

PowerLogic ION8650 DNP 3.0 device profile

This document describes the DNP V3.0 communications protocol employed by PowerLogic™ ION8650 meters. The DNP protocol can be selected for the following:

- up to three serial communication ports (which can consist of RS232/RS485/Internal Modem)
- the optical port
- up to three Ethernet connections.

A maximum of three ports/connections in total may be used at the same time.

It is assumed that the reader is familiar with the DNP V3.00 protocol and serial communications in general.

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Hazard categories and special symbols

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



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

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

DANGER

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

WARNING

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

CAUTION

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

CAUTION

CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, can result in equipment damage.

NOTE

Provides additional information to clarify or simplify a procedure.

Please note

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

Safety precautions

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

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E in the USA or applicable local standards.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this device and the equipment in which it is installed before working on the device or equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Connect protective ground (earth) before turning on any power supplying this device.
- Do not use the device for critical control or protection applications where human or equipment safety relies on the operation of the control circuit.
- Replace all devices, doors and covers before turning on power to this equipment.
- Incorrectly configured ION modules may render the meter non-functional. Do not modify a module's configuration without understanding the impact to the meter and any associated devices.

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

1.DNP device profile

<h2>DNP V3.00</h2> <h3>DEVICE PROFILE DOCUMENT</h3>	
Vendor Name: Power Measurement Ltd	
Device Name: ION8650 Option A, ION8650 Option B, ION8650 Option C	
Highest DNP Level Supported: For Requests Level 2 ¹ For Responses Level 2	Device Function: <input type="checkbox"/> Master <input type="checkbox"/> <input checked="" type="checkbox"/> Slave
Notable objects, functions, and/or qualifiers supported in addition to the Highest DNP Levels Supported (the complete list is described in the attached table): Please refer to section "Details on customizing DNP v3.0 configuration" on page 15.	
Maximum Data Link Frame Size (octets): Transmitted 292 Received (must be 292)	Maximum Application Fragment Size (octets): Transmitted 2048 (configurable: 15 to 2048 octets) Received 2048
Maximum Data Link Re-tries: <input type="checkbox"/> None <input type="checkbox"/> Fixed at _____ <input checked="" type="checkbox"/> Configurable, range 0 to 15	Maximum Application Layer Re-tries: <input checked="" type="checkbox"/> None <input type="checkbox"/> Configurable, range _____ to _____ (Fixed is not permitted)

¹ The device can be configured to support some DNP Objects not defined in DNP 3.0 Subset 2 –requests and responses for these objects are highlighted with "***" in the Implementation Table which follows. Users have control over the objects returned by the device to make sure that it only responds with objects parsable by a Subset 2 master.

Requires Data Link Layer Confirmation:

- Never
- Always
- Sometimes If 'Sometimes', when? _____

Configurable If 'Configurable', how?

User option to set Data Link Confirmation to:

- **Always** – device will always request Data Link Confirmations.
- **Multi-packet only** – the device will request Data Link Confirmations when sending multi-packet responses.
- **Never** – the device will never request Data Link Confirmations.

Requires Application Layer Confirmation:

- Never
- Always (not recommended)
- When reporting Event Data (Slave devices only)
- When sending multi-fragment responses (Slave devices only)

Sometimes If 'Sometimes', when? _____

Configurable If 'Configurable', how? _____

Timeouts while waiting for:

- | | | | | |
|-------------------------|--|--------------------------------------|-----------------------------------|--|
| Data Link Confirm | <input type="checkbox"/> None | <input type="checkbox"/> Fixed at __ | <input type="checkbox"/> Variable | <input checked="" type="checkbox"/> Configurable |
| Complete Appl. Fragment | <input checked="" type="checkbox"/> None | <input type="checkbox"/> Fixed at __ | <input type="checkbox"/> Variable | <input type="checkbox"/> Configurable |
| Application Confirm | <input checked="" type="checkbox"/> None | <input type="checkbox"/> Fixed at __ | <input type="checkbox"/> Variable | <input type="checkbox"/> Configurable |
| Complete Appl. Response | <input checked="" type="checkbox"/> None | <input type="checkbox"/> Fixed at __ | <input type="checkbox"/> Variable | <input type="checkbox"/> Configurable |

