E-Mon
Energy Monitoring Products

Interval Data Recorder (IDR)

INSTALLATION INSTRUCTIONS

E-Mon
850 Town Center Drive
Langhorne, PA 19047
(800) 334-3666
www.emon.com
info@emon.com

62-0394-03

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 E-Mon product, please read the information on the following pages carefully.

We believe that you will find the E-Mon D-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 E-Mon D-Mon meter.

Thank you.

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1.0 PRE-INSTALLATION INFORMATION

The Interval Data Recorder (IDR) is an energy data collection device. Installation must be performed by qualified personnel only and must be in accordance with local and national electrical codes. E-Mon and its representatives are not responsible for damage or injury from improper installation.

The IDR is housed in a JIC Steel Enclosure, where ambient temperatures are between +32 and +120 degrees Fahrenheit. It is available in 8 and 16 input configurations.

The IDR must be located in an area that is central to the meters connected to it.

IMPORTANT:

All meters can be located up to 500 feet from the IDR.

NOTE: The IDR Modular Jack Model is designed to operate with E-Mon D-Mon meters only. Terminal input models can support the monitoring of third-party metering equipment; contact E-Mon for further information.

The IDR must be installed in a location according to the following guidelines to ensure continued safe, trouble-free operation.

- Do not install near sensitive radio communication equipment or receiving antenna systems.
- Do not install near high-energy electrical fields such as those produced by welding equipment or by high-power electrical motors.
- Always install in an area that is dry, away from any potential liquid or chemical splash hazards. Never install electrical equipment in an area where flammable chemicals or vapors are present.

The IDR enclosure door must be kept closed once installed. Exposing the internal circuits to dust, dirt, fumes or high humidity can damage the IDR.

NOTE: All internal circuits are isolated from the AC line.

IDR-16's are supplied with an ID letter for each group of 8 inputs to make them compatible with E-Mon Energy™ software. The available choices are A-B, C-D, E-F, G-H, I-J, K-L, M-N, O-P, Q-R, S-T, U-V, W-X and Y-Z. No other combinations are available. When mixing 8-point and 16-point IDRs together, it may be necessary to jump a letter in the system. As an example, if you have an 8-point IDR labeled "A", "B" and "C", the 16-point IDR to choose would be the E-F unit.

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.

1.0 PRE-INSTALLATION INFORMATION (CONTINUED)

The IDR is available in two configurations.

1. Modular Jacks (IDR-8 and IDR-16): Supplied with all modular jacks for use only with E-Mon D-Mon meters.

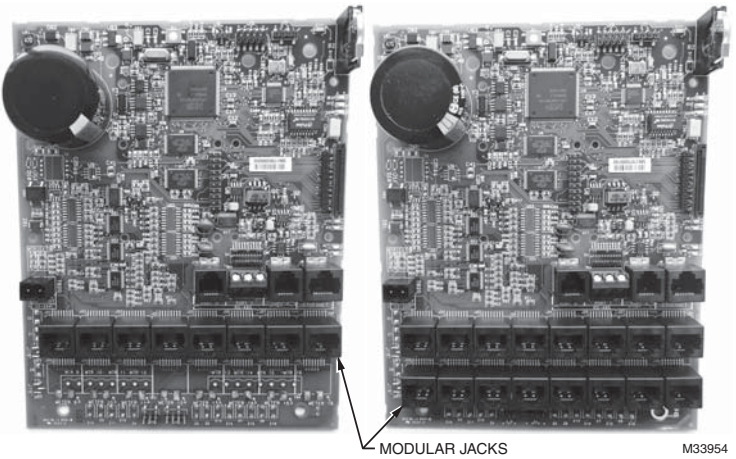


Fig. 1. Modular Jacks.

2. Plug-In Screw-Type Connectors (IDR-8): Supplied with all plug-in screw-type connectors for use with third-party meters (electric, gas, water, etc.) that are provided with a dry contact pulse output.

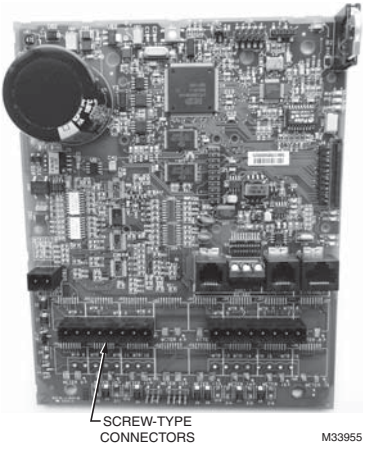


Fig. 2. Plug-In Screw-Type Connectors.

2.0 MECHANICAL INSTALLATION

IMPORTANT:

The internal circuits of the IDR can be damaged by electrostatic discharge. Before reaching inside the enclosure, discharge yourself by touching an earth-grounded object.

Accidental discharge of static electricity onto the circuit board can result in:

- Loss of stored data
- A system lock-up
- Permanent damage to the IDR

The IDR is available in two types of enclosure systems:

a. Stand-Alone IDR (Standard Configuration).

The stand-alone IDR configuration consists of a single IDR unit. The enclosure should be mounted using the mounting flanges located at the top and bottom of the enclosure. The enclosure has three available knockouts for cable entrance/ exit from the IDR.

NEVER ATTEMPT TO DRILL THROUGH THE STEEL ENCLOSURE. DOING SO MAY PERMANENTLY DAMAGE THE ELECTRONIC CIRCUITRY AND WILL VOID ALL WARRANTIES.

Fig. 3. JIC Steel Enclosure.

b. MMU (Multiple Meter Unit) Configuration.
MMU units containing E-Mon D-Mon meters and IDRs have been pre-wired by the factory prior to shipment. The meters have been connected to the IDR. The installer needs to provide 120V power for the IDR unit in the MMU. See Section 6.0 for communication connections.

