Honeywell

Din-Mon™ Smart Meter

Advanced kWh/Demand Meters with Communication

INSTALLATION INSTRUCTIONS

62-0468-03

Dear Valued Customer,

We are pleased that you chose to buy one of our products and want you to be just as pleased with owning it. Before installing your new Din-Mon product, please read the information on the following pages carefully.

We believe that you will find the Din-Mon meters easy to install and to use for monitoring and evaluating your electrical usage.

To be sure that you are 100% satisfied with your products, we provide toll-free technical and sales support Monday through Friday, 8:00 am to 7:30 pm, EST: (800) 334-3666. You may also reach us via email at info@emon.com.

If you have questions, we can handle them quickly and effectively with a telephone call. Please let us try to help you BEFORE you remove your meter. And to help us help you, we ask that you have all relevant information on hand when you call (model or part numbers, nature of difficulty, etc.)

Be sure to forward this manual to the owner after installation is complete, so that they may use it as a reference guide when reading the Din-Mon meter.

Thank you.

TABLE OF CONTENTS

SAFETY LABEL DEFINITIONS AND INFORMATION

The Din-Mon™ meter may contain one or more of the following labels. Operator(s) should familiarize themselves with the meaning of each label to minimize risk.

This symbol indicates double or reinforced insulation.

The presence of this label is a cautionary indicator identifying a danger risk. The manual should be consulted prior to proceeding.

The presence of this label indicates that an electrical shock hazard exists in the location or area where the label is placed. Prior to proceeding, the MAINS power must be disconnected and the manual consulted for safety information.

FCC NOTICE

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

– Reorient or relocate the receiving antenna.

– Increase the separation between the equipment and receiver

– Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

– Consult the dealer or an experienced radio/TV technician for help.

STANDARDS COMPLIANCE

BACnet MS/TP and IP protocol is BTL listed.

LonWorks TP/FT-10 protocol is LonMark® certified.

PRECAUTIONARY AND SAFETY INFORMATION

⚠ CAUTION

Internal circuit card components are extremely sensitive to electrostatic discharge. Be careful not to touch internal circuitry prior to discharging any static buildup on your person. To discharge yourself, touch a grounded metal object such as conduit or an earth-grounded metal enclosure.

⚠ WARNING

High voltages are present on voltage input connections screw terminals. Risk of serious injury and/or electrical shock exists. Prior to performing any wiring operations, review all contents of the user manual and de-energize the MAINS power switch. Only qualified personnel should perform installation wiring. Installation wiring must comply with all local and national electrical codes.

1.0 INTRODUCTION

The Din-Mon™ meter is used to monitor electric power usage of individual loads after the utility meter and store kW and kVAR data for automatic meter reading.

The model D2 kWh meter has an RS-485 communication for remote reading.

The model D5 Advanced kWh meter has dual protocols with Ethernet or LonWorks communications in addition to RS-485.

Refer to the Technical Specification section for details.

Fig. 1. Din-Mon™ Meter (top angle view with covers).

Installation must only be performed by qualified personnel and in accordance with these instructions and all applicable local and national electrical codes. Honeywell and its representatives assume no responsibility for damages or injury resulting from the improper installation of this meter.

Fig. 2. Meter Name Plate (side view with cover removed).

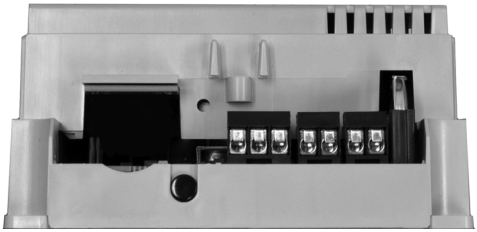


Fig. 3. Model D2 Meter (top view with cover removed).

Verify the input voltage rating, amperage, sensor type and configuration on the meter name plate (located on the left side of the meter) to ensure that it is suitable for the intended electrical service. For example, the meter labeled for 120/208V service MUST NOT be installed on service feeds of 277/480V and vice versa. Verify that the meter's current sensors are sized suitably for the load to be monitored.

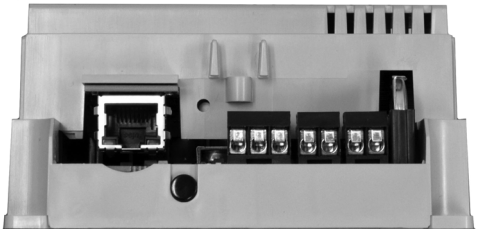


Fig. 4. Model D5 Meter with Ethernet (top view with cover removed).

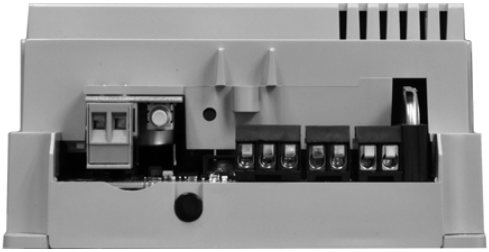


Fig. 5. Model D5 Meter with LonWorks (top view with cover removed).

NOTE: If any trouble arises during installation or functional verification operations, do not immediately remove the unit. Before removing the unit, contact E-Mon's technical support department at (800) 334-3666. E-Mon's technical department will assist you in detailed troubleshooting of the Din-Mon™ meter installation.

⚠ CAUTION

Internal circuit card components are extremely sensitive to electrostatic discharge. Prior to handling or touching internal circuitry, discharge any static buildup on your person. To discharge yourself, touch a grounded metal object such as conduit or an earth grounded metal enclosure.

⚠ WARNING

Use of this instrument, Din-Mon™ kWh Meter, in a manner inconsistent with this manual or not specified by the manufacturer in writing, can cause permanent damage to the unit and/or serious injury to the operator. The protection and safety features provided by this equipment may become impaired or otherwise compromised.

2.0 METER TECHNICAL SPECIFICATIONS

2.1 Ordering Information

	Brand	Class	Voltage	Current Rating (Amps)	Enclosure	Communication Protocol	Current Sensor Type	Phase	Current Sensor Input	Package Type
Example	**H**	**D5**	**480**	**100**	**S**	**03**	**SPL**	**3**	**V3**	**KIT3**
	H-D5-480100-S03SPL3-V3KIT3									
Brand	**H**=Honeywell									
Class	**D2** = Din-Mon™ kWh Meter **D5** = Din-Mon™ Advanced kWh Meter									
Voltage (Input)	**120**=120V (L-N) **208**=120/208V, 127/220V (L-L) **480**=277/480V (L-L) **600**=347/600V (L-N) **400**=220/380V, 230/400V, or 240/415V (L-N)									
Current Rating (Amps)	100-, 200-, 400-, 800-									
Enclosure	**S**=DIN Rail / Flat mount									
Communication Protocol	**RTU**=MODBUS RTU (only D2) **BAC**=BACnet MS/TP (only D2) **EZ**=EZ7 (only D2) **01**=EZ7, EZ7 Ethernet **02**=Modbus RTU, EZ7 Ethernet **03**=BACnet MS/TP, EZ7 Ethernet **04**=EZ7,Modbus TCP/IP **05**=EZ7, BACnet IP **06**=Modbus RTU, Modbus TCP/IP **12**=EZ7/ LonWorks (TP/FT-10)									
Current Sensor Type	**SPL**=Split Core Sensors(100, 200, 400, 800) Amps **SCS**=Solid Core Sensor (100, 200) Amps									
Phase	**1**=Single Phase, **2**=Two Phases, **3**=Three Phases									
Current Sensor Input	**V3**=0.333V **C1**=100mA									
Package Type	Blank=No Current Sensor **KIT1**=Include 1 Current Sensor, **KIT2**=Include 2 Current Sensors, **KIT3**=Include 3 Current Sensors									

2.2 Technical Specifications

Input Voltage Configuration	2-wire single phase, 3-wire single phase, 3-wire (Delta), or 4-wire (WYE)	
Mains Voltage Input	Up To 600 VAC RMS Available	
Meter Input Power	6 VA Maximum	
Current Sensor Rating	Up To 800 Amps RMS AC	
Power Factor	0.5 Leading Or Lagging	
Line Frequency	50-60 Hz	
Meter Accuracy	ANSI C12.20	
Voltage Operating Range	+/-10% Of Rated Voltage	
Temperature Range	-30 C To +60 C	
Relative Humidity Range	0-95% Non-condensing	
Altitude	2000 Meters	
Voltage Overload	+25% Continuously: +100% For 20 Cycles	
Pollution Degree	Degree 2 In Accordance With IEC 664	
Installation (Overvoltage) Category	Category III	
Measurement Category	Category III	
Enclosure Material	PPO/PS (plastic)	
Display	4-Line LCD with backlight	
Standards	EN 61326-1:2006 IEC 61010-1:2012, 3rd Edition	
Voltage Ranges	120 VAC (2-wire single phase)	
	277 VAC (2-wire single phase) [optional]	
	120/208-240 VAC (3-wire single phase) 120/208 VAC (4-wire WYE) 127/220 VAC (4-wire WYE) 240 VAC (3-wire Delta)	
	277/480 VAC (4-wire WYE or 3-wire Delta)	
	347/600 VAC (4-wire WYE only)	
	220/380 VAC (4-wire WYE only) 230/400 VAC (4-wire WYE only) 240/415 VAC (4-wire WYE only)	
Amperage Ranges	100, 200, 400, 800 Amp	
Recommended In-line Fuse	Manufacturer	Littelfuse
	Mfg. Part No	OKLK.500T
	Rating:	500mA, 600VAC Cartridge Fuse

Battery Cell	Description	Non-rechargeable Cell Used For Memory Retention and RTC
	Manufacturer	Panasonic
	Manufacturer Part No	CR2032
	Working Voltage	3 VDC
	Current Capacity	225 mAHr
	Electrolyte	Manganese Dioxide Lithium
RS-485 Serial Communications	Cable	UL-listed stranded conductors 22-26 AWG, Belden 3106A (3-wire)
	Input / Output Voltage	Grounded-isolated +/-5.4 VDC
	Cable Connector	Screw terminal termination
	Circuit Input Isolation	5.3 kVAC
	Max Cable Distance	4,000 feet
	Max Network Nodes	64 cabling nodes
	Max Baud Rate	Up to 76.8 kpbs
Ethernet Communications	Cable	UL-Listed CAT-5e cable, 8-conductor, stranded 24 AWG
	Cable Connector	RJ-45
	Protocol	10/100-Base-T
	Cable Distance	450 feet
LonWorks Communications	Cable	Stranded Twisted 24 Awg. TIA 568A Category 5
	Cable Connector	Screw Terminal Terminations
	Protocol	TP/FT-10 Twisted Pair/Free Topology
	Max Cable Distance	Single Terminated: 820 feet (device to device) 1476 feet (total wire length) Doubly Terminated: 3280 feet (max bus length) 10 feet (max stub length)
	Max Network Nodes	64 Devices/Nodes on single network
	Max Baud Rate	78 kbps bit rate
Outputs 1 and 2	Contact Closure	N.O. Dry
	Contact Rating (max.)	100mA, 60V AC or VDC
	Mating Connector	Screw terminal plug (2-wire)
	Isolation Voltage	2.5 kV

3.0 METER OVERVIEW

The unit is comprised of 3 main components, the Main Power Connections, the Sensor Input Terminals and the Communication Ports and Terminals.

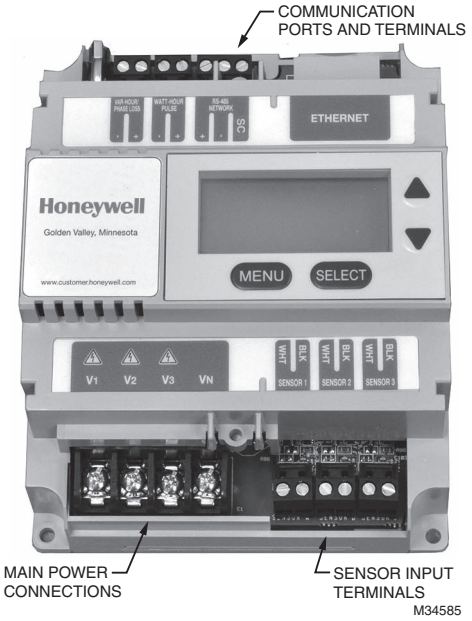


Fig. 6. Communication Ports, Main Power Input and Current Sensor Input Terminals.

3.1 Main Power Input Voltage and Current Sensors

The Main Power Input Terminals are the 4-screw terminals located on the lower left of the unit. The main power input wires connect to these terminals. The terminals are covered with a protective shield for safety purposes. The meter draws a maximum of 6 VA.

The Current Sensor Input Terminals are the 6-screw terminal plugs located on the lower right of the unit. The current sensor input wires connect to these terminal plugs, and each 2-screw terminal plug corresponds to an input voltage phase; care must be exercised to ensure that each current sensor is connected to the correct terminal plug.

3.2 Communication Ports and Output Contact Terminals

The Communication Ports and Output Contact Terminals are located along the top edge of the meter.

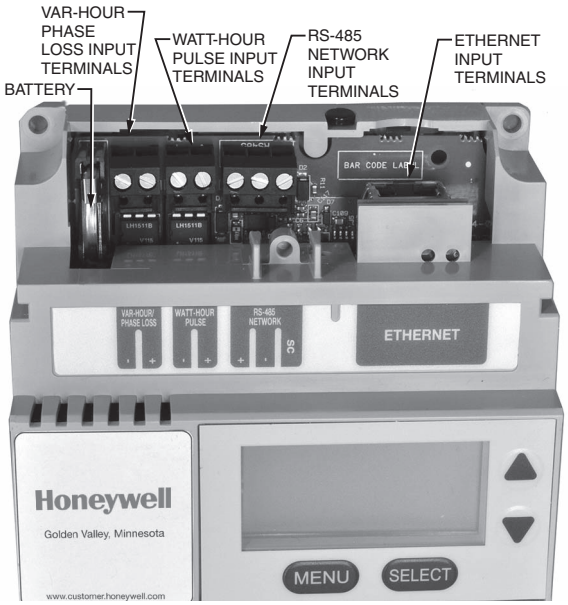


Fig. 7. Communication Ports and Terminals.

The VAR-Hour/Phase Loss and Watt-Hour pulse output terminals provide a scaled VAR-Hour/Watt-Hour pulse that is dependent on the meter amperage rating. Please see Section “Pulse Type and Value” for pulse values. Optionally the VAR-Hour terminals can be set to indicate a “Loss of Phase” alarm output.

The VAR-Hour/Phase Loss and Watt-Hour pulse output terminals are solid-state switches. Switching is limited to 100mA (0.1 Amp) and voltage should not exceed 60 Volts AC or DC.

