

# Datasheet: ION® 7300 | 7330 | 7350



## Intelligent Metering and Control Devices

Used in enterprise energy management applications such as feeder monitoring and sub-metering, ION 7300™ series meters offer unmatched value, functionality, and ease of use. ION 7300 series meters interface to ION Enterprise™ software or other automation systems for fast information sharing and analysis.

The ION 7300 meters are an ideal analog meter replacement with a multitude of power and energy measurements, analog and digital I/O, communication ports, and industry-standard protocols. The ION 7330 meter adds on-board data storage, emails of logged data, and an optional modem. The ION 7350 meter is further augmented by more sophisticated power quality analysis, alarms and a call-back-on-alarm feature.

Patented ION® technology also lets you customize metering or analysis functions at your workstation, without any hard wiring. Just graphically link a few drag-and-drop icons, or select default setups, and you're ready to go.

*Not all features listed are available with every model. Please refer to the detailed descriptions within for a complete list of feature availability.*

## Applications Summary

### Power and Energy Metering

Each meter in the versatile ION 7300 series gives you hundreds of high-accuracy power, energy, demand and harmonics measurements. Use the revenue-certified models for billing, bill verification, and sub-metering applications.

### Power Quality Analysis

You can use meter data to help uncover the sources of harmonics and voltage sags/swells. Analyze problems and avoid repeat interruptions.

### Cost Allocation and Billing

Determine cost centers, identify opportunities for demand control, and check energy consumption patterns.

### Demand and Power Factor Control

Avoid penalties with automated load shedding, scheduling, peak shaving or capacitor bank control.

### Load Studies and Circuit Optimization

Determine the capacity of your electric network and run at peak efficiency. Perform load trending.

### Equipment Monitoring and Control

Improve process yields and extend equipment life. Meter all your utilities including gas, steam, water and more.

### Preventative Maintenance

Set up alarms to warn of pending problems. Log events and alarms for all critical conditions.

## Features Summary

### Measurements

- ♦ Energy: bi-directional, absolute and net
- ♦ Demand: rolling block, predicted, and thermal
- ♦ Harmonics: individual and total harmonic distortion up to the 15<sup>th</sup> or 31<sup>st</sup>
- ♦ Advanced logic and mathematical functions

### Internet-Enabled Communications

- ♦ Two RS-485 ports
- ♦ Optional built-in modem with ModemGate™ allows modem access for 31 other devices
- ♦ Optional Ethernet port with EtherGate™ allows direct Ethernet-to-RS-485 data transfer to 31 other devices
- ♦ Infrared data port standard
- ♦ Modbus™ RTU, Modbus TCP, DNP 3.0, and PROFIBUS DP
- ♦ Call-back feature offers fast alarm response
- ♦ Web server, MeterM@il® allow distribution of metered data and alarms over the Internet

### On-Board Data Logging

- ♦ Scheduled or event-driven logging of up to 96 parameters
- ♦ Sequence-of-events and min/max logging

### Setpoints for Control and Alarms

- ♦ Setpoint on any parameter or condition
- ♦ 1 second operation

### Inputs and Outputs

- ♦ 4 digital inputs for status/counter functions
- ♦ 4 digital outputs for control/pulse functions
- ♦ Optional analog inputs and outputs



**POWER  
MEASUREMENT**

drive energy performance™

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## Example Display Formats

I a	265
I b	256
I c	259
I avg	260

Vln a	479.8
I a	376.2

KWH Import	193106
------------	--------

Ia THD	9.3
Ib THD	7.4
Ic THD	3.4
IavgTHD	6.7

## Front Panel Display

The ION 7300 series front panel supports local data display and basic setup:

- Easy-to-read LCD with back lighting
- Adjustable contrast
- Remote display option up to 1.8m (6ft.) from base unit
- 8 data display screens that can be customized through the communications port, to show the parameters of your choice and scrolled manually or automatically
- Four display formats: 4-parameter, to single-parameter large character displays
- Custom parameter labels (programmable via communications)

## Metering

The ION 7300 series meters provide fully bi-directional, 4-quadrant, revenue-accurate or revenue-certified energy metering. They can replace discrete energy meters, demand meters and pulse initiators, and perform a wide range of other metering and instrumentation functions.