3.0 CONNECTING METERS TO THE IDR

E-Mon D-Mon Meter Connections

a. Each E-Mon D-Mon meter has two modular jacks located at the top of the main circuit board. The jack on the left (RJ-45, 8-pin) is used to connect the meter to the IDR.**

NEVER USE 6-PIN JACKS LABELED "PORT 0" OR "PORT 2" TO CONNECT A METER TO THE IDR.

b. * All E-Mon D-Mon meters must be connected to meter jacks #1-8 using 6-conductor flat modular cable.**

c. *IDR-16 - If the IDR is an IDR-16, connect the additional meters to Jacks #9-16 on the circuit board using 6-conductor flat modular cable.**

d. IDR-8s supplied with plug-in screw type connectors can be up to 500 feet from all meters, and utilize a pair of wires for connecting to the meter pulse output.**

** See Appendix D for item B&C above.***

*** For more information on cable assembly, see Appendix B.***

Pulse Output Meters (IDR-ST Models Only):

a. Each meter is interfaced with the IDR through the plug-in screw type connectors. Any of the connectors may be used with #22-14 AWG conductors.

b. When used with solid-state switches, correct polarity must be observed in order for that contact to be recognized. The left terminal of the screw-terminal on the IDR must be connected to the plus (+) side of the switch.

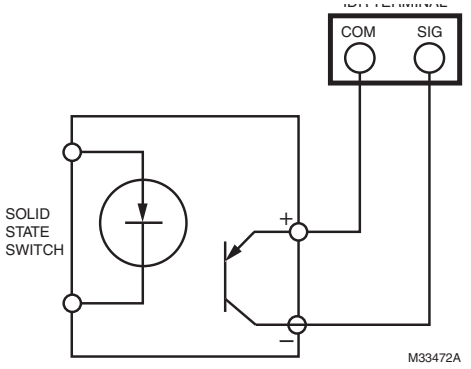


Fig. 4. Meter Connections.

c. The meter can be up to 500 feet away from the IDR.

3.0 CONNECTING METERS TO THE IDR (CONTINUED)

Third-Party Meter Connections

In order to connect “third-party” meters such as gas, water or utility-type meters, the IDR must be ordered with the “two-screw” connectors (designated with the suffix ST at the end of the model number) terminals instead of the modular jacks that are used with E-Mon D-Mon meters.

The input pulses supplied to the IDR must be non-powered. Pulses can be either physical (mechanical) contacts or electronic switches. When electronic switches are used, the left terminal on the IDR is the “+” output and the right is the return from the switch.

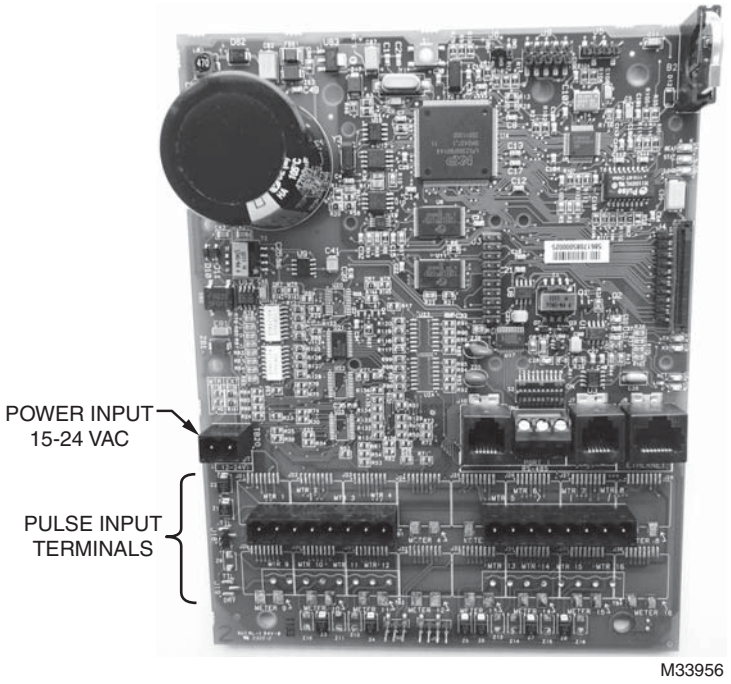


Fig. 5. IDR Terminal Connections.

4.0 AC ADAPTER

1. The AC adapter's two-wire cord must be plugged into the IDR at TB20. (The polarity of these wires does not matter.)

2. Plug the AC adapter into a 120 VAC outlet.

NOTE: The AC adapter is designed to be used with a 120 VAC outlet only.

3. The IDR should now be energized. Perform the visual checks.

Verify the status of the LED indicators on the IDR circuit board. (See Appendix B for locations.)

1. Power Supply Indicators

   - LCD backlite -> if the IDR is powered, the LCD backlite is on.

2. Meter LED Indicators

There are three groups of LEDs located on the main power board:

- Meter status - BEAT, STATUS and LOAD
- RS-485 communication – TX and RX
- Ethernet communication – ACT and LINK

LED CHART

	Color	Location	Definition
BEAT	Red	D4	Heart beat
STATUS	Yellow	D5	Firmware status
TX	Yellow	D1	Transmit
RX	Green	D2	Receive
ACT	Green	D8	Ethernet communication activity - blink
LINK	Yellow	D9	Ethernet connection - solid LED on

NOTE: The AC adapter provides an isolated 9 VAC/300 mA power source for the IDR. Contact E-Mon at (800) 334-3666 if another power supply is to be used.

5.0 IDR DISPLAY

The IDR display allows you to manually enter information into the unit. Four push buttons on the circuit board that is mounted to the door of the meter are utilized for this function.

