection point on the RS-485 bus, no more than two cables should be connected. This includes connection points on instruments, converters, and terminal strips. Following this guideline ensures that both star and tee connections are avoided.



Optical Port Connections (COM3)

The front optical port is designed to accept ANSI Type 2 magnetic couplers. The optical magnetic coupler is purchased separately; contact Schneider Electric for a list of recommended opto-couplers.

The optical port can communicate real-time measurements to a laptop or similar device via ION, Modbus RTU, or DNP 3.0 (ION7330 and ION7350). The port can also be used for infrared energy pulsing. See the *Optical Magnetic Couplers* technical note for more information.

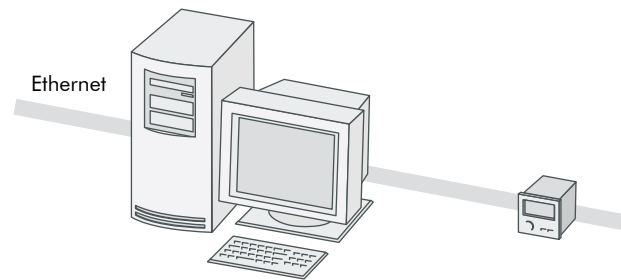


To enable communications from the optical port, configure the Comm 3 Communications module. The *Protocol*, the *Baud Rate* and *Unit ID* setup registers must properly match your system. When creating an ION site, ensure that RtsCts is disabled (set to No) in the COM3 serial site.

Refer to the Management Console section in the online *ION Enterprise Help* for more details about adding serial sites.

Ethernet Connections (optional)

This section only applies if your ION7300 series meter has the Ethernet option.



10Base-T Ethernet connections are made via the RJ45 modular port on the left side of the unit. Use high quality Category 3 or 5 UTP (CAT 5 unshielded twisted pair recommended) cable with a male RJ45 modular connector for connection to the 10Base-T port.

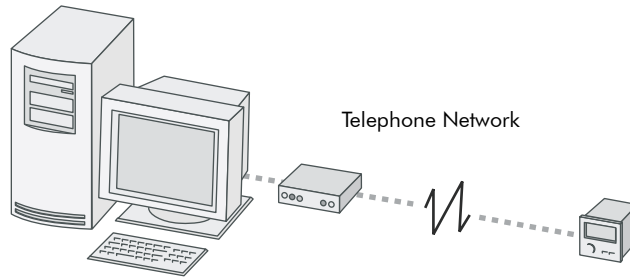
The meter supports a single Ethernet connection at a time. WebMeter is accessible at the same time, as are connections to EtherGate and email messaging, as long as these features are available on your meter.

The optional Ethernet port:

- ◆ is capable of data rates up to 10Mbps
- ◆ supports ION, Modbus RTU and Modbus/TCP protocols
- ◆ is controlled by the ETH1 Communications module

The EtherGate feature provides communications both to an Ethernet connected device and through that device to a connected serial network (See the section “The EtherGate Protocol (ION7330 and ION7350)”). Only one EtherGate connection is allowed per meter port at any given time.

Internal Modem Connections (optional)

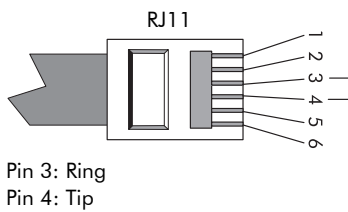


The meter’s optional internal modem can be readily used in most countries, and complies with FCC, Industry Canada and TBR-21 regulations — refer to the Notices at the start of this document for more details.

Connection to the internal modem is made via the RJ-11 jack located on the right side of the meter. Connect the meter to the telephone network with an FCC Part 68 compliant telephone cord (that has two male RJ-11 plugs).

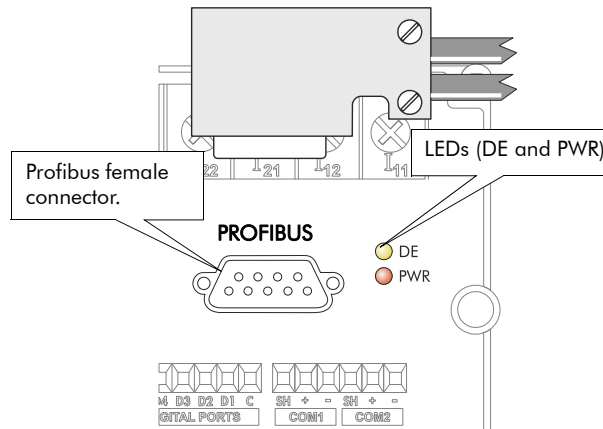
If you have the CTR-21 compliant internal modem option, you may also require an adaptor to interface with your regional telephone jack.

To enable communications through the meter’s internal modem, you must configure the Comm 1 Communications module. The *Baud Rate*, *Unit ID*, and *Protocol* setup registers must properly match your system, and the initialization string for the internal modem must be set up using the *ModemInit* register. See the section “Modem Communications Setup” for details.



Profibus Port

This option is offered exclusively on the ION7300 meter.



 **NOTE**

The Profibus Master file (.GSD file) is included on a floppy disk with the meter. This file must be installed on your Profibus Masters before the meter can communicate with the Profibus network.

The optional Profibus port on the meter is capable of operating baud rates up to 12 Mbps. Profibus Connections to the meter are made via the nine-pin connector on the rear of the unit. Plug your Profibus connector from the network into this connector.

Configuring Meter Communications

Communication settings are typically configured when the ION meter is initially put into service. A single Communications module controls each communications port on the meter. The modules' setup registers define the parameters used for each port; these parameters vary according to the type of communications channel selected (i.e. RS-485, Modem, Optical, Ethernet).

The Communication modules control the following channels:

Module Name	Settings
Comm 1	COM1 RS-485 port and internal modem ¹
Comm 2 ²	COM2 RS-485 port or EtherGate ³ port
Infrared Comm	COM3 Optical port
Ethernet Comm	10Base-T Ethernet port
Profibus Comm ⁴	Profibus Communications port

¹ For ION7330 / ION7350 meters with an optional modem, COM1 is hardwired for ModemGate.

² COM2 is not available for the ION7300 meter.

³ For ION7330 / ION7350 meters with an optional Ethernet card, COM2 is hardwired for EtherGate.

⁴ Available for the ION7300 meter only.

Use the meter's front panel or ION Setup to initially configure the meter's communications. Once communication is established, Designer may also be used to make changes.

NOTE

Altering certain settings of a communications channel that is in use may cause a loss of communications with the meter.

Refer to the Communications module description in the *ION Reference* for complete details about all the setup registers in the Communications module.

Communications Protocols

By default, all communication ports are configured to use the ION protocol. Using other protocols requires configuration of the *Protocol* setup register for the Communications module that controls the port you want to use. Not all protocols are available on all ports.

Available Protocols

- ◆ ION
- ◆ Modbus RTU
- ◆ DNP 3.0
- ◆ EtherGate

- ◆ ModemGate
- ◆ Infrared I/O
- ◆ Profibus
- ◆ Factory (reserved for use by Technical Support)

Serial Communications Setup

Serial communications are available on COM1, COM2 and COM3 (Infrared). To enable communications through the meter's serial ports, configure the applicable Communications module. The *Protocol*, *Tran Delay*, *Baud Rate* and *Unit ID* setup registers must properly match your system and can be set through the meter's front panel or ION software.

Using the Front Panel

The current configuration of the meter's communication ports are found in the various COM Setup menu items. Ethernet settings are located under Network Setup.

Menu	Setting	Description	Range (Values)	Default
Comm 1	CM1 PROTOCOL	The communications protocol	ION, Modbus RTU, DNP 3.00, Factory, ModemGate ¹	ION
	CM1 BAUD RATE	The data rate, in bits per second	1200, 2400, 4800, 9600, 19200	9600
	CM1 UNIT ID	Every meter on an RS-485 network must have a unique Unit ID number	1 to 9999	From serial number ²
Comm 2	CM2 PROTOCOL	The communications protocol	ION, Modbus RTU, DNP 3.00, Factory, Ethergate ³	ION
	CM2 BAUD RATE	The data rate, in bits per second	1200, 2400, 4800, 9600, 19200	9600
	CM2 UNIT ID	Every meter on an RS-485 network must have a unique Unit ID number	1 to 9999	From serial number ²
Infrared Comm	IR1 PROTOCOL	The communications protocol	ION, Modbus RTU, DNP 3.00, Factory, Infrared I/O	ION
	IR1 BAUD RATE	The data rate, in bits per second	1200, 2400, 4800, 9600, 19200	9600
	IR1 UNIT ID	Every meter on an RS-485 network must have a unique Unit ID number	1 to 9999	From serial number ²

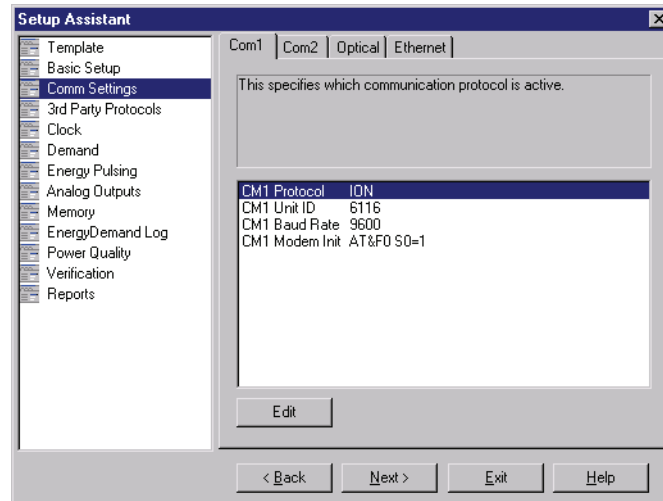
¹ ModemGate is available on ION7330 and ION7350 meters with an internal modem.

² The factory set Unit ID for COM1 is based on the serial number of the meter, using the last four numbers before the dash. For example, if the serial number is PA-0009B263-01, the Unit ID is set in the factory to 9263. After a factory reset, the unit ID number will default to 100.

³ EtherGate is available on ION7330 and ION7350 meters with Ethernet.

Using ION Setup

1. Open ION Setup and connect to your meter, using Basic Mode.
2. In the Setup Assistant, navigate to the Comm Settings folder.



3. Click on the various tabs to configure the three serial ports (Com1, Com2 and Infrared). To change a setting, select the parameter and click the Edit button.

Using Designer

Use Designer to enable serial communications on a meter port by configuring the associated Communications module.

1. Open your meter in Designer. Navigate to the Communications Setup framework.
2. Right-click the Communications module and configure the *Protocol*, *Tran Delay*, *Baud Rate* and *Unit ID* setup registers to match your system.

Profibus Setup (ION7300)

In addition to the existing communications ports available on the ION7300 meter, the ION7300-Profibus option is equipped with a Profibus port capable of operating at baud rates up to 12 Mbps. You must configure the ION7300-Profibus before the meter can provide power system data to the Profibus network.

The Comm 4 Profibus Communications module has one setting: *PB Address*. The default value of this register is 126. Use the front panel to configure this setting to a unique *PB Address* on your Profibus network.

Ethernet Communications Setup

To enable communications through the meter's Ethernet port, configure the Ethernet Communications module. The *IP Address*, *Subnet Mask*, *Gateway*, *SMTP Server* and *SMTP Connection Timeout* setup registers must properly match your system and can be set through the meter's front panel or ION software.

Using the Front Panel

The current configuration of the meter's communication ports are found in the various Quick Setup menu items. Ethernet settings are located in Ethernet Setup.

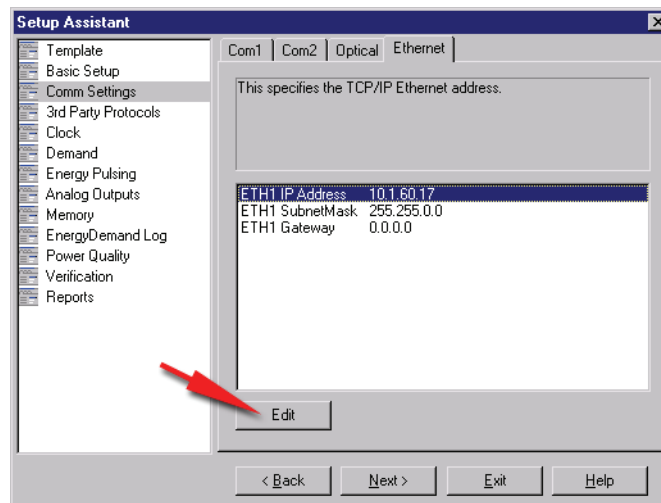
Menu	Setting	Description	Range (Values)	Default
Ethernet	ETH1 IP ADDRESS	Sets the IP address for the meter	000.000.000.000 to 999.999.999.999	None
	ETH1 SUBNET MASK	Used if subnetting applies to your network	000.000.000.000 to 999.999.999.999	None
	ETH1 GATEWAY	Used in multiple network configurations	000.000.000.000 to 999.999.999.999	None
	ETH1 SMTP Server ¹	Sets the IP address for the SMTP Mail Server that is configured to forward mail from the meter	000.000.000.000 to 999.999.999.999	None
	ETH1 SMTP Connection Timeout ¹	Sets the minimum time (in seconds) that the meter waits for a connection to an SMTP server	0 to 9999	60
	ETH1 Webserver Config Access	Enables/disables configuration of meter with a web browser	Enabled or Disabled	Enabled

¹ Settings available for ION7330 and ION7350 meters with email messaging features enabled.

Use the front panel arrow buttons to edit the values of the network settings so that they match your system addresses.

Using ION Setup

1. Open ION Setup and connect to your meter, using Basic Mode.
2. In the Setup Assistant, navigate to the Comm Settings folder.
3. Click on the Ethernet tab to configure the meter's TCP/IP settings.



4. To change a setting, select the parameter and click the Edit button.

Using Designer

1. Open your meter in Designer.
2. Navigate to the Communications Setup framework.
3. Right-click the Ethernet Communications module and configure the *IP Address*, *Subnet Mask*, and *Gateway* setup registers to match your system.

Meter Network Configuration and ION Enterprise

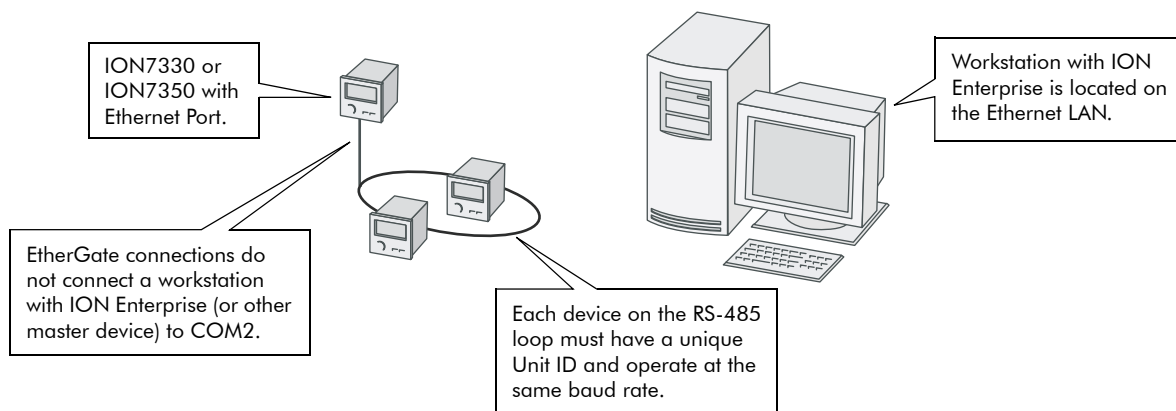
After you have wired your meter to the Ethernet network and performed basic setup, add the meter to your ION Enterprise network using the Management Console.