### 4-Quadrant Energy

The meters are fully bi-directional and monitor energy in all four quadrants. They provide all traditional active, reactive and apparent energy parameters and can provide measurements like Volt-Hours, Amp-Hours, etc.

- kWh, imported, exported, net (imported and exported), and total (imported and exported)
- kVARh imported, exported, net (imported and exported), and total (imported and exported)
- kVAh total
- kVAh, imported, exported, net (ION 7330 and ION 7350 meters only)
- Volt-hours and amp-hours
- Integration of any instantaneous measurement

### Demand

The ION 7300 series meters support rolling block, thermal, and predicted demand. The meters calculate demand on any instantaneous measurement and record peak (maximum) and minimum demand. Peak demand registers can be reset manually (password protected) from the front panel or via communications. 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

## Instantaneous

The ION 7300 series meters offer the most comprehensive array of instantaneous (real-time) measurements available in the industry.

Measurements include true RMS, per phase and total for:

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

## Time of Use

The ION 7330 and ION 7350 meters provide:

- 2 year internal calendar
- Up to 15 daily tariff profiles
- Programmable triggers
- Separate energy and demand accumulators

## Harmonics

The ION 7300 series meters feature harmonic distortion metering.

- Total Harmonic Distortion and individual harmonics to the 15<sup>th</sup>, (31<sup>st</sup> on the ION 7350 meter) on voltage and current inputs
- K-factor for current inputs

## Universal Metering

The ION 7300 series meters can be equipped with a variety of digital and analog I/O combinations, for universal metering. You can replace PLCs and RTUs (monitoring pressure, temperature and power transducers), as well as traditional power transducers. The ION 7330 and ION 7350 meters can accept input pulses from gas, water, steam, or other metering equipment and convert pulses into actual consumption values.

## Residual Current

When set to 4-Wire Wye, any of the meters can calculate neutral or ground current based on three phase current measurements.

## Min/Max Recording

The ION 7300 meter will 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

## Logging and Recording

The ION 7330 and ION 7350 meters provide data and event logs. Non-volatile memory ensures that valuable information can be preserved between intervals when the logs are retrieved via communications.

### Historical Logging

Any combination of measurements can be recorded at scheduled intervals by setpoints or logic conditions. ION 7300 series meters can be configured for up to 30 days of recording capacity at 15 minute intervals.

- The ION 7350 meter offers a maximum of 6 data logs, each recording up to 16 user defined parameters concurrently, for a total of 96 parameters
- The ION 7330 meter offers a maximum of 2 data logs, each recording up to 16 user defined parameters concurrently, for a total of 32 parameters

For more detail, refer to the *ION 7300 Series User's Guide*.

### Min/Max Logging

- Perform min/max logging on any parameter, over any time interval (e.g. daily, monthly)
- Easily record other values coinciding with the new minimum or maximum
- Defaults: Min and max for all basic power parameters. Voltage (L-L/L-N) per phase, Current per phase, kW, kVAR, kVA, Power Factor, Frequency, and Rolling Block Demand for kW, kVAR and kVA.

### Event Logging and Alarming

Configurable event priorities allow you to define alarm conditions.

- Sequence-of-events timestamped to  $\pm 10$ ms accuracy
- Time-stamped record of all configuration changes, setpoint and min/max events

### Waveform Recording

The ION 7350 meter simultaneously captures events on all channels, up to 48 cycles each:

- Resolution: 64 samples per cycle
- The maximum number of cycles for contiguous waveform capture is 6,900 (based on 16 samples/cycle x 48 cycles)

### Sag/Swell Monitoring

- Detect sags or swells on any voltage channel and record instantaneous values and waveforms with the ION 7350 meter

## Logic, Math and Control

The ION 7330 and ION 7350 meters offer sophisticated logic and mathematical functions to perform on-board calculations on any measured value. You can calculate true quantities from pulse inputs (e.g. BTU calculations) or use the math functions to calculate other values.