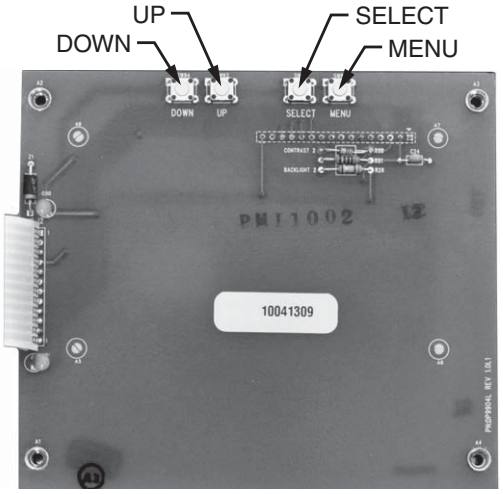
The push buttons provide access to entering the time and date, the device ID, and the IP settings. *Load control is not presently available through the IDR*.

Pressing the MENU button allows access to the function menu, up and down buttons are used to move the pointer.

The SELECT button allows entry to each of the functions. Repeated use of this button allows the object selected to be modified.

The UP and DOWN buttons are used to modify the object that was selected. Once changed, the SELECT button is used to move to the next object to be modified. When completed, press the MENU button to save the setting and exit the function.

The display shows the accumulated meter readings and the load reading of each of the input channels. *The input pulse value must be entered through E-Mon Energy software*.

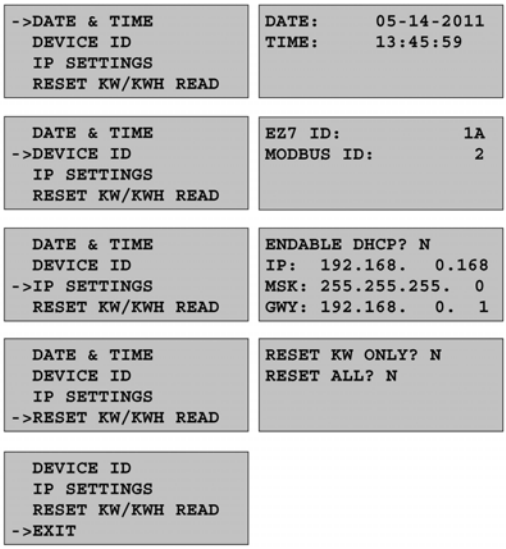


M33474

Fig. 6. IDR Display Board.

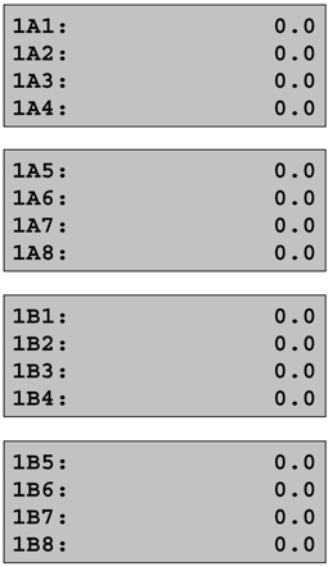
5.0 IDR DISPLAY (CONTINUED)

5.1 Program Mode

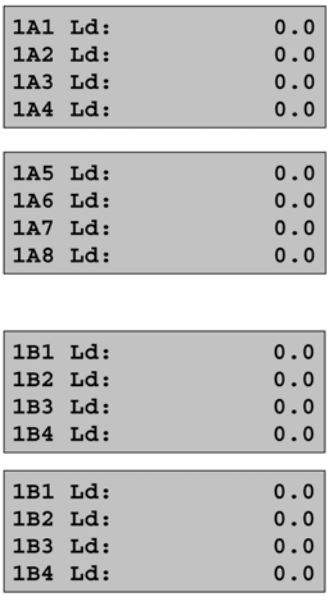


5.2 Normal Run Modes

1. Energy consumption (kWh)



2. Real-Time Load (kW)



6.0 SERIAL COMMUNICATIONS (EZ7)

a. Hardwired System using the USB Communication Key. (See the hardwired system configuration diagrams in Appendix F.)

   The USB communications key allows you to connect IDRs to a personal computer that has E-Mon Energy software installed. The computer communicates with the IDRs through the USB key.

   The USB key must be located within 15 feet of the host computer.

b. Connecting the USB key to the computer.

   The USB key is supplied with:
   a. (1) 3 FT USB A to USB B cable
   b. (1) 7 FT 4 conductor modular cable with RJ11 4 pin plug

   Connect the supplied USB A to USB B cable to the USB Key. Plug the opposite end of the cable into any USB Port of a personal computer or laptop. Using the CD included with the USB Key, Install (2) drivers to the PC or laptop.

c. Connecting IDRs to the USB Key using the 7 FT modular cable provided with the USB Key.

   As many as 52 IDRs can be connected to the USB Key over a total cable length of 4000 feet.

6.0 SERIAL COMMUNICATIONS (EZ7) (CONTINUED)

Method 1: Modular Plug Method

This method requires using 4 stranded conductors inside a cable that is fitted with an RJ-11 type plug for 4-conductor modular systems at each end of the cable.

* Do not use any pre-made telephone cables. See Appendix A for correct cable configuration.

1. Plug the 4-wire RJ-11 cable/plug assembly into either PORT 1 or PORT 2 of the IDR.

2. The unused RS-485 port is used to connect another cable to the next IDR. This is called a “daisy-chain” connection. This can be done repeatedly to connect as many as 52 individual IDRs. NOTE: The total combined cable length must be no more than 4,000 feet.