See the Management Console section in the online *ION Enterprise Help* for details.

The EtherGate Protocol (ION7330 and ION7350)

The EtherGate protocol is a communications tool that lets you communicate **to** a meter and **through** a meter simultaneously. When a meter installed on the Ethernet network has EtherGate enabled, a master device (such as a workstation running ION Enterprise software) can communicate to the meter, and through the meter to a serial network of devices wired to the meter's COM2 port. The protocol permits the direct transfer of data from up to 31 devices.

Ethernet-enabled ION7330 and ION7350 meters have COM2 preset to EtherGate; no other protocol may be selected for this port (7802).



Connect your chain of serial devices to COM2 and configure the port's baud rate. The transfer of data between protocols is then handled automatically.

Refer to the *ION Meter as an Ethernet Gateway* technical note for complete details on configuring your meter for EtherGate.

Modem Communications Setup

See the section “Serial Communications Setup” for configuring COM3. Additional modem configuration required is explained in the following section.

ModemInit Setup Register

The setup register labeled *ModemInit* is available for ION7330 and ION7350 meters with internal modems, and defines the initialization string for the internal modem (by default, the modem is factory configured to answer on one ring). You should not require changes to the *ModemInit* string for normal operation. If you require advanced modem functionality, you can customize the *ModemInit* register with a string up to 47 characters long.

Modem Initialization Strings

Refer to the technical note *Modem AT Commands* for a complete list of AT commands for your modem.

Adjusting the Modem Initialization String for CTR-21 Compliant modems

The table below shows the strings to add to the end of your modem configuration string setup register for each of three possible problems.

Problem	Add to Modem Initialization String
Does not answer (modem does not detect ring tone)	*NC70
Does not dial (modem does not detect dial tone)	In order of preference: *NC70, *NC70X0, *NC8 (Italy only)
Does not detect busy signal	*NC70

If your **local** modem (not the internal modem) is not already set up, configure it with the Remote Modem Configuration Utility according to the instructions in the online help. After the meter is installed and the internal modem is connected to the telephone network, the Comm 3 module can be configured using the meter’s front panel or ION software. To learn how to connect the internal modem to the telephone network, consult your meter’s Installation Guide.

Adding a Meter and a Modem Site to your ION Enterprise Network

In the Management Console, add the meter with the internal modem, and a modem site to your ION Enterprise network.

Consult the online *ION Enterprise Help* for details on commissioning an ION network, managing modem connections, setting up periodic dial-out, and configuring remote site event notification.

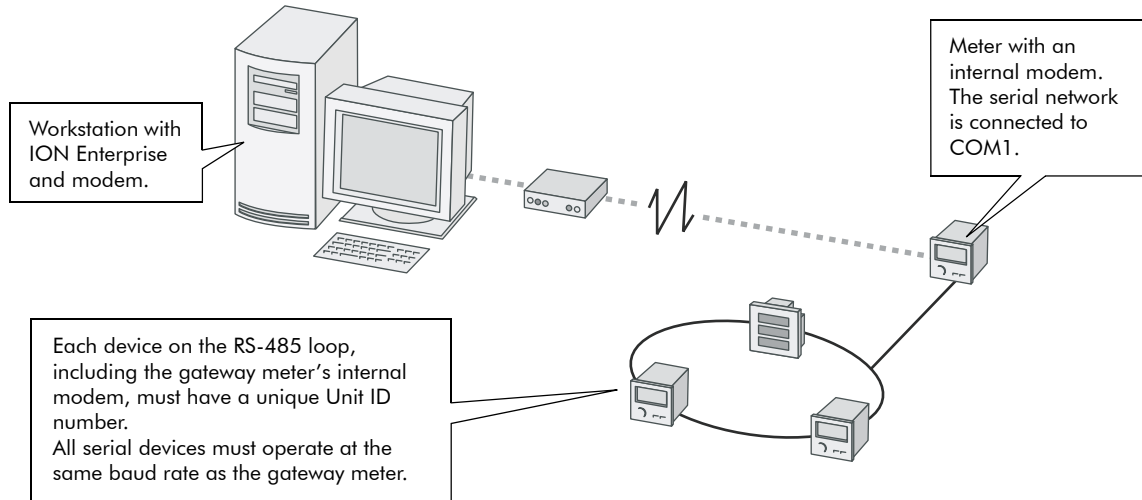
The ModemGate Protocol

The ModemGate feature creates a communications connection between the telephone network and an RS-485 serial network of devices.

When you specify the protocol for a meter's COM port as MODEMGATE, all data received by the meter's internal modem is automatically transferred to the serial network.

 **NOTE**

Modem-enabled ION7330 and ION7350 meters have COM1 preset to ModemGate; no other protocol may be selected for this port (7801).



ModemGate connections do not connect a workstation with ION Enterprise (or other master device) to the gateway meter's COM1 port, but rather the gateway meter's internal modem port (COM1).

Refer to the *ION Meter as a ModemGate* technical note for complete details on configuring your meter for ModemGate.

Internet Connectivity

Ethernet ION7300 series meters provide Internet connectivity, allowing you to receive meter emails, view real-time data, and configure your system through a web browser from anywhere in the world. Your meter provides the following internet connectivity options:

- ◆ Email messaging feature (receive data logs and email alerts from the meter)
- ◆ WebMeter feature (onboard web server allows you to view real-time data and configure the meter through a web browser)
- ◆ WebReach (view ION Enterprise system information through a web browser)

 **NOTE**

To enable WebMeter and email messaging features, the meter must have firmware v271 or later and an Ethernet card with firmware ETH73v271 or later. Firmware can be downloaded from www.powerlogic.com. Refer to the technical note *Upgrading ION Device Firmware* to learn how to upgrade device firmware.

WebMeter Feature

WebMeter-enabled meters have an on-board web server. Built-in web pages display certain energy and basic power quality information and also support basic meter configuration tasks. A meter with the WebMeter feature can be connected to your corporate Ethernet network like any other network device, and you can access it with a standard web browser like Internet Explorer.

Refer to the technical note *WebMeter Internal Web Server Feature* to learn how to:

- ◆ view your WebMeter data on the Internet
- ◆ configure your WebMeter-enabled meter
- ◆ set up your network for the WebMeter feature

Email Messaging Feature (ION7330 and ION7350)

The email messaging feature allows your meter to send data logs as email attachments to a workstation, pager, cell phone, or PDA. ION7350 meters can also send email alerts.

Refer to the technical note *MeterM@il Internal Email Client Feature* to learn how to:

- ◆ view email messaging data
- ◆ set up your network for email messaging from the meter
- ◆ configure your meter to use the email messaging feature
 - ◆ set up the meter for your SMTP Server
 - ◆ set up the email messaging feature to send alerts
 - ◆ set up the email messaging feature to send data logs

WebReach

WebReach enables you to remotely view ION Enterprise information through a web browser. WebReach requires a simple URL and no client machine configuration so you have the flexibility to view your data from a web browser anywhere in the world. With WebReach, you can view real-time data and select views of historical/waveform data. Currently, no configuration or control functions are available through WebReach. Refer to the online *ION Enterprise Help* for more details on WebReach.

Telnet and HyperTerminal

You can access certain Ethernet settings and statistics through a telnet application such as Microsoft Telnet. Similarly, you can use Windows HyperTerminal to access certain meter module settings. Use the following guidelines to determine which application you should use to access your meter:

- ◆ If your meter is connected to an Ethernet network, use a telnet application such as Microsoft Telnet.
- ◆ If your meter is connected serially or through a modem to your workstation, use a terminal application such as Windows HyperTerminal.

You can access certain Power Meter module and Factory module settings from both a Telnet session and HyperTerminal session. Additionally, a Telnet session lets you view ethernet statistics and access certain Ethernet communications module settings.

Refer to the technical note *Telnet and HyperTerminal Access* for the appropriate application's menu options and connection instructions.

Communications LEDs

All LEDs are found on the backplate of the meter, except the two Ethernet LEDs, which are found on the left side (if you are facing front of meter).

LED	Color	Function
L1	Red	Pulses once for every 1.8 Wh of energy measured
L2	Red	Blinks slowly to indicate CPU operation. It blinks rapidly to indicate communications through one of its serial ports ¹
Ethernet LINK	Yellow ²	Remains on while an Ethernet carrier is present; if this LED is off, the Ethernet connection cannot be established
Ethernet ACTIVITY	Yellow ²	Blinks to indicate Ethernet traffic
Profibus DE	Yellow	Indicates communications between the Profibus Master and the meter have been established
Profibus PWR	Red	Shows that the meter is powered

¹ If the L2 LED does not blink once the meter is installed, contact Schneider Electric Technical Support.

² One or both of the Ethernet LED colors may differ from the standard yellow.

Chapter
7

Third-Party Protocols

This chapter explains how Modbus, DNP 3.0 and Profibus protocols are implemented on the meter.

For information on using MV-90 protocol with ION7300 series meters, consult the *MV90 and ION Technology* technical note.

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Overview

ION7300 series meters support DNP 3.0, Profibus (option available on ION7300 only), Modbus/TCP and Modbus RTU protocols.

While your meter is factory configured to **send** data (acting as Modbus Slave), it is not ready to **receive** data until you set up the necessary framework. The meter is also pre-configured to **send** DNP 3.0 data to a DNP Master.

 **NOTE**

Changing the default factory third-party protocol frameworks (or creating new frameworks to enable receive functionality) is an advanced procedure. Refer to the DNP modules and Modbus modules descriptions in the *ION Reference*, as well as the technical notes *DNP 3.0 and ION Technology*, and *Modbus and ION Technology* before proceeding.

Most Modbus and DNP modules on the meter are factory pre-set and only require basic configuration, such as communications setup.

 **NOTE**

Changing these modules from their factory configuration is an advanced setup procedure that requires an understanding of the protocol, as well as an understanding of the meter's internal operation. For more information on your meter and these protocols see the *Common Modbus Registers* document and the *ION7330 / ION7350 DNP 3.0 Device Profile*.

Communications Protocol Configuration

In order to use the factory Modbus or DNP configuration, you must first assign the communications channel you want to use. By default, all communications ports are configured to use the ION protocol, except meters ordered with the Modbus special option. Choose the 3rd-party protocol you want from the list of available protocols in the Communications module's Protocol setup register. See the Communications chapter for instructions.

 **NOTE**

Modbus RTU is available on each of the meter's communications ports, and multiple ports can communicate using Modbus simultaneously. Only a single port can use the DNP 3.00 protocol at any one time.

The Meter as Modbus Slave

Your meter can act as a Modbus Slave, using both the Modbus RTU and Modbus/TCP protocols.

See the *Modbus and ION Technology* technical note for more information.

Using the Modbus RTU Protocol

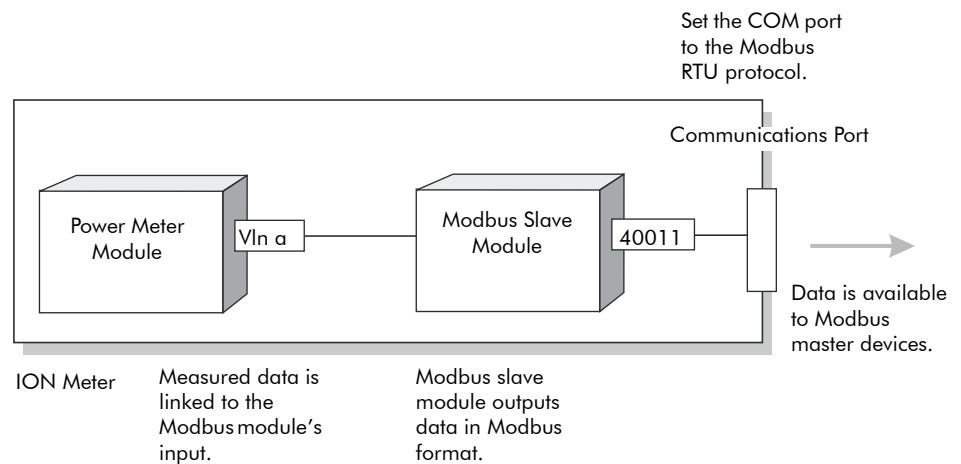
All ION7300 series meters can act as Modbus Slave devices, making any real-time data available through the Modicon Modbus RTU protocol. Modbus Master devices connected to the meter can access (read) this data or write data to your meter's ION registers, making device configuration changes and initiating control actions.

The Factory Modbus Slave Configuration

The meter makes data available to Modbus Master devices using pre-configured Modbus Slave modules. These modules are linked to other modules in the meter that provide the energy, power and demand data. Once a communications channel is configured to use Modbus RTU protocol, the data is available to Modbus Master devices.

 **NOTE**

Connect to IP Service Port 7701 for Modbus RTU communications over Ethernet. The Modbus Unit ID of the meter over Ethernet is 100.



As the data available through the Modbus Slave modules is in a specific format, knowledge of the Modbus protocol and an understanding of the settings used in the meter are required to interpret the data provided.

Changing the Modbus Configuration

If the factory Modbus configuration does not suit your needs, the existing Modbus Slave modules can be relinked to other parameters you want to access through Modbus.

If your Modbus Master device requires data in a format different than that provided by the factory Modbus configuration, you can edit the setup registers in the Modbus Slave modules. These setup registers specify the Modbus format, scaling and base address settings. Refer to the *ION Reference* for complete details on the Modbus Slave module.