### Mathematical Functions

Define custom formulas using:

- Arithmetic (+, x, -,  $\div$ )
- Comparison (>, <, =,  $\geq$ ,  $\leq$ ,  $\neq$ )
- Logical (AND, OR, NOT, TRUE, FALSE, IF)
- Trigonometric (SIN, COS, TAN, ASIN, ACOS, ATAN)
- Math ( $\pi$ , SQRT, POWER, SUM, SUMSQ, AVG, RMS, LOG10, LN, MAX, MIN)

### Programmable Logic and Setpoints

The ION 7330 and ION 7350 meters can use logical operators and setpoints to set alarms, define basic control algorithms for capacitor and demand control, and implement advanced back-up protection for equipment. 12 setpoints are configurable for 1-second operation. Each setpoint can be triggered for the over- or under-conditions you specify. Use setpoints to trigger:

- Data logging
- Digital outputs
- Clearing and reset functions
- Pulse outputs
- Call-back (ION 7350)

### Example Display Formats

```
kVARh tot 3105
kVAh      6210
```

```
kVA SD    1058
kVA SD MAX 1124
```

```
KW Tot    896.3
KVAR Tot  517.4
KVA Tot    1035
PFsign Tot -86.6
```

```
kVA SD    1058
kVA SD MAX 1124
```

An ION 7300 with remote display



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## Software Integration

The meters can be easily integrated within an energy management or SCADA system to provide remote display of all measured parameters at a PC workstation, as well as remote configuration and manual control capabilities.

### ION Enterprise™

The meters are compatible with our Windows 2000-based ION Enterprise power monitoring software. ION Enterprise web-enabled software displays real-time and logged data, and offers control/configuration capabilities. It provides enterprise-wide data sharing in a secure networked environment.

### ION Setup™ Software

The meters are further enhanced by ION Setup for Windows, a software solution that displays real-time data from your power monitoring devices and provides device configuration capabilities. ION Setup lets you create a network of sites and devices, so that the meters are easy to find and the communication links are ready whenever you want to make changes to your meters or network.

## Internet Connectivity

### MeterM@il®

When equipped with an Ethernet port, the ION 7330 and ION 7350 meters can automatically send data logs via e-mail. The ION 7350 can also send alarm notifications via e-mail. MeterM@il messages can be received like any e-mail message, at a workstation, cell phone, pager or PDA. Data logs can also be sent on an event-driven or scheduled basis via e-mail, while conveniently accommodating firewall restrictions.

### WebMeter™

An on-board Web server combined with an Ethernet port offers quick and easy access to real-time energy and basic power quality information without special software. Built-in web pages display a range of energy and basic power quality information through any web-enabled device, and even support basic meter configuration tasks.

## Communications

### Serial Ports

The ION 7300 meter is equipped with a single RS-485 port, while the ION 7330 and ION 7350 meters can have two RS-485 ports, depending on the communications options selected.

- ♦ Optically isolated
- ♦ Baud rates up to 19,200bps
- ♦ Compatible with power monitoring software that supports Modbus RTU or ION
- ♦ The ION 7330 meter and ION 7350 meter also support DNP 3.0

### Infrared Data Port

A front panel optical port is offered on all models in the ION 7300 series.

- ♦ Compatible with an ANSI C12.13 Type 2 magnetic optical communications coupler and can operate at baud rates up to 19,200bps
- ♦ Can be used for infrared energy pulsing or communication with Power Measurement software

### Ethernet Port (optional)

All meters in the ION 7300 series can be ordered with an optional 10Base-T port for direct access to metering information via an Ethernet LAN/WAN.

- ♦ Protocol: ION, Modbus TCP
- ♦ Data rate: 10 Mbps
- ♦ Ping and Telnet diagnostic services
- ♦ EtherGate™ allows the ION 7330 and ION 7350 to act as a gateway, allowing the direct transfer of data between an Ethernet network and up to 31 RS-485 devices

**Note: The meter COM2 port functions as a dedicated EtherGate port (RS-485 Master) on ION 7330 and ION 7350 meters with the Ethernet option**

### PROFIBUS Port (optional)

PROFIBUS DP standard protocol support via sub-D 9 pin female connector is offered exclusively on the ION 7300.

### Internal Modem

The ION 7330 and ION 7350 offer an optional, space saving, internal modem which helps reduce cost and improve reliability by replacing external modems and RS-485 to RS-232 converters.