One 3-terminal screw terminal plug is provided for RS-485 communications.

Din-Mon™ D5 meters are available with a RJ-45 jack for 10/100-Base-T Ethernet for communicating via Modbus TCP/IP, BACnet IP, or EZ7 over Ethernet. Ethernet is not available on the Din-Mon™ D2 meters: if the meter was ordered with LonWorks, a z-position screw terminal plug for LonWorks will replace the RJ-45 jack (Ethernet).

LonWorks (optionally available on Din-Mon™ D5 meters) is a protocol used to communicate via TP/FT-10 (Twisted Pair / Free Topology) network. It allows the end user to read meter point data via SNVT's (Standard Network Variable Types).

The Din-Mon™ D5 meter uses the LonWorks Protocol to provide remote monitoring of metered data points for use in e.g. BAS (Building Automation Systems), and AMR (Automatic Meter Reading Systems).

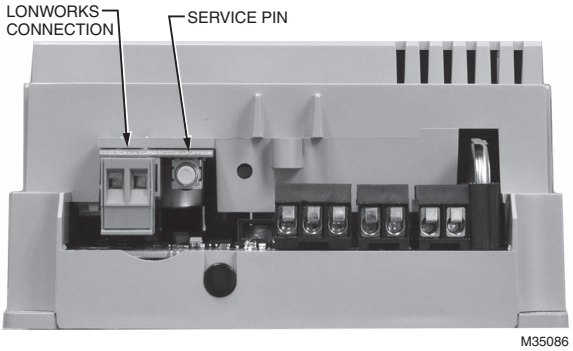


Fig. 8. Model D5 Advanced kWh Meter with LonWorks Input Terminals.

3.3 Terminal Covers

The Din-Mon™ meter has 2 terminal covers – one for the voltage/current terminal and the other for the pulse/phase loss outputs and communications. Each terminal cover has breakable teeth to let the wires feed through; break the teeth as needed for your applications. Once wiring is completed, replace the terminal cover and secure in place.

Fig. 9. Terminal Cover.

4.0 METER INSTALLATION

4.1 Mounting the Meter

The Din-Mon™ meter is designed to be mounted by using the four mounting holes on the meter or attaching it to a DIN rail that has previously been installed. Refer to the wall mounting instructions below or to the DIN Rail mounting instructions on the following page.

Installation must only be performed by qualified personnel and in accordance with these instructions and all applicable local and national electrical codes. Honeywell and its representatives assume no responsibility for damages or injury resulting from the improper installation of this meter.

The Din-Mon™ meters are designed to be installed in protective enclosures. The enclosure must be of the proper type to contain fire, should this occur. The environmental conditions of the application must be considered in choosing the appropriate enclosure type. Use appropriately sized mounting hardware to fasten the meter enclosure to the selected mounting surface.

4.2 Wall Mounting

The meter mounts using four screws inserted through the corners of the base plate. Fasten securely with four No. 6 or No. 8 machine or sheet metal screws.

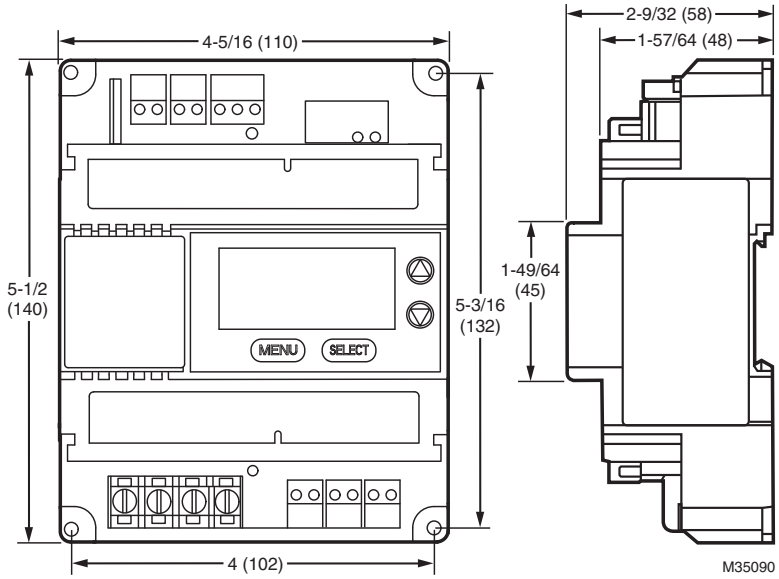


Fig. 10. Wall Mount and Meter Dimensions (front and side view).

4.3 DIN-Rail Mounting

The meter mounts on the DIN Rail using the flex connects at bottom of the enclosure.

To install the meter on the DIN perform the following steps:

1. Holding the meter with its top tilted in towards the DIN rail, hook the two top tabs on the back of the meter onto the top of the DIN rail.
2. Push down and in to snap the two bottom flex connectors of the meter onto the DIN rail.

To remove the meter from the DIN rail, perform the following:

3. Push straight up from the bottom to release the top tabs.
4. Rotate the top of the meter out towards you and pull the meter down and away from the DIN rail to release the bottom flex connectors.

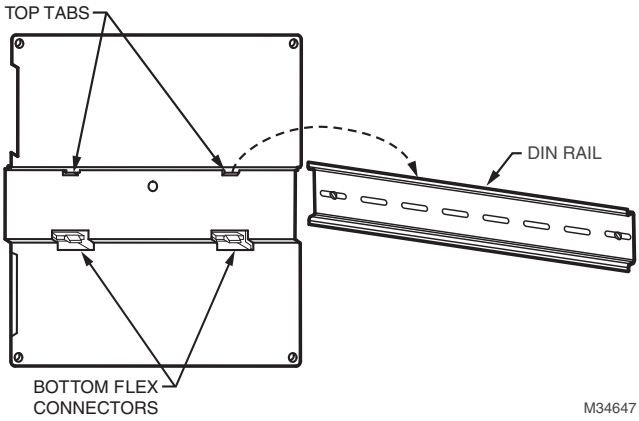


Fig. 11. DIN Rail (Bottom View).

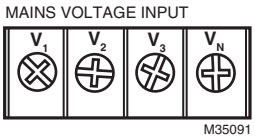
NOTE: The meter enclosure is constructed of a plastic base plate and 2 plastic screw- mounted covers. The enclosure is designed so that the cover does not need to be removed from the base plate for either mounting or wiring. Ventilation openings are designed into the cover to allow proper heat dissipation.

4.4 Wiring the Voltage

⚠ WARNING

High voltages are present on voltage input connections screw terminals. Risk of serious injury and/or electrical shock exists. Prior to performing any wiring operations, review all contents of the user manual and de-energize the MAINS power switch. Only qualified personnel should perform installation wiring. Installation wiring must comply with all local and national electrical codes.

1. The four position terminal block located at the bottom left corner of the main power board, is labeled V1, V2, V3, VN (neutral). Connect the NEUTRAL wire to the appropriate terminal block position.



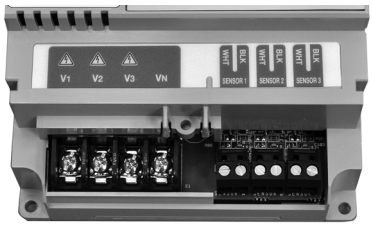


Fig. 12. Meter MAINS Voltage Input Terminal.

NOTE: For 3-wire delta-type applications, DO NOT connect the NEUTRAL wire. Remove the terminal block screw for this position.

a. To ensure a safe installation, the Din-Mon™ meter requires an external switch mechanism, such as a circuit breaker or in-line fuse, be installed on the Din-Mon™ meter MAINS input wiring. The switch mechanism must be installed in close proximity to the meter and easily reachable for the operator. This device must also be marked as the disconnecting device for the Din-Mon™ meter. Install 1/2 Amp fast activation in-line fuses with the suitable voltage rating for each conductor phase at the MAINS input to the meter. The fuses must be labeled to indicate voltage and current rating as well as element characteristics. The fuse element must be a fast activating type, such as the Littelfuse part number OKLK.500T (not included).

b. Connect the three AC main power wires (Phases A, B and C) to their respective positions on the 4-position terminal block and torque to 7 in-lb. Wiring should be a minimum of #14 AWG, stranded, with 600V insulation rating. After all conductors are connected to each of their respective terminal block positions and tightened down, verify that each terminal block screw is securely fastened by gently tugging on each conductor.

   Verify that no conductor wires are frayed or shorting to adjacent terminal block positions.

c. The terminal cover has breakable teeth to let the wires feed through, break the teeth as needed. Replace the terminal cover and secure in place.
d. Energize the AC main power input. The meter display will light up showing the startup screens, then scroll through the following screens. Each display is visible for 5 seconds.

   Display screens are as follows:

   Screen 1 - Total kilowatt-hours (kWh) consumed
   Screen 2 - Peak demand (kW) with date & time stamp
   Screen 3 - Present load (kW)
   Screen 4 - Current (amps) per phase
   Screen 5 - Voltage (volts) phase to neutral (for WYE service)
   Screen 6 - Voltage (volts) phase to phase
   Screen 7 - Power factor (PF) per phase

e. Verify the voltage readings using an AC voltmeter. Typical readings shown below are measured phase to neutral for 4-wire and phase to phase for 3-wire. Readings should be +/- 10% of nominal.

Meter Type	Nominal Voltage	Limits (+/- 10%)
120/208V, 3ø, 4 Wire 120/240V, 1ø, 3 Wire 127/220V, 1ø, 3 Wire 120V, 1ø, 2 Wire	120 VAC (L-N)	108 to 132 VAC
277/480V, 3ø, 4 Wire 277V, 1ø, 2 Wire	277 VAC (L-N)	249 to 305 VAC
240V, 3ø, 3 Wire	240 VAC (L-L)	216 to 264 VAC
400V, 3ø, 4 Wire	230 VAC (L-N)	207 to 253 VAC
480V, 3ø, 3 Wire	480 VAC (L-L)	432 to 528 VAC
600V, 3ø, 4 Wire	347 VAC (L-N)	312 to 380 VAC

NOTE: For 3-Wire (Delta) systems, the voltages are measured Phase to Phase. For 4-Wire (Wye) systems the voltages are measured Phase to Neutral. Delta meters are powered by Phases A and B. Wye meters are powered by Phase A to Neutral.

4.4.1 Phasing of Line Voltage

The 3-phase AC power input must be in proper phase sequence. If the sequence is incorrect or a phase is missing, there will be a message on the meter's display: "PH Seq Err" or "PH Loss x" where 'x' is the missing phase. (Refer to the section on Line Voltage Diagnostics if this message is present.) When the line voltage is connected correctly, the error message will not be present.

Wait for the meter display to scroll to the voltage display. Verify that the meter reads correct voltages on all phases.

Once the meter displays the correct line voltages and there are no error messages, you are ready to connect the current sensors to the meter. Before continuing with the installation, verify that the six screens display as follows:

Screen 1 (kWh):	Should read 0.0 kWh.
Screen 2 (kW Peak Demand):	kW peak should read 0.0 kW. There will not be a date/time stamp yet.
Screen 3 (Load/Date and Time):	Should read 0.0 kW load.
Screen 4 (Amps per Phase):	There should be 0.0 on all three phases.
Screen 5 (AC Volts, L-N):	
Screen 6 (AC Volts, L-L):	
Screen 7 (Power Factor):	There should be 0.0 PF on all three phases.

NOTE: The meter kWh and/or kW peak demand readings can be reset later.

4.5 Wiring Current Sensor Inputs

Once the AC voltages have been confirmed to be within acceptable limits, you are ready to install the current sensors. De-energize the meter for this procedure. In the lower right corner of the meter are the sensor connection terminals. Each sensor connects to two terminals, one labeled “WHT” for white and the other “BLK” for black. Positions 1 and 2 are the inputs for Phase A sensor, positions 3 and 4 are the inputs for Phase B sensor and positions 5 and 6 are the inputs for Phase C sensor; torque screws to 2 in-lbs.

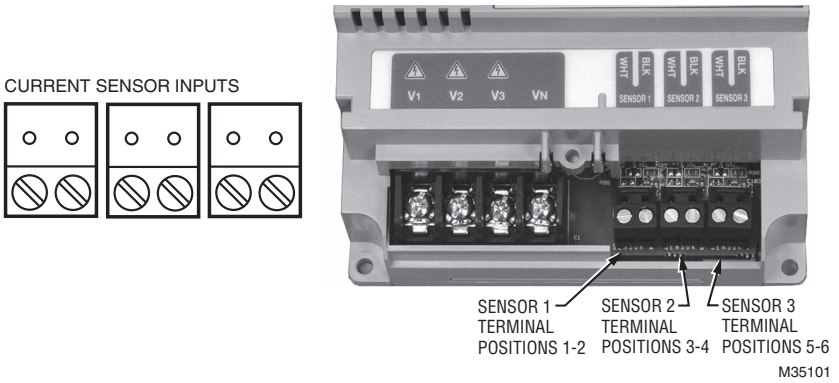


Fig. 13. Current Sensor Input Terminals (front view).

The Din-Mon™ meter is available for use with voltage (0.333V) output type of sensors or with current (100mA) output type of sensors.

NOTE: The sensor output type is indicated in the part number (OS) as “V3” for 0.333V and “C1” for 100mA type.

Each output type is available in two forms:

1. Split-core current sensor. This sensor opens so that it can be attached around the circuit being monitored without disconnecting the conductors.
2. Solid-core current sensor. This sensor does not open and requires the monitored conductor to be removed from the circuit to install the current sensor.

NOTE: UL Current Sensors rated for Measurement Category III providing double insulation for 600V installations.

4.5.1 Installing Split-Core Current Sensor Assembly

1. Each phase being monitored will require one split-core current sensor assembly. Open the current sensor assembly by lifting the top off the sensor.

Fig. 14. Typical Split Core Current Sensor.

2. Reassemble the current sensor assembly around the conductor(s) to be monitored. Ensure the current sensor side marked “This Side Toward Source” is facing the source side of the metered conductor.

3. Run the Black and White wires from the current sensors to the meter and install them according to the standard installation diagram.

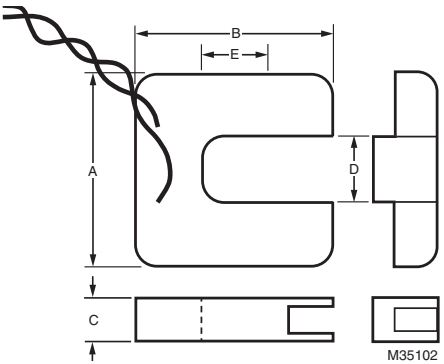


Fig. 15. Split Current Sensor Dimensions.