Modbus Slave Modules

Your meter is pre-configured with four modules. The settings for your Modbus Slave modules are as follows:

Modbus Slave Module #1

Format:	unsigned 16 bit	InZero:	0
Base Address:	40011	InFull:	6553
Scaling:	Yes	OutZero:	0
		OutFull:	65530

Input	Modbus Register	Parameter
Source #1	40011	VIn a
Source #2	40012	VIn b
Source #3	40013	VIn c
Source #4	40014	VIn avg
Source #5	40015	VII ab
Source #6	40016	VII bc
Source #7	40017	VII ca
Source #8	40018	VII avg
Source #9	40019	I a
Source #10	40020	I b
Source #11	40021	I c
Source #12	40022	I avg
Source #13	40023	V unbal
Source #14	40024	I unbal
Source #15	40025	Freq
Source #16	40026	Phase Rev

Modbus Slave Module #2

Format:	signed 32 bit	InZero:	-214,748,364
Base Address:	40027	InFull:	214,748,364
Scaling:	Yes	OutZero:	-2,147,483,640
		OutFull:	2,147,483,640

Input	Modbus Register	Label
Source #1	40027-40028	kW a
Source #2	40029-40030	kW b
Source #3	40031-40032	kW c
Source #4	40033-40034	kW tot
Source #5	40035-40036	kVAR a
Source #6	40037-40038	kVAR b
Source #7	40039-40040	kVAR c
Source #8	40041-40042	kVAR tot
Source #9	40043-40044	kVA a
Source #10	40045-40046	kVA b
Source #11	40047-40048	kVA c
Source #12	40049-40050	kVA tot
Source #13	40051-40052	PF sign a
Source #14	40053-40054	PF sign b
Source #15	40055-40056	PF sign c
Source #16	40057-40058	PF sign tot

Modbus Slave Module #3

Format:	signed 32 bit	InZero:	-214,748,364
Base Address:	40059	InFull:	214,748,364
Scaling:	Yes	OutZero:	-2,147,483,640
		OutFull:	2,147,483,640

Input	Modbus Register	Label
Source #1	40059-40060	kW td
Source #2	40061-40062	kVAR td
Source #3	40063-40064	kVA td
Source #4	40065-40066	kW td mx
Source #5	40067-40068	kVAR td mx
Source #6	40069-40070	kVA td mx
Source #7	40071-40072	VIn avg mx
Source #8	40073-40074	I avg mx
Source #9	40075-40076	kW tot mx
Source #10	40077-40078	kVAR tot mx
Source #11	40079-40080	kVA tot mx
Source #12	40081-40082	Freq mx
Source #13	40083-40084	VIn avg mn
Source #14	40085-40086	I avg mn
Source #15	40087-40088	Freq mn

Modbus Slave Module #4

Format: signed 32 bit M10K
 Base Address: 40089
 Scaling: No

Input	Modbus Register	Label
Source #1	40089-40090	kWh imp
Source #2	40091-40092	kWh exp
Source #3	40093-40094	kWh tot
Source #4	40095-40096	kWh net
Source #5	40097-40098	kVARh imp
Source #6	40099-40100	kVARh exp
Source #7	40101-40102	kVARh tot
Source #8	40103-40104	kVARh net
Source #9	40105-40106	kVAh tot
Source #10	40107-40108	V1 THD max
Source #11	40109-40110	V2 THD max
Source #12	40111-40112	V3 THD max
Source #13	40113-40114	I1 THD max
Source #14	40115-40116	I2 THD max
Source #15	40117-40118	I3 THD max

Importing Data using Modbus RTU

It is possible to bring data into the meter using Modbus. Various ION registers can be written by Modbus Master devices by correlating the Modbus register number with the address of the ION register you want to write. When a Modbus register is written with a value, the corresponding ION register will be written, provided the Modbus RTU protocol is active on the communications channel that connects the Modbus Master to the meter.

You can use the Modbus RTU protocol to write values into ION external numeric, pulse and Boolean registers, allowing you to enable, disable and reset meter functions. You can also use the Modbus protocol to change setup register values in various ION modules to configure the meter's operation.

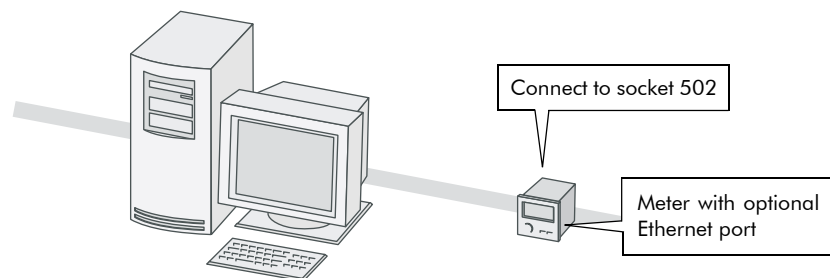
See the *Common Modbus Registers* document for a Modbus to ION map.

Using the Modbus/TCP Protocol

Modbus/TCP is the newest open Modbus protocol variant (formerly called MBAP). It defines the packet structure and connection port (port 502) for the industry standard TCP/IP protocol. The structure of Modbus/TCP is very similar to the Modbus RTU packet except that it has an extra six-byte header and does not use the cyclic redundancy check (CRC). Modbus/TCP retains the Modbus RTU limit of 256 bytes to a packet.

Modbus TCP Communications

You can communicate to the meter using Modbus TCP (formerly called MBAP) if your meter has the optional Ethernet port. Connect to socket **502**.



NOTE

You cannot form an EtherGate connection to the Modbus TCP network.

Configuring Modbus

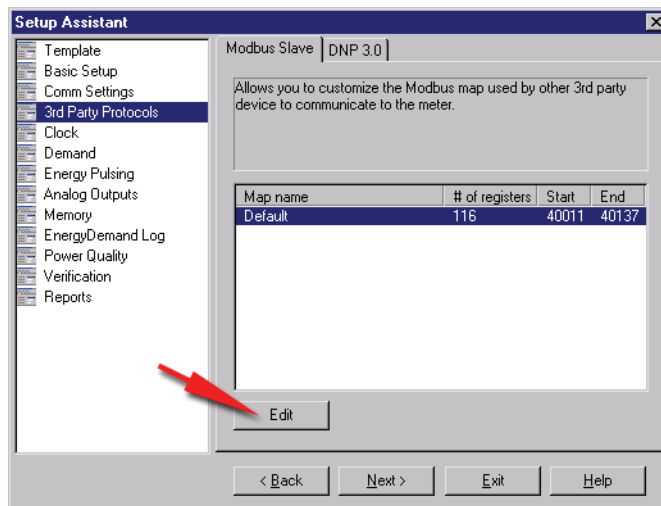
Using the Front Panel

You cannot configure Modbus through the meter’s front panel. You can only assign the Modbus protocol to communication ports. See the Communications chapter for details.

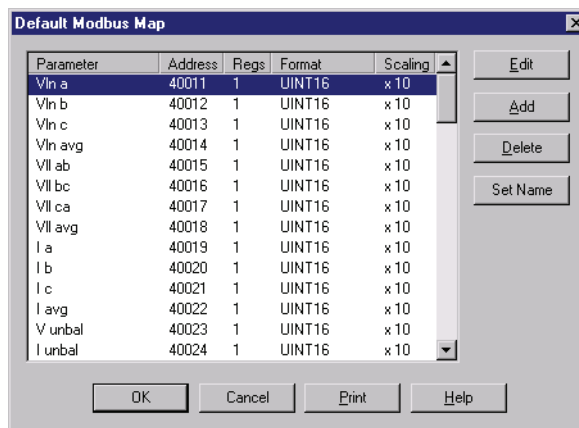
Using ION Setup

The Modbus Setup Assistant helps you configure Modbus Slave functionality for your meter.

1. Open ION Setup and connect to your meter, using Basic Mode.
2. In the Setup Assistant, navigate to 3rd Party Protocols
3. Click on the Modbus Slave tab to edit the Modbus Slave modules.
4. Select the map name (in this example, the default map) and click Edit.



5. The default Modbus map editor appears, allowing you to edit, add, delete or set the name of Modbus Slave module registers.



Using the DNP 3.0 Protocol (ION7330 and ION7350)

The Distributed Network Protocol Version 3.0 (DNP 3.0) is an open protocol used in the electric utility industry for communications and interoperability among substation computers, Remote Terminal Units (RTUs), Intelligent Electronic Devices (IEDs, e.g. meters), and Master Stations.

You meter can be integrated into a DNP network as a DNP Slave, using the DNP Slave Import, DNP Slave Export and DNP Slave Options modules. For more information on the various DNP modules, see the *ION Reference*.

 **NOTE**

DNP 3.0 can only be used on one port per meter.

Consult the DNP User's Group at <http://www.dnp.org/> to learn more about the protocol.

The Factory DNP 3.0 Configuration

Your meter is pre-configured with a DNP framework that allows for basic DNP Slave functionality. DNP Slave Export modules are used to send data to the DNP Master, while DNP Slave Options modules provide global settings such as communications options. Although some minor setup of the framework is necessary before it becomes enabled (assigning the DNP protocol to the communications ports etc.), most module settings should not require alteration.

For information on your meter's default DNP map and factory configuration, see the *ION7330 and ION7350 DNP 3.0 Device Profile*.

Importing Data using DNP 3.0

Data can be imported into the meter from a DNP control relay or analog output device. DNP Slave Import modules are used to take a DNP Analog output or Binary output object and map them into ION registers.

 **NOTE**

DNP Slave Import modules are not part of the factory DNP framework and must be added manually. Refer to the DNP Slave Import module description in the *ION Reference* for details.

Configuring DNP 3.0

If the factory DNP configuration does not suit your needs, you can relink the existing DNP Slave Export modules to access a different set of parameters through DNP. Alternately, you can add additional DNP Slave Export modules and link the desired ION parameters to them.

If your DNP network requires data in a format different than that provided by the factory DNP configuration, you can edit the setup registers in the DNP Slave Export modules and the DNP Slave Options modules.

NOTE

Do not make any changes to the DNP Slave Options module's setup registers unless you understand the effects each change will cause. Refer to the *ION Reference* for complete details on DNP Slave Export and DNP Slave Options module function.

For detailed information on configuring your meter to use DNP, see the *DNP and ION Technology* technical note.

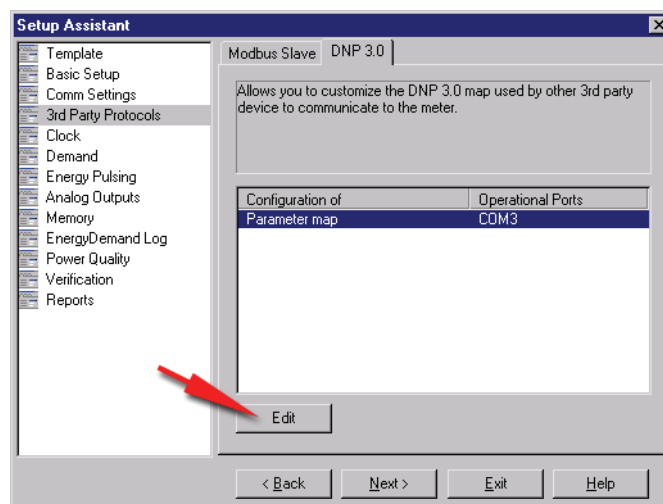
Using the Front Panel

You cannot configure DNP through the meter's front panel. You can only assign the DNP 3.0 protocol to communication ports. See the Communications chapter.

Using ION Setup

The DNP 3.0 Setup Assistant helps you configure the DNP Slave Export and DNP Slave Options modules.

1. Open ION Setup and connect to your meter, using Basic Mode.
2. In the Setup Assistant, navigate to 3rd Party Protocols and click on the DNP 3.0 tab.
3. Select the DNP feature you wish to configure (Parameter Map in this example) and click Edit.



4. The Setup Assistant guides you through DNP configuration. See the *ION Setup Online Help* for more information.

DNP Slave Export Module Settings

The 14 factory-configured DNP Slave Export modules are configured as shown in the following table.

Setup Register	Setting
BasePoint	Varies – each analog input or binary counter has a different BasePoint
StaticObj	11 modules are Analog Input; three are Binary Counter
EventObj	Disable Event Objects
Deadband	0
FrozStaObj	Disable Frozen Static Objects
FrozEvtObj	Disable Frozen Event Objects
EventClass	Class 1
Scaling	OFF (excluding Unbalx10 and Freqx10 which are ON)
IONZero	0
IONFull	0 (1000 for Unbalx10 and 100 for Freqx10)
DNPZero	0
DNPFull	0 (10000 for Unbalx10 and 1000 for Freqx10)

Some setup register settings vary for different modules. Specifically, *BasePoint* differs for each module within a group (Analog Input and Binary Counter are groups), and *StaticObj* is set to Analog Input for the 11 analog input points and Binary Counter for the three binary counter points. (*StatObj* defines the type of DNP object the module provides when the Master polls it.)

In addition, Scaling is OFF for all but two modules. The only modules that apply scaling are the Analog Input points that provide Voltage and Current Unbalance data (labeled DNP Unbalx10) and Frequency data (labeled DNP Freqx10). These modules apply x10 scaling.

DNP Options Module Settings

The DNP Options module provides global settings that affect all DNP Slave Export and DNP Slave Import modules. The default settings in this module are shown in the following table.

Setup Register	Setting	Function
BinInStatic	Single-bit Binary Input	Variant for Binary Input Static objects
BinInEvents	Binary Input Change w/o time	Variant for Binary Input Event objects
BinInEvDepth	50	Maximum number of Binary Input Events that can be stored
BinCntStatic	16-bit Binary Counter w/o flag	Variant for Binary Counter Static objects
FrzCntStatic	16-bit Frozen Counter w/o flag	Variant for Frozen Counter Static objects
FrzCntEvents	16-bit Frozen Counter Event w/o time	Variant for Frozen Counter Event objects
FrzCntEvDepth	0	Max number of Frozen Counter Events that can be stored
CntChangeEvents	16-bit Counter Change Event w/o time	Variant for Counter Change Event objects
CntChangeEvDepth	50	Max number of Counter Change Events that can be stored
AIStatic	16-bit Analog Input w/o flag	Variant for Analog Input Static objects
FrzAIStatic	16-bit Frozen Analog Input w/o flag	Variant for Frozen Analog Input Static objects
FrzAIEvents	16-bit Frozen Analog Event w/o time	Variant for Frozen Analog Input Event objects
FrzAIEvDepth	0	Max number of Frozen Analog Input Events that can be stored
AIChangeEvents	16-bit Analog Input Change Event w/o time	Variant for Analog Input Change Event objects
AIChangeEvDepth	50	Max number of Analog Input Change Events that can be stored
AOStatic	16-bit Analog Output Status	Variant for Analog Output Block objects
SelectTimeout	10.000	Select Before Operate timeout period (in seconds)
TimeSynchPeriod	86400	Time (in seconds) between IED requests for time syncs
ALFragSize	2048	Max application layer message size (in octets) that IED can send
DLAck	Never	When device requests data link layer acknowledgements
DLTimeout	2.000	How long the data link layer waits for acknowledgement from Master
DLNumRetries	0	How many times a data link layer packet is re-sent after failing

Importing Data using DNP 3.0

Data can be imported into the ION7330 and ION7350 from a DNP Master device. DNP Slave Import modules are used to take a DNP analog or binary output object and map it into an ION numeric or Boolean register. Refer to the *ION Reference* for detailed module descriptions.

See the *ION7330 and ION7350 DNP 3.0 Device Profile* for information on your meter's default DNP map, and for information on modifying the map to suit your needs.

Using the Profibus Protocol (ION7300)

ION7300 meters, ordered with the optional Profibus port, can provide many real-time power system measurements to any Profibus Master device connected to the network. Refer to the *ION7300 Profibus Protocol Document* for complete details on the Profibus implementation in the ION7300.

Communications

The ION7300-Profibus provides a Profibus port at its rear panel. Profibus communications is achieved via an internal Profibus expansion communications card. This card allows communication using the Profibus standard at baud rates up to 12 Mbps. Connection to the Profibus network is achieved via a DB-9 cable. Configuration is performed via the ION Profibus Communications module, CM04. See the “Profibus Setup (ION7300)” section for details.

Profibus communications allows multiple master and slave devices to be connected on the same communications line. Up to 32 devices can be connected on a single Profibus comm line, or up to 126 devices, if repeaters are used.

Factory Profibus Configuration

The ION7300-Profibus makes data available to Profibus devices using 12 Profibus Slave Export modules. These modules are linked to other modules in the meter that provide energy, power and demand data through the Profibus Communications module. As the data available through the Profibus Slave Export modules is in a specific format, knowledge of the Profibus protocol and an understanding of the settings used in the meter are required to interpret the data provided.

Changing the Profibus Configuration

If the factory Profibus configuration does not suit your needs, link the unused parameters in the existing Profibus Slave Export modules. If you require more changes, you will have to relink these modules to other parameters.

Profibus Slave Export Module Parameter Mapping

The following tables detail the measurements provided by 12 Profibus modules. The “Source ION Module” is shown so that you can easily unlink parameters if you want to access different data. To change scaling, refer to the Profibus Slave Export module description in the *ION Reference*.