Others _____

Attach explanation if 'Variable' or 'Configurable' was checked for any timeout

- **Data Link Confirm timeout** is configurable: 0.1s to 30s

<p>Sends/Executes Control Operations:</p> <p>WRITE Binary Outputs <input checked="" type="checkbox"/> Never <input type="checkbox"/> Always <input type="checkbox"/> Sometimes <input type="checkbox"/> Configurable</p> <p>SELECT/OPERATE <input type="checkbox"/> Never <input checked="" type="checkbox"/> Always <input type="checkbox"/> Sometimes <input type="checkbox"/> Configurable</p> <p>DIRECT OPERATE <input type="checkbox"/> Never <input checked="" type="checkbox"/> Always <input type="checkbox"/> Sometimes <input type="checkbox"/> Configurable</p> <p>DIRECT OPERATE - NO ACK <input type="checkbox"/> Never <input checked="" type="checkbox"/> Always <input type="checkbox"/> Sometimes <input type="checkbox"/> Configurable</p> <p>Count > 1 <input checked="" type="checkbox"/> Never <input type="checkbox"/> Always <input type="checkbox"/> Sometimes <input type="checkbox"/> Configurable</p> <p>Pulse On <input type="checkbox"/> Never <input checked="" type="checkbox"/> Always <input type="checkbox"/> Sometimes <input type="checkbox"/> Configurable</p> <p>Pulse Off <input checked="" type="checkbox"/> Never <input type="checkbox"/> Always <input type="checkbox"/> Sometimes <input type="checkbox"/> Configurable</p> <p>Latch On <input type="checkbox"/> Never <input checked="" type="checkbox"/> Always <input type="checkbox"/> Sometimes <input type="checkbox"/> Configurable</p> <p>Latch Off <input type="checkbox"/> Never <input checked="" type="checkbox"/> Always <input type="checkbox"/> Sometimes <input type="checkbox"/> Configurable</p> <p>Queue <input checked="" type="checkbox"/> Never <input type="checkbox"/> Always <input type="checkbox"/> Sometimes <input type="checkbox"/> Configurable</p> <p>Clear Queue <input checked="" type="checkbox"/> Never <input type="checkbox"/> Always <input type="checkbox"/> Sometimes <input type="checkbox"/> Configurable</p> <ul style="list-style-type: none"> • Select timeout period is configurable: 0s to 30s 	
<p>FILL OUT THE FOLLOWING ITEMS FOR SLAVE DEVICES ONLY:</p>	
<p>Reports Binary Input Change Events when no specific variation requested:</p> <p><input type="checkbox"/> Never</p> <p><input type="checkbox"/> Only time-tagged</p> <p><input type="checkbox"/> Only non-time-tagged</p> <p><input checked="" type="checkbox"/> Configurable to send both, one or the other (explanation below)</p> <p>User option to have all Binary Input Change Events returned as either:</p> <ul style="list-style-type: none"> • time-tagged OR • non-time-tagged 	<p>Reports time-tagged Binary Input Change Events when no specific variation requested:</p> <p><input type="checkbox"/> Never</p> <p><input checked="" type="checkbox"/> Binary Input Change With Time</p> <p><input type="checkbox"/> Binary Input Change With Relative Time</p> <p><input type="checkbox"/> Configurable (attach explanation)</p>
<p>Sends Unsolicited Responses:</p> <p><input checked="" type="checkbox"/> Never</p> <p><input type="checkbox"/> Configurable (attach explanation)</p> <p><input type="checkbox"/> Only certain objects</p> <p><input type="checkbox"/> Sometimes (attach explanation)</p> <p><input type="checkbox"/> ENABLE/DISABLE UNSOLICITED Function codes supported</p>	<p>Sends Static Data in Unsolicited Responses:</p> <p><input checked="" type="checkbox"/> Never</p> <p><input type="checkbox"/> When Device Restarts</p> <p><input type="checkbox"/> When Status Flags Change</p> <p>No other options are permitted.</p>

<p>Default Counter Object/Variation:</p> <ul style="list-style-type: none"><input type="checkbox"/> No Counters Reported<input checked="" type="checkbox"/> Configurable (explanation below)<input type="checkbox"/> Default Object _____ Default Variation _____<input type="checkbox"/> Point-by-point list attached <p>User option to return all static counters in one of the following variations:</p> <ul style="list-style-type: none">• 32-Bit Binary Counter• 32-Bit Binary Counter Without Flag• 16-Bit Binary Counter• 16-Bit Binary Counter Without Flag	<p>Counters Roll Over at:</p> <ul style="list-style-type: none"><input type="checkbox"/> No Counters Reported<input checked="" type="checkbox"/> Configurable (explanation below)<input type="checkbox"/> 16 Bits<input type="checkbox"/> 32 Bits<input type="checkbox"/> Other Value _____<input type="checkbox"/> Point-by-point list attached <p>User option to select roll over:</p> <ul style="list-style-type: none">• 32 bit counters roll over at 2^{32}.• 16 bit counters roll over at 2^{16}
<p>Sends Multi-Fragment Responses: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>	