P/N	AMPS	A	B	C	D	E	NOTE
50082281-006	100	2.00	2.10	0.60	0.75	0.75	
50082281-008	200	3.25	3.35	1.00	1.25	1.25	
50082281-010	400	3.25	3.35	1.00	1.25	1.25	
50082281-012	800	4.75	5.00	1.20	2.00	2.00	

4.5.2 Installing Solid-Core Current Sensor

NOTE: Under no circumstances is this operation to take place without shutting off the power to the conductor(s) being monitored.

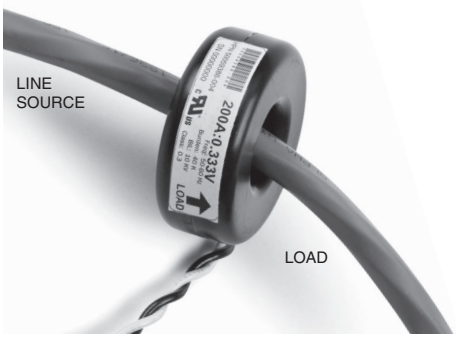


Fig. 16. Typical Solid-Core Current Sensor.

1. With the power off, disconnect the conductor from its breaker or terminal.
2. Slide the solid-core current sensor over the conductor, making sure that the indicator on the sensor is pointing in the direction of the load.
3. Reconnect the conductor.
4. Run the black and white wires from the current sensors to the meter and install them according to the standard installation diagram.

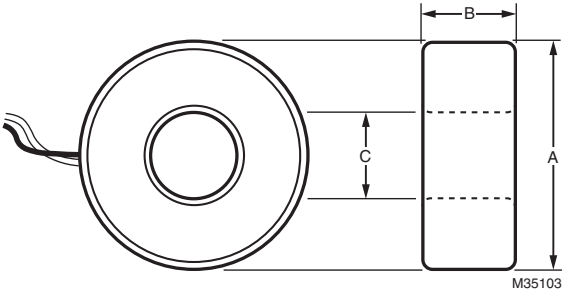


Fig. 17. Split Current Sensor Dimensions.

P/N	AMPS	A	B	C			NOTE
50059386-003	100	2.00	0.80	0.75			
50059386-004	200	2.00	0.80	0.75			

4.5.3 Current Sensor Wiring

Once the current sensors are installed onto their appropriate phase conductors, you can begin terminating the current sensors onto the meter. The current sensor wires can be extended up to 500 feet for remote monitoring applications. To extend the length of the wires, use #22 AWG twisted-pair wire with one white and one black wire.

The current sensor connection points are located at the bottom right of the meter. Each sensor connects to two terminals, one labeled “WHT” for white and the other “BLK” for black. Connect current sensor from phase A to terminal 1 and 2, current sensor from phase B to terminal 3 and 4, current sensor from phase C to terminal 5 and 6; torque screws to 2 in-lbs.

The terminal cover has breakable teeth to let the wires feed through; break the teeth as needed, once completed replace the terminal cover and secure in place.

After all meter circuit wiring has been examined for correctness, power may be applied to the meter. If the monitored circuit is under load, the arrow in the lower right corner of the display will blink off and on. Very light loads will result in an extended blink time.

Use the meter’s built-in current sensor diagnostics to ensure proper orientation and installation of the current sensors. In order to verify the orientation, there must be at least 1% of the meter’s current rating (Amps) flowing in each of the conductors being monitored.

Refer to Section 4.7.2, Current Sensor Diagnostics, for assistance in troubleshooting these errors.

4.5.4 Multiple-Load Monitoring

The Din-Mon™ kWh meter provides extreme flexibility by allowing additional sets of current sensors to be used in parallel so multiple load locations can be monitored by one meter. This feature allows totalized display readout from two or more load circuits.

NOTE: Paralleling of current sensors applies only to those designed for 0.333V output ("V3"); 100mA output ("C1") sensors must not be paralleled.

When paralleling current sensors, the following rules must be followed:

1. Current sensors must be installed in complete sets of three (or two with single phase installations), with a maximum of three sensors installed in parallel per phase.
2. All sensors used in parallel must be of the same type and amperage. rating. The rating is determined by the current rating of the meter. For example, a 200-Amp meter must use extra sets of 200-Amp sensors.
3. All locations being monitored must have the same power source. A 480 Volt meter cannot monitor a 208 Volt load, nor can a meter monitor two 480 Volt loads if they are from different originating power sources or from different transformers.
4. Multiply the meter display readings by the number of sets of current sensors installed. Example: Meter readings of 5 kWh with 2 sets of current sensors, the actual usage is 10 kWh. (5 x 2=10).

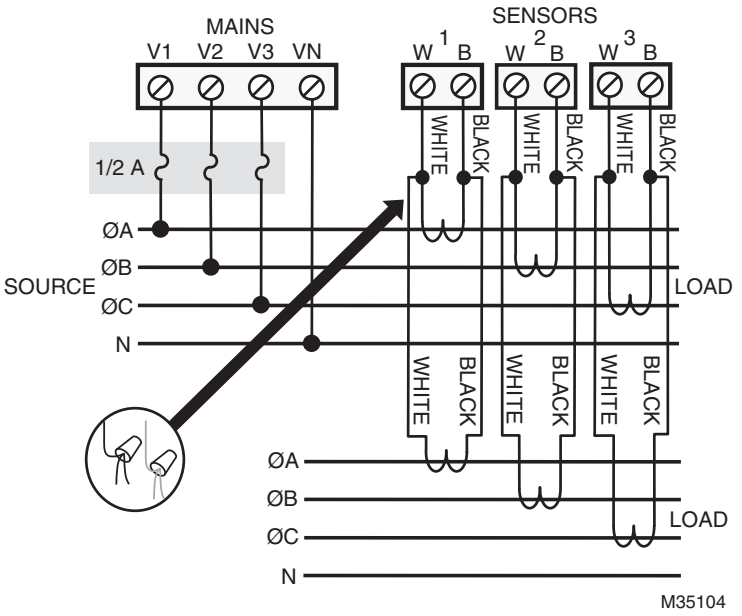


Fig. 18. Paralleling Current Sensors.

4.6 Main Power & Current Sensor Wiring Diagram

4.6.1 4-Wire Wye, 3-Element Connection Diagram

1. Recommended fuses or circuit breaker per the national electrical code (meter load 6VA); refer to Technical Specification section.
2. Install current sensors according to instructions.

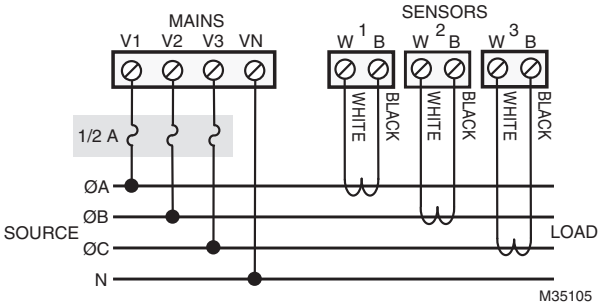


Fig. 19. 3-Phase, 4-Wire (120/208V, 127/220V, 230/400V, 277/480V, 347/600V).

4.6.2 3-Wire, 3-Element Connection Diagram

1. Recommended fuses or circuit breaker per the national electrical code (meter load 6VA).
2. Neutral MUST NOT be used in Delta system.
3. Install current sensors according to instructions.

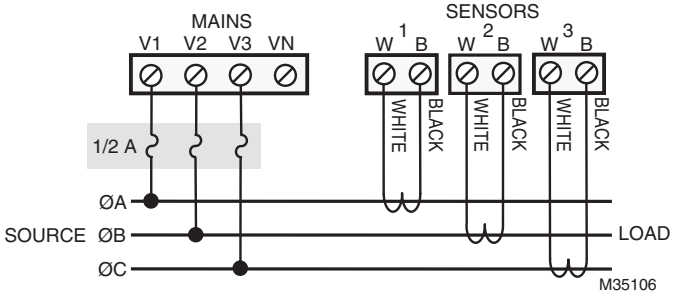


Fig. 20. 3-Phase, 3-Wire (240V, 480V).

4.6.3 3-Wire, 2-Element Connection Diagram

1. Recommended fuses or circuit breaker per the national electrical code (meter load 6VA).
2. Install jumper wire between V2 (ÆB) and V3 (ÆC).
3. Install current sensors according to instructions.

4. Install jumper wire between “W” and “B” on Sensor 3 (ÆC).

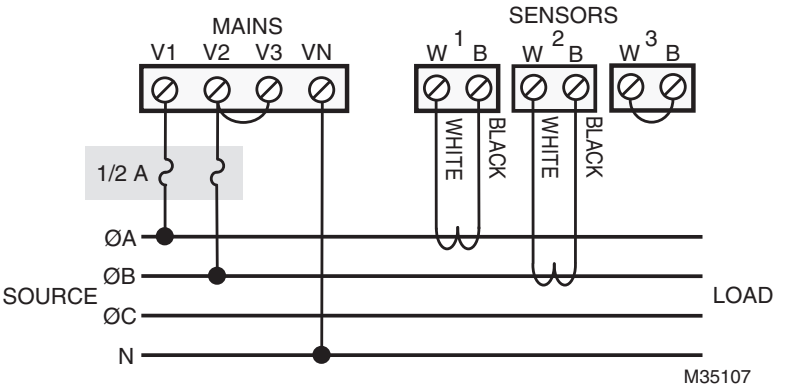
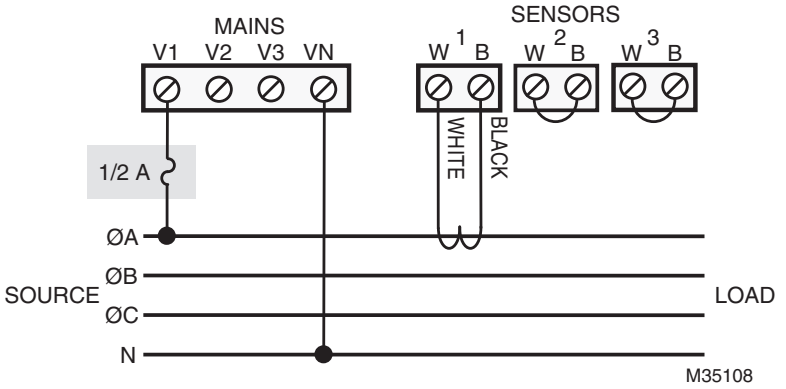


Fig. 21. 1-Phase, 3-Wire
(120/240V, 120/208V, 277/480V)

4.6.4 2-Wire, 1-Element Connection Diagram

1. Recommended fuses or circuit breaker per the national electrical code (meter load 6VA).
2. Install current sensors according to instructions.
3. Install jumper wire between ‘W’ and ‘B’ Sensor 2 (ÆB).

Fig. 22. Install jumper wire between ‘W’ and ‘B’ Sensor 3 (ÆC).



Single-Phase, 2-Wire,
120, 230, or 277 Volt Installation Diagram.

4.7 Installation Diagnostics

Following is a list of diagnostic messages that may appear on the meter display.

DIAGNOSTIC MESSAGES SHOULD NOT BE ON CONTINUOUSLY WHEN THE METER IS INSTALLED PROPERLY AND IS IN WORKING ORDER.

4.7.1 Line Voltage Diagnostics

The diagnostics program detects line voltage faults by displaying one of two messages:

Error Messages:

PH Seq Err
PH Loss C

PH Seq Err indicates that the 3-phase line voltage is not hooked up in the proper phase sequence. This message should never be seen continuously on the display during normal operation. The meter will not display correct electrical data in this condition. The phase sequence error must be remedied in order for the meter to work properly.

PH Loss C indicates that the line voltage is missing on Phase C. This message will appear whenever the power on Phase C is off.

4.7.2 Current Sensor Diagnostics

The load current must be at least 1% of the meter's rated load in order to use the diagnostic function.

Current sensor diagnostics can detect:

1. Reversed current sensors
2. Incorrect phase correspondence

Error Messages:

CT Err A
CT Err A B
CT Err A C

CT Err: (ABC) is used to detect the swapping or mis-wiring of current sensor phases.

NOTE: If you have connected the current sensor to all terminals and the error message is still appearing, reverse the black and white wires and repeat the previous steps until the correct connection is found. If the CT Error message is eliminated, you have found the correct sensor connection; however, the current sensor was not installed properly around the conductor, or the sensor wires were extended and not spliced together correctly.

Correct the sensor installation by reconnecting the black wire to the black terminal and the white wire to the white terminal on the plug and reinstall the plug into the correct phase terminal for that current sensor. The error message should be eliminated and the current sensor is now installed properly.

If the CT Error message has not been eliminated at any time while trying all 3 inputs both ways, check the AC voltage output from the current sensor leads between the black and white wires using an AC voltmeter. If the reading on the AC voltmeter is close to or at zero, this indicates a very light load on the circuit or that the current sensors are not secured properly (check connection between current sensor halves or the lead splices to ensure they are tight).

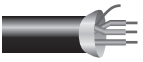
Once the first current sensor is connected properly and the error message has been eliminated, repeat the previous procedure for the remaining current sensor(s). When all error messages have been eliminated and all sensors are installed correctly, the meter is operational.

When the meter is properly connected, replace Mains / Current Sensor cover and secure with cover screw.

Wait 5 seconds and check the meter display.

4.8 Wiring the Communications

4.8.1 RS-485 Network and Wiring



BELDEN 3106A

M35109

RS-485 communication allows a computer, automation system, or modem to communicate with one or more Din-Mon™ meters. You can connect as many as 52 meters along a 4,000-foot RS-485 cable run with Belden 3106A cable or equivalent. The cable rating of 600V allows the RS-485 network to be used in cabinets with service voltage up to 600V. Meter is supplied with internal bias of Belden 3106A 45K Ohms, some installations may require additional biasing. A typical RS-485 network requires the use of one 120 Ohm termination resistor at each end of the RS-485 cable run. The termination resistors are installed across the '+' (high) and '–' (low) terminals.

Din-Mon™ meter supports 3 protocols on RS-485 connection operating in half-duplex, stop-and-wait mode. They are available in Modbus RTU, BACnet MS/TP, or EZ7.

The Din-Mon™ meter RS-485 network uses the convention '+' and '–' to represent the lines 'A' and 'B', defined by the RS-485 standard, respectively; in addition, "SC" is used for signal common.

The daisy-chain topology is used to link multiple meters together for one connection back to the computer, automation system, or modem.