Profibus Slave Export Module 1 (Scaling x10)		
Source ION Module	Measurement	ION Label
Power Meter	Volts line to neutral A	VIn a
Power Meter	Volts line to neutral B	VIn b
Power Meter	Volts line to neutral C	VIn c
Power Meter	Volts l-n average	VIn avg
Maximum #4	VIn avg Maximum	VIn mx
Maximum #31	kVAR Tot Th. Dmd max	kVAR td mx

Profibus Slave Export Module 2 (Scaling x10)		
Source ION Module	Measurement	ION Label
Power Meter	Volts line to line AB	VII ab
Power Meter	Volts line to line BC	VII bc
Power Meter	Volts line to line CA	VII ca
Power Meter	Volts l-l average	VII avg
Maximum #8	VII avg MAX	VII avg mx
Maximum #32	kVA Tot Th. Dmd MAX	kVA td mx

Profibus Slave Export Module 3 (Scaling x10)		
Source ION Module	Measurement	ION Label
Power Meter	Current Phase A	I a
Power Meter	Current Phase B	I b
Power Meter	Current Phase C	I c
Power Meter	Average Current	I avg
Maximum #13	Max. Average Current	I avg mx
Minimum #13	Min. Average Current	I avg mn

Profibus Slave Export Module 4 (Scaling x10)		
Source ION Module	Measurement	ION Label
Power Meter	kW phase A	kW a
Power Meter	kW phase B	kW b
Power Meter	kW phase C	kW c
Power Meter	kW Total	kW tot
Thermal Demand #1	kW Total Th.Demand	kW td
Maximum #30	kW Total Th. Dem. Max	kW td mx

Profibus Slave Export Module 5 (Scaling x10)		
Source ION Module	Measurement	ION Label
Power Meter	kVAR phase A	kVAR a
Power Meter	kVAR phase B	kVAR b
Power Meter	kVAR phase C	kVAR c
Power Meter	kVAR Total	kVAR tot
Th. Demand #2	kVAR Total Th. Demand	kVAR td
Maximum #31	kVAR Tot Th. Dmd max	kVAR td mx

Profibus Slave Export Module 6 (Scaling x10)		
Source ION Module	Measurement	ION Label
Power Meter	kVA phase A	kVA a
Power Meter	kVA phase B	kVA b
Power Meter	kVA phase C	kVA c
Power Meter	kVA Total	kVA tot
Th. Demand #3	kVA Total Th. Demand	kVA td
Maximum #32	kVA Tot Th. Dmd MAX	kVA td mx

Profibus Slave Export Module 7 (Scaling x10)		
Source ION Module	Measurement	ION Label
Power Meter	Power Factor phase A	PF a
Power Meter	Power Factor phase B	PF b
Power Meter	Power Factor phase C	PF c
Power Meter	Power Factor Total	PF sign tot
Minimum #22	Power Factor Lead min	PF lead mn
Minimum #23	Power Factor Lag min	PF lag mn

Profibus Slave Export Module 8 (Scaling x10)		
Source ION Module	Measurement	ION Label
Power Meter	Volts unbalanced	V unbal
Power Meter	Current unbalanced	C unbal
Power Meter	Line Frequency	Freq
Maximum #21	Line Frequency max	Freq mx
Minimum #21	Line Frequency min	Freq mn
---	Not used	---

Profibus Slave Export Module 9 (No Scaling)		
Source ION Module	Measurement	ION Label
Integrator #3	kW hour Total	kWh tot
Integrator #7	kVAR hour Total	kVARh tot
Integrator #9	kVA hour	kVAh tot
---	Not used	---
---	Not used	---
---	Not used	---

Profibus Slave Export Module 10 (No Scaling)		
Source ION Module	Measurement	ION Label
Integrator #1	kW hour Import	kWh imp
Integrator #2	kW hour Export	kWh exp
Integrator #4	kW hour Net	kWh net
Integrator #5	kVAR hour Import	kVARh imp
Integrator #6	kVAR hour Export	kVARh exp
Integrator #8	kVAR hour Net	kVARh net

Profibus Slave Export Module 11 (Scaling x10)		
Source ION Module	Measurement	ION Label
S W Demand #1	kW Sliding Demand	kW swd
S W Demand #1	kW Predicted Demand	kW swd pred
Maximum #27	kW Sliding Demand max	kW swd mx
Minimum #27	kW Sliding Demand min	kw swd mn
---	Not used	---
---	Not used	---

Profibus Slave Export Module 12 (Scaling x100)		
Source ION Module	Measurement	ION Label
Power Meter	kVA phase A	kVA a
Power Meter	kVA phase B	kVA b
Power Meter	kVA phase C	kVA c
Power Meter	kVA Total	kVA tot
Thermal Demand #3	kVA Total Th. Demand	kVA td
Maximum #32	kVA Tot Th. Dmd MAX	kVA td mx

Chapter
8

Time

This chapter covers the meter’s clock and time synchronization.

In This Chapter

- ◆ **Meter Clock (ION7330 and ION7350)** **90**
 - Configuring the Meter Clock 90
 - Using the Front Panel 90
 - Using ION Setup 90
 - Using Designer 91
 - Clock Module Settings 91

- ◆ **Time Synchronization** **92**

Meter Clock (ION7330 and ION7350)

The Clock module controls the meter's internal clock, which provides timestamps for data logged by the device. The clock needs to be configured properly to ensure that logged data has accurate timestamp information. The Clock module also receives the time synchronization signals sent to it by the workstation running ION software, updating the device's clock when required.

The Clock module's *Clock Source* setup register defines how the meter's internal clock auto-corrects drift from its internally calculated time. A separate time source (such as a GPS receiver) can be used to synchronize the clock through a communications channel.

 **NOTE**

The ION7300 meter does not have a Clock module.

See the *ION Reference* for more information on the Clock module.

Configuring the Meter Clock

Use the front panel or ION software to change the meter's clock settings.

Using the Front Panel

The ADVANCED METER SETUP menu allows you to configure all time related meter modules. To access the various modules, press the round button twice; scroll down the Setup menu and select ADVANCED METER SETUP.

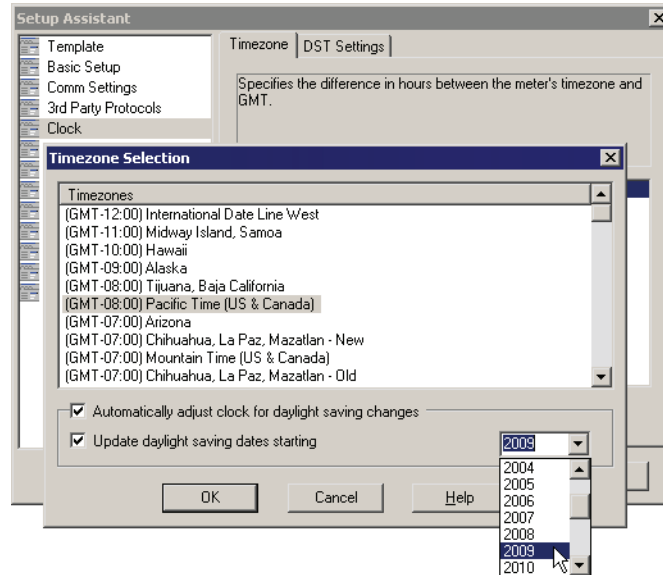
 **NOTE**

The front panel displays the Clock module settings in UNIX time (the number of seconds since 00:00:00 UTC on January 1, 1970) for DST Start and DST End, and in seconds for time zone (TZ Offset) and DST Offset.

Using ION Setup

The Clock Setup Assistant helps you configure the Clock module.

1. Open ION Setup and connect to your meter, using Basic Mode.
2. In the Setup Assistant, navigate to the Clock folder.
3. Click on the Timezone tab to configure your meter's clock settings. Select Timezone and click Edit.
4. Use the Timezone Selection box to set your time zone. Select the "Automatically adjust clock for daylight saving changes" box to set up the meter for DST time changes. Select the checkbox "Update daylight saving dates starting" then use the year dropdown box to select the year when the DST start and end dates are automatically set. Click OK.



- If required, select the other parameters and click Edit to change the settings.

Manually setting the DST time changes for the current year

Click the DST Settings tab to manually set your meter's daylight savings period. Select a parameter and click Edit to change.

Using Designer

Open your meter in Designer and navigate to the Meter Clock Setup framework. Right-click the Clock module to edit. When modifying setup registers of the Clock module in Designer, use the Format option to convert between UNIX and conventional time. To select the time zone from a list, click the Quick Setup button.

Clock Module Settings

The setup registers in the Clock module specify time zone, Daylight Savings Time (DST) parameters and time synchronization functions.

Setup Register	Function
Timezone	Sets the time zone the device is in, relative to Greenwich Mean Time.
DST Start	The date and time when DST begins.
DST End	The date and time when DST ends.
DST Offset	The amount of time the clock is changed when DST begins or ends.
Time Sync Source	Specifies the communications port that receives time sync signals.
Time Sync Type	Specifies the type of time sync signal (Local or Universal time).
Clock Source	Specifies the clock's time synchronization signal source (i.e., internal crystal).

Time Synchronization

Time synchronization lets you synchronize your meter's internal clock with all of the other meters, devices, and software in a network. Once synchronized, all data logs have timestamps that are relative to a uniform time base. This allows you to achieve precise sequence-of-events and power quality analyses. To synchronize clocks, you can use ION software to broadcast time signals across the network.

Refer to the technical note *Time Synchronization & Timekeeping* for more information on implementing time synchronization.

Enabling or Customizing Time Synchronization in ION Enterprise

1. Launch the Management Console.
2. From the System Setup Pane, select Sites or Devices.
 - ◆ Select **Sites** if you want to customize a particular serial, modem, or Ethernet Gateway site.
 - ◆ Select **Devices** if you want to customize an individual Ethernet device.
3. Right-click in the main window and select Properties.
4. Right-click inside the display window and select Advanced Properties.

The fields for enabling or customizing time synchronization are shown below.

These fields appear in the Devices Advanced Properties screen for Ethernet devices. Serial devices are configured via the Serial Site advanced properties.

Property	Value
Transmit Delay	50
Time Synch Ethernet Enabled	No
Time Synch Interval Ethernet	3600000
Computer	TECHPUBSXP2
Receive Timeout	10000
ICMP Timeout	2000
Maximum Attempts Multiple	3
Attempt Increment	3
Online Event Priority	10
Offline Event Priority	128
Offline Attempt Number	1
Offline Timeout Period	30000

Property Description
Device Type: Type of meter.

OK Cancel

Property	Value
Use DTR	No
Baud Rate	9600
Enabled	Yes
Transmit Delay	50
Description	
Time Synch ION Enabled	Yes
Time Synch Interval ION	3600000
Time Synch 3720 Enabled	Yes
Time Synch Interval 3720	3600000
Time Synch 3000 Enabled	Yes
Time Synch Interval 3000	3600000

Property Name
ERR

OK Cancel

Use these fields on the Site Advanced Properties screen to enable time synchronization or set custom intervals for any device in any Serial Site or Ethernet Gateway Site.

The Property Description area explains the purpose for each field. The default time synchronization interval of 3,600 seconds (displayed in milliseconds) is acceptable for most ION installations.

NOTE

You need appropriate permissions to configure the meters on your network. Refer to the technical note *ION System Security* for details on software and meter security.

Chapter
9

Demand

This chapter explains how to configure and view demand values on your meter.

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- ◆ **Configuring Demand** **94**
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 - Using ION Setup 94
 - Using Designer 95
 - Sliding Window Demand Module Settings 95
 - Thermal Demand Module Settings 95
- ◆ **Displaying Demand** **96**

Introduction

Demand is a measure of average power consumption over a fixed time interval. Peak (or maximum) demand is the highest demand level recorded over the billing period. ION7300 series meters utilize two methods to measure demand: using Thermal Demand modules and using Sliding Window Demand modules. These modules are configured to calculate the average current demand and kW, kVAR and kVA demand. The setup registers in the demand modules define time intervals for demand calculations, setting the sensitivity of the module's operation.

See the *ION Reference* for more information about these modules.

Configuring Demand

Use the front panel or ION software to change your meter's demand settings.

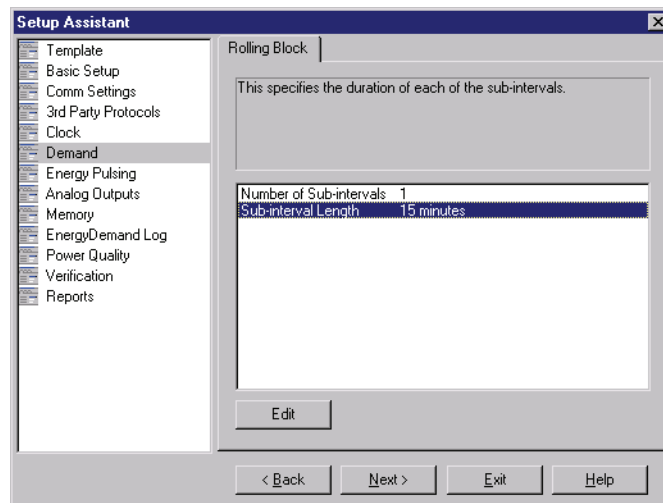
Using the Front Panel

The ADVANCED METER SETUP menu allows you to configure all demand related meter modules. To access the various modules, press the round button twice; scroll down the Setup menu and select ADVANCED METER SETUP.

Using ION Setup

The Demand Setup Assistant helps you configure Sliding Window Demand only.

1. Open ION Setup and connect to your meter, using Basic Mode.
2. In the Setup Assistant, navigate to the Demand folder.



3. Configure Rolling Block (Sliding Window) demand by selecting a register and clicking Edit.

You can configure **both** Sliding Window Demand and Thermal Demand modules using Advanced Mode.

1. Connect to your meter, using Advanced Mode.
2. Click on the module you wish to configure.

Using Designer

Open your meter in Designer and navigate to the Demand Setup framework. There are two sections: Sliding Window Demand setup and Thermal Demand setup. Right-click on a module to edit.

Sliding Window Demand Module Settings

Sliding Window Demand is often referred to as Rolling Block Demand. To compute sliding window demand values, the Sliding Window Demand module uses the sliding window averaging (or rolling interval) technique which divides the demand interval into sub-intervals. The demand is measured electronically based on the average load level over the most recent set of sub-intervals. This method offers better response time than fixed interval methods.

Setup Register	Function	Default
Sub Intvl	The time, in seconds, in the sliding window demand sub-interval.	900
#SubIntvls	The number of sub-intervals in the sliding window.	1
Pred Resp	The speed of Predicted Demand calculations; use higher values for faster prediction (70 to 99 recommended).	70

Thermal Demand Module Settings

The Thermal Demand module calculates thermal demand over a specified length of time. It uses a method which is equivalent to thermal averaging. For thermal averaging, the traditional demand indicator responds to heating of a thermal element in a Watt-Hour meter. Adjust the Thermal Demand module's calculation to mimic this technique by changing the *Time Const* and *Interval* setup parameters.

Setup Register	Function	Default
Interval	The time, in seconds, in the thermal demand interval.	900
Time Const	The sensitivity to changes in the source signal; higher values provide faster response time (common values are 63 and 90).	90

Displaying Demand

View Demand values in the following locations:

Application	Menu	Navigation
Front Panel	Display 2 screen	Press down button until screen appears
ION Setup	Demand Display Screen	Display Mode > Demand
Vista	Energy & Demand Screen (SWD)	Energy & Dmd tab
WebMeter	Consumption Screen	Consumption link

Chapter 10

Inputs / Outputs

This chapter provides information on the meter's various digital and analog inputs and outputs (I/O).