3. Each IDR has two LEDs (yellow and green) located directly below the RS-485 jacks. If the system is properly wired, these two LEDs will normally be OFF. These LEDs will flash when the computer and IDR are communicating.

Method 2: Terminal Block Method

IDRs may also be daisy-chained using a 3-conductor cable. Instead of using the two modular jacks for the RS-485 daisy chain, you can use Port 1, between the RJ11 jacks.

1. Daisy-chain the IDRs by connecting:
   - All HI terminals together
   - All LO terminals together

   ** This requires putting two wires into each of the 2 terminals.

6.0 SERIAL COMMUNICATIONS (EZ7) (CONTINUED)

d. RS-232 Key with Built-In Modem (USBK)

The RS-232 key with built-in modem connects the entire RS-485 network of IDRs to a telephone line.

** Refer to the previous section, “Connecting IDRs to the RS-232 key using RS-485.” Connect the RS-485 network via Method 1 or Method 2.

On the back panel of the RS-232 Key/modem, the left jack (RS232) is not used in most cases since there is no local host computer.

The two jacks at the top center of the rear panel on the RS-232 key/modem are for connecting to the phone line. Connect one of these two jacks to the telephone line.

IMPORTANT:

The telephone line should be dedicated exclusively to the automatic meter reading system. Never connect to a phone line that has other modems or fax machines connected. If there are telephones connected to this phone line, the proprietor must be aware that all phones must be on “hook” in order for the modem to work. A dedicated telephone line is recommended for system reliability.

e. Baud Rate

The communication baud rate is 9600 baud (factory default).

When using the IDR with a modem, the rate of 9600 should always be selected.

7.0 ETHERNET COMMUNICATIONS

Ethernet/IP communications connections are provided through an RJ-45 connector(J8) in the lower right corner of the main board. This port can be connected directly to a network port of a PC using a CAT 5e crossover cable or to an IP router, hub, or switch using a standard CAT 5e cable.

Two LEDs are provided directly above the connector. The LINK LED is yellow and when lit, indicates ethernet connectivity. The ACT led is green and when lit, indicates communication activity.

Communication protocol for the Ethernet/IP port is selectable using the position 2 switch of S2. If position 2 is ON, EZ7 is selected. If position 2 is OFF, Modbus TCP/IP is selected.

IDR 2500s can be tied into a local Ethernet network (Intranet) or used on the Internet with a public IP Address. Each device that is connected directly to the ethernet network requires a unique IP address. The IP address is entered through the pushbuttons located on the display board. Section 5.0 describes the use of those buttons.

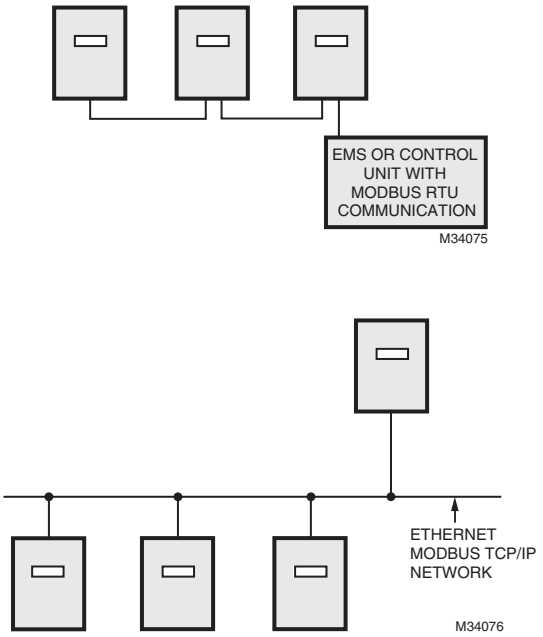


Fig. 7. Ethernet Network and EMS or Control Unit.

8.0 IDR PROTOCOL DEFINITIONS

Modbus Customer Point Map: IDR8 and IDR16						
Integer Address	**Float Address**	**Registers**	**Description**	**Integer Units**	**Float Units**	**IDR**
40001[1]	41001[1]	2	Usage Channel 1	Pulse	Pulse * Pulse Value	R/W
40003[1]	41003[1]	2	Usage Channel 2	Pulse	Pulse * Pulse Value	R/W
40005[1]	41005[1]	2	Usage Channel 3	Pulse	Pulse * Pulse Value	R/W
40007[1]	41007[1]	2	Usage Channel 4	Pulse	Pulse * Pulse Value	R/W
40009[1]	41009[1]	2	Usage Channel 5	Pulse	Pulse * Pulse Value	R/W
40011[1]	41011[1]	2	Usage Channel 6	Pulse	Pulse * Pulse Value	R/W
40013[1]	41013[1]	2	Usage Channel 7	Pulse	Pulse * Pulse Value	R/W
40015[1]	41015[1]	2	Usage Channel 8	Pulse	Pulse * Pulse Value	R/W
40017[1]	41017[1]	2	Usage Channel 9	Pulse	Pulse * Pulse Value	R/W
40019[1]	41019[1]	2	Usage Channel 10	Pulse	Pulse * Pulse Value	R/W
40021[1]	41021[1]	2	Usage Channel 11	Pulse	Pulse * Pulse Value	R/W
40023[1]	41023[1]	2	Usage Channel 12	Pulse	Pulse * Pulse Value	R/W
40025[1]	41025[1]	2	Usage Channel 13	Pulse	Pulse * Pulse Value	R/W
40027[1]	41027[1]	2	Usage Channel 14	Pulse	Pulse * Pulse Value	R/W
40029[1]	41029[1]	2	Usage Channel 15	Pulse	Pulse * Pulse Value	R/W
40031[1]	41031[1]	2	Usage Channel 16	Pulse	Pulse * Pulse Value	R/W
40065	41065	2	Demand Channel 1	Demand	Demand * Pulse Value	R
40067	41067	2	Demand Channel 2	Demand	Demand * Pulse Value	R