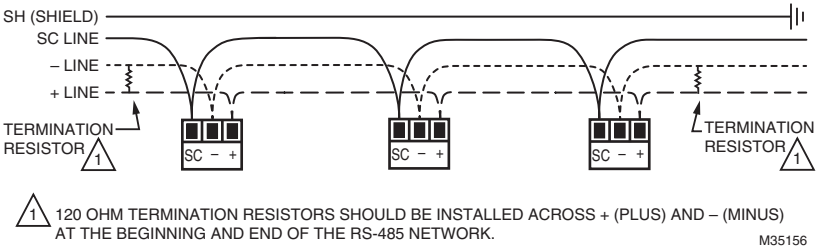
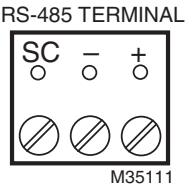


Fig. 23. A 3-Wire RS-485 Network Diagram.

NOTE: Belden 3601A recommended for RS-485 up to 600V environment applications. Torque screws to 2 in-lbs.

4.8.2 Meter RS-485 Wiring



1. Connect the + (high) terminal of each meter together so that the + terminals on all meters are linked, + to +...
2. Connect the – (low) terminal of each meter together so that the - terminals on all meters are linked, – to –...
3. Connect the SC (signal common) terminal of each meter so that the SC terminals on all meters are linked, SC to SC.
4. Install termination resistors (120 Ohm) at each end of the daisy-chain cable run.
5. Connect the SH (shield) of each cable so that the SH on all cables are linked, SH to SH. Terminate one end of SH to Earth ground. The SH should not be connected to the meter.

NOTE: SC (signal common) is electrically connected to the isolated RS-485 digital ground of the meter. If there are devices on the network that do not have SC terminal connection, skip over these devices. NEVER connect SC to SH (shield).

4.8.3 USB Key Wiring

The USB Key allows you to connect Din-Mon™ meters to a personal computer that has E-Mon Energy™ software installed. The USB key must be located within 15 feet of the host computer.

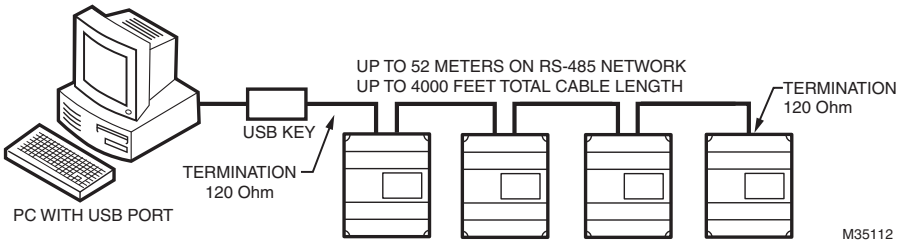
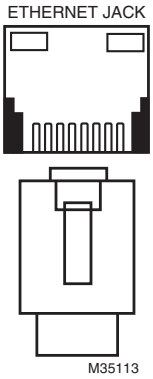


Fig. 24. USB Key to RS-485 Network.

The USB Key plugs into the PC's USB port and provides a termination point for the RS-485 wiring from the meters. A termination is needed for the other end of the RS-485 network. The USB Key is labeled + (plus), – (minus), "SC"; wiring must match the same positions on the meters. Refer to RS-485 Wiring section for details. If more than 52 meters are to be monitored, additional USB Keys can be utilized to connect them to the PC.

4.8.4 Ethernet Wiring (Optional on D5 Models Only)

Ethernet/IP communication connections are provided through an RJ-45 connector on top of the meter. This port can be connected to a LAN for use as an Intranet or Internet connection; or can be connected directly to a network port of a PC using a Cat-5e crossover cable.



The Din-Mon™ Ethernet operates at 10/100-Base-T.

Two LEDs are provided directly above the connector. They are located on the top of the modular jack. The LINK LED is yellow and when lit, indicates Ethernet connectivity. The ACT LED is green and when lit, indicates network communication activity.

The communication protocol for the Ethernet port is selected when ordering the meter. The available choices are EZ7, Modbus TCP/IP, and BACnet IP. See the ordering information section for the available choices in combination with the RS-485.

Each device that is connected directly to the Ethernet network requires a unique IP address.

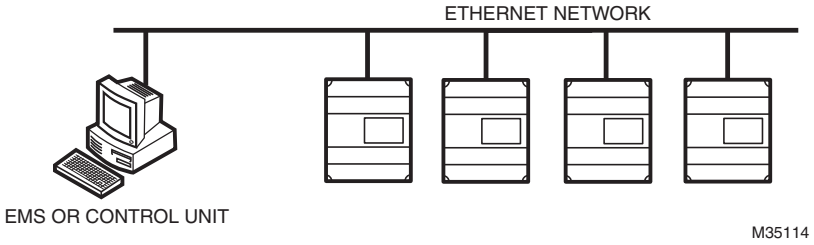


Fig. 25. Ethernet Network

4.8.5 LonWorks Wiring (Optional on D5 Models Only)

LonWorks communication connections are provided through a 2-position screw terminal plug on top of the meter. This port can be connected to a LonWorks TP/FT-10 (Twisted Pair / Free Topology) network using 24 AWG twisted pair cable, TIA 568A Category 5 or equivalent.

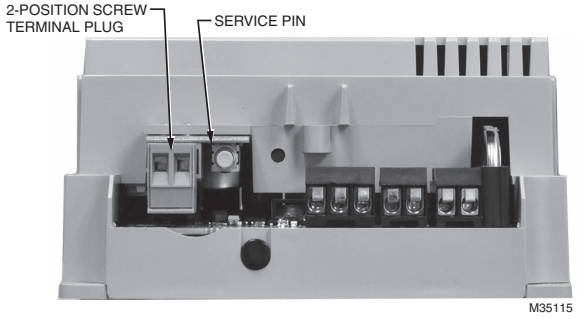


Fig. 26. 2-Position Screw Terminal Plug and Service Pin.

WIRING THE CONNECTION

1. Remove the communications terminal cover.
2. Remove the 2-position screw terminal plug from the meter.
3. Connect each conductor of network cable to each screw terminal. Torque screws to 2 in-lbs.
   (NOTE: Connection is polarity independent.)
4. Re-install the 2-position screw terminal plug to the meter.

COMMISSIONING LONWORKS NODE

1. With all TP/FT-10 network connections made, apply power to the meter. Allow ample startup time.
2. The network configuration tool using the TP/FT-10 standard can be set to search for a Neuron ID or listen for a Neuron ID when the service pin is pressed.
   a. **Neuron ID**: The Neuron ID is printed on the Order Specification label located on the side of the meter enclosure. Enter the Neuron ID into the network configuration tool and discover the node on the network.
   b. **Service Pin**: Set the network configuration tool to detect ServicePin. Press the Service Pin switch located next to the 2-position screw terminal plug. Refer to figure above.
3. Once commissioning has been completed, replace the communications terminal cover, and fasten with screw provided.

Refer to Communication Protocols Section for details on LonWorks TP/FT-10.

LONWORKS SPECIFICATIONS

1. Supports up to 64 Devices / Nodes on a single network segment.
2. Supports 78 kbps bit rate.
3. TP/FT-10 accommodates Bus, Star, Loop, or combinations of topologies.
4. Bus Topology Specifications (Doubly Terminated):
   a. MAX Bus Length: 1,000 meters (3,280 Feet).
   b. MAX Stub Length: 3 meters (10 Feet).
5. Free Topology Specifications (Single Terminated):
   a. MAX Device to Device distance 250 meters (820 Feet).
   b. MAX Total Wire Length 450 meters (1476 Feet).
6. Required Termination:
   a. Bus Topology: (2) Terminators, ECHELON Model Number 44100R or equivalent.
   b. Free Topology: (1) Terminator, ECHELON Model Number 44100R or equivalent.

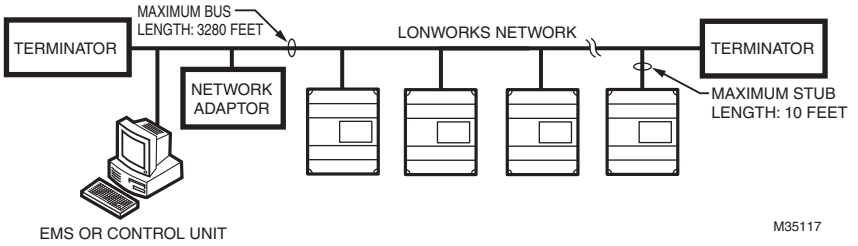


Fig. 27. LonWorks Bus Topology.

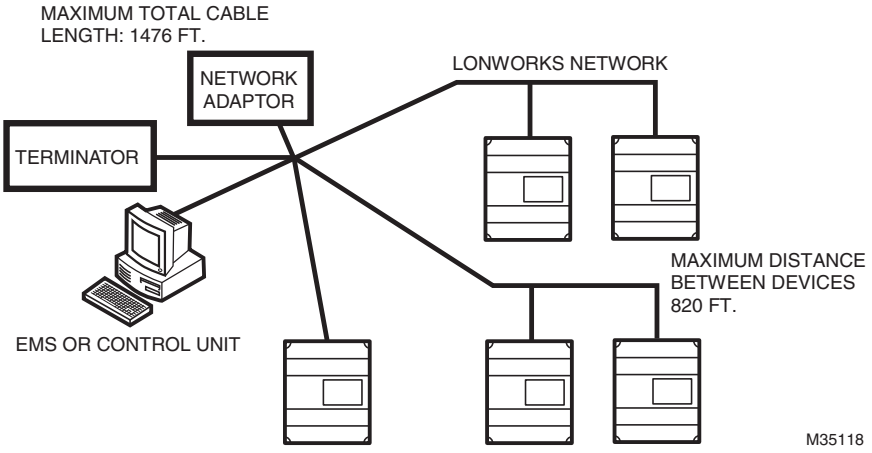


Fig. 28. LonWorks Free Topology.

5.0 COMMUNICATION PROTOCOLS

The Din-Mon™ meter supports multiple communication protocols. Refer to section 2.1 Ordering Information to check your meter model configuration to determine which protocol(s) it supports.

- Refer to section “Wiring the Communications” for wiring details.
- Refer to section “Setting Communication Protocol” for selecting available protocols. If the protocol you need is not listed in the menu selection, verify the model number you ordered.
- Refer to the Appendices for Modbus point maps, BACnet objects, and LonWorks SNVTs.

5.1.1 Modbus RTU

The Din-Mon™ Modbus RTU meter communicates with building automation equipment over a 3-wire (3-conductor) RS-485 network using Modbus RTU protocol.

The meter is shipped with a Modbus ID number of 1. The Modbus ID range is 1 to 247. There can be no duplicate numbers on a RS-485 network, so caution must be taken when assigning a meter ID number prior to its installation on the network.

5.1.2 BACnet MS/TP

The Din-Mon™ BACnet MS/TP meter communicates with building automation equipment over RS-485 network using BACnet MS/TP protocol.

The meter is shipped with a BACnet instance device ID number of 1 and MS/TP MAC of 1; both of these numbers must be unique within an MS/TP network.

The meter MS/TP MAC can be numbered from 0 to 127; the MAX Master range is 1 to 127; the BACnet instance device ID range is 0 to 4194303.

5.1.3 Baud Rate and Settings on RS-485

RS-485 communication can operate at different baud rates (speed). The baud rate is selected via the LCD display menu. There are 4 baud rate selections: 9600 (factory default), 19200, 38400, and 76800 baud; higher baud rates would require shorter cable length. The setting is 8-parity bits, no-parity, 1-stop bit.

5.1.4 Modbus TCP/IP

The Din-Mon™ D5 Modbus TCP/IP meter communicates with building automation equipment over an Ethernet communication on port 502. The default IP address is 192.168.0.168, unless specified in the order form.

The meter is shipped with a Modbus ID number of 1. The Modbus ID range is 1 to 247.

5.1.5 BACnet IP

The Din-Mon™ D5 BACnet IP meter communicates with building automation equipment over an Ethernet communication on port 47808.

The meter is shipped with a BACnet instance device ID number of 1. The BACnet instance device ID range is 0 to 4194303.

5.1.6 LonWorks TP/FT-10

The Din-Mon™ D5 LonWorks meter communicates with building automation equipment via a TP/FT-10 (Twisted Pair - Free Topology) network. End users can read meter point data via SNVTs (Standard Network Variable Types).

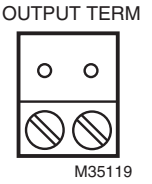
The meter is shipped configured. If the network is already configured, the LonWorks meter will need to be recommissioned.

5.1.7 EZ7 on RS-485 and Ethernet

All Din-Mon™ meters have EZ7 protocol on RS-485 and Ethernet built-in for communicating with E-Mon Energy software. EZ7 is an E-Mon proprietary protocol.

The meter is shipped with a default EZ7 ID of 1A. The EZ7 ID range is 1A..1Z to 8A..8Z.

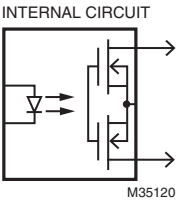
6.0 EXTERNAL INTERFACE



The Din-Mon™ meter has 2 pairs of output terminals.

1. Watt-Hour pulse output.
2. VAR-Hour pulse or Phase Loss output.

6.1 Pulse Output



The board contains two pulse outputs for use by Building Automation Systems, etc. One pulse is in watt-hours, the second pulse is in VAR-hours. They are polarity independent. The maximum current allowed is 400 mA and the maximum voltage allowed is 40 VAC or VDC. See the table below for maximum pulse rate.

Table 1. Pulse Rate Maximum Load.

Index	Voltage Rating	Maximum pulse rate per minute (at rated load)
0	Others	User
1	120/208 (3ø)	307.52
2	277/480 (3ø)	708.00
3	346/600 (3ø)	886.88
4	120/208 (2ø)	204.96
5	277/480 (2ø)	472.96
6	346/600 (2ø)	591.20
7	120 (1ø)	102.40
8	277 (1ø)	236.48

6.2 Pulse Type and Value

The pulse outputs provided by the Din-Mon™ meter are VAR-Hour and Watt-Hour. The pulse value is dependent on the amperage size of the meter. See the chart below for the standard pulse values. Refer to section 10.2.6 Pulse Values for detailed instructions on changing settings.

Meter Amps	Watt-hours / Pulse	VAR-hours / Pulse
100	1.95313	1.95313
200	3.90625	3.90625
400	7.81250	7.81250
800	15.62500	15.62500

Din-Mon™ meters with “V3” sensor type support paralleling of up to 3 sets of 0.333V type current sensors. Current sensors must be of the same type and model number. The pulse values listed in the above table are based on 1 set of current sensors. When multiple sets of current sensors are installed in parallel, the final pulse values will be the product of the based pulse values times the number of sets of current sensors in parallel.