- ♦ Baud rates from 300bps to 33,600bps
- ♦ The ModemGate feature lets the remote master station access the meter and up to 31 other devices connected to the RS-485 loop through a single internal modem

**Note: The meter COM1 port functions as a dedicated ModemGate port (RS-485 Master) on ION 7330 and ION 7350 meters with the internal modem option**

- ♦ Compatible with power monitoring software that supports Modbus RTU, ION or DNP 3.0
- ♦ RJ-11 or a captured wire connector (CWC)
- ♦ The ION 7350 meter is offered with a call-back feature for quick alarm response

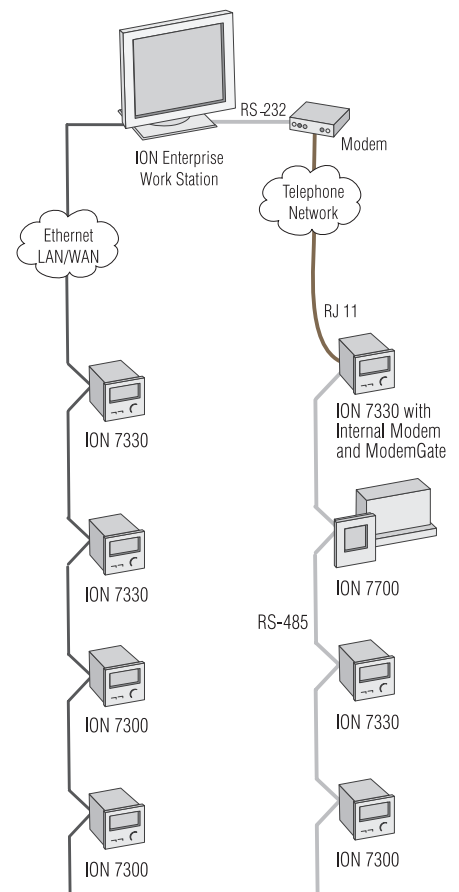
### Interoperability

The ION 7330 and ION 7350 meters can concurrently communicate via multiple protocols so you can use their advanced features to extend an existing Modbus, DNP or ION Enterprise network. Logs and real time values are also available through Modbus. In addition, the meters are fully supported by UTS MV-90® through serial and Ethernet.

Connection to Infrared Data Port



Example 7330 ION Communication Connections



### The Power of ION

The ION 7300 series meters are based on our patented ION technology which ensures the longevity of your metering solution because it can adapt as your needs change. The measurements and other functions of the meters are provided by ION modules. You can quickly add or rearrange functions with drag-and-drop icons and a few clicks of a mouse. Imagine new features and build them with ION.

### Inputs/Outputs\*

The ION 7300 series meters offer a variety of analog and digital I/O combinations. The analog I/O option can be specified for any ION 7300 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.

#### Status Inputs

Four optically isolated digital inputs on the ION 7330 and ION 7350 meters can monitor status, count transducer pulses, breaker trips and pulses from any external "volts free" dry contact.

#### Digital Outputs

ION 7300 series meters are equipped with 4 fully programmable digital output ports, suitable for pulsing or controlling relays. The Infrared Data Port and/or a rear panel LED can also be used for energy pulsing.

#### Relay Extension Board

An optional Digital Output Extension Board extends the meter's output capabilities with additional relay options. *(Please contact Power Measurement for details.)*

#### Analog Inputs/Outputs

Any meter in the ION 7300 series can be equipped with an optional analog I/O card featuring:

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

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

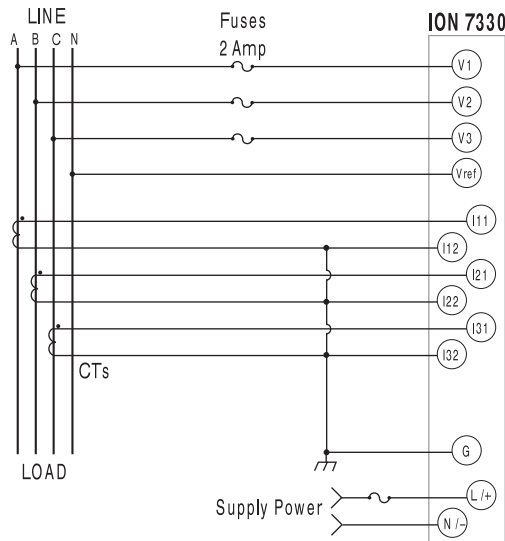
### Connections and LEDs

The meters support 4-Wire Wye, Delta, 3-Wire Wye, Direct Delta and single phase systems. They have 3 voltage and 3 current inputs.