1.1 Implementation table

Level 2 Implementation (DNP-L2)

⚠ WARNING

HAZARD OF UNINTENDED OPERATION

- Do not use the meter for critical control or protection applications where human or equipment safety relies on the operation of the control circuit.
- Be aware that an unexpected change of state of the digital outputs may result when the supply power to the meter is interrupted or after a meter firmware or template upgrade.

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

OBJECT			REQUEST (slave must parse)		RESPONSE (master must parse)	
Obj	Var	Description	Func Codes (dec)	Qual Codes (hex)	Func Codes	Qual Codes (hex)
1	0	Binary Input - All Variations	1	00,01,06		
1	1	Binary Input	1	00,01,06	129	00, 01
1	2	Binary Input with Status	1	00,01,06	129	00, 01
2	0	Binary Input Change - All Variations	1	06,07,08		
2	1	Binary Input Change without Time	1	06,07,08	129	17, 28
2	2	Binary Input Change with Time	1	06,07,08	129	17, 28
2	3	Binary Input Change with Relative Time	1	06,07,08		
10	0	Binary Output - All Variations	1	00,01,06		
10	1	Binary Output				
10	2	Binary Output Status	1	00,01,06	129	00,01
12	0	Control Block - All Variations				
12	1	Control Relay Output Block	3,4,5,6	17,28	129	echo of request
12	2	Pattern Control Block				
12	3	Pattern Mask				

OBJECT			REQUEST (slave must parse)		RESPONSE (master must parse)	
Obj	Var	Description	Func Codes (dec)	Qual Codes (hex)	Func Codes	Qual Codes (hex)
20	0	Binary Counter - All Variations	1,7,8, 9,10	00,01,06		
20	1	32-Bit Binary Counter	1	00,01,06	129	00,01
20	2	16-Bit Binary Counter	1	00,01,06	129	00,01
20	3	32-Bit Delta Counter				
20	4	16-Bit Delta Counter				
20	5	32-Bit Binary Counter without Flag	1	00,01,06	129	00,01
20	6	16-Bit Binary Counter without Flag	1	00,01,06	129	00,01
20	7	32-Bit Delta Counter without Flag				
20	8	16-Bit Delta Counter without Flag				
21	0	Frozen Counter - All Variations	1	00,01,06		
21	1	32-Bit Frozen Counter	1	00,01,06	129	00,01
21	2	16-Bit Frozen Counter	1	00,01,06	129	00,01
21	3	32-Bit Frozen Delta Counter				
21	4	16-Bit Frozen Delta Counter				
21	5	32-Bit Frozen Counter with Time of Freeze	1	00,01,06	129	00,01
21	6	16-Bit Frozen Counter with Time of Freeze	1	00,01,06	129	00,01
21	7	32-Bit Frozen Delta Counter with Time of Freeze				
21	8	16-Bit Frozen Delta Counter with Time of Freeze				
21	9	32-Bit Frozen Counter without Flag	1	00,01,06	129	00,01
21	10	16-Bit Frozen Counter without Flag	1	00,01,06	129	00,01
21	11	32-Bit Frozen Delta Counter without Flag				
21	12	16-Bit Frozen Delta Counter without Flag				

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² The device can be configured to respond with the object/variations marked with “***”. Note that these object/variations are not listed in the DNP V3.00 Subset 2 definitions. If the meter is configured to respond with these objects care must be taken to make sure that the master can parse the response.