Formula for calculating pulse value:

Pulse Value = (Base Pulse Value) x (Number of sets of Current Sensors in Parallel)

Example: Calculate the multiplier for a meter of 120/208 Volt, 3-Phase, 200 Amp, 3 sets of Current Sensors in parallel. Final pulse value is 11.71875 that is the result of 3.90625 multiplied by 3.

NOTE: The VAR-Hour pulse output contact can also be programmed to function as a Phase Loss contact. The normally open contact closes within the meter due to the loss of any one of the three lines of voltage inputs to the meter. The contact closure may be used to activate an audible alarm, light, control coil, or other indicator device. This alerts appropriate personnel to the loss of voltage. An emergency phone dialer may also be programmed to send notification automatically by phone, text, or pager. Alarming devices are to be supplied by others and are not included with the Din-Mon™ meter.

NOTE: If the meter has more than 1 set of sensors in parallel, make sure to factor in the number of sets of sensors to the pulse values.

7.0 SETTING UP THE METER USING THE PUSH BUTTONS

The meter has 4 push buttons (**MENU**, **SELECT**, **UP**, **DOWN**) located on the front of the meter. These buttons are used to program the following items:

Item	Function	Description
1	Date and Time	Set month, day, year, and time
2	Device ID	Set EZ7 ID, Modbus ID, BACnet Device Instance
3	IP Settings	Set DHCP or static IP address
4	Pulse Value	Output pulse values
5	Protocol	Set protocol if D5 dual protocol meter is ordered
6	Baud Rate	Set RS-485 baud rate
7	Phase Loss	Set Phase Loss or VAR-hour
8	CT Selection	Set current sensor type and size
9	Access Protect	Enable/disable menu protection and/or remote access protection
10	Change Password	Password protection for menu items
11	BACnet Settings	Only applies to BACnet MS/TP
12	Reset KW/KWH Read	Reset Peak kWh and/or kWh readings

7.1 Navigating Menus

Enter the main menu by pressing **MENU**. Continue pressing **UP** and **DOWN** until the arrow points to desired item, then press **SELECT** to proceed to submenu. Use **UP** or **DOWN** to make changes, press **SELECT** to advance to the next field. Press **MENU** to return to main menu. If changes were made, you'll be asked to save, press **UP** or **DOWN** to select '**Y**' or '**N**'; press **SELECT** to proceed returning to main menu. In main menu, select **EXIT** to get out of programming mode and return to normal display mode. **NOTE**: Hold **SELECT** for 3 seconds to cancel program mode, or wait for 8 seconds for timeout to cancel.

NOTE: To change a numeric field one digit at a time, follow these steps.

1. Locate the number to be changed by using **UP** or **DOWN**.
2. Press and hold the **DOWN** for 3 seconds, then release the button; the last digit for this number will blink.
3. Press **UP** to cycle through 0 to 9.
4. Press **DOWN** to move to the next digit.
5. Press **SELECT** to accept the changes and advance to the next field.

The submenu items that can be changed by digit:

IP address/Gateway/Subnet Mask, BACnet Device ID, BACnet MSTP MAC Address/max masters, Pulse Value

7.1.1 Setup Menu Screens

Item	Program	Main Menu	Sub Menu
1	Date and Time	>DATE & TIME DEVICE ID IP SETTINGS PULSE VALUE	DATE 02-14-2013 TIME 13:45-59
2	Device ID (Modbus Firmware)	DATE & TIME >DEVICE ID IP SETTINGS PULSE VALUE	DEVICE ID EZ7 1A MODBUS 2
3	Device ID (BACnet Firmware)	DATE & TIME >DEVICE ID IP SETTINGS PULSE VALUE	DEVICE ID EZ7 1A BACNET 2
4	IP Settings	DATE & TIME DEVICE ID >IP SETTINGS PULSE VALUE	ENABLE DHCP? N I192.168.0.168 M255.255.255.0 G192.168.0.1
5	Pulse Value	DATE & TIME DEVICE ID IP SETTINGS >PULSE VALUE	OUT CHANNEL 1 USE DEFAULT Y WHr/P 1.95313
6	Protocol	DEVICE ID IP SETTINGS PULSE VALUE >PROTOCOL	RS-485 MODBUS ETHERNET MODBUS
7	Baud Rate	IP SETTINGS PULSE VALUE PROTOCOL >BAUD RATE	BAUD RATE 9600

Item	Program	Main Menu	Sub Menu
8	Phase Loss	PROTOCOL BAUD RATE >PHASE LOSS CT SELECTION	PHASE LOSS ENABLE Y
9	CT Selection	PROTOCOL BAUD RATE PHASE LOSS >CT SELECTION	CT TYPE SPLIT CT SIZE 200
10	Access Protect	BAUD RATE PHASE LOSS CT SELECTION >ACCESS PROTECT	ACCESS PROTECT REMOTE Y LCD Y
11	Change Password	PHASE LOSS CT SELECTION ACCESS PROTECT >CHANGE PASSWORD	OLD 0000 NEW 0000 CONFIRM Y
12	BACnet Settings (BACnet MS/TP Firmware)	CT SELECTION ACCESS PROTECT CHANGE PASSWORD >BACNET SETTINGS	MSTP MAC 1 MAX MASTER 127 PORT 47808
13	Reset KW/KWH	ACCESS PROTECT CHANGE PASSWORD BACNET SETTINGS >RESET KW/KWH	RESET KW ONLY? N RESET ALL? N
14	Exit	CHANGE PASSWORD BACNET SETTINGS RESET KW/KWH >EXIT	

7.2 Configurable Settings from the Display Menu

Item	Main Menu	Sub Menu	Range	Default
1	Date &Time	Date	MM-DD-YYYY	00-00-0000
		Time	HH:MM:SS	00:00:00
2	Device ID	EZ7 ID	1A..8Z	1A
		Modbus ID	1..247	2
		BACnet ID	0..1\4194303	1
3	IP Settings	Enable DHCP?	Y or N	N
		IP Address	255.255.255.255	192.168.0.1
			255.255.255.255	255.255.255.0
			255.255.255.255	192.168.0.1
4	Register to BBMD	BBMD IP Address	255.255.255.255	
		BBMD Port	0-65535	
		Live-Time	0-65535	0
5	BACnet Settings	MS/TP MAC	0..127	1
		MAX Master	1..127	127
		Port		47808
6	Pulse Value	Out Channel	1 or 2	1
		Use Default	Y or N	Y
		WHr/P		(meter amperage)
7	Protocol	RS-485	Modbus, MS/TP, EZ7	
		Ethernet		
8	Baud Rate	RS-485 comm. speed	9600, 19200, 38400, or 76800	9600
9	Phase Loss	Phase Loss / VAR-hour	Phase Loss or VAR-Hour pulse	Phase Loss
10	CT Selection	CT Type	Split or Solid	
		CT Size	Default, Unknown, 25-800	
11	Access Protect	Remote access protect?	Y or N	N
		LCD access protect?	Y or N	N
12	Change Password	Old password	0000-9999	N
		New password	0000-9999	
		Confirm	Y or N	
13	Reset KW/KWH	Reset kW Only?	Y or N	N
		Reset All?	Y or N	N
14	Exit	Return to normal display mode.		

7.2.1 Setting Date and Time

To change the date and time, complete the following steps:

```
DATE   02-14-2013
TIME   13:45-59
```

1. Press **MENU** button.
2. Press **SELECT** button. The 2-digit month will be blinking.
3. Use **UP** or **DOWN** button to make changes.
4. Press **SELECT** button to advance to the next setting. Repeat this step until all the date and time settings have been updated.
5. Press **MENU** to complete the changes. If changes were made, you'll be asked to save changes.
6. Press **UP** or **DOWN** to select '**Y**' or '**N**'.
7. Press **SELECT** button to accept the selection. This will return you to the main menu.
8. Select **EXIT** to get out of programming mode and return to normal display mode.

FIELD RANGE: MM-DD-YYYY, MM=[1..12], DD=[1..31], YYYY=[2000..2???]; HH:MM:SS, HH=[0..24], MM=[0..59], SS=[0..59]

7.2.2 Setting Device ID (Modbus)

To change the Device ID, complete the following steps:

```
DEVICE ID
EZ7              1A
MODBUS            2
```

1. Press **MENU** button.
2. Use **UP** or **DOWN** button until the arrow is on the **DEVICE ID** line.
3. Press **SELECT** button.
4. Use **UP** or **DOWN** button to make changes.
5. Press **SELECT** button to advance to the next setting. Repeat this step until all the Device ID settings have been updated.
6. Press **MENU** to complete the changes. If changes were made, you'll be asked to save changes.
7. Press **UP** or **DOWN** to select '**Y**' or '**N**'.
8. Press **SELECT** button to accept the selection. This will return you to the main menu.
9. Select **EXIT** to get out of programming mode and return to normal display mode.

FIELD RANGE: EZ7 ID=[1A..1Z]..[8A..8Z]; Modbus ID=[1..247]

7.2.3 Setting Device ID (BACnet)

To change the Device ID, complete the following steps:

```
DEVICE ID
EZ7              1A
BACNET            2
```

1. Press **MENU** button.
2. Use **UP** or **DOWN** button until the arrow is on the **DEVICE ID** line.
3. Press **SELECT** button.
4. Use **UP** or **DOWN** button to make changes.
5. Press **SELECT** button to advance to the next setting. Repeat this step until all the Device ID settings have been updated.
6. Press **MENU** to complete the changes. If changes were made, you'll be asked to save changes.
7. Press **UP** or **DOWN** to select '**Y**' or '**N**'.
8. Press **SELECT** button to accept the selection. This will return you to the main menu.
9. Select **EXIT** to get out of programming mode and return to normal display mode.

FIELD RANGE: EZ7 ID=[1A..1Z]..[8A..8Z]; BACnet ID=[0..4194303]

7.2.4 Setting Ethernet IP Address

To change the Ethernet IP Address, complete the following steps:

```
ENABLE DHCP? N
I192.168.0.168
M255.255.255.0
G192.168.0.1
```

1. Press **MENU** button.
2. Use **UP** or **DOWN** button until the arrow is on the **IP SETTINGS** line.
3. Press **SELECT** button.
4. Use **UP** or **DOWN** button to make changes.
   To change by digit, refer to note in Section 7.1 Navigating Menus.
5. Press **SELECT** button to advance to the next setting. Repeat this step until all the IP address settings have been updated.
6. Press **MENU** to complete the changes. If changes were made, you'll be asked to save changes.
7. Press **UP** or **DOWN** to select '**Y**' or '**N**'.
8. Press **SELECT** button to accept the selection. This will return you to the main menu.
9. Select **EXIT** to get out of programming mode and return to normal display mode.

FIELD RANGE: IP, Mask, Gateway=[000.000.000.000 – 255.255.255.255]

7.2.5 Setting Pulse Value

To change the Pulse Value, complete the following steps:

```
OUT CHANNEL      1
USE DEFAULT      Y
WHr/P      1.95313
```

1. Press **MENU** button.
2. Use **UP** or **DOWN** button until the arrow is on the **PULSE VALUE** line.
3. Press **SELECT** button.
4. Use **UP** or **DOWN** button to make changes.
   To change by digit, refer to note in Section 7.1 Navigating Menus.
5. Press **SELECT** button to advance to the next setting. Repeat this step until all the pulse value settings have been updated.
6. Press **MENU** to complete the changes. If changes were made, you'll be asked to save changes.
7. Press **UP** or **DOWN** to select '**Y**' or '**N**'.
8. Press **SELECT** button to accept the selection. This will return you to the main menu.
9. Select **EXIT** to get out of programming mode and return to normal display mode.

FIELD RANGE: OUT CHANNEL=[1 or 2], WHr/P=[0.00001..999.99999]

7.2.6 Setting Communication Protocol

To change the Communication Protocol, complete the following steps:

```
RS-485       MODBUS
ETHERNET     MODBUS
```

1. Press **MENU** button.
2. Use **UP** or **DOWN** button until the arrow is on the **PROTOCOL** line.
3. Press **SELECT** button.
4. Use **UP** or **DOWN** button to make changes.
5. Press **SELECT** button to advance to the next setting. Repeat this step until all the protocol settings have been updated.
6. Press **MENU** to complete the changes. If changes were made, you'll be asked to save changes.
7. Press **UP** or **DOWN** to select '**Y**' or '**N**'.
8. Press **SELECT** button to accept the selection. This will return you to the main menu.
9. Select **EXIT** to get out of programming mode and return to normal display mode.

FIELD RANGE: RS-485=[EZ7, Modbus or BACnet]; Ethernet=[EZ7, Modbus or BACnet]

7.2.7 Setting Communication Baud Rate

To change the Communication Baud Rate, complete the following steps:

```
BAUD RATE      9600
```

1. Press **MENU** button.
2. Use **UP** or **DOWN** button until the arrow is on the **BAUD RATE** line.
3. Press **SELECT** button.
4. Use **UP** or **DOWN** button to make changes.
5. Press **SELECT** button to advance to the next setting. Repeat this step until all the baud rate settings have been updated.
6. Press **MENU** to complete the changes. If changes were made, you'll be asked to save changes.
7. Press **UP** or **DOWN** to select '**Y**' or '**N**'.
8. Press **SELECT** button to accept the selection. This will return you to the main menu.
9. Select **EXIT** to get out of programming mode and return to normal display mode.

FIELD RANGE: BAUD RATE=[9600, 19200, 38400, or 76800]

7.2.8 Setting Phase Loss or VAR-Hour Pulse

To change the Phase Loss or VAR-Hour Pulse, complete the following steps:

```
PHASE LOSS
ENABLE           Y
```

1. Press **MENU** button.
2. Use **UP** or **DOWN** button until the arrow is on the **PHASE LOSS** line.
3. Press **SELECT** button.
4. Use **UP** or **DOWN** button to make changes.
5. Press **SELECT** button to advance to the next setting. Repeat this step until all the phase loss settings have been updated.
6. Press **MENU** to complete the changes. If changes were made, you'll be asked to save changes.
7. Press **UP** or **DOWN** to select '**Y**' or '**N**'.
8. Press **SELECT** button to accept the selection. This will return you to the main menu.
9. Select **EXIT** to get out of programming mode and return to normal display mode.