Refer to your Installation Guide for instructions on wiring inputs and outputs and for general meter I/O specifications.

In This Chapter

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Digital I/O

ION7300 series meters offer a variety of digital I/O combinations. The following are standard for **all** meters:

- ◆ four digital outputs
- ◆ one infrared data port
- ◆ one configurable LED output

Additionally, four digital status inputs are standard on ION7330 and ION7350 meters.

Use the digital outputs as status outputs or for relay control. The digital inputs are ideal for monitoring status or counting pulses from external dry contacts. The LED output is suitable for energy pulsing and alarming.

There is also an analog I/O option - four analog inputs and four analog outputs - that can be specified for any ION7300 series meter. Use these to monitor a wide range of conditions, such as device cycles (RPM), flow rates, fuel levels, oil pressures and transformer temperatures. You can output energy pulses to an RTU or perform equipment control operations. For more information, see the “Analog I/O (optional)” section in this chapter.

Digital Input modules control the meter’s digital inputs. The digital outputs can be controlled by Digital Output modules, Pulser modules, or Calibration Pulser modules. All of these modules act as intermediaries between the hardware port and the other modules in the meter; they define the characteristics of outgoing signals or tell the meter how to interpret incoming signals.

Refer to the technical note *Digital and Analog I/O* for more information on digital inputs and outputs.

Specifying a Port in an ION Module

Configure the Digital Output, Digital Input (ION7330 and ION7350), Pulser, and Calibration Pulser modules’ *Port* setup registers to specify which port handles the outgoing or incoming signals. To assign a port to one of these modules, simply modify the *Port* setup register by selecting a port from the enumerated list. This can be done with Designer or ION Setup.

Be aware that the enumerated list only displays those ports that are not yet assigned to another module. To make an assigned port available, you must first locate the module controlling the port and set its *Port* setup register to NOT USED (or delete the module entirely). The port now appears in the enumerated list.

NOTE

Infrared LED capability is not available until you set the IR1 PROTOCOL register in the IR Comm module to INFRARED I/O.

The following table describes the ports that can be configured (in the Digital Output, Pulser, Digital Input, and Calibration Pulser modules) to handle digital outgoing or incoming signals.

Port Setup Register Label (all models)	Meter Hardware Port
Port D1	D1
Port D2	D2
Port D3	D3
Port D4	D4
L1	L1
IR LED ¹	Infrared optical port
Port Setup Register Label (ION7330 / ION7350 only)	Meter Hardware Port
Port S1	S1
Port S2	S2
Port S3	S3
Port S4	S4

1. The infrared LED port is only available on meter models with integrated or remote display.

Using the Onboard Digital Outputs

The four digital output ports are located on the rear of the meter. ION Digital Output, Calibration Pulser, or Pulser modules control the function of the digital output ports. These modules define the characteristics of outgoing signals and can act as intermediaries between the hardware port and the other modules in the meter. Digital Output ports can be used to control relays or send status signals.

To configure the Digital Output, Calibration Pulser, or Pulser modules:

- ◆ assign each module to a different hardware port
- ◆ define the type of pulses each module sends

CAUTION

The relay outputs of the meter should never be used for primary protection functions. Be sure that you are familiar with the warnings at the beginning of this document, as well as those presented in your meter's Installation Guide.

Digital outputs can be controlled by different modules, depending on the application. For relay and control, use the Digital Output module. For pulsing applications, the Pulser and Calibration Pulser modules are generally used.

Digital Output Modules

The digital output ports can be controlled with the following modules:

- ◆ **Calibration Pulser modules** allow you to generate high accuracy energy pulses for calibration testing purposes. They integrate instantaneous power appearing at their inputs.
- ◆ **Digital Output modules** accept Boolean inputs, and output a continuous signal or pulses.
- ◆ **Pulser modules** convert instantaneous pulses to pulses or transitions.

Consult the *ION Reference* for more information about these ION modules.

Configure the settings of the controlling module to match your requirements. The settings in these modules are as follows:

ION Module	Setup Registers	Available Settings	Default	Description
Calibration Pulser Module	Port ¹	D1 to D4, L1, IR LED, or NOT USED	NOT USED	Specifies the output hardware channel
	Pulse Width	numeric	0.05	Pulse Width, in seconds
	Kt	0.01 to 1 x 10 ⁹	1.8 Wh	Specifies Watts per pulse
	Output Mode	Pulse, KYZ	Pulse	Sets the type of output
	Int Mode	Forward, Reverse, Absolute, Net	Forward	Specifies the integration
Digital Output Module	Port ¹	D1 to D4, L1, IR LED, or NOT USED	NOT USED	See above
	Pulse Width	numeric	0	Pulse Width, in seconds (set to 0 for continuous pulse)
	Polarity	Fixed at NON-INVERTING	NON-Inverting	Specifies non-inverted pulse
	EvLog Mode	LOG ON or LOG OFF	LOG OFF	Specifies to store state changes in the Event Log
Pulser Module	Port ¹	D1 to D4, L1, IR LED, or NOT USED	NOT USED	See above
	PulseWidth	numeric	1	Pulse width, in seconds
	OutputMode	PULSE or KYZ	PULSE	Specifies full pulse or KYZ
	Polarity	Fixed at NON-INVERTING	NON-Inverting	Specifies non-inverted pulse

1. The "IR LED" Port setting is only available if the Infrared Comm (Communications) module's Protocol is set to "INFRARED I/O".

Ensure that the module's *Port* setup register matches the meter's output you want to control. If the port you want to use does not appear in the *Port* setup register's list, it means that port is in use by another module. Edit the *Port* setup register of the module using that port and set it to NOT USED, then send and save the changes to the meter — the port will then be available to other modules.

Using the Digital Inputs (ION7330 and ION7350)

Use the meter's four digital (status) inputs for monitoring external contacts or pulse counting applications. These inputs can be used for dry contact sensing, but they cannot be used for voltage sensing applications.

The functions of digital input ports S1 through S4 are controlled by Digital Input modules Digital In 1 through 4, respectively. These modules are preconfigured at the factory, together with four Counter modules S1 through S4 for counting status changes, and an External Pulse module for resetting the Counter modules.

Digital Input Modules

The four Digital Input modules are factory configured as follows (refer to the *ION Reference* for complete details on module function). Configure the settings of the controlling module to match your requirements.

Setup Register	Available Settings	Creation Default	Description
Input Mode	Pulse or KYZ	Pulse	Complete pulse or KYZ transition pulse
EvLog Mode	Log Off or Log On	Log Off	Whether or not to log status changes in the Event Log
Debounce	0 to 65.25	0.010	Mechanical contact bounce, in seconds
Polarity	Non-Inverting or Inverting	Inverting	Non-inverted (or level) pulse
Port	Not Used Port S1 Port S2 Port S3 Port S4	Not Used	The input hardware channel controlled

Once you have connected the status inputs to the field equipment they are going to monitor, check the meter's Digital Input modules to ensure they are configured appropriately.

Analog I/O (optional)

Optional analog I/O ports are found on the rear of the meter. Use analog inputs to monitor a wide range of conditions, such as flow rates, RPM, fluid levels, oil pressures and transformer temperatures. Analog outputs let you output real-time power to an RTU or perform equipment control operations.

NOTE

You must order your meter with the analog I/O option for analog capability; it cannot be field retrofitted.

Refer to the technical note *Digital and Analog I/O* for more information on analog inputs and outputs.

Your meter uses Analog Input and Analog Output modules for analog I/O. See the *ION Reference* for more information on these modules.

NOTE

Your meter's default template may already include a framework of pre-configured Analog Input and Analog Output modules.

Specifying a Port in an ION Module

Configure the Analog Output and Analog Input modules' *Port* setup registers to specify which port handles the outgoing or incoming signals. To assign a port to one of these modules, simply modify the *Port* setup register by picking a port from the enumerated list. This can be done using either Designer or ION Setup.

The following table lists the ports that can be configured in the Analog Input and Analog Output modules to handle outgoing or incoming analog signals.

Analog Output Port Setup Register Label	Meter Hardware Port
Analog Out 1	A1
Analog Out 2	A2
Analog Out 3	A3
Analog Out 4	A4
Analog Input Port Setup Register Label	Meter Hardware Port
Analog In 1	A11
Analog In 2	A12
Analog In 3	A13
Analog In 4	A14

Using the Analog Outputs

The four optional Analog Output ports can output energy pulses to an RTU or perform equipment control operations. Both types of Analog Output (either 0-20 mA or 0-1 mA) can deliver a continuous DC signal. Analog Output modules control these hardware ports.

Analog Output Modules

Configure the settings of the controlling module to match your requirements. The settings in these modules are as follows:

Setup Registers	Available Settings	Creation Default	Description
Port	Not Used, Analog Out1 to Analog Out 4 inclusive	Not Used	The output hardware channel
Full Scale	-1×10^9 to 1×10^9	1	Defines what value appears in the ScaledValu output register when the highest possible value from the hardware is applied
Zero Scale	-1×10^9 to 1×10^9	0	Defines what value appears in the ScaledValu output register when the lowest possible value from the hardware is applied

Setting Zero Scale for 4 to 20 mA Outputs

If you want your meter's 0 to 20 mA analog output ports to operate as 4 to 20 mA outputs (i.e. delivers a 4 mA current with a zero *Source* input value to the Analog Output module), use the following formula:

$$\text{Zero Scale} = -0.25 * \text{Full Scale}$$

For example, with a *Full Scale* value of 100, your *Zero Scale* setting would be -25.

Using the Analog Inputs

Use the analog inputs to measure and store analog information such as electrical signals from transducers (from flow rates, temperatures, pressures, rotations, and fluid levels). Analog Input modules control the analog inputs.

Analog Input Modules

Configure the settings of the controlling module to match your requirements. The settings in these modules are as follows:

Setup Registers	Available Settings	Creation Default	Description
Port	Not Used, Analog In 1 to Analog In 4 inclusive	Not Used	The input hardware channel
Full Scale	-1×10^9 to 1×10^9	1	Defines what value appears in the ScaledValu output register when the highest possible value from the hardware is applied
Zero Scale ¹	-1×10^9 to 1×10^9	0	Defines what value appears in the ScaledValu output register when the lowest possible value from the hardware is applied

¹ An arbitrary input value can be treated as the Zero Scale (i.e., a 4-20 mA input is capable of generating a 0 to X output).

Configuring Inputs and Outputs

Use the front panel, ION Enterprise or ION Setup software to configure the meter's I/O framework:

- ◆ ION Setup Basic mode provides a Setup Assistant to help you configure Analog Outputs.
- ◆ ION Setup Advanced mode allows you to configure all I/O related modules (Digital Inputs, Digital Outputs, Analog Inputs, Analog Outputs).
- ◆ You can also use Designer to configure all modules.

See the Energy Pulsing chapter for information on configuring the Calibration Pulser modules.

Using the Front Panel

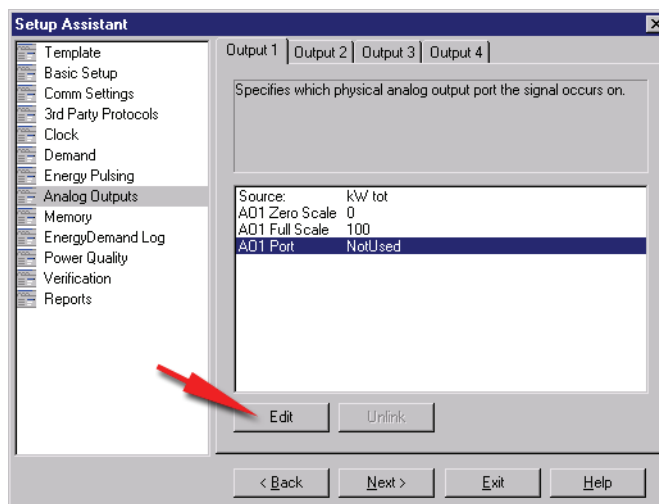
The ADVANCED METER SETUP menu allows you to modify the setup registers settings for ION modules that currently exist in the meter framework (i.e., Digital Input, Analog Input, Analog Output, and Calibration Pulser modules). You cannot use the front panel to create a new module, modify a module's source/input or rename a module.

To access the various modules, press the Round button twice; scroll down the Setup menu and select ADVANCED METER SETUP.

Using ION Setup

The Analog Outputs Setup Assistant helps you configure the Analog Output modules.

1. Open ION Setup and connect to your meter, using Basic Mode.
2. In the Setup Assistant, navigate to Analog Outputs.



The tabs on the Analog Outputs screen correspond to Analog Output modules (for example, Output 1 allows you to configure Analog Output module 1). Click on the tab you wish to edit.

3. To edit a value select the parameter and click Edit.
4. You can also unlink the source for each Analog Output module, using the Unlink button. To link a new source, click Edit and select a source register.

You can configure *all* of the I/O related modules using Advanced Mode.

1. Connect to your meter, using Advanced Mode.
2. Click the module you wish to configure.

Using Designer

Open your meter in Designer and navigate to the Advanced Configuration framework. Click on the appropriate grouping object (Digital Inputs, Digital Outputs or Analog I/O) and right-click the module you want to edit.

Chapter
11

Energy Pulsing

This chapter provides instructions for configuring energy pulsing on your meter.

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Introduction

Your meter uses Calibration Pulser modules and Pulser modules for energy pulsing.

The Pulser module serves as an intermediary between other modules' pulse output registers (accepting them as pulse inputs) and a hardware output channel on the device. These modules are capable of sending pulses or pulse transitions to any hardware output channel.

The Calibration Pulser module is a highly accurate energy pulser used for verifying calibration on meters employed in billing applications. This module type serves as an intermediary between the power (kW, kVAR or kVA) outputs of the Power Meter module and a device's hardware output channel.

See the *ION Reference* for more information on these modules.

Configuring Energy Pulsing

Use the front panel or ION software to change your meter's energy pulsing settings.

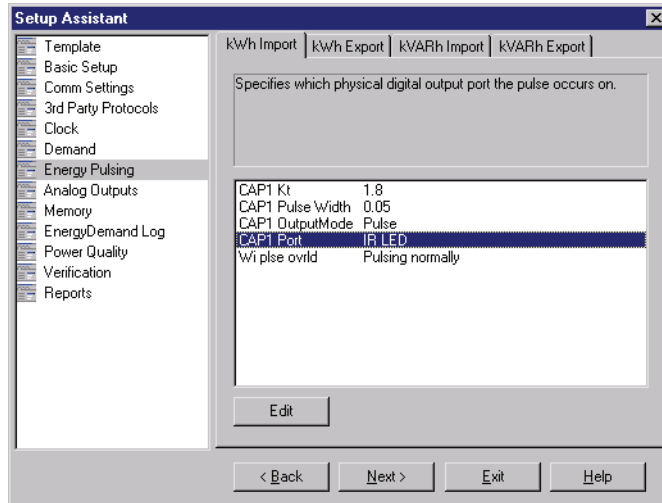
Using the Front Panel

The ADVANCED METER SETUP menu allows you to configure all energy pulsing related meter modules. To access the various modules, press the round button twice; scroll down the Setup menu and select ADVANCED METER SETUP.

Using ION Setup

The Energy Pulsing Setup Assistant helps you configure the Calibration Pulser modules.