Modbus Customer Point Map: IDR8 and IDR16						
Integer Address	**Float Address**	**Registers**	**Description**	**Integer Units**	**Float Units**	**IDR**
40069	41069	2	Demand Channel 3	Demand	Demand * Pulse Value	R
40071	41071	2	Demand Channel 4	Demand	Demand * Pulse Value	R
40073	41073	2	Demand Channel 5	Demand	Demand * Pulse Value	R
40075	41075	2	Demand Channel 6	Demand	Demand * Pulse Value	R
40077	41077	2	Demand Channel 7	Demand	Demand * Pulse Value	R
40079	41079	2	Demand Channel 8	Demand	Demand * Pulse Value	R
40081	41081	2	Demand Channel 9	Demand	Demand * Pulse Value	R
40083	41083	2	Demand Channel 10	Demand	Demand * Pulse Value	R
40085	41085	2	Demand Channel 11	Demand	Demand * Pulse Value	R
40087	41087	2	Demand Channel 12	Demand	Demand * Pulse Value	R
40089	41089	2	Demand Channel 13	Demand	Demand * Pulse Value	R
40091	41091	2	Demand Channel 14	Demand	Demand * Pulse Value	R
40093	41093	2	Demand Channel 15	Demand	Demand * Pulse Value	R
40095	41095	2	Demand Channel 16	Demand	Demand * Pulse Value	R

Modbus Customer Point Map: IDR8 and IDR16				
Address	**Registers**	**Format**	**Description**	**IDR**
44001[1]	6	Custom	Interval Day Block	R/W
44007[2]	1 per interval	Integer	Interval Data	R
45501[3]	2 per day	Custom	Interval Data Headers	R
46025[4]	8	Custom	RTC Date/Time	R/W

46049[5]	8	Custom	EZ7 ID, Modbus ID, Serial Number	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 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)

2. Each register represents a 15 or 5 minute 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.

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

4. 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)

5. 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.

With an IDR16 each channel 1 through 16 represents the IDR16 meter jack inputs 1 through 16.

With an IDR8 each channel 1 through 8 represents the IDR8 meter jack inputs 1 through 8.

BACnet Object Descriptors Customer: IDR8 and IDR16

Instance ID	BACnet Object	Description	Units	BACnet Property	IDR
1[1]	Analog Input	Usage Channel 1	Pulse * Pulse Value	Present Value	R
2[1]	Analog Input	Usage Channel 2	Pulse * Pulse Value	Present Value	R
3[1]	Analog Input	Usage Channel 3	Pulse * Pulse Value	Present Value	R
4[1]	Analog Input	Usage Channel 4	Pulse * Pulse Value	Present Value	R
5[1]	Analog Input	Usage Channel 5	Pulse * Pulse Value	Present Value	R
6[1]	Analog Input	Usage Channel 6	Pulse * Pulse Value	Present Value	R
7[1]	Analog Input	Usage Channel 7	Pulse * Pulse Value	Present Value	R

BACnet Object Descriptors Customer: IDR8 and IDR16					
Instance ID	**BACnet Object**	**Description**	**Units**	**BACnet Property**	**IDR**
8[1]	Analog Input	Usage Channel 8	Pulse * Pulse Value	Present Value	R
9[1]	Analog Input	Usage Channel 9	Pulse * Pulse Value	Present Value	R
10[1]	Analog Input	Usage Channel 10	Pulse * Pulse Value	Present Value	R
11[1]	Analog Input	Usage Channel 11	Pulse * Pulse Value	Present Value	R
12[1]	Analog Input	Usage Channel 12	Pulse * Pulse Value	Present Value	R
13[1]	Analog Input	Usage Channel 13	Pulse * Pulse Value	Present Value	R
14[1]	Analog Input	Usage Channel 14	Pulse * Pulse Value	Present Value	R
15[1]	Analog Input	Usage Channel 15	Pulse * Pulse Value	Present Value	R
16[1]	Analog Input	Usage Channel 16	Pulse * Pulse Value	Present Value	R
17	Analog Input	Demand Channel 1	Demand * Pulse Value	Present Value	R
18	Analog Input	Demand Channel 2	Demand * Pulse Value	Present Value	R
19	Analog Input	Demand Channel 3	Demand * Pulse Value	Present Value	R
20	Analog Input	Demand Channel 4	Demand * Pulse Value	Present Value	R
21	Analog Input	Demand Channel 5	Demand * Pulse Value	Present Value	R
22	Analog Input	Demand Channel 6	Demand * Pulse Value	Present Value	R
23	Analog Input	Demand Channel 7	Demand * Pulse Value	Present Value	R
24	Analog Input	Demand Channel 8	Demand * Pulse Value	Present Value	R
25	Analog Input	Demand Channel 9	Demand * Pulse Value	Present Value	R
26	Analog Input	Demand Channel 10	Demand * Pulse Value	Present Value	R

BACnet Object Descriptors Customer: IDR8 and IDR16					
Instance ID	**BACnet Object**	**Description**	**Units**	**BACnet Property**	**IDR**
27	Analog Input	Demand Channel 11	Demand * Pulse Value	Present Value	R
28	Analog Input	Demand Channel 12	Demand * Pulse Value	Present Value	R
29	Analog Input	Demand Channel 13	Demand * Pulse Value	Present Value	R
30	Analog Input	Demand Channel 14	Demand * Pulse Value	Present Value	R
31	Analog Input	Demand Channel 15	Demand * Pulse Value	Present Value	R
32	Analog Input	Demand Channel 16	Demand * Pulse Value	Present Value	R