FIELD RANGE: PHASE LOSS ENABLE=[Y or N], Y=Phase loss, N=VAR-Hour pulse

7.2.9 Setting CT Selection

To change the CT Selection, complete the following steps:

```
CT TYPE        SPLIT
CT SIZE          200
```

1. Press **MENU** button.
2. Use **UP** or **DOWN** button until the arrow is on the **CT SELECTION** line.
3. Press **SELECT** button.
4. Use **UP** or **DOWN** button to make changes.
5. Press **SELECT** button to advance to the next setting. Repeat this step until all the CT selection settings have been updated.
6. Press **MENU** to complete the changes. If changes were made, you'll be asked to save changes.
7. Press **UP** or **DOWN** to select '**Y**' or '**N**'.
8. Press **SELECT** button to accept the selection. This will return you to the main menu.
9. Select **EXIT** to get out of programming mode and return to normal display mode.

FIELD RANGE: CT TYPE=[Split or Solid]; CT SIZE=[50, 100, 200, 400, 800] Amps

7.2.10 Setting Access Protection

To change the Access Protection, complete the following steps:

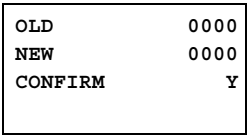
```
ACCESS PROTECT
REMOTE           Y
LCD              Y
```

1. Press **MENU** button.
2. Use **UP** or **DOWN** button until the arrow is on the **ACCESS PROTECT** line.
3. Press **SELECT** button.
4. Use **UP** or **DOWN** button to make changes.
5. Press **SELECT** button to advance to the next setting. Repeat this step until all the Access Protection settings have been updated.
6. Press **MENU** to complete the changes. If changes were made, you'll be asked to save changes.
7. Press **UP** or **DOWN** to select '**Y**' or '**N**'.
8. Press **SELECT** button to accept the selection. This will return you to the main menu.
9. Select **EXIT** to get out of programming mode and return to normal display mode.

FIELD RANGE: REMOTE=[Y or N]; LCD=[Y or N]

7.2.11 Changing Password

To change the Password, complete the following steps:



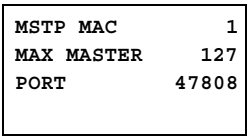
1. Press **MENU** button.
2. Use **UP** or **DOWN** button until the arrow is on the **PASSWORD** line.
3. Press **SELECT** button.
4. Use **UP** or **DOWN** button to make changes.
5. Press **SELECT** button to advance to the next setting. Repeat this step until all the password settings have been updated.
6. Press **MENU** to complete the changes. If changes were made, you'll be asked to save changes.
7. Press **UP** or **DOWN** to select '**Y**' or '**N**'.
8. Press **SELECT** button to accept the selection. This will return you to the main menu.
9. Select **EXIT** to get out of programming mode and return to normal display mode.

*status: <Pwd change OK>, <Pwd not changed>, <Pwd Reset OK>

FIELD RANGE: OLD password=[0000..9999], NEW password=[0000..9999];

7.2.12 Setting BACnet MS/TP

To change the BACnet setting, complete the following steps:



1. Press **MENU** button.
2. Use **UP** or **DOWN** button until the arrow is on the **BACNET SETTINGS** line.
3. Press **SELECT** button.
   Use **UP** or **DOWN** button to make changes.
   To change by digit, refer to note in Section 7.1 Navigating Menus.
4. Press **SELECT** button to advance to the next setting. Repeat this step until all the BACnet settings have been updated.
5. Press **MENU** to complete the changes. If changes were made, you'll be asked to save changes.
6. Press **UP** or **DOWN** to select '**Y**' or '**N**'.
7. Press **SELECT** button to accept the selection. This will return you to the main menu.
8. Select **EXIT** to get out of programming mode and return to normal display mode.

FIELD RANGE: MSTP MAC=[0..127]; MAX MASTER=[1..127]

7.2.13 Resetting Meter kWh/kW

To reset the meter kW and/or kWh readings, complete the following steps:

```
RESET KW ONLY?   N
RESET ALL?       N
```

1. Press **MENU** button.
2. Use **UP** or **DOWN** button until the arrow is on the **RESET K/KWH READ** line.
3. Press **SELECT** button.
   Use **UP** or **DOWN** button to make changes.
4. Press **SELECT** button to advance to the next setting. Repeat this step until all the reset kW and/or kWh selections have been updated.
5. Press **MENU** to complete the changes. If changes were made, you'll be asked to save changes.
6. Press **UP** or **DOWN** to select '**Y**' or '**N**'.
7. Press **SELECT** button to accept the selection. This will return you to the main menu.
8. Select **EXIT** to get out of programming mode and return to normal display mode.

FIELD RANGE: RESET KW ONLY=[Y or N], Y=reset KW peak demand, N=will also reset KWH; RSET ALL?=[Y or N], Y=reset KW peak demand and KWH accumulated display

8.0 NORMAL OPERATING MODES

The Din-Mon™ Meter is used to monitor electric power usage of individual loads after the utility meter and store kW and kVAR data for automatic meter reading.

8.1 Startup Screens

When the meter starts up, the screen first displays the meter name and firmware image type.

After approximately 4 seconds, the screen displays misc. information such as active configurations, meter configurations, phase, voltage, amperage, calibration factors, serial number, Date/time and firmware version.

Fig. 29. Din-Mon™ Meter

Screen	Description	Display
1	Startup screen 1	Din-Mon M Starting Up... 121212r
2	Startup screen 2	9600 EZ7 EZ7 3P-208V-100A 0.994 0.99B 1.00 121212r 06.51.01

Firmware Code	Firmware Type
M	ModBus RTU and ModBus TCP/IP
B-IP	BACnet IP on Ethernet, EZ7 on RS-485 only
B-MSTP	BACnet MS/TP on RS-485, EZ7 on Ethernet only
L	LonWorks TP/FT-10, EZ7 on RS-485 only

Protocol Code	Active Protocol Selection
EZ7	EZ7
B-IP	BACnet IP
B-MSTP	BACnet MS/TP
LON	LonWorks TP/FT-10

8.2 Reading the Meter Display

The Din-Mon™ meter features seven different screens showing monitoring data. Each screen is displayed for 5 second intervals, before scrolling onto the next screen.

You can “lock” the scrolling display on any one of the seven screens. This will be explained in detail on following pages. Explanations of these displays are as follows:

Screen	Description	Display
1	Total Kilowatt-Hours (kWh) Consumed (Delivered)	TOTAL: 123 KWH
2	Peak Demand (kW) with Date and Time Stamp	PEAK 25.5 KW DATE 05/15 TIME 11:45
3	Present Load (kW) with Present Date and Time	LOAD 24.0 KW DATE 06/14/11 TIME 08:46:58
4	Current (Amps) Per Phase	PH-A 119.8 V PH-B 120.2 V PH-C 119.5 V
5	Voltage (Volts) Phase to Neutral (for WYE service)	PH-A 12.3 AMP PH-B 10.2 AMP PH-C 14.7 AMP
6	Voltage (Volts) Phase to Phase	PH-AB 208.0 V PH-BC 208.2 V PH-CA 207.0 V
7	Power Factor (PF) Per Phase	PH-A 97.4 % PF PH-B 98.2 % PF PH-C 98.6 % PF

NOTE: Not all items will be shown on 1-phase or 2-phase models.

8.3 Display Hold Feature

You can hold the scrolling display so that it will stay locked on any one of the 7 screens.

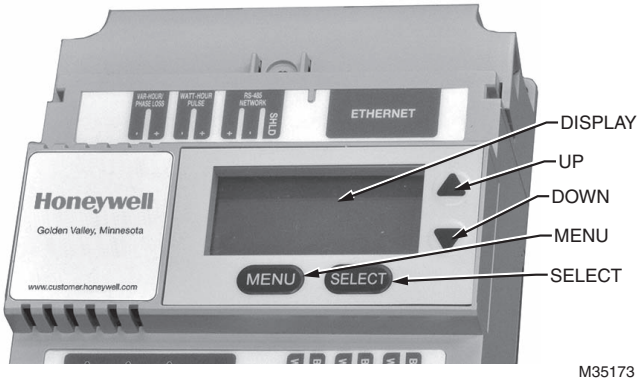


Fig. 30. Display and Push Buttons.

To Enter Hold Mode:

1. Use the **UP** and **DOWN** buttons to choose which of the 7 screens you would like to display.

   Press the **SELECT** button. At the bottom of the display, you will see the message **HOLD1**. This will lock the display for 1 hour.

NOTE: The display hold feature has different selectable time periods.

2. Press **SELECT** again will show the message **HOLD6**. This will lock the display for 6 hours.
3. Continuing to press the **SELECT** button will provide additional timing choices:

   HOLD12: Locks the display for 12 HOURS
   HOLD24: Locks the display for 24 HOURS
   HOLD: Locks the display indefinitely

To Exit the HOLD Mode:

Press **SELECT** button as many times as needed until the **HOLD** message disappears from the display.

9.0 PREVENTATIVE/SCHEDULED MAINTENANCE

The unit is shipped in a calibrated and fully functional tested condition. Since the unit is factory-calibrated using proprietary firmware algorithms, no internal unit adjustments are necessary.

This unit contains no internal adjustments, so no preventative or scheduled maintenance is required.

No cleaning or decontamination procedures are required for this instrument.

10.0 LITHIUM BATTERY REPLACEMENT

The Din-Mon™ meter has a Lithium Battery Cell, which is used to retain the contents of the memory (SRAM) and the real-time clock (RTC) during power outages. The battery has a life expectancy of greater than 5 years.

Nominal Working Voltage	3 Vdc Output
Nominal Current Capacity	225 mAHr
Cell Chemical	Manganese Dioxide Lithium
Operating Temperature Range	-30 to +60 Degrees Celsius
Manufacturer	Panasonic
Manufacturer's Part Number	CR2032

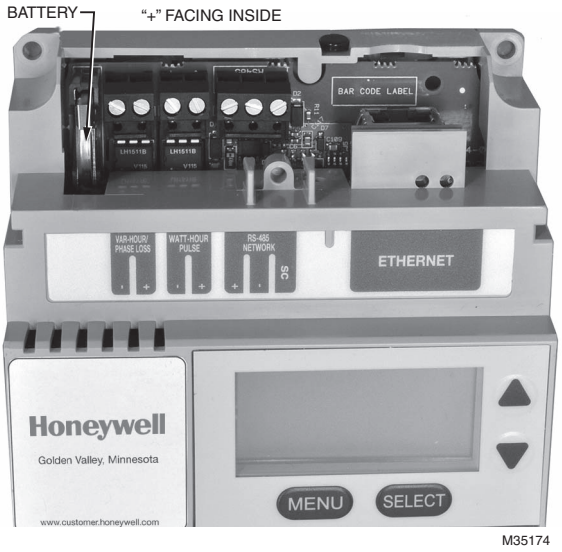


Fig. 31. Lithium Battery Cell

⚠ WARNING

eplace battery with Panasonic part number CR2032 only. Use of another battery may present a risk of explosion. See owner's manual for safety instructions. Internal circuit card components are extremely sensitive to electrostatic discharge. Be careful not to touch internal circuitry prior to discharging any static buildup on your person. To discharge yourself, touch a grounded metal object such as conduit or a metal enclosure exterior.

The battery cell is mounted in a coin cell holder on the upper left side of the enclosure. Replace the battery if the low battery warning is on display.

1. Remove the top cover from the meter.
2. Remove the battery from its holder and place on a non-conductive surface.
3. Install new battery into the battery holder.

NOTE: Care should be taken to insure that the replacement battery is installed the same polarity as the battery that was removed. No damage to unit or battery will occur if battery is inadvertently installed in the wrong direction.

4. Dispose of the used battery in accordance with the manufacturer's instructions.
5. Replace the top cover on the meter and screw in the cover screw.

11.0 FREQUENTLY ASKED QUESTIONS

Q. When providing line voltage to the meter, can I tap off from the same breaker I am monitoring?

A. Yes, the voltage can be pulled from the same breaker being monitored.

Q. Can the meter's line voltage wires be run in the same conduit as the sensor leads?

A. Yes. There will be no effect if the sensor leads and line voltage wires are run in the same conduit.

Q. Can the meter's communication wires and line voltage be run in the same conduit?

A. It is not recommended to run these wires together due to noise concerns and their effects on the communications signal integrity. Communications wires can be routed separately using a 3/4" conduit port.

Q. How do I find the cost for kWh and kW to bill my tenants?

A. Your local utility bill should list the cost per kWh and kW. If not, simply call your utility and ask them to provide you with the cost per kWh and kW.

Q. What size wire do I use for the line voltage leads?

A. These wires are normally sized at #14 AWG, but be sure to confirm this requirement with your local and national electrical code requirements.

Q. What size wire should I use to extend the current sensor leads?

A. These wires are normally 14-22 AWG, twisted-pair arrangement. Consult your electrical code for proper wiring requirements.

Q. The load I need to monitor has parallel feeds. How do I install the current sensors for this application?

A. There are two ways you can monitor parallel feeds. The easiest and preferred method is to clamp the sensors around all feed wires for each phase. The second way to monitor parallel feeds is to clamp the sensor around one of the feed wires for each phase. When you read the meter, the final reading must be multiplied by the number of feed wires for each phase.

Q. I have two subpanels I would like to monitor with one meter. These subpanels are fed by different transformers in the building. Can I parallel sensors and monitor both panels with one meter?

A. No. These panels cannot be monitored with one meter because they are different power sources. When you parallel current sensors, all loads being monitored must be from the same voltage source.

Q. I have 5 breakers in one subpanel I would like to monitor with one meter. Can this be done without having to parallel current sensors?

A. Yes. Simply run all the breaker wires through one set of current sensors. Make sure all A-phase circuits are run through the A-phase sensor, and the same for B and C phases. The meter should be sized by the highest amount of current being monitored by one sensor.

Q. I've gone through the troubleshooting guides and I still can't get my meter to work. What should I do?

A. Before removing the unit, contact E-Mon's technical services department at (800) 334-3666. E-Mon's technical department will assist you in troubleshooting of the meter installation and assist you in getting the unit running.

12.0 METER LIMITED WARRANTY

Subject to the exclusions listed below, Honeywell will either repair or replace (at its option) any product that it manufactures and which contains a defect in material or workmanship.