1. Open ION Setup and connect to your meter, using Basic Mode.
2. In the Setup Assistant, navigate to Energy Pulsing.



3. Click any of the tabs; each tab corresponds to a Calibration Pulser module. Configure each module as necessary.

You can configure *both* the Calibration Pulser and Pulser modules using Advanced Mode.

1. Connect to your meter, using Advanced Mode.
2. Click the module you wish to configure.

Using Designer

Open your meter in Designer and navigate to the Energy Pulsing Setup Framework. Right-click a module to edit.

Pulser Module Settings

The Pulser module contains the following setup registers:

Setup Register	Function	Default
Pulse Width	This register specifies the width of the output pulses (in seconds).	1
OutputMode	This register defines whether the output is a complete pulse or a transition pulse (KYZ).	Pulse
Polarity	This register specifies the polarity of a pulse output. It has no effect if <i>OutputMode</i> is KYZ.	Non-inverting
Port	This register specifies which hardware port the output appears on. Only those hardware channels that are still available appear in this list.	Not Used

Five common parameters (kWh del, kWh rec, kVARh del, kVARh rec, and kW sd del) are already linked to the Pulser modules for you.

NOTE

For safety reasons, no hardware channel is pre-selected. To make use of these links, you must link the Pulser module's *Port* setup register to the appropriate hardware port.

Calibration Pulser Module Settings

Five Calibration Pulser modules are preconfigured at the factory for energy pulsing applications. One of these modules is programmed to send kWh pulses to the LED on the back of the meter. The remaining four (configured for imported/exported kWh and kVARh pulsing) can be configured to send energy pulses to any digital output port. Edit the appropriate Calibration Pulser or Pulser module's *Port* setup register, and set it to the port you want to send the signal through (D1, D2, D3 or D4, or IR1).

The following setup registers are available in the Calibration Pulser module:

Setup Register	Function	Default
Pulse Width	This register specifies the width of the pulses sent to the hardware channel (in seconds). The Calibration Pulser module maintains a minimum duty cycle of 50% on the output pulse train.	0.05
Kt	The numeric bounded register defines how much energy the module accumulates before a pulse is sent to the hardware channel. An industry standard for energy pulsing is 1.8, or one pulse per 1.8 energy-hours.	1.80
Int Mode	Specifies the modes of integration that may be selected.	Absolute
OutputMode	This register specifies whether the output is a complete pulse (Pulse) or a change of state transition (KYZ).	Pulse
Port	This register specifies which hardware port the pulse/KYZ transition appears on. Only those hardware channels that are still available appear in this list.	Not Used

Energy Pulsing with LEDs

The LED port (L1) controls the LED on the back of the meter. This port is used for kWh pulsing by default; LED 1 on the back of the meter pulses every 1.8 Wh. If you wish to configure the LED for other energy pulsing applications (i.e. kVAh, kVARh), you must first disable the default kWh pulsing.

Using the front panel to disable kWh pulsing

1. From the SELECT SETUP menu, choose ADV METER SETUP > CALIBRATION PULSER MODULES > kWh IMP LED, highlight the *Port* setup register and press the round button.
2. From the list of available ports, select NOT USED.

Using Designer to disable kWh pulsing

Select the kWh imp LED Calibration Pulser module and disable L1 by setting the *Port* setup register to NOT USED.

Configuring Other Energy Pulsing Applications

Now that you have the L1 port free, you can assign other Pulser, Digital Output, or Calibration Pulser modules to it. Using the front panel, assign a Pulser module as follows:

1. From SELECT SETUP choose ADV METER SETUP, then select the new module type and the module you wish to use for pulsing the LED.
2. Scroll down and select the *Port* (e.g. PU2) setup register, then choose L1.

You can also configure LED energy pulsing from Designer. Select the Digital Output, Pulser, or Calibration Pulser module you wish to use and set its *Port* setup register to L1.

Changing the value for the *Kt* setup register of the controlling Calibration Pulser module lets you modify the pulsing rate of either channel. If you want to configure the LED port for a different pulsing application, you must re-link the *Source* input to the output register of a different instantaneous power quantity in one of the Arithmetic modules in the Demand Framework. Ensure that the quantity you choose originates from the MU (meter units) Power Meter module.

Chapter
12

Logging

Your meter includes data logging and event recording capabilities. Data and event logs recorded by the meter are prioritized and stored onboard. This data is then retrieved periodically by the ION Enterprise Log Server or another third party application.

If you use ION Enterprise software, all retrieved data from your system is stored in an ODBC-compliant database. The information in the database can be viewed and analyzed using ION Enterprise software applications such as Vista (for viewing), or Reporter (for organizing and presenting data).

For more information on Vista and Reporter see the online *ION Enterprise Help*.

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Data Logging (ION7330 and ION7350)

The standard configuration of the meter includes data recorders that log various power system data such as energy and demand, or the average power system quantity used over a period of time (Historic Mean Log). The ION7350 also logs voltage sags and swells.

To learn more about these modules, consult the *ION Reference*.

CAUTION

Changing logging settings will reset logged values. Ensure that all important data has been recorded before you make changes.

Refer to the section “Default Logging Configuration” for detailed information about your meter’s pre-configured Data Recorder modules.

Configuring Data Logging

Use the front panel or ION software to change your meter’s logging settings.

Using the Front Panel

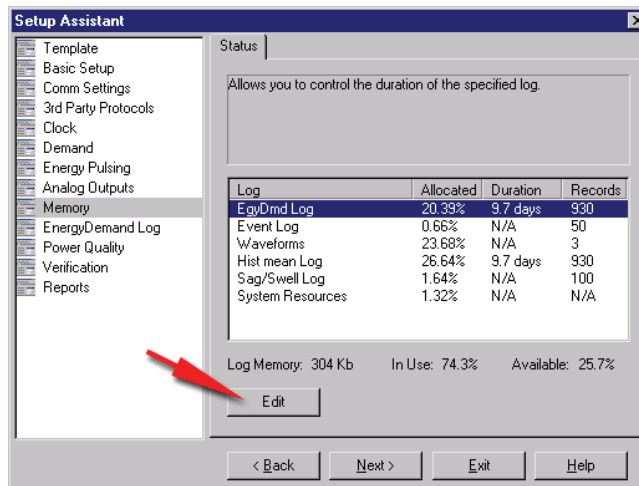
The ADVANCED METER SETUP menu allows you to configure all logging related meter modules. To access the various modules, press the round button twice; scroll down the Setup menu and select ADVANCED METER SETUP.

Using ION Setup

The Setup Assistant helps you configure meter data logging. Open ION Setup and connect to your meter, using Basic Mode.

Memory Screen

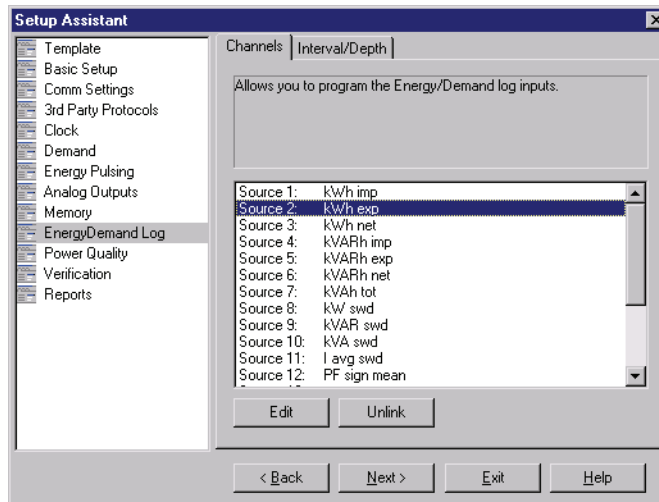
1. Select the Memory screen to re-allocate meter memory.



2. Select the Log you wish to configure and click Edit. You can change both the Log Duration (days) and the Log Size (records). Notice how changing these parameters affects the meter memory allocated to that log.

EnergyDemand Log Screen

1. Select the EnergyDemand Log screen to configure Data Recorder #10 (Energy Demand Log).



2. Click the Channels tab to edit, link and unlink energy and demand log parameters.
3. Click the Interval/Depth tab to edit the interval and duration of the energy/demand log

Changing the Parameters that are Logged

The meter's factory configuration logs a comprehensive set of energy, power and harmonics parameters. You cannot change which parameters are logged simply by configuring a setup register. If you are comfortable editing module links, you can change the logged parameters by linking the output registers you want logged to the inputs of an Data Recorder module.

NOTE

Adding or deleting a log's parameters is an advanced procedure, as it requires changes to the links between modules; use Designer (refer to the Designer section of the online *ION Enterprise Help*) or ION Setup.

Changing Waveform Recording (ION7350 only)

The Waveform Recorder modules (V1, V2, V3, I1, I2, I3) do not require changes to their default settings. If you want to change the format of the recorded waveforms, refer to the Waveform Recorder module description in the *ION Reference*.

Default Logging Capacity

The following table summarizes the default recording depths and recording intervals of the various Data and Waveform recorders in the meter.

Log	Depth	Interval
Historic Log	930	900 seconds (15 minutes)
Waveform recording (waveform recorders)	3	Triggered on demand
Report Generator Log (EgyDmd Log)	930	900 seconds (15 minutes)
Sag/Swell Log (ION7350 only)	100	Triggered on demand
Event Log (Event Log Controller module)	50	Triggered on demand

Changing the Log Depths

Change the value in the *Depth* setup register to increase the number of records stored in the recorder. The *RecordMode* setup register controls how the Data Recorder will overwrite old records; refer to the Data Recorder module description in the *ION Reference* before changing this setup register.

Changing the Frequency of Logging

The two Periodic Timer modules that control the frequency of different data recording are as follows:

- ◆ “EgyDmd Log” Trg controls the frequency of logging for the Energy and Demand Log (this log is used for generating reports using Reporter).
- ◆ “Hist Log Trg” controls the frequency of Historic Data logging.

Change the value in the *Period* setup register to change the frequency of data logging (Period values are specified in seconds).

Default Logging Configuration

The standard configuration of ION7330 and ION7350 meters includes two data recorders that log various power system data.

The ION7350 also includes the Sag/Swell Data Recorder module, as well as six Waveform Recorder modules.

Historical Data Logging

One Data Recorder module, the Historic Mean Log, records the following output register values by default:

Hist Mean Log	
Vll avg mean	Vln avg mean
I avg mean	kW tot mean
kVAR tot mean	kVA tot mean
PF sign mean	Freq mean
V unbal mean	I unbal mean
V1 THD mean	V2 THD mean
V3 THD mean	I1 THD mean
I2 THD mean	I3 THD mean

ION Enterprise Reporting

The Egy Dmd Log recorder is configured to provide power system data for the Reporter software. If any input links to this module are changed, Reporter will not be able to create reports from the device's logs. If you use Reporter, do not change the parameters that are logged in the Egy Dmd Log.

Sag/Swell Logging (ION7350 only)

The meter's Sag/Swell Log records the following output register values:

Sag/Swell Log	
SS1 DistDur	SS1 DistV1Min
SS1 DistV1Max	SS1 DistV2Min
SS1 DistV2Max	SS1 DistV3Min
SS1 DistV3Max	SS1 DistNominal

Viewing Data Logs

See the Reporting chapter. You can also view Data Logs using ION Setup.

1. Open your meter in ION Setup, using Basic Mode.
2. Navigate to View > Data Screens > Data Recorders. The following logs are available for viewing:
 - ◆ Demand
 - ◆ Enables
 - ◆ Event
 - ◆ Harmonic
 - ◆ Maximum
 - ◆ Minimum
 - ◆ RealTime
 - ◆ Status
 - ◆ Waveform (ION7350 only)

Event Logging

Events produced by a meter's various ION modules are prioritized and grouped to facilitate custom logging. Each event is assigned a priority group number based on its type and severity.

ION Event Priority Groups

Some event groups are preset with a Priority Number as shown in the table below. You can also define your own priority number for some modules. Priority numbers from 128-191 appear in the global event log viewer in ION Enterprise software. Priority numbers from 192-255 are logged, initiate a beep and cause the window to flash. You can customize these responses to display messages or perform *net send* messages, for example.

Event Group	Description	Priority Number
Reset	Module reset or resynchronized	5
Setup Change	Module setup changes	10
Input Register Change	Inputs of certain modules change value	15
I/O State Change	I/O state changes (i.e. relay closes)	20
Information	Module produces important user information	25
Warning	Module produces a warning	30
Failure	A failure has occurred	255

The Event Log Controller module allows you to set a priority cutoff for event logging. Any events with a priority number greater than the cutoff value are logged, and events with lower priorities are discarded. Refer to the individual module descriptions and the Event Log Controller module description in the *ION Reference* for more details.

External ION Events

Some events are not produced by a specific module. These events are generated internally by the meter. Their associated priority levels are shown in the table below.

Event Group	Description	Priority Number
Warning	Factory initialize performed	30
	Firmware upgrade performed	
	Memory upgrade performed	
	Device power-up	
	Device power-down	
Failure	Communications fail to allocate required memory	255

Displaying Events

View Events in the following locations:

Application	Menu / Screen	Navigation
Front Panel	N/A	N/A
ION Setup	Event	Display Mode > Data Recorders folder > Event
Vista	Meter Events	System & Logs tab > Meter Events object
WebMeter	N/A	N/A

Logging and Recording Capacity

ION7330 and ION7350 meters provide both data and event logs. The standard memory capacity for both meters is 304 kilobytes of non-volatile memory. This is enough memory to log 16 parameters every 15 minutes for 30 days. However, by default the meter is set for a log depth of 930, which is enough for 9 days.

The following equation can help determine the amount of memory required to store **data and event logs**:

$$\text{each record consumes (in Bytes)} = [(\text{number of parameters} * 5) + 8]$$

ION7350 meters can also perform waveform recording. It can simultaneously capture events on all channels to a maximum of 48 cycles each.

To calculate the **waveform memory** usage use the following formula:

$$\text{waveform memory usage (in Bytes)} = [2 * (\text{number of samples per cycle} + 10) * (\text{number of cycles in waveform}) + 30]$$

See the following table:

Format	Memory Usage	Page Usage
16 x 22	1024 x M ¹	1 x M
16 x 48	2048 x M	2 x M
16 x 72	3072 x M	3 x M
16 x 96	4096 x M	4 x M
32 x 12	1024 x M	1 x M
32 x 26	2048 x M	2 x M
32 x 40	3072 x M	3 x M
32 x 54	4096 x M	4 x M
64 x 14	2048 x M	2 x M
64 x 28	4096 x M	4 x M
128 x 14	4096 x M	4 x M

¹ M = Recorder depth

NOTE

Round up to the next kilobyte after each of the above calculations.

Chapter
13

Power Quality (ION7350 only)

This chapter explains how to configure your meter's power quality functionality.

In This Chapter

◆ Introduction	126
◆ Configuring Power Quality	126
Using the Front Panel	126
Using ION Setup	127
Using Designer	127
Sag/Swell Module Settings	128

Introduction

For the ION7350 meter, power quality parameters can be set up using the Sag/Swell module. The Sag/Swell module monitors applicable phase voltages for temporary undervoltages and overvoltages (i.e. CBEMA Type 2 and Type 3 disturbances).

Once a disturbance is detected, magnitude and duration data is captured by the Sag/Swell module, and is passed to a data recording framework.

See the *ION Reference* for more information on this module.

Configuring Power Quality

Use the front panel or ION software to change your meter's power quality settings.