Instance ID	BACnet Object	BACnet Property	IDR
BACnet Device ID	Device	Object identifier	R
BACnet Device ID	Device	Object name	R
BACnet Device ID	Device	Object type	R
BACnet Device ID	Device	System status	R/W
BACnet Device ID	Device	Vendor name	R
BACnet Device ID	Device	Vendor Identifier	R
BACnet Device ID	Device	Model name	R
BACnet Device ID	Device	Firmware revision	R
BACnet Device ID	Device	Application software version	R
BACnet Device ID	Device	Location	R/W
BACnet Device ID	Device	Description	R/W
BACnet Device ID	Device	Protocol version	R
BACnet Device ID	Device	Protocol services supported	R
BACnet Device ID	Device	Protocol object types supported	R
BACnet Device ID	Device	Protocol revision	R
BACnet Device ID	Device	Object list	R
BACnet Device ID	Device	Max APDU length supported	R
BACnet Device ID	Device	Segmentation supported	R
BACnet Device ID	Device	Local time	R
BACnet Device ID	Device	Local date	R

Instance ID	BACnet Object	BACnet Property	IDR
BACnet Device ID	Device	APDU time-out	R/W
BACnet Device ID	Device	Number of APDU retries	R/W
With an IDR16 each channel 1 through 16 represents the IDR16 meter jack inputs 1 through 16.			
With an IDR8 each channel 1 through 8 represents the IDR8 meter jack inputs 1 through 8.			

PIC STATEMENT

BACNET PROTOCOL IMPLEMENTATION CONFORMANCE STATEMENT

Date	October 2013
Vendor Name:	E-Mon
Vendor ID:	482
Product Name:	CL3200, CL3400, CL5000, IDR and Din-Mon™ Meters
Product Model Numbers:	E32-208100-RBACKIT, E34-480200-R05KIT, E50-480200-R03KIT, EIDR-8-R05RJ
Product Description	This product will provide bi-directional communication between E-Mon BACnet MS/TP meters, BACnet IP meters, and a BACnet system.

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)
X K.5.12 BIBB - Device Management - TimeSynchronization-B (DM-TS-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™ CL3200 does not support BACnet IP

Device Address Binding:

Not supported

Character Sets Supported:

X ANSI X3.4

E-Mon D-Mon LonWorks Point Map: IDR8 and IDR16					
Network Variable Name	**Function Block Index**	**SNVT Type**	**Description**	**Units**	**IDR**
nvoUsageCh01[1]	1	SNVT_count_f	Usage Channel 1	Pulse * Pulse Value	R
nvoUsageCh02[1]	2	SNVT_count_f	Usage Channel 2	Pulse * Pulse Value	R
nvoUsageCh03[1]	3	SNVT_count_f	Usage Channel 3	Pulse * Pulse Value	R
nvoUsageCh04[1]	4	SNVT_count_f	Usage Channel 4	Pulse * Pulse Value	R
nvoUsageCh05[1]	5	SNVT_count_f	Usage Channel 5	Pulse * Pulse Value	R
nvoUsageCh06[1]	6	SNVT_count_f	Usage Channel 6	Pulse * Pulse Value	R
nvoUsageCh07[1]	7	SNVT_count_f	Usage Channel 7	Pulse * Pulse Value	R
nvoUsageCh08[1]	8	SNVT_count_f	Usage Channel 8	Pulse * Pulse Value	R
nvoUsageCh09[1]	9	SNVT_count_f	Usage Channel 9	Pulse * Pulse Value	R
nvoUsageCh10[1]	10	SNVT_count_f	Usage Channel 10	Pulse * Pulse Value	R
nvoUsageCh11[1]	11	SNVT_count_f	Usage Channel 11	Pulse * Pulse Value	R
nvoUsageCh12[1]	12	SNVT_count_f	Usage Channel 12	Pulse * Pulse Value	R
nvoUsageCh13[1]	13	SNVT_count_f	Usage Channel 13	Pulse * Pulse Value	R
nvoUsageCh14[1]	14	SNVT_count_f	Usage Channel 14	Pulse * Pulse Value	R
nvoUsageCh15[1]	15	SNVT_count_f	Usage Channel 15	Pulse * Pulse Value	R
nvoUsageCh16[1]	16	SNVT_count_f	Usage Channel 16	Pulse * Pulse Value	R
nvoUsageCh17[1]	17	SNVT_count_f	Usage Channel 17	Pulse * Pulse Value	R
nvoUsageCh18[1]	18	SNVT_count_f	Usage Channel 18	Pulse * Pulse Value	R

E-Mon D-Mon LonWorks Point Map: IDR8 and IDR16					
Network Variable Name	**Function Block Index**	**SNVT Type**	**Description**	**Units**	**IDR**
nvoUsageCh19[1]	19	SNVT_count_f	Usage Channel 19	Pulse * Pulse Value	R
nvoUsageCh20[1]	20	SNVT_count_f	Usage Channel 20	Pulse * Pulse Value	R
nvoUsageCh21[1]	21	SNVT_count_f	Usage Channel 21	Pulse * Pulse Value	R
nvoUsageCh22[1]	22	SNVT_count_f	Usage Channel 22	Pulse * Pulse Value	R
nvoUsageCh23[1]	23	SNVT_count_f	Usage Channel 23	Pulse * Pulse Value	R
nvoUsageCh24[1]	24	SNVT_count_f	Usage Channel 24	Pulse * Pulse Value	R
nvoUsageCh25[1]	25	SNVT_count_f	Usage Channel 25	Pulse * Pulse Value	R
nvoUsageCh26[1]	26	SNVT_count_f	Usage Channel 26	Pulse * Pulse Value	R
nvoUsageCh27[1]	27	SNVT_count_f	Usage Channel 27	Pulse * Pulse Value	R
nvoUsageCh28[1]	28	SNVT_count_f	Usage Channel 28	Pulse * Pulse Value	R
nvoUsageCh29[1]	29	SNVT_count_f	Usage Channel 29	Pulse * Pulse Value	R
nvoUsageCh30[1]	30	SNVT_count_f	Usage Channel 30	Pulse * Pulse Value	R
nvoUsageCh31[1]	31	SNVT_count_f	Usage Channel 31	Pulse * Pulse Value	R
nvoUsageCh32[1]	32	SNVT_count_f	Usage Channel 32	Pulse * Pulse Value	R
nvoDemandCh01	33	SNVT_count_f	Demand Channel 1	Demand * Pulse Value	R
nvoDemandCh02	34	SNVT_count_f	Demand Channel 2	Demand * Pulse Value	R
nvoDemandCh03	35	SNVT_count_f	Demand Channel 3	Demand * Pulse Value	R
nvoDemandCh04	36	SNVT_count_f	Demand Channel 4	Demand * Pulse Value	R