The following exclusions apply:

1. This Limited Warranty is only effective for a period of (5) five years following the date of manufacture when installed in accordance with manufacturer's instructions by qualified personnel.
2. Honeywell must be notified of the defect within ninety (90) days after the defect becomes apparent or known.
3. Buyer's remedies shall be limited to repair or replacement of the product or component which failed to conform to Honeywell's express warranty set forth above.
4. Buyer shall be responsible for all freight costs and shall bear all risk of loss or damage to returned goods while in transit.
5. This Limited Warranty does not cover installation, removal, reinstallation, or labor costs, and excludes normal wear and tear. Buyer shall provide labor for the removal of the defective component or item and installation of its replacement at no charge to Honeywell.
6. This Limited Warranty does not cover any product if: (i) a product is altered or modified from its original manufactured condition, (ii) any repairs, alterations or other work has been performed by Buyer or others on such item, other than work performed with Honeywell's authorization and according to its approved procedures; (iii) the alleged defect is a result of abuse, misuse, improper maintenance, improper installation, accident or the negligence of any party; (iv) damaged as a result of events beyond Honeywell's control or other force majeure events or (v) used in conjunction with equipment, components, accessories, parts or materials not supplied or approved by Honeywell.
7. This Limited Warranty is limited to the obligation to repair or replace the manufactured product. This is the sole and exclusive remedy for any breach of warranty.
   IN NO EVENT SHALL HONEYWELL BE LIABLE FOR ANY INDIRECT, INCIDENTAL, SPECIAL, CONSEQUENTIAL OR PUNITIVE DAMAGES (INCLUDING ANY DAMAGE FOR LOST PROFITS) ARISING OUT OF OR IN CONNECTION WITH THE FURNISHING OF PRODUCTS, PARTS OR SERVICES, OR THE PERFORMANCE, USE OF, OR INABILITY TO USE ANY PRODUCTS, PARTS OR SERVICES, SALE OF OR OTHERWISE, WHETHER BASED IN CONTRACT, WARRANTY, TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, OR ANY OTHER LEGAL OR EQUITABLE THEORY.
8. EXCEPT AS EXPRESSLY PROVIDED HEREIN, HONEYWELL MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED WITH RESPECT TO ANY PRODUCTS, PARTS OR SERVICES PROVIDED BY HONEYWELL INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. PRODUCTS OR COMPONENTS DISTRIBUTED, BUT NOT MANUFACTURED, BY HONEYWELL ARE NOT WARRANTED BY HONEYWELL AND BUYER MUST INSTEAD RELY ON THE REPRESENTATIONS AND WARRANTIES, IF ANY, PROVIDED DIRECTLY TO THE BUYER BY THE MANUFACTURER OF SUCH PRODUCT OR COMPONENT.

APPENDIX A: MODBUS POINT MAP

ADDRESS	REG	TYPE	DESCRIPTION	UNITS	R/W
40001[1]	2	Integer	Energy delivered	Wh Pulse	R/W
40003[1]	2	Integer	Energy received	Wh Pulse	R/W
40005[1]	2	Integer	Reactive energy delivered	VARh Pulse	R/W
40007[1]	2	Integer	Reactive energy received	VARh Pulse	R/W
41001[1]	2	Float	Energy delivered	kWh	R/W
41003[1]	2	Float	Energy received	kWh	R/W
41005[1]	2	Float	Reactive energy delivered	kVARh	R/W
41007[1]	2	Float	Reactive energy received	kVARh	R/W
41009	2	Float	Real power	kW	R
41011	2	Float	Reactive power	kVAR	R
41013	2	Float	Apparent power	kVA	R
41015	2	Float	Power factor	% PF	R
41017	2	Float	Peak demand	kW	R/W
41019	2	Float	Current average	Amps	R
41021	2	Float	Voltage line-neutral	Volts-N	R
41023	2	Float	Voltage line-line	Volts-L	R
41025	2	Float	Frequency	Hz	R
41027	2	Float	Phase angle	Degree	R
41029	2	Float	Real power, phase A	kW	R
41031	2	Float	Real power, phase B	kW	R
41033	2	Float	Real power, phase C	kW	R
41035	2	Float	Reactive power, phase A	kVAR	R
41037	2	Float	Reactive power, phase B	kVAR	R
41039	2	Float	Reactive power, phase C	kVAR	R
41041	2	Float	Apparent power, phase A	kVA	R
41043	2	Float	Apparent power, phase B	kVA	R
41045	2	Float	Apparent power, phase C	kVA	R
41047	2	Float	Power factor, phase A	% PF	R
41049	2	Float	Power factor, phase B	% PF	R
41051	2	Float	Power factor, phase C	% PF	R
41053	2	Float	Current, phase A	Amps	R
41055	2	Float	Current, phase B	Amps	R
41057	2	Float	Current, phase C	Amps	R
41059	2	Float	Voltage, line phase A to N	Volts-N	R

ADDRESS	REG	TYPE	DESCRIPTION	UNITS	R/W
41061	2	Float	Voltage, line phase B to N	Volts-N	R
41063	2	Float	Voltage, line phase C to N	Volts-N	R
41065	2	Float	Voltage, line phase A to B	Volts-L	R
41067	2	Float	Voltage, line phase B to C	Volts-L	R
41069	2	Float	Voltage, line phase C to A	Volts-L	R
41071	2	Float	Phase angle, phase A	Degree	R
41073	2	Float	Phase angle, phase B	Degree	R
41075	2	Float	Phase angle, phase C	Degree	R
44001[3]	6	Custom	Interval Day Block		R/W
44007[4]	1*	Integer	Interval Data (1 register per interval)	Pulse	R
45501[5]	2*	Custom	Interval Data Headers (2 registers per day)		R
46025[6]	8	Custom	RTC Date/Time		R/W
46049[7]	8	Custom	EZ7 ID, Modbus ID, Serial		R/W
46057	8	Custom	Recorder Info., Demand Interval		R/W
46513	8	Custom	Flags L1: Power Failure, Battery		R
46521	8	Custom	Flags L2: Power Failure Date		R

1. To clear single meter kWh/kVARh, set multiple points at 40001 or 41001 for 8 points with data set to 0000 0000 0000 0000 0000 0000 0000 0000. Jumper J6 must be closed.

2. N/A

3. To set the interval data day block, set multiple points at 44001 for 6 points with data set to 0C0I 0000 MMDD YYYY 0000 0000. 0C = Channel, 0I = Interval (0F = 15 minute intervals, 05 = 5 minute intervals).

4. Each register represents a 15 or 5 minute kWh pulse value based on the interval day block. 96 registers max with 15 minute intervals. 288 registers max with 5 minute intervals. The first interval data register 44007 represents the pulse count for the first 15 or 5 minute interval beginning at midnight.

5. The interval data headers represent days with available interval data. Each day represents 2 registers. Format: MMDD YYYY.

6. To set the date and time, set multiple points at 46025 for 4 points with data set to HHMM SSDW MMDD YYYY (DW= day of week).

7. To change the ModBus ID, set single point at 46050 with data set to new ModBus ID (e.g. 1 to 247). Jumper J6 must be closed.

APPENDIX B: BACNET OBJECTS

INSTANCE ID	BACNET OBJECT	DESCRIPTION	UNITS	PROPERTY	R/W
1[1]	Analog Input	Energy delivered	kWh	Present Value	R
2[1]	Analog Input	Energy received	kWh	Present Value	R
3[1]	Analog Input	Reactive energy delivered	kVARh	Present Value	R
4[1]	Analog Input	Reactive energy received	kVARh	Present Value	R
5	Analog Input	Real power	kW	Present Value	R
6	Analog Input	Reactive power	kVAR	Present Value	R
7	Analog Input	Apparent power	kVA	Present Value	R
8	Analog Input	Power factor	% PF	Present Value	R
9	Analog Input	Peak demand	kW	Present Value	R
10	Analog Input	Current average	Amps	Present Value	R
11	Analog Input	Voltage line-neutral	Volts-N	Present Value	R
12	Analog Input	Voltage line-line	Volts-L	Present Value	R
13	Analog Input	Frequency	Hz	Present Value	R
14	Analog Input	Phase angle	Degree	Present Value	R
15	Analog Input	Real power, phase A	kW	Present Value	R
16	Analog Input	Real power, phase B	kW	Present Value	R
17	Analog Input	Real power, phase C	kW	Present Value	R
18	Analog Input	Reactive power, phase A	kVAR	Present Value	R
19	Analog Input	Reactive power, phase B	kVAR	Present Value	R
20	Analog Input	Reactive power, phase C	kVAR	Present Value	R
21	Analog Input	Apparent power, phase A	kVA	Present Value	R
22	Analog Input	Apparent power, phase B	kVA	Present Value	R
23	Analog Input	Apparent power, phase C	kVA	Present Value	R
24	Analog Input	Power factor, phase A	% PF	Present Value	R
25	Analog Input	Power factor, phase B	% PF	Present Value	R
26	Analog Input	Power factor, phase C	% PF	Present Value	R
27	Analog Input	Current, phase A	Amps	Present Value	R
28	Analog Input	Current, phase B	Amps	Present Value	R
29	Analog Input	Current, phase C	Amps	Present Value	R
30	Analog Input	Voltage line-neutral phase A-N	Volts-N	Present Value	R
31	Analog Input	Voltage line-neutral phase B-N	Volts-N	Present Value	R
32	Analog Input	Voltage, line-neutral phase C-N	Volts-N	Present Value	R
33	Analog Input	Voltage line-line phase A-B	Volts-L	Present Value	R
34	Analog Input	Voltage line-line phase B-C	Volts-L	Present Value	R
35	Analog Input	Voltage line-line phase C-A	Volts-L	Present Value	R
36	Analog Input	Phase angle, phase A	Degree	Present Value	R

INSTANCE ID	BACNET OBJECT	DESCRIPTION	UNITS	PROPERTY	R/W
37	Analog Input	Phase angle, phase B	Degree	Present Value	R
38	Analog Input	Phase angle, phase A	Degree	Present Value	R
39	Analog Input	Reserve A	No units	Present Value	R
40	Analog Input	Reserve B	No units	Present Value	R
41	Analog Input	Reserve C	No units	Present Value	R

INSTANCE ID	BACNET OBJECT	DESCRIPTION	R/W
Device ID	Device	Present value	R
Device ID	Device	Object name	R
Device ID	Device	Object type	R
Device ID	Device	System status	R/W
Device ID	Device	Vendor name	R
Device ID	Device	Vendor identifier	R
Device ID	Device	Model name	R
Device ID	Device	Firmware revision	R
Device ID	Device	Application software version	R
Device ID	Device	Location	R/W
Device ID	Device	Description	R/W
Device ID	Device	Protocol version	R
Device ID	Device	Protocol services supported	R
Device ID	Device	Protocol object types supported	R
Device ID	Device	Protocol revision	R
Device ID	Device	Object list	R
Device ID	Device	Max APDU length supported	R
Device ID	Device	Segmentation supported	R
Device ID	Device	Local time	R
Device ID	Device	Local date	R
Device ID	Device	APDU time out	R/W
Device ID	Device	Number of APDU retries	R/W
Device ID	Device	Device address binding	R

[1] To clear single meter kWh/kVARh, select reset kW/kWh on the display menu of the meter. This function will also reset external inputs. Jumper J6 must be closed. Remove J6 when changes have been completed.

PIC STATEMENT

BACNET PROTOCOL IMPLEMENTATION CONFORMANCE STATEMENT

Vendor Name:	E-Mon
Vendor ID:	482
Product Name:	Din-Mon™ Meter
Product Model Numbers:	D2 Smart Meter, D5 Advanced Smart Meter
Product Description	Kilo-watt hour meter

BACnet Standardized Device Profile (Annex L):

X BACnet Smart Sensor (B-SS)

BACnet Interoperability Building Blocks Supported (Annex K):

X K.1.2 BIBB - Data Sharing - ReadProperty-B (DS-RP-B)

X K.1.4 BIBB - Data Sharing - ReadPropertyMultiple-B (DS-RPM-B)

X K.5.2 BIBB - Device Management - Dynamic Device Binding-B (DM-DDB-B)

X K.5.4 BIBB - Device Management - Dynamic Object Binding-B (DM-DOB-B)

Segmentation Capability:

None

Standard Object Types Supported

X Device Object

X Analog Input

For all these properties, the following apply:

1. Does not support BACnet CreateObject
2. Does not support BACnet DeleteObject
3. No additional writable properties exist
4. No proprietary properties exist
5. No range restrictions exist

Data Link Layer Options:

X MS/TP master (Clause 9), baud rate(s): 9.6k, 19.2k, 38.4k, 76.8k bps

X BACnet IP, (Annex J): Din-Mon™ D2 meter does not support BACnet IP

Device Address Binding:

Not supported

Character Sets Supported:

X ANSI X3.4

APPENDIX C: LONWORKS PROTOCOL DATA POINTS

NETWORK VAR	BLK	VAR	SNVT	DESCRIPTION	UNITS	R/W
nvoWh_DelPulse [1]	1	3	SNVT_count_32	Energy delivered pulse	Wh Pulse	R
nvoWh_RecPulse [1]	2	4	SNVT_count_32	Energy received pulse	Wh Pulse	R
nvoVARh_RecPulse[1]	3	5	SNVT_count_32	Reactive energy delivered	VARh	R
nvoVARh_DelPulse [1]	4	6	SNVT_count_32	Reactive energy received	VARh	R
nvoKWh_Del [1]	5	7	SNVT_count_inc_f	Energy delivered	kWh	R
nvoKWh_Rec [1]	6	8	SNVT_count_inc_f	Energy received	kWh	R
nvoKVARh_Del [1]	7	9	SNVT_count_inc_f	Reactive energy delivered	kVARh	R
nvoKVARh_Rec [1]	8	10	SNVT_count_inc_f	Reactive energy received	kVARh	R
nvoReal_Pwr	9	11	SNVT_count_inc_f	Real power	kW	R
nvoReact_Pwr	10	12	SNVT_count_inc_f	Reactive power	kVAR	R
nvoAppar_Pwr	11	13	SNVT_count_inc_f	Apparent power	kVA	R
nvoPwr_Fact	12	14	SNVT_pwr_fact_f	Power factor	% PF	R
nvoPeak_Dem 1	13	15	SNVT_count_inc_f	Peak demand	kW	R
nvoCurrent_Avg	14	16	SNVT_amp_f	Current average	Amps	R
nvoVolt_LN	15	17	SNVT_volt_f	Voltage line-neutral	Volts-N	R
nvoVolt_LL	16	18	SNVT_volt_f	Voltage line-line	Volts-L	R
nvoFrequency	17	19	SNVT_freq_f	Freq.	Hz	R
nvoPhase_Angle	18	20	SNVT_count_inc_f	Phase angle	Degree	R
nvoReal_Pwr_PhA	19	21	SNVT_count_inc_f	Real power, phase A	kW	R
nvoReal_Pwr_PhB	20	22	SNVT_count_inc_f	Real power, phase B	kW	R
nvoReal_Pwr_PhC	21	23	SNVT_count_inc_f	Real power, phase C	kW	R
nvoReact_Pwr_PhA	22	24	SNVT_count_inc_f	Reactive power, phase A	kVAR	R
nvoReact_Pwr_PhB	23	25	SNVT_count_inc_f	Reactive power, phase B	kVAR	R
nvoReact_Pwr_PhC	24	26	SNVT_count_inc_f	Reactive power, phase C	kVAR	R
nvoAppar_Pwr_PhA	25	27	SNVT_count_inc_f	Apparent power, phase	kVA	R
nvoAppar_Pwr_PhB	26	28	SNVT_count_inc_f	Apparent power, phase	kVA	R
nvoAppar_Pwr_PhC	27	29	SNVT_count_inc_f	Apparent power, phase	kVA	R
nvoPwr_Fact_PhA	28	30	SNVT_pwr_fact_f	Power factor, Ph. A	% PF	R
nvoPwr_Fact_PhB	29	31	SNVT_pwr_fact_f	Power factor, Ph. B	% PF	R
nvoPwr_Fact_PhC	30	32	SNVT_pwr_fact_f	Power factor, Ph. C	% PF	R
nvoCurrent_PhA	31	33	SNVT_amp_f	Current, phase A	Amps	R
nvoCurrent_PhB	32	34	SNVT_amp_f	Current, phase B	Amps	R
nvoCurrent_PhC	33	35	SNVT_amp_f	Current, phase C	Amps	R
nvoVolt_LN_PhA_N	34	36	SNVT_volt_f	Voltage line-neutral phase A-N	Volts-N	R
nvoVolt_LN_PhB_N	35	37	SNVT_volt_f	Voltage line-neutral phase B-N	Volts-N	R
nvoVolt_LN_PhC_N	36	38	SNVT_volt_f	Voltage, line-neutral phase C-N	Volts-N	R