OBJECT			REQUEST (slave must parse)		RESPONSE (master must parse)	
Obj	Var	Description	Func Codes (dec)	Qual Codes (hex)	Func Codes	Qual Codes (hex)
22	0	Counter Change Event - All Variations	1	06,07,08		
22	1	32-Bit Counter Change Event without Time	1	06,07,08	129	17, 28
22	2	16-Bit Counter Change Event without Time	1	06,07,08	129	17, 28
22	3	32-Bit Delta Counter Change Event without Time				
22	4	16-Bit Delta Counter Change Event without Time				
22	5	32-Bit Counter Change Event with Time	1	06,07,08	129	17, 28
22	6	16-Bit Counter Change Event with Time	1	06,07,08	129	17, 28
22	7	32-Bit Delta Counter Change Event with Time				
22	8	16-Bit Delta Counter Change Event with Time				
23	0	Frozen Counter Event - All Variations	1	06,07,08		
23	1	32-Bit Frozen Counter Event without Time	1	06,07,08	129	17,28
23	2	16-Bit Frozen Counter Event without Time	1	06,07,08	129	17,28
23	3	32-Bit Frozen Delta Counter Event without Time				
23	4	16-Bit Frozen Delta Counter Event without Time				
23	5	32-Bit Frozen Counter Event with Time	1	06,07,08	129	17, 28
23	6	16-Bit Frozen Counter Event with Time	1	06,07,08	129	17, 28
23	7	32-Bit Frozen Delta Counter Event with Time				
23	8	16-Bit Frozen Delta Counter Event with Time				
30	0	Analog Input - All Variations	1,7,8	00,01,06		
30	1	32-Bit Analog Input	1	00,01,06	129	00,01
30	2	16-Bit Analog Input	1	00,01,06	129	00,01
30	3	32-Bit Analog Input without Flag	1	00,01,06	129	00,01
30	4	16-Bit Analog Input without Flag	1	00,01,06	129	00,01

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OBJECT			REQUEST (slave must parse)		RESPONSE (master must parse)		
Obj	Var	Description	Func Codes (dec)	Qual Codes (hex)	Func Codes	Qual Codes (hex)	
31	0	Frozen Analog Input - All Variations	1	00,01,06			**
31	1	32-Bit Frozen Analog Input	1	00,01,06	129	00,01	**
31	2	16-Bit Frozen Analog Input	1	00,01,06	129	00,01	**
31	3	32-Bit Frozen Analog Input with Time of Freeze	1	00,01,06	129	00,01	**
31	4	16-Bit Frozen Analog Input with Time of Freeze	1	00,01,06	129	00,01	**
31	5	32-Bit Frozen Analog Input without Flag	1	00,01,06	129	00,01	**
31	6	16-Bit Frozen Analog Input without Flag	1	00,01,06	129	00,01	**
32	0	Analog Change Event - All Variations	1	06,07,08			
32	1	32-Bit Analog Change Event without Time	1	06,07,08	129	17, 28	
32	2	16-Bit Analog Change Event without Time	1	06,07,08	129	17, 28	
32	3	32-Bit Analog Change Event with Time	1	06,07,08	129	17, 28	**
32	4	16-Bit Analog Change Event with Time	1	06,07,08	129	17, 28	**
33	0	Frozen Analog Event - All Variations	1	06,07,08	129	17, 28	**
33	1	32-Bit Frozen Analog Event without Time	1	06,07,08	129	17, 28	**
33	2	16-Bit Frozen Analog Event without Time	1	06,07,08	129	17, 28	**
33	3	32-Bit Frozen Analog Event with Time	1	06,07,08	129	17, 28	**
33	4	16-Bit Frozen Analog Event with Time	1	06,07,08	129	17, 28	**
40	0	Analog Output Status - All Variations	1	00,01,06			
40	1	32-Bit Analog Output Status	1	00,01,06	129	00,01	**
40	2	16-Bit Analog Output Status	1	00,01,06	129	00,01	
41	0	Analog Output Block - All Variations					
41	1	32-Bit Analog Output Block	3,4,5,6	17,28	129	echo of request	**
41	2	16-Bit Analog Output Block	3,4,5,6	17,28	129	echo of request	
50	0	Time and Date - All Variations					
50	1	Time and Date	2	07 where quantity = 1			
50	2	Time and Date with Interval					

OBJECT			REQUEST (slave must parse)		RESPONSE (master must parse)	
Obj	Var	Description	Func Codes (dec)	Qual Codes (hex)	Func Codes	Qual Codes (hex)
51	0	Time and Date CTO - All Variations				
51	1	Time and Date CTO				
51	2	Unsynchronized Time and Date CTO				
52	0	Time Delay - All Variations				
52	1	Time Delay Coarse			129	07, quantity=1
52	2	Time Delay Fine			129	07, quantity=1
60	0					
60	1	Class 0 Data	1	06,07,08		
60	2	Class 1 Data	1	06,07,08		
60	3	Class 2 Data	1	06,07,08		
60	4	Class 3 Data	1	06,07,08		