E-Mon D-Mon LonWorks Point Map: IDR8 and IDR16					
Network Variable Name	**Function Block Index**	**SNVT Type**	**Description**	**Units**	**IDR**
nvoDemandCh05	37	SNVT_count_f	Demand Channel 5	Demand * Pulse Value	R
nvoDemandCh06	38	SNVT_count_f	Demand Channel 6	Demand * Pulse Value	R
nvoDemandCh07	39	SNVT_count_f	Demand Channel 7	Demand * Pulse Value	R
nvoDemandCh08	40	SNVT_count_f	Demand Channel 8	Demand * Pulse Value	R
nvoDemandCh09	41	SNVT_count_f	Demand Channel 9	Demand * Pulse Value	R
nvoDemandCh10	42	SNVT_count_f	Demand Channel 10	Demand * Pulse Value	R
nvoDemandCh11	43	SNVT_count_f	Demand Channel 11	Demand * Pulse Value	R
nvoDemandCh12	44	SNVT_count_f	Demand Channel 12	Demand * Pulse Value	R
nvoDemandCh13	45	SNVT_count_f	Demand Channel 13	Demand * Pulse Value	R
nvoDemandCh14	46	SNVT_count_f	Demand Channel 14	Demand * Pulse Value	R
nvoDemandCh15	47	SNVT_count_f	Demand Channel 15	Demand * Pulse Value	R
nvoDemandCh16	48	SNVT_count_f	Demand Channel 16	Demand * Pulse Value	R
nvoDemandCh17	49	SNVT_count_f	Demand Channel 17	Demand * Pulse Value	R
nvoDemandCh18	50	SNVT_count_f	Demand Channel 18	Demand * Pulse Value	R
nvoDemandCh19	51	SNVT_count_f	Demand Channel 19	Demand * Pulse Value	R
nvoDemandCh20	52	SNVT_count_f	Demand Channel 20	Demand * Pulse Value	R
nvoDemandCh21	53	SNVT_count_f	Demand Channel 21	Demand * Pulse Value	R
nvoDemandCh22	54	SNVT_count_f	Demand Channel 22	Demand * Pulse Value	R

E-Mon D-Mon LonWorks Point Map: IDR8 and IDR16					
Network Variable Name	**Function Block Index**	**SNVT Type**	**Description**	**Units**	**IDR**
nvoDemandCh23	55	SNVT_count_f	Demand Channel 23	Demand * Pulse Value	R
nvoDemandCh24	56	SNVT_count_f	Demand Channel 24	Demand * Pulse Value	R
nvoDemandCh25	57	SNVT_count_f	Demand Channel 25	Demand * Pulse Value	R
nvoDemandCh26	58	SNVT_count_f	Demand Channel 26	Demand * Pulse Value	R
nvoDemandCh27	59	SNVT_count_f	Demand Channel 27	Demand * Pulse Value	R
nvoDemandCh28	60	SNVT_count_f	Demand Channel 28	Demand * Pulse Value	R
nvoDemandCh29	61	SNVT_count_f	Demand Channel 29	Demand * Pulse Value	R
nvoDemandCh30	62	SNVT_count_f	Demand Channel 30	Demand * Pulse Value	R
nvoDemandCh31	63	SNVT_count_f	Demand Channel 31	Demand * Pulse Value	R
nvoDemandCh32	64	SNVT_count_f	Demand Channel 32	Demand * Pulse Value	R
nviResetUsageCh[1]	65	SNVT_count	Reset Usage Channel	Integer Channel	R/W
nvoRTC_DateTime	66	SNVT_time_stamp	RTC Date, Time Read	Date, Time	R
nviRTC_DateTime[2]	66	SNVT_time_stamp	RTC Date, Time Set	Date, Time	R/W
nvoIntervalData[3]	67	SNVT_reg_val_ts	Interval Data Pulse Read	Integer Pulses, Date, Time	R
nviIntDataTime[3]	67	SNVT_time_stamp	Interval Date, Time Set	Date, Time	R/W
nviIntDataChan[3]	67	SNVT_count	Interval Data Channel Set	Integer Channel	R/W

E-Mon D-Mon LonWorks Point Map: IDR8 and IDR16					
Network Variable Name	**Function Block Index**	**SNVT Type**	**Description**	**Units**	**IDR**
nviIntDataPeriod[3]	67	SNVT_count	Interval Data Window Set	Minutes	R/W
nvoStatus[4]	0	SNVT_obj_status	Function Block Status	Function Block Status	R
nviRequest[4]	0	SNVT_obj_request	Function Block Request	Function Block Enable/ Disable	R/W
nvoFileDirectory	0	SNVT_address	File Directory	Config File Directory	R

1. To clear all usage channels, select reset kW/kWh on the display menu of the IDR. Jumper J6 must be closed. To clear individual channels, set nviResetUsageCh to the desired channel. For example, set nviResetUsageCh to 1 to reset nvoUsageCh01.