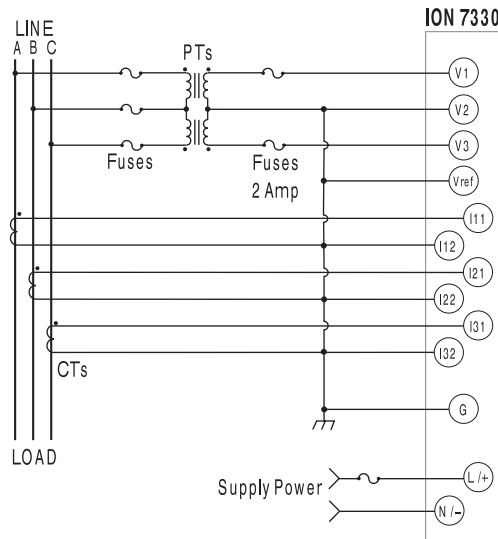
- No PTs required on the voltage inputs for Wye systems up to 347/600VAC and Delta systems up to 600VAC
- Accept CTs with 5A nominal/10A full scale outputs
- Captured-wire connector (CWC) option
- Inputs pass the ANSI/IEEE C37.90.1-1989 surge withstand and fast transient test

#### Example Connections

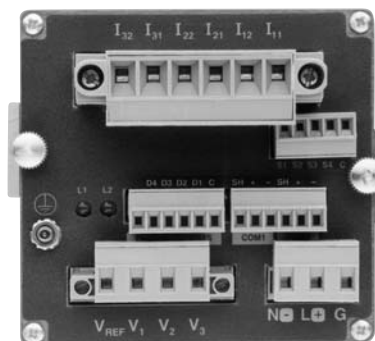
##### 4-Wire Wye (Direct Connection)



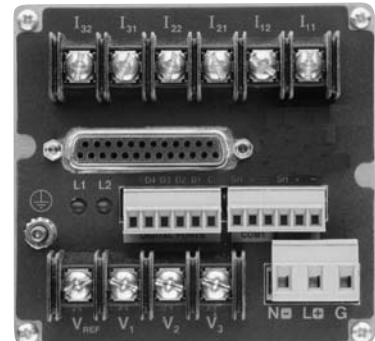
##### 3-Wire Delta (2 PTS and 3 CTs)



ION 7330 Basic Model Rear Panel - CWC Option



ION 7300 Tran Model Rear Panel



\* Analog I/O is not available with all form factors and communications configurations. Please check our on-line order forms for supported combinations.

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## Mounting

- Basic models have an integrated display and fit in a DIN standard 92mm x 92mm (3.6in. x 3.6in.) panel cutout, secured by sliding clamps tightened by thumbscrews.
- TRAN models have no integrated display and can be flush-mounted against any flat surface. Optional DIN rail mount is also available.
- The RMD (Remote Display Module), fits a DIN standard cutout up to 1.8m (6ft.) from the base meter. Off-the-shelf panel punches can be purchased. Contact us for sources.
- An adapter plate is available to facilitate the conversion from our 3000 series meters to ION 7300 series meters. Contact us for more information.
- Meters weigh approx. 4lbs / 1.8kg.  
Box dimensions are 15x11x7in / 38x28x18cm.

## Switchboard Draw-out Cases

ION 7300 series meters can be ordered with switchboard hardware, which is offered as a complete kit (internal cage with external casing) and as a "retro-fit" kit designed to fit into existing GE S1 or ABB FT21 switchboard cases. The FT21 implementation supports type D4B-7F (in Delta volts mode) and type D4B-3F (in 4-wire Wye volts mode).