OBJECT			REQUEST (slave must parse)		RESPONSE (master must parse)	
Obj	Var	Description	Func Codes (dec)	Qual Codes (hex)	Func Codes	Qual Codes (hex)
80	1	Internal Indications	2	00 index=7		
		No Object (Cold Restart)	13			
		No Object (Warm Restart)	14			
		No Object (Delay Measurement)	23			

2. Time synchronization information

Parameter	Time
Maximum time base drift over a 10 minute interval	18ms
Maximum difference between meter time base and master station time base after time set from DNP protocol	2s
Maximum delay measurement error	200ms

2.1 Time Sync Request Configuration

The time interval which the device waits before requesting a time sync from the master (using IIN1-4) is configurable from 1 second to 1 day (in 1 second intervals). The factory default is 1 day.

A Setup option in the DNP Slave Options ION Module is used used to configure the Time Sync Request period.

2.2 Configuring DNP communications port to accept time synchronization

Setup options in the ION Clock Module need to be configured before DNP Time Syncs to be processed correctly:

- TimeSyncSource identifies the communications port running the DNP Protocol.
- TimeSyncType indicates if the time syncs are sent in local time or universal time format.

3.ION8650 default DNP configuration

ION8650 meters are shipped from the Factory with the following DNP static objects defined. These objects are returned in response to a Class 0 Poll. Note that the protocol of the desired communications port must set to “DNP 3.0” before the meter will respond to DNP master requests.

Analog Input Objects (16-Bit Analog Input without Flag) (Object 30, Variation 4)		
Point	Measurement	Scaling
0	VIn a	x1
1	VIn b	x1
2	VIn c	x1
3	VIn avg	x1
4	VII ab	x1
5	VII bc	x1
6	VII ca	x1
7	VII avg	x1
8	I a	x1
9	I b	x1
10	I c	x1
11	I avg	x1
12	kW a	x1
13	kW b	x1
14	kW c	x1
15	kW tot	x1
16	kVAR a	x1
17	kVAR b	x1
18	kVAR c	x1
19	kVAR tot	x1
20	kVA a	x1
21	kVA b	x1
22	kVA c	x1
23	kVA tot	x1
24	PFsign a	x1
25	PFsign b	x1
26	PFsign c	x1
27	PFsign tot	x1
28	V unbal	x10
29	I unbal	x10
30	I4	x1
31	Freq	x10
32	kW sd del-rec ³	x1
33	kVAR sd del-rec ³	x1
34	kVA sd del+rec ³	x1

Binary Counter Objects (16-Bit Binary Counter without Flag) (Object 20, Variation 6)		
Point	Measurement	Scaling
0	kWh del (Import)	x1
1	kWh rec (Export)	x1
2	kWh del+rec (Total)	x1
3	kWh del-rec (Net)	x1
4	kVARh del (Import)	x1
5	kVARh rec (Export)	x1
6	kVARh del+rec (Total)	x1
7	kVARh del-rec (Net)	x1
8	kVAh del+rec (Total)	x1

³ Note : These are instantaneous demand quantities, not peak (maximum) demand.

4. Details on customizing DNP v3.0 configuration

The ION8650 is factory configured with the basic DNP objects as outlined in “ION8650 default DNP configuration” on page 14. The ION8650 DNP configuration can be further customized to take advantage of other DNP features.

4.1 Customizing the DNP Point map

WARNING

HAZARD OF UNINTENDED OPERATION

- Do not use the meter for critical control or protection applications where human or equipment safety relies on the operation of the control circuit.
- Be aware that an unexpected change of state of the digital outputs may result when the supply power to the meter is interrupted or after a meter firmware or template upgrade.

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

The ION8650 configuration can be modified to define which measurements are mapped to DNP Static points – this allows a user to exactly control the number of objects returned in a Class 0 poll. ION Modules are used to map ION8650 measurements to DNP points as follows:

- Up to 100 ION8650 measurements can be mapped to DNP Static points. The DNP Slave Export ION Module is used to map ION8650 measurements to DNP Binary Input, Binary Counter, or Analog Input points. A DNP Static point is defined for each ION8650 measurement that is “linked” to a DNP Slave Export ION Module. The type of DNP Static point is a setup option of the DNP Slave Export ION Module.
- Up to 16 relays can be controlled through DNP. The DNP Slave Import ION Module is used to map DNP Control Relay Output Block, and Analog Output Block points to ION8650 relay and analog output hardware.