Using the Front Panel

Navigate to Quick Setup > Sag/Swell to access the following settings for the detection of voltage sags and swells.

Menu	Setting	Description	Range (Values)	Default
Sag/Swell	Swell Lim ¹	The limit a monitored voltage must exceed in order for the meter to classify it as an overvoltage condition	0 to 9999	106
	Sag Lim ¹	The limit a monitored voltage must fall below in order for the meter to classify it as an undervoltage condition	0 to 999	88
	Nom Volts ²	The primary power system voltage (L-L voltage for Delta systems, and L-N voltage for Wye systems)	0 to 9,999,999	0

¹ The ANSI C84.1 1989 standard recommends a temporary overvoltage limit of 106% for Range B voltage levels, and a temporary undervoltage limit of 88% for load voltages and 92% for the service entrance.

² The primary power system voltage is sometimes different than the PT Primary setup register value; i.e. when the PT Primary is used to indicate winding ratio rather than primary voltage.

Swell Limit

This value must be expressed as a percentage of the nominal voltage (entered below in the NOM VOLTS item). Setting the SWELL LIM value changes the *Swell Lim* setup register in the factory-configured Sag/Swell module.

Sag Limit

This value must be expressed as a percentage of the nominal voltage (entered below in the NOM VOLTS item). Setting the SAG LIM value changes the *Sag Lim* setup register in the factory-configured Sag/Swell module.

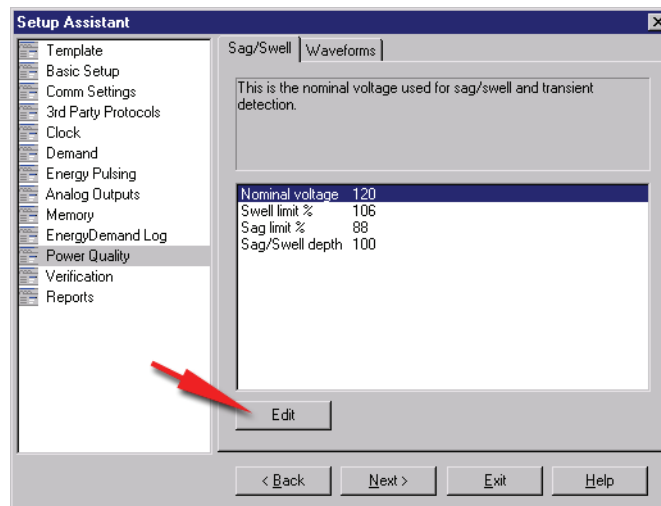
Nominal Voltage

By default, this value is set to 0 V. Ensure that this item matches your power system's nominal voltage (i.e. 120, 277, or 347). All Sag/Swell functions are disabled when the nominal voltage setting is 0 (zero). Setting the *NOM VOLTS* value changes the *Nom Volts* setup register in the factory-configured Sag/Swell module.

Using ION Setup

The Power Quality Setup Assistant helps you configure the various power quality modules.

1. Open ION Setup and connect to your meter, using Basic Mode.
2. In the Setup Assistant, navigate to the Power Quality folder.



3. Click on the Sag/Swell tab to set sag and swell limits, configure sag/swell recorder depths and most importantly, record your system's nominal voltage.
4. Click on the Waveform tab to configure waveform recorder settings.

Using Designer

Open your meter in Designer and navigate to the Power Quality Setup Framework. Right-click a module to edit.

Sag/Swell Module Settings

The Sag/Swell module monitors voltage waveforms for sags and swells (i.e. ITI (CBEMA) Type 2 and Type 3 disturbances); it then reports each disturbance's magnitude and duration. The Sag/Swell module can also detect sub-disturbances during a Sag/Swell event. Settings are as follows:

Setup Register	Function	Default
Swell Lim	This is the magnitude above which a voltage deviation is considered a swell.	106
Sag Lim	This is the magnitude below which a voltage deviation is considered a sag.	88
Nom Volts	This is the nominal power system voltage (used for all Power Quality functions).	0 ¹

¹ The primary power system voltage is sometimes different than the PT Primary setup register value (i.e. when the PT Primary is used to indicate winding ratio rather than primary voltage).

NOTE

If the Sag/Swell module's *Nom Volts* setup register is set to zero, all Sag/Swell module functions are disabled. *Nom Volts* is typically set when the meter is put into service. If *Nom Volts* has not been set, enter a value for your system's nominal voltage (i.e. 120, 277, or 347).

Chapter
14

Meter Resets

This chapter provides instructions for performing various meter resets.

In This Chapter

- ◆ **Performing a Reset 130**
 - Using the Front Panel 130
 - Using ION Setup 131
 - Using Vista 132

Performing a Reset

Resets allow you to clear various accumulated parameters stored by the meter.

NOTE

Be sure to record any important data before performing a meter reset.

Using the Front Panel

Use the CLEAR FUNCTIONS menu to reset cumulative parameters. To access the Clear Functions screen, press the round button; scroll down the Setup menu and select CLEAR FUNCTIONS.

Peak Demand Reset

The following Demand parameters are reset when you select PEAK DMD RSET:

- ◆ Maximum and Minimum Rolling (Sliding Window) Demand (kW, kVAR, kVA)
- ◆ Maximum and Minimum Thermal Demand (kW, kVAR, kVA)

Min/Max Reset

Select MNMX RSET to reset the minimum and the maximum values for each of the following parameters:

- ◆ Phase and average Current
- ◆ Line-to-line voltages
- ◆ Line-to-neutral voltages
- ◆ Frequency
- ◆ PF lead and PF lag
- ◆ Total kW, kVAR, kVA

Sliding Window Demand Reset

These Sliding Window Demand values are reset when SWDEMAND RSET is selected:

- ◆ Average Current (I avg) SWD
- ◆ kVAR SWD
- ◆ kW SWD
- ◆ kVA SWD

Thermal Demand Reset

The following Thermal Demand parameters are reset when TDEMAND RSET is selected:

- ◆ Average Current TD
- ◆ kVAR TD
- ◆ kW TD
- ◆ kVA TD

Manual Waveform Trigger

Select this menu item to capture your per-phase current and voltage waveforms.

Harmonics Min/Max Reset

Select HARM MNMX to reset the following Harmonics Parameters:

- ◆ Current Total HD (Ia, Ib, Ic)
- ◆ Voltage Total HD (Va, Vb, Vc)

Energy Reset

Select ENERGY RSET to reset the following energy parameters:

- ◆ kWh import, export, total and net
- ◆ kVAh
- ◆ kVARh import, export, total and net

Status Counters

Each of the four Status Counters that monitor the number of times each Status input changes are reset when S COUNT RSET is selected.

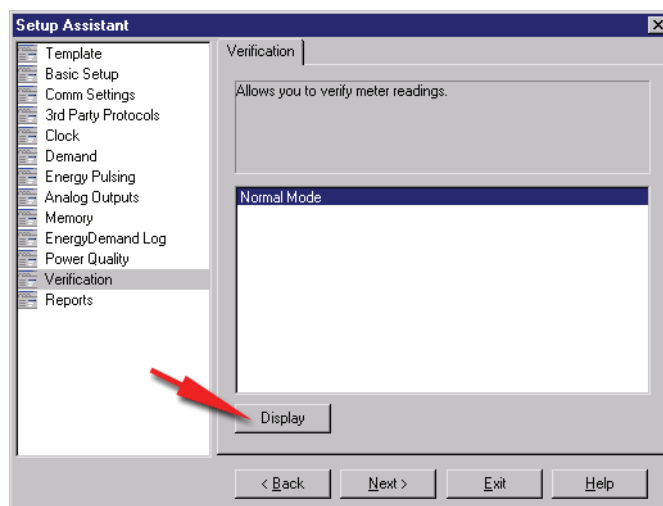
Disturbance Counter Reset

Resets the counter in the Sag / Swell module that keeps track of how many Sags or Swells are detected by the meter.

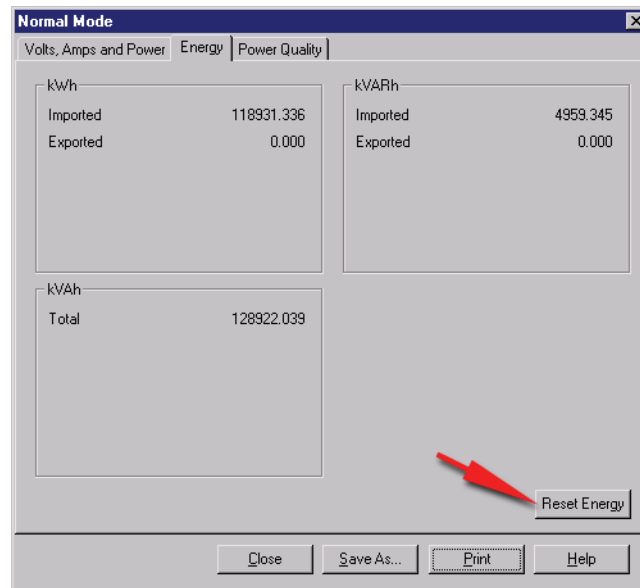
Using ION Setup

Perform the following to reset energy values.

1. Open ION Setup and connect to your meter, using Basic Mode.
2. In the Setup Assistant, navigate to the Verification folder.
3. Select Normal Mode and click Display.



4. Click on the Energy tab in the Normal Mode dialog box, and then click the Reset Energy button to perform the reset.



A dialog box informs you when the reset is complete.

Using Vista

Open your meter in Vista. You can perform several resets from within Vista:

Performing a Long-Term Min/Max Reset

1. Click the Long-Term Min/Max control object on the Real Time screen.
2. Click the Min/Max Reset button to reset voltage, current, power, PF and frequency minimum & maximum values.

Performing a Harmonics Min/Max Reset

1. Click the Long-Term Min/Max control object on the Power Quality screen.
2. Click the Harmonics Min/Max Reset button to reset voltage and current harmonics minimum & maximum values.

Performing a Demand, Peak Demand or Energy Reset

1. Click the Energy & Dmd tab.
2. Click the appropriate reset button to perform the reset.

Chapter
15

Alerting (ION7350 only)

Meter alerts can send an email or contact a modem, fax, pager, or software in the event of a user-specified condition. These conditions can be changes in relays or power quality problems including surges, sags, swells and outages.

This chapter explains how to configure your ION7350 meter for alerting.

In This Chapter

◆ Introduction	134
◆ Configuring the Meter for Alerting	134
Alerting ION Software via the Alarm Server	135
Alerting via an Alphanumeric Pager	136
Alerting via a Numeric Pager	136
Alerting via Email	137

Introduction

The ION7350 meter's Alert module sends an alert whenever its *Trigger* input is pulsed. You can connect this input to any module that produces a pulse output. You can use modules that monitor alarm conditions such as changes in relay status and power quality problems. For example, you can connect the *Trigger* input to the output of a Setpoint module, thereby allowing the Alert module to send an alert when the setpoint condition is reached.

The Alert module delivers these types of alerts:

- ◆ Numeric Pager
- ◆ Alphanumeric Pager
- ◆ PEGASYS (for alerts to PEGASYS software)
- ◆ ION Alert (for alerts to ION Enterprise software)
- ◆ ASCII
- ◆ Email

Selection between modes is made with the Alert module *Alert Type* setup register.

The Alert module requires access to either a modem (a dedicated modem or a modem handling a loop of meters) or Ethernet (for the Alert module email capabilities).

Your ION7350 meter has no pre-configured Alert framework. For detailed information about alerting, including how to build a framework to send alerts, refer to the Alert module description in the *ION Reference*.

Configuring the Meter for Alerting

Use the front panel or ION software to change your meter's alert settings.

Using the Front Panel

The ADVANCED METER SETUP menu allows you to configure all Alert modules. To access the modules, press the round button twice; scroll down the Setup menu and select ADVANCED METER SETUP.

Using ION Setup

1. Connect to your meter in ION Setup, using Advanced Mode.
2. Click on an Alert module to edit.

Using Designer

1. Create a new Alert module by dragging one from the Toolbox.
2. Right-click on the module to configure.

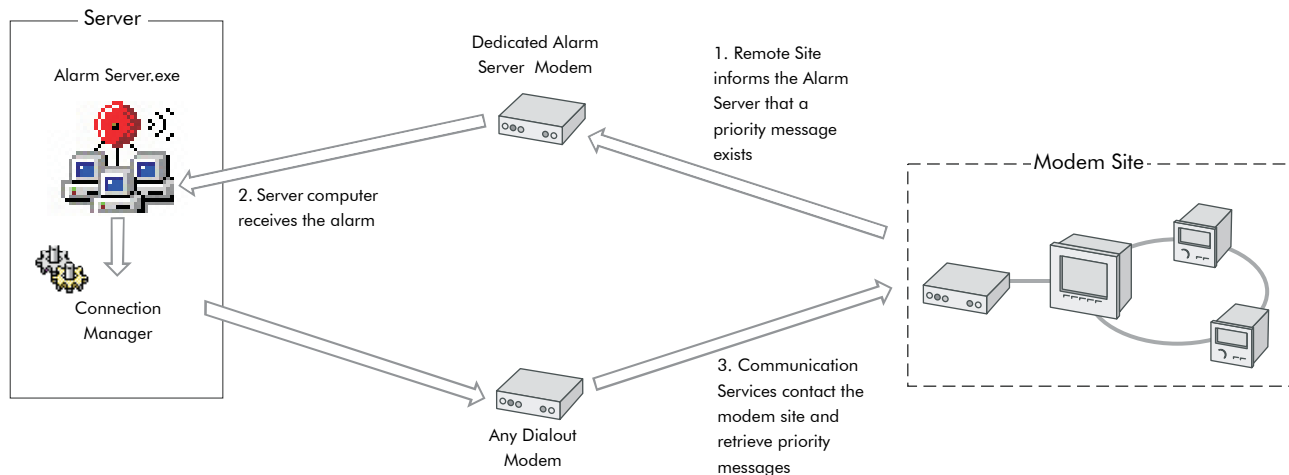
Alerting ION Software via the Alarm Server

NOTE

For detailed information about sending alerts to ION Enterprise/PEGASYS software via the Alarm Server, refer to the ION Enterprise online help.

The Alarm Server can run on any ION software Primary or Secondary server. The server computer should have a dedicated phone line and modem. Modems at remote sites are programmed to dial the server's phone number when a priority event occurs. The Alarm Server monitors the phone line and waits for the remote sites to annunciate events. The most common use of the Alarm Server is to handle Remote Site Event Notification.

Remote Site Event Notification



The Alarm Server uses a series of command line arguments to specify the actions it takes when a priority event is reported. These commands must be entered on the computer that is running the Alarm Server utility. Typically the Alarm Server is configured to launch the Connection Manager, which dials up the remote site and retrieves the logs from the devices. The Alarm Server can also be configured to launch other applications. A series of parameter switches are added to the command line to pass information about the event to the application that is launched.

Configuring the Alarm Server

The Alarm Server should have a dedicated phone line, modem, and COM port to avoid conflicts with other ION software components.

The modem used by the Alarm Server is **not** configured with the Management Console— only dialout modems are configured in the Management Console. The Alarm Server's executable, `alarmsrv.exe`, is typically located in `\\Schneider Electric\ION Enterprise\SYSTEM\bin`. You can run the Alarm Server in a console window, or you can define a shortcut icon that includes all of the command line arguments required.

Alarm Server Command Line Arguments

Refer to the ION Enterprise online help for a list of command lines that the Alarm Server supports.