## Ratings

### Voltage Inputs

- 50 to 347VAC L-N
- 25% overrange
- CWC option: Pluggable captured-wire connectors
- All options: Overload withstand for 1500VAC continuous, 3250VAC for 1 second non recurring. Input impedance: > 2M Ohms

### Current Inputs

- 5A nominal / 10A full scale
- Starting current: 20mA
- Overload withstand: 20A continuous, 500A for 1 second non-recurring
- Worst case burden (at10A): 0.0625VA
- 20% Overage full accuracy

### Power Supply

- Basic: 95 to 240VAC ( $\pm 10\%$ ), (47 to 440Hz) 120 to 310VDC ( $\pm 10\%$ ), 0.2A worst case loading (12W) at 100VAC at 25°C (77°F)
- P24 option: 20 to 60VDC ( $\pm 10\%$ ), 0.6A worst case loading (12W)

### Environmental Conditions

- Operation: -20°C to +60°C (-4°F to +140°F) ambient air
- Storage: -30°C to +85°C (-22°F to +185°F)
- Humidity: 5% to 95% non-condensing

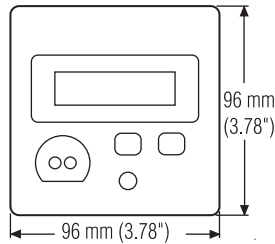
### Digital Outputs

- 4 optically isolated digital outputs
- Maximum forward current: 80mA
- Maximum voltage: 30V

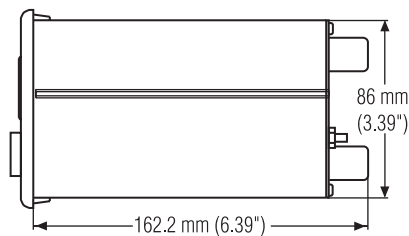
## Dimensions

### ION 7300 Series Panel Meter Configurations

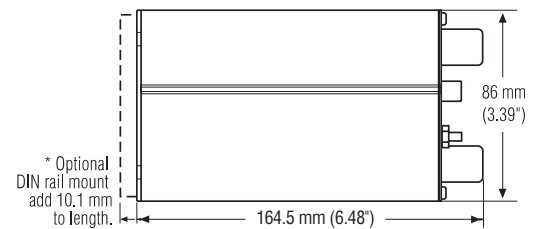
Front View of Basic, Display and RMD Models



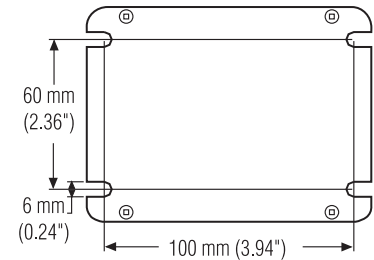
Side View of Basic and Display Models



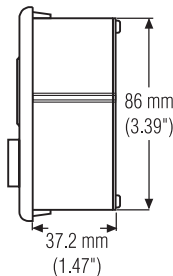
Side View of TRAN Base Unit with optional DIN rail mount