***NOTE**: **BLK** = Function Block, **VAR** = Lon Network Variable, **SNVT** = Standard Network Variable Type

NETWORK VAR	BLK	VAR	SNVT	DESCRIPTION	UNITS	R/W
nvoVolt_LL_PhA_B	37	39	SNVT_volt_f	Voltage line-line phase A-B	Volts-L	R
nvoVolt_LL_PhB_C	38	40	SNVT_volt_f	Voltage line-line phase B-C	Volts-L	R
nvoVolt_LL_PhC_A	39	41	SNVT_volt_f	Voltage line-line phase C-A	Volts-L	R
nvoPhase_AngleA	40	42	SNVT_count_inc_f	Phase angle, phase A	Degree	R
nvoPhase_AngleB	41	43	SNVT_count_inc_f	Phase angle, phase B	Degree	R
nvoPhase_AngleC	42	44	SNVT_count_inc_f	Phase angle, phase A	Degree	R
nvoReserve_A	43	45	SNVT_count_f	Reserve A	No units	R
nvoReserve_B	44	46	SNVT_count_f	Reserve B	No units	R
nvoReserve_C	45	47	SNVT_count_f	Reserve C	No units	R
nvoExt_Input_1 [1]	46	48	SNVT_count_f	External input 1	Pulse	R
nvoExt_Input_2 [1]	47	49	SNVT_count_f	External input 2	Pulse	R
nviResetUsageCh [1]	48	50	SNVT_count	Reset Usage	Integer Channel	R/W
nviRTC_DateTime [2]	49	51	SNVT_time_stamp	RTC Date & Time Read	Date Time	R/W
nvoRTC_DateTime [2]	49	52	SNVT_time_stamp	RTC Date & Time Set	Date Time	R
nvoIntervalData [3]	50	53	SNVT_reg_val_ts	Interval Data Pulse Read	Integer Pulses, Date Time	R
nviIntDataTime [3]	50	54	SNVT_time_stamp	Interval Data, Time Set	Date Time	R/W
nviIntDataChan [3]	50	55	SNVT_count	Interval Data, Channel Set	Integer Channel	R/W
nviIntDataPeriod [3]	50	56	SNVT_count	Interval Data, Window Set	Minutes	R/W
nvoIntDataChan [3]	50	57	SNVT_count	Interval Data Channel	Integer Channel	R
nvoStatus [4]	0	0	SNVT_obj_status	Function Block Status	Function Block Status	R
nviRequest [4]	0	1	SNVT_obj_request	Function Block Request	Function Block Enable/ Disable	R/W
nvoFileDirectory	0	2	SNVT_address	File Directory	Config File Directory	R
*__NOTE: BLK__ = Function Block, __VAR__ = Lon Network Variable, __SNVT__ = Standard Network Variable Type						

NOTE	DESCRIPTION
1	To clear kWh and kVARh, set nviResetUsageCh to 1. To clear nvoExt_Input_1, set nviResetUsageCh to 2. To clear nvoExt_Input_2, set nviResetUsageCh to 3. To clear nvoPeak_Dem, set nviResetUsageCh to 4.
2	To set the real time clock, set nviRTC_DateTime to the desired date and time.
3	nvoIntervalData will display the number of pulses for the selected interval period and channel. For example: set nviIntDataTime to 6/1/2012 13:15:00 to read the number of pulses from 13:15:00 to 13:29:59. The second status bit value will be 0 if no error has occurred. nviIntDataPeriod will select the interval data of 15 or 5 minutes. This value will not change the default interval data period value of 15 minutes. nviIntDataChan will select the usage channel. For example, set nviIntDataChan to 1 to read the interval data for nvoKWh_Del. Set nviIntDataChan to 2 to read the interval data for nvoKVARh_Del. Set nviIntDataChan to 3 to read the interval data for nvoKWh_Rec. Set nviIntDataChan to 4 to read the interval data for nvoKVARh_Rec.
4	nviRequest commands can disable or enable functional blocks. Any changes will be saved even after powered down. Set nviRequest to 0,RQ_DISABLE to disable all functional blocks. Set nviRequest to 0,RQ_ENABLE to enable all function blocks. Set nviRequest to 1,RQ_DISABLE to disable only functional block 1. The first value of nvoStatus is the functional block, and the 3rd bit in the bit array is 1 when disabled.

***NOTE: BLK** = Function Block, **VAR** = Lon Network Variable, **SNVT** = Standard Network Variable Type

CONFIG. PROPERTY	BLK	VAR	DESCRIPTION	UNITS	R/W
UCPTMinSndTWh_DelPulse [1]	1	3	Min. time to propagate NV	Seventeenth	R/W
UCPTMaxSndTWh_DelPulse [2]	1	3	Max. time to propagate N	SNVT_count	R/W
UCPTMinSndTWh_RecPulse	1	3	Min. change in value to propagate	Unsigned quad	R/W
UCPTMaxSndTWh_RecPulse	2	4	Min. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaWh_RecPulse	2	4	Max. time to propagate NV	SNVT_count	R/W
UCPTMinSndTVARh_DelPulse	2	4	Min. change in value to propagate	Unsigned quad	R/W
UCPTMaxSndTWh_DelPulse [2]	3	5	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTVARh_DelPulse	3	5	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaVARh_DelPulse	3	5	Min. change in value to propagate	Unsigned quad	R/W
UCPTMinSndTVARh_RecPulse	4	6	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTVARh_RecPulse	4	6	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaVARh_DelPulse	4	6	Min. change in value to propagate	Unsigned quad	R/W
UCPTMinSndTKWh_Del	5	7	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTKWh_Del	5	7	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaKWh_Del	5	7	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTKWh_Rec	6	8	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTKWh_Rec	6	8	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaKWh_Rec	6	8	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTKVarh_Del	7	9	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTKVarh_Del	7	9	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaKVarh_Del	7	9	Min. change in value to propagate	SNVT_count	R/W
UCPTMinSndTKVarh_Rec	8	10	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTKVarh_Rec	8	10	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaKVarh_Rec	8	10	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTReal_Pwr	9	11	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTReal_Pwr	9	11	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaReal_Pwr	9	11	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTReact_Pwr	10	12	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTReact_Pwr	10	12	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaReact_Pwr	10	12	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTAppar_Pwr	11	13	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTAppar_Pwr	11	13	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaAppar_Pwr	11	13	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTPwr_Fact	12	14	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTPwr_Fact	12	14	Min. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaPwr_Fact	12	14	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTPeak_Dem	13	15	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTPeak_Dem	13	15	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaPeak_Dem	13	15	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTCurrent_Avg	14	16	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTCurrent_Avg	14	16	Max. time to propagate NV	SNVT_count	R/W

* **NOTE: BLK** = Corresponding Function Block, **VAR** = Corresponding Network Variable, **SNVT** = Standard Network Variable Type

CONFIG. PROPERTY	BLK	VAR	DESCRIPTION	UNITS	R/W
UCPTSendDeltaCurrent_Avg	14	16	Max. time to propagate NV	SNVT_count_f	R/W
UCPTMinSndTVolt_LN	15	17	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTVolt_LN	15	17	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaVolt_LN	15	17	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTVolt_LL	16	18	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTVolt_LL	16	18	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaVolt_LL	16	18	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTFrequency	17	19	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTFrequency	17	19	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaFrequency	17	19	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTPhase_Angle	18	20	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTPhase_Angle	18	20	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaPhase_Angle	18	20	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTReal_Pwr_PhA	19	21	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTReal_Pwr_PhA	19	21	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaReal_Pwr_Ph	19	21	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTReal_Pwr_PhB	20	22	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTReal_Pwr_PhB	20	22	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaReal_Pwr_Ph	20	22	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTReal_Pwr_PhC	21	23	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTReal_Pwr_PhC	21	23	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaReal_Pwr_Ph	21	23	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTReact_Pwr_PhA	22	24	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTReact_Pwr_PhA	22	24	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaReact_Pwr_P	22	24	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTReact_Pwr_PhB	23	25	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTReact_Pwr_PhB	23	25	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaReact_Pwr_P	23	25	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTReact_Pwr_PhC	24	26	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTReact_Pwr_PhC	24	26	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaReact_Pwr_P	24	26	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTAppar_Pwr_PhA	25	27	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTAppar_Pwr_PhA	25	27	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaAppar_Pwr_P	25	27	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTAppar_Pwr_PhB	26	28	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTAppar_Pwr_PhB	26	28	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaAppar_Pwr_P	26	28	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTAppar_Pwr_PhC	27	29	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTAppar_Pwr_PhC	27	29	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaAppar_Pwr_P	27	29	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTPwr_Fact_PhA	28	30	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTPwr_Fact_PhA	28	30	Max. time to propagate NV	SNVT_count	R/W

* **NOTE: BLK** = Corresponding Function Block, **VAR** = Corresponding Network Variable, **SNVT** = Standard Network Variable Type

CONFIG. PROPERTY	BLK	VAR	DESCRIPTION	UNITS	R/W
UCPTSendDeltaPwr_Fact_Ph	28	30	Min. time to propagate NV	SNVT_count	R/W
UCPTMinSndTPwr_Fact_PhB	29	31	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTPwr_Fact_PhB	29	31	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaPwr_Fact_Ph	29	31	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTPwr_Fact_PhC	30	32	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTPwr_Fact_PhC	30	32	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaPwr_Fact_Ph	30	32	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTCurrent_PhA	31	33	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTCurrent_PhA	31	33	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaCurrent_PhA	31	33	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTCurrent_PhB	32	34	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTCurrent_PhB	32	34	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaCurrent_PhB	32	34	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTCurrent_PhC	33	35	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTCurrent_PhC	33	35	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaCurrent_PhC	33	35	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTVolt_LN_PhA_N	34	36	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTVolt_LN_PhA_N	34	36	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaVolt_LN_PhA	34	36	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTVolt_LN_PhB_N	35	37	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTVolt_LN_PhB_N	35	37	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaVolt_LN_PhB	35	37	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTVolt_LN_PhC_N	36	38	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTVolt_LN_PhC_N	36	38	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaVolt_LN_PhC	36	38	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTVolt_LL_PhA_B	37	39	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTVolt_LL_PhA_B	37	39	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaVolt_LL_PhA	37	39	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTVolt_LL_PhB_C	38	40	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTVolt_LL_PhB_C	38	40	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaVolt_LL_PhB	38	40	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTVolt_LL_PhC_A	39	42	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTVolt_LL_PhC_A	39	42	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaVolt_LL_PhC	39	42	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTPhase_AngleA	40	43	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTPhase_AngleA	40	43	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaPhase_Angle	40	43	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTPhase_AngleB	41	44	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTPhase_AngleB	41	44	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaPhase_Angle	41	44	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTPhase_AngleC	42	45	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTPhase_AngleC	42	45	Max. time to propagate NV	SNVT_count	R/W

* **NOTE: BLK** = Corresponding Function Block, **VAR** = Corresponding Network Variable, **SNVT** = Standard Network Variable Type

CONFIG. PROPERTY	BLK	VAR	DESCRIPTION	UNITS	R/W
UCPTSendDeltaPhase_Angle	42	45	Min. time to propagate NV	SNVT_count	R/W
UCPTMinSndTReserve_A	43	45	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTReserve_A	43	45	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaReserve_A	43	45	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTReserve_B	44	46	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTReserve_B	44	46	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaReserve_B	44	46	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTReserve_C	45	47	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTReserve_C	45	47	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaReserve_C	45	47	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTExt_Input_1	46	48	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTExt_Input_1	46	48	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaExt_Input_1	46	48	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTExt_Input_2	47	49	Min. time to propagate NV	SNVT_count	R/W
UCPTMaxSndTExt_Input_2	47	49	Max. time to propagate NV	SNVT_count	R/W
UCPTSendDeltaExt_Input_2	47	49	Min. change in value to propagate	SNVT_count_f	R/W
UCPTMinSndTDateTime	49	52	Min. time to propagate NV	SNVT_count	R/W

* **NOTE: BLK** = Corresponding Function Block, **VAR** = Corresponding Network Variable, **SNVT** = Standard Network Variable Type

NOTE	DESCRIPTION
1	The MinSendTime configuration property corresponds to the shortest time that a bound network variable needs to wait in order to propagate an update as long as the SendDelta value has been exceeded.
2	The MaxSendTime configuration property corresponds to the longest time that a bound network variable needs to wait in order to propagate an update regardless of the SendDelta value.
3	The SendDelta configuration property corresponds to the difference in value between the current and previous value that must be exceeded in order to propagate a bound network variable. The MinSendTime configuration property for the nvoRTC_DateTime network variable corresponds to the frequency at which the date and time network variable is propagated.

APPENDIX D: TROUBLESHOOTING

ITEM	MESSAGES	DESCRIPTION	NOTE
	PH Seq Err	Pase rotation is incorrect - See Section 4.7.1 Line Voltage Diagnostics on page 27	
	PH Loss *X*	At least one phase is missing, where *X* is the missing phase	
	CT Err A	Current sensor is installed incorrectly - see trouble shooting section See Section 4.7.2 Current Sensor Diagnostics on page 27	
	CT Err A B		
	CT Err A C		

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