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. The interval data period window can be set to read 15 or 5 minutes using the nviIntDataPeriod. 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 nvoUsageCh01.

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.

With an IDR16 each channel 1 through 16 represents the IDR16 meter jack inputs 1 through 16.

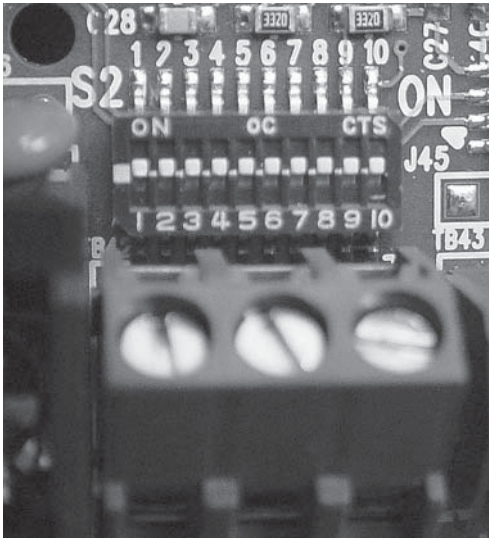
With an IDR8 each channel 1 through 8 represents the IDR8 meter jack inputs 1 through 8.

Appendix A - DIP Switch Settings

The 10-position DIP Switch is used to configure:

- RS-485 Communication protocol (pos 1)
- Ethernet Communication protocol (pos 2)
- RS-485 Baud rate (pos 3 & 4)
- Single channel input mode for RJ45 style connector and ST (screw terminal); dual-channel only available on RJ45. (pos 5)
- Spare Pos 7 & 8
- RS-485 Bias (pos 9 & 10); only one device on the network needs to have biasing.

The communication baud rate is selected by means of a DIP Switch on the circuit board. There are four (4) selections: 9600 (factory default), 19.2k, 38.4k, and 76.8k bps; higher baud rate would reduce cabling length. When connecting the device to an RS-485 network needing the use of biasing the RS-485 line, turn on DIP Switch pos 9 and pos 10. After changing the DIP switch selections (1.8), restart the device for the new settings to take effect (9&10 for BIAS doesn't require CPU restart).



3	4	BAUD RATE
ON	ON	9600
OFF	ON	19200
ON	OFF	38400
OFF	OFF	76800

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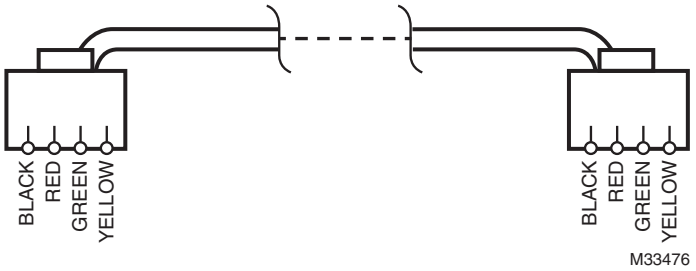
Fig. 8. DIP Switch Baud Rates.

Appendix B - Cable Configurations

1. Four-Conductor Cables (IDR RS-485 Communication)



2. Six-Conductor Cables (Meters #1-#8, optional #9-#16)

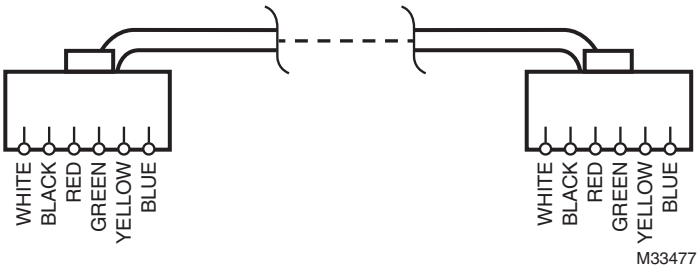


Fig. 9. Cable Configurations

Appendix C - LED Indicator Locations

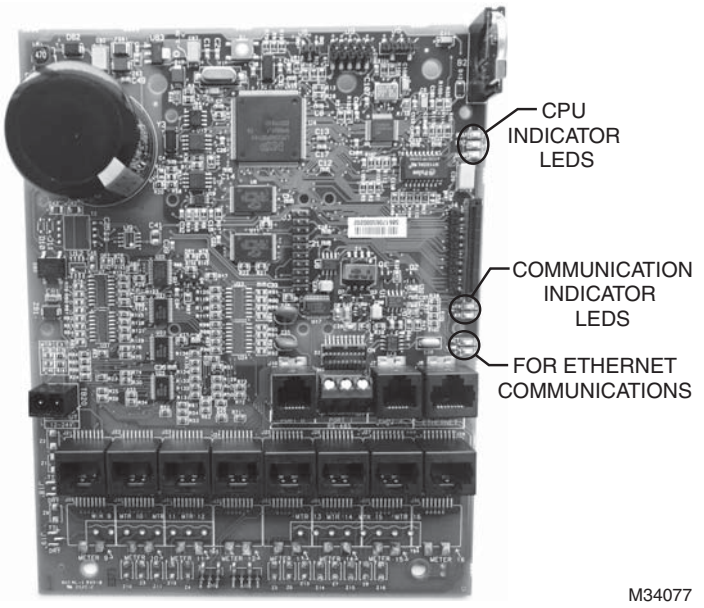


Fig. 10. LED Indicator Locations

Appendix D - IDR Circuit Board Components