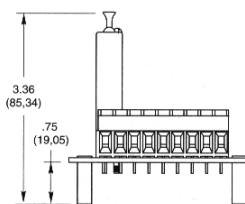
Front View of TRAN Base Unit



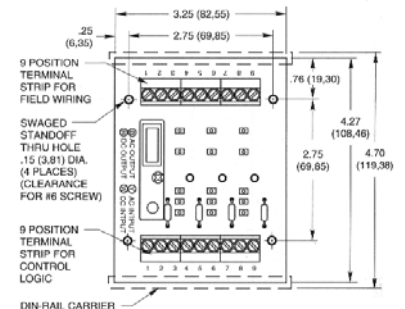
Side View RMD Display



End View of Relay Board

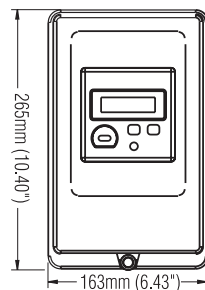


Top View of Relay Board

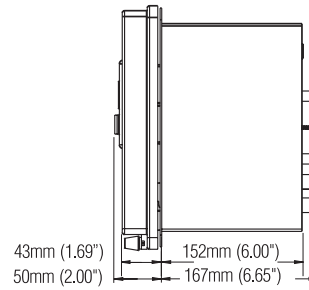


### ION 7300 Series Switchboard Drawout Case Configurations

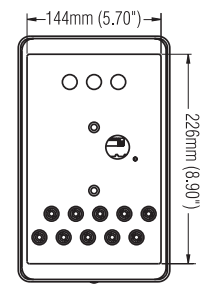
Front View of ABB FT21 Case



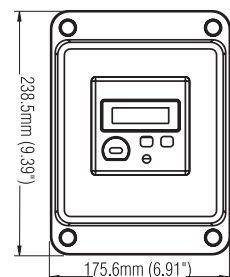
Side View of ABB FT21 Case



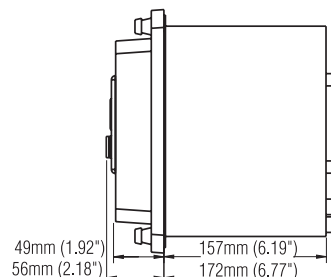
Rear View of ABB FT21 Case



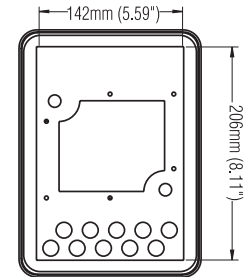
Front View of GE S1 Switchboard Case



Side View of GE S1 Switchboard Case



Rear View of GE S1 Switchboard Case



### Measurement Specifications (at 50.0Hz and 60.0Hz at 25°C / 77°F)

Parameter	Accuracy ±(%rdg + %FS*)
Voltage	0.25% + 0.05%
Frequency	±0.01Hz
Current	0.25% + 0.05%
kVA	0.5% + 0.1%
kVAR (>5% F.S.)	1.5% reading
kVAh	1.0% reading
kVARh	1.5% reading
Power Factor	1.5% reading
Total Harmonic Distortion (THD)	1.0% Full Scale
I4 Derivation	1.0% reading + 0.2% unbalanced
K Factor	5.0% Full Scale

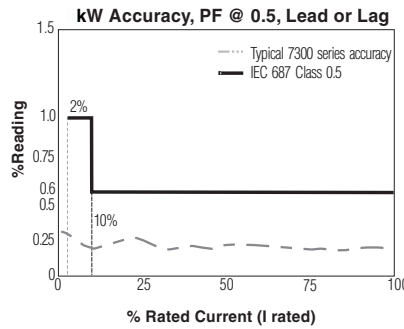
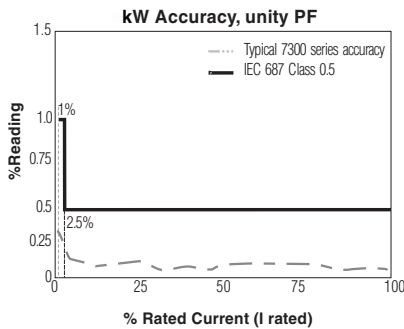
\* %Full scale voltage and current † 50VAC to 347VAC +25%

Display resolution meets or exceeds accuracy.

### kW and kWh Measurements

	Accuracy*	Register Bounds	
		kW	kWh
ANSI 12.20 Class 0.5	0.5% reading	0 to ± 3.3x10 <sup>7</sup>	0 to ± 10 <sup>38</sup>
IEC 60687 Class 0.5	0.5% reading	0 to ± 3.3x10 <sup>7</sup>	0 to ± 10 <sup>38</sup>

\* Accuracy specifications comply with IEC 687 Class 0.5 specification and ANSI 12.20 Class 0.5 at 25°C (77°F)



### User Programmable Log Capacity

Example Configurations:

	Event	Data	Waveform Recording Settings				# of days
			Channel	Samples per cycle	Cycles	Record depth	
ION 7330	500	A	-	-	-	-	29
	500	B	-	-	-	-	118
	500	C	-	-	-	-	96
	500	D	-	-	-	-	383
ION 7350	500	A	6	32	12	3	28
	500	B	6	32	12	3	111
	500	A	6	16	48	3	26
	500	D	6	64	16	3	331

A 16 parameters recorded every 15 minutes

B 16 parameters recorded hourly

C 4 parameters recorded every 15 minutes

D 4 parameters recorded every hour

### Ratings (continued)

Status Inputs (ION 7330 and ION 7350 meters)

- ♦ Self-excited, dry contact, no external voltage source required
- ♦ +30VDC differential SCOM output to S1 through S4 inputs
- ♦ Minimum pulse width: 25msec