Alerting via an Alphanumeric Pager

NOTE

For detailed information about building a framework for alerting via an alphanumeric pager, refer to the Alert module description in the *ION Reference*.

If an alphanumeric pager is specified as the destination address in the Alert module, then an alphanumeric paging service receives a message from the ION meter.

Once the modem at the paging service is contacted, the ION meter transmits the following information:

- ◆ Pager identification number
- ◆ Local time (year, month, date, hours, minutes, seconds)
- ◆ Remote site identification
- ◆ Priority of the alarm
- ◆ Alert message, with text strings and realtime measured values

To include a module's *Source* input in the message, reference the message string by using the form `%Vn`, where `n` is the *Source* input number. In the following *Message* register setting, the `kWtot` value is `%V1`. The string includes *Source* input 1 which would be the `kWtot` register from the Power Meter module.

The destination register contains your modem access number for the paging service provider and is what is dialed out first. The *Pager Num* register is the pager access number that is provided by your paging company.

Alerting via a Numeric Pager

NOTE

For detailed information about building a framework for alerting via a numeric pager, refer to the Alert module description in the *ION Reference*.

If a numeric pager is specified as the destination address in the Alert module, then a numeric paging service receives a message from the ION meter. Due to the inherent limitations in numeric paging, the ION meter can only send a string of digits to the paging service. The Alert module then waits a specified time, determined by the number of commas inserted after the phone number in the *Pager Num* setup register. Finally, the Alert module dials the message digital string.

There are two important factors to consider when setting up the Alert module for numeric paging. First, be sure to specify a string of digits that is meaningful to you, such as a coded message. Second, be aware that there is no way to assure that a message has been successfully transmitted. Instead, there may be a busy signal or an answering machine may take the call. The number of commas you add to your dial string is an estimate of how long the modem at the remote site waits before it transmits numbers.

 **NOTE**

In the following destination-setting example: 1-250-555-666,,,,,999#, the pager number is 1-250-555-666 and the message string that displays on the pager is 999. You may need to insert 9,,, before the destination number if the line you are using is not a direct line. In this case the destination number is 9,,1-250-555-666,,999#

Alerting via Email

 **NOTE**

For detailed information about setting up your network and building an email messaging framework for meter alerts, refer to the technical note *MeterM@il Internal Email Client Feature*.

If email is specified as the destination address in the Alert module then an email message is sent to any address you specify. You can only set one email address per Alert module. If you want to send an alert to more than one email address you need to create a group — be sure your email server is configured to send email to groups via SMTP (Simple Message Transport Protocol).

Follow the steps below to send email alerts from your meter. Note that your meter must support emailing (with a correctly configured SMTP server):

1. Create an Alert module.
2. Configure these Alert module setup registers as indicated:
 - ◆ *Message* – type in the text of the alert to be emailed.
 - ◆ *Destination* – type in the destination email address.
 - ◆ *Type* – select Email.
 - ◆ *Com Port* – select Ethernet.
 - ◆ *Location* – type in a custom string; this is optional, and appears in the email.
 - ◆ *Email From* – type in an address that you want the email to appear from. This may be required as some SMTP servers only accept emails from valid addresses.

3. Create an ION module that will produce a pulse on its *Trigger* output when the exceptional event occurs (for example, a Setpoint module pulses its *Trigger* output when the setpoint condition is reached).
4. Link the Alert module's *Trigger* input to the *Trigger* output of the module created in step 3.
5. Send and save. When the *Trigger* input is pulsed, the Alert module establishes communications with the SMTP mail server, and emails the alert message.

Chapter
16

Setpoints (ION7330 and ION7350)

This chapter provides instructions for configuring meter setpoints.

In This Chapter

- ◆ **Introduction** 140
 - Setpoint Modules 140
- ◆ **Configuring Setpoints** 140
 - Setpoint Module Settings 142

Introduction

The Setpoint module provides extensive control, secondary protection, and analysis capabilities by allowing you to initiate an action in response to a specific condition. See the *ION Reference* for more information on the Setpoint module.

NOTE

There is usually no need to change any of the Setpoint modules' setup registers for normal operation of the meter.

Setpoint Modules

The four Setpoint modules on ION7330 and ION7350 meters monitor the following for “over” or “under” conditions:

Setpoint Module	Description
Over I avg	When active, this annunciates the average current exceeds a specified amount.
Over kW swd	When active, this annunciates when the total kW SWDemand exceeds a specified amount.
Under PF sign	When active, this annunciates when the power factor goes below specified amount.
Under VII avg	When active, this annunciates when the average voltage (line to line) goes below a specified amount.

Configuring Setpoints

Use the front panel or ION software to change your meter's setpoints.

Using the Front Panel

The ADVANCED METER SETUP menu allows you to configure all setpoint modules. To access the various modules, press the round button twice; scroll down the Setup menu and select ADVANCED METER SETUP.

Using ION Setup

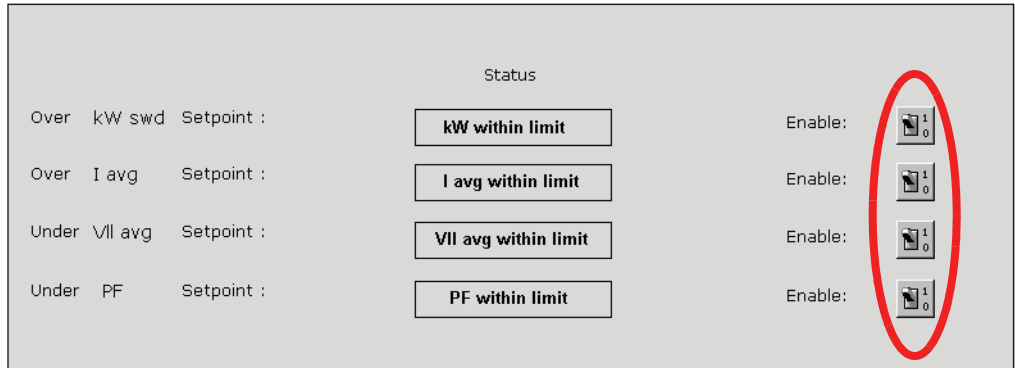
1. Connect to your meter in ION Setup, using Advanced Mode.
2. Click on the Setpoint module you wish to configure.

Using Designer

Open your meter in Designer and navigate to the Setpoints Setup framework. Right-click on a module to edit.

Using Vista

Open your meter in Vista and click on the Setpoints tab. Use the switches to turn various monitoring on and off (see circled below).



Setpoint Module Settings

The meter's Setpoint modules contain the following setup registers:

Register	Description	Default Setting
High Limit	When the Eval Mode is GreaterThan, this register specifies what limit the Source input must exceed for the Status output register to change to on. When the Eval Mode is LessThan, it specifies what limit the Source input must exceed for the Status output register to change to off. If the Source input is Boolean, the value entered into this register is disregarded, and the High Limit is automatically set to 0.	Depends on specific module
Low Limit	When the Eval Mode is LessThan, this register specifies what limit the Source input must fall below for the Status output register to change to on. When the Eval Mode is GreaterThan, it specifies what limit the Source input must fall below for the Status output register to change to off. If the Source input is Boolean, the value entered into this register is disregarded, and the Low Limit is automatically set to 1.	
SusUntlON	When the Eval Mode is GreaterThan, this register defines the amount of time in seconds the Source input must exceed the High Limit for the Status output register to change to on. When the Eval Mode is LessThan, this register defines the amount of time the Source input must fall below the Low Limit for the Status output register to change to on.	0.00
SusUntlOFF	When the Eval Mode is GreaterThan, this register defines the amount of time in seconds the Source input must fall below the Low Limit for the Status output register to change to off. When the Eval Mode is LessThan, this register defines the amount of time the Source input must exceed the High Limit for the Status output register to change to off.	0.00
Input Mode	Specifies how the value of the Source input is interpreted. When Input Mode is Absolute, the absolute value of the Source input is used in Setpoint calculations, and the high and low limits, if negative, are converted to their absolute values. When Input Mode is SIGNED, the Source input is taken to be a signed value.	Depends on specific module
Eval Mode	Specifies the criterion by which the Source input is evaluated. It contains either the value LessThan or GreaterThan	
EvPriority	This register allows you to assign a priority level to the following events produced by the Setpoint module: <ul style="list-style-type: none"> ◆ The Status output register changes to on because the setpoint condition is met. ◆ The Status output register changes to off because the setpoint condition is no longer met. ◆ The Setpoint module is re-linked, reset or disabled while the Status output register is on. ◆ Setup registers are changed while the Status output register is on. The priority level you specify applies to all of the above events.	128

Fine Tuning Over Condition Monitoring

If you want to fine-tune over condition monitoring, the only setup registers you should change are *SusUntlON* and *SusUntlOFF*.

SusUntlON determines how long the modules wait after an over condition is detected before reporting it. This gives the monitored value a short period to correct itself before the event is registered with the module so that very brief over conditions are ignored. Similarly, *SusUntlOFF* is the amount of time a normal value must be present before the module considers normal operation to be restored. Both *SusUntlON* and *SusUntlOFF* values are entered in seconds (the default value for both is 30 seconds).

Chapter
17

Reporting

This chapter provides instructions for viewing various meter logs.

In This Chapter

- ◆ **Introduction** **144**
- ◆ **Viewing Meter Logs** **144**
 - Using the Front Panel 144
 - Using ION Setup 144
 - Using Vista 145

Introduction

Accumulated meter values are saved in logs. These **logs** are acquired by your energy management software (ION Enterprise or third-party) and saved in its database for analysis and reporting.

The Reporter component of ION Enterprise is a database reporting application that lets you define, generate, and manage comprehensive **reports** based on the information in your system database. It processes selected data and generates a finished report in Microsoft Excel 2000 format.

For more information on reports, see the Reporter section of the online *ION Enterprise Help*.

Viewing Meter Logs

Use ION software to view your meter's logs.

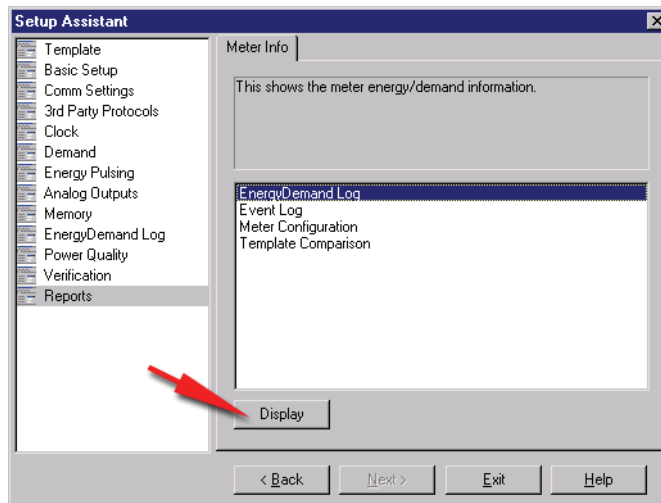
Using the Front Panel

You cannot view meter logs from the front panel.

Using ION Setup

Display various meter logs using the Report Assistant.

1. Open ION Setup and connect to your meter, using Basic Mode.
2. In the Setup Assistant, navigate to the Reports folder.



3. Select one of the logs or comparisons in the list and click Display to view.

Below is an example of an Energy Demand Log.

Date/Time	kWh imp	kWh exp	kWh net	kVARh imp	kVARh exp	kVARh net	
5/16/2005 7:30:00.000 AM	12,411.076172	0.000000	12,411.077148	517.534912	0.000000	517.534912	1
5/16/2005 7:45:00.000 AM	12,413.157227	0.000000	12,413.158203	517.621704	0.000000	517.621704	1
5/16/2005 8:00:00.000 AM	12,415.237305	0.000000	12,415.238281	517.708435	0.000000	517.708435	1
5/16/2005 8:15:00.000 AM	12,417.318359	0.000000	12,417.319336	517.795227	0.000000	517.795227	1
5/16/2005 8:30:00.000 AM	12,419.399414	0.000000	12,419.400391	517.881958	0.000000	517.882019	1
5/16/2005 8:45:00.000 AM	12,421.479432	0.000000	12,421.480469	517.968750	0.000000	517.968750	1
5/16/2005 9:00:00.000 AM	12,423.560547	0.000000	12,423.561523	518.055542	0.000000	518.055542	1
5/16/2005 9:15:00.000 AM	12,425.641602	0.000000	12,425.642578	518.142273	0.000000	518.142273	1
5/16/2005 9:30:00.000 AM	12,427.722656	0.000000	12,427.722656	518.229065	0.000000	518.229065	1
5/16/2005 9:45:00.000 AM	12,429.802734	0.000000	12,429.803711	518.315796	0.000000	518.315857	1
5/16/2005 10:00:00.000 AM	12,431.883789	0.000000	12,431.884766	518.402588	0.000000	518.402588	1
5/16/2005 10:15:00.000 AM	12,433.963867	0.000000	12,433.964844	518.489319	0.000000	518.489380	1
5/16/2005 10:30:00.000 AM	12,436.044922	0.000000	12,436.045898	518.576111	0.000000	518.576111	1
5/16/2005 10:45:00.000 AM	12,438.125977	0.000000	12,438.126953	518.662842	0.000000	518.662903	1
5/16/2005 11:00:00.000 AM	12,440.207031	0.000000	12,440.207031	518.749634	0.000000	518.749634	1
5/16/2005 11:15:00.000 AM	12,442.287109	0.000000	12,442.288086	518.836426	0.000000	518.836426	1
5/16/2005 11:30:00.000 AM	12,444.368164	0.000000	12,444.369141	518.923157	0.000000	518.923157	1
5/16/2005 11:45:00.000 AM	12,446.449219	0.000000	12,446.450195	519.009949	0.000000	519.009949	1
5/16/2005 12:00:00.000 PM	12,448.529297	0.000000	12,448.530273	519.096680	0.000000	519.096741	1
5/16/2005 12:15:00.000 PM	12,450.610352	0.000000	12,450.611328	519.183472	0.000000	519.183472	1
5/16/2005 12:30:00.000 PM	12,452.691406	0.000000	12,452.692383	519.270203	0.000000	519.270264	1
5/16/2005 12:45:00.000 PM	12,454.771484	0.000000	12,454.772461	519.356995	0.000000	519.356995	1
5/16/2005 1:00:00.000 PM	12,456.852539	0.000000	12,456.853516	519.443726	0.000000	519.443787	1
5/16/2005 1:15:00.000 PM	12,458.933594	0.000000	12,458.934570	519.530518	0.000000	519.530518	1
5/16/2005 1:30:00.000 PM	12,461.013672	0.000000	12,461.014648	519.617310	0.000000	519.617310	1

- You can view, save or print the log. Click Close to exit.

Using Vista

Open your meter in Vista. Click a grouping object to view the associated logs.

Click on the Real Time tab. The following logs are available:

- ◆ Voltage Trending
- ◆ Current Trending
- ◆ Power Trending
- ◆ Freq/PF Trending
- ◆ Meter Events

Click on the Energy&Dmd tab. The following logs are available:

- ◆ Demand Profile Trending

Click on the Power Quality tab. The following logs are available:

- ◆ Sag/Swell Statistics
- ◆ Waveform/Sequence of Events
- ◆ Harmonics Trending

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**PowerLogic™ ION7300 series
with WebMeter™**

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Getting technical support:
Contact your local Schneider Electric sales representative
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70002-0162-05
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04/2009