4.2 Report-by-exception processing (DNP Events)

Any DNP Static point can be configured to create DNP Event objects on value changes. Binary Input Change Events are created when a DNP Binary Input point changes state. Counter and Analog Change Event objects are created when the corresponding Static object changes by more than a programmable deadband value. Deadbands can be set on a per-object basis. Further, Event objects can be assigned as either Class 1, Class 2, or Class 3 on a per-object basis.

Setup options in the DNP Slave Export ION Module are used to enable Events, define deadband values, and assign DNP Event Classes.

Setup options in the DNP Slave Options ION Module are used to select the Object/Variations of Events that will be produced.

The “scan time” for Binary Counter and Analog Input Points is 1 second.

The “scan time” for Binary Input Points is 20ms.

Event capacities are:

- Binary Input Change Events – 25 events
- Frozen Counter Events – 25 events
- Counter Change Events – 25 events
- Frozen Analog Input Events – 25 events
- Analog Input Change Events – 50 events

4.3 Control Relay Output Block

WARNING

HAZARD OF UNINTENDED OPERATION

- Do not use the meter for critical control or protection applications where human or equipment safety relies on the operation of the control circuit.
- Be aware that an unexpected change of state of the digital outputs may result when the supply power to the meter is interrupted or after a meter firmware or template upgrade.

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

Both ‘1 point per address’ and ‘2 points per address’ modes of addressing are supported for Control Relay Output Block objects. A setup option in the DNP Slave Import ION Module selects the addressing mode.

4.4 Freezing Binary Counter Points

Any DNP Binary Counter Point can be configured to support the freeze command. When a Binary Counter is frozen it copies its value into a DNP Frozen Counter point. These Frozen Counter points are returned in a Class 0 poll. Freeze, Freeze/Clear, Freeze/No-Ack, and Freeze/Clear/No-Ack functions are supported.

A Setup option in the DNP Slave Export ION Module is used to give freeze capabilities to the associated Static point.

A Setup option in the DNP Slave Options ION Module is used to select the Object/Variation of the Frozen Static object.

4.5 Scaling

Counter and Analog Input objects can be scaled on a per-object basis. Scaling can be used to maintain resolution in floating point measurements. For example, Frequency measurements can be multiplied by 10 to obtain 1 decimal place of resolution.

4.6 Assigning ION DNP Slave Options Modules to Meter Communication Ports

The ION DNP Slave Options Module contains a CommPort setup register that assigns this ION DNP Slave Options Module to a particular communication port. Only the settings in the assigned ION DNP Slave Options Module have any affect on that communications port.

For TCP/IP connections (port is set to Ethernet) the MasterIP Addr setup register is used to differentiate between the connections. Setting a specific IP address in this register allows only that IP address to connect to this session. If the register is set to None or left blank, any IP address can connect and use the session.

For more information see the Multiport DNP 3.0 and ION Technology technical note, available from the PowerLogic web site.

5. Glossary of terms

Application	A piece of software (a program) consisting of one or more processes and supporting functions.
Binary	A number system having only two symbols (1 and 0), and where values are expressed in the base two number system.
Bit	Abbreviation of binary digit. The smallest unit of information in a binary system. Has a value of either one (1) or zero (0).
Master	The client or host station or computer, with which the RTU equipment communicates. Also referred to as a host or host computer.
Non-volatile random-access memory	A semi-permanent type of data storage (memory) that is backed up by batteries to maintain stored data even if system power is lost. Can be both read and changed by the system. Abbreviated as NVRAM.
Random-access memory	A type of temporary data storage (memory) that can be read and changed while the computer is in use. Data stored in random-access memory is lost if the system loses power. Abbreviated as RAM.
Remote terminal unit	A piece of equipment located at a distance from a master station to monitor and control the status of outlying equipment, and to communicate the information back to the master station or host. Abbreviated as RTU.
Sequence of events	A time-tagged change of state, logged as part of a chronological record of significant changes in the condition of a particular point or points being monitored. Abbreviated as SOE.

6. List of acronyms and abbreviations

DNP	distributed network protocol
IED	intelligent electronic device
NVRAM	non-volatile random-access memory
OSI	open systems interconnect
RAM	random-access memory
RTU	remote terminal unit
SOE	sequence of events