### Analog Inputs

- ♦ Accuracy: <+0.3% of full scale
- ♦ Update rate: 1s
- ♦ Input impedance: 24.3 Ohms, 475 Ohms (0 to 20mA, 0 to 1mA)
- ♦ Maximum source impedance (Ohms): 500 Ohms, 10k Ohms (0 to 20mA, 0 to 1mA)
- ♦ Channel to channel isolation: None
- ♦ Maximum common mode voltage: 30V

### Analog Outputs

- ♦ Accuracy: <+0.3% of full scale
- ♦ Maximum load drive capability: 500 Ohms (0 to 20mA), 10k Ohms (0 to 1mA)
- ♦ Channel to channel isolation: None
- ♦ Maximum common mode voltage: 30V

### Standards Compliance

- ♦ UL: Certified to UL 3111
- ♦ CAN/CSA C22.2 No.1010-1
- ♦ CE marked
- ♦ EMC compliant to:
  - EN 55014-1:1993 for Radiated and Conducted Emissions
  - EN 61036:1996 for Fast Transient Bursts
  - EN 60687:1993 for Immunity to Electromagnetic HF Fields
  - EN 60687:1993 for Immunity to Electrostatic Discharges
- ♦ IEC 1010-1
- ♦ Measurement Canada AE-0788
- ♦ OFGEM approved (UK)
- ♦ Surge withstand: All inputs pass ANSI/IEEE C37.90-1989 surge withstand and fast transient tests
- ♦ FCC: Part15, FCC Rules for Class A Digital Device
- ♦ Analog I/O: Each analog I/O pin passes IEC 61000-4-4 fast transient test with capacitive clamp (4kVp-p @ 2.5kHz for 1 min)

# Datasheet: ION® 7300 | 7330 | 7350

Some features are optional.

To identify standard and optional features, please see the 'Product Order Forms' at [www.pwrm.com](http://www.pwrm.com).

Features and Options List	ION 7300	ION 7330	ION 7350
<b>Power, Energy, and Demand</b>			
Voltage/current per phase, average, unbalance	■	■	■
Power: real, reactive, apparent, power factor, frequency	■	■	■
Energy: bi-directional, total, import, export, net	■	■	■
Demand: block, rolling block, thermal	■	■	■
<b>Power Quality</b>			
Sag/Swell monitoring			■
Harmonics: individual, even, odd, total up to	15 <sup>th</sup>	15 <sup>th</sup>	31 <sup>st</sup>
Sampling rate, maximum samples per cycle	32	32	64
<b>Logging and Recording</b>			
Standard memory capacity		300kB	300kB
Min/max logging for any parameter		■	■
Historical logs, maximum # of channels		32	96
Waveform logs, maximum # of cycles			48
Timestamp resolution in seconds		0.001	0.001
<b>Communications and I/O (maximum #)</b>			
RS-485 ports	1	2	2
Ethernet ports	1	1	1
Infrared optical port	1	1	1
Internal modem		1	1
PROFIBUS DP port	1		
DNP 3.0 through serial, modem and I/R ports		■	■
Modbus RTU slave on serial, modem and I/R ports	■	■	■
Modbus TCP through Ethernet port	■	■	■
EtherGate, data transfer between Ethernet and RS-485		■	■
ModemGate, data transfer between internal modem and RS-485		■	■
MeterM@il, logged data and alarms via e-mail		■	■
WebMeter, onboard web server	■	■	■
Analog inputs	4	4	4
Analog outputs	4	4	4
Digital status inputs/counter		4	4
Digital relay outputs	4	4	4
<b>Setpoints, Alarming, and Control</b>			
Setpoints, minimum response time		1 second	1 second
Math, logic, trig, log, linearization formulas		■	■
Single and multi-condition alarms		■	■
Call-out on alarms			■
<b>Revenue Metering and Standards</b>			
ANSI C12.16 accuracy compliant	■	■	■
IEC 60687 accuracy class 0.5S compliant	■	■	■
ANSI class 10, (5A nominal, 10A max)	■	■	■
MV-90 on serial, Ethernet ports		■	■
Multi-year scheduling: hourly activity profiles		■	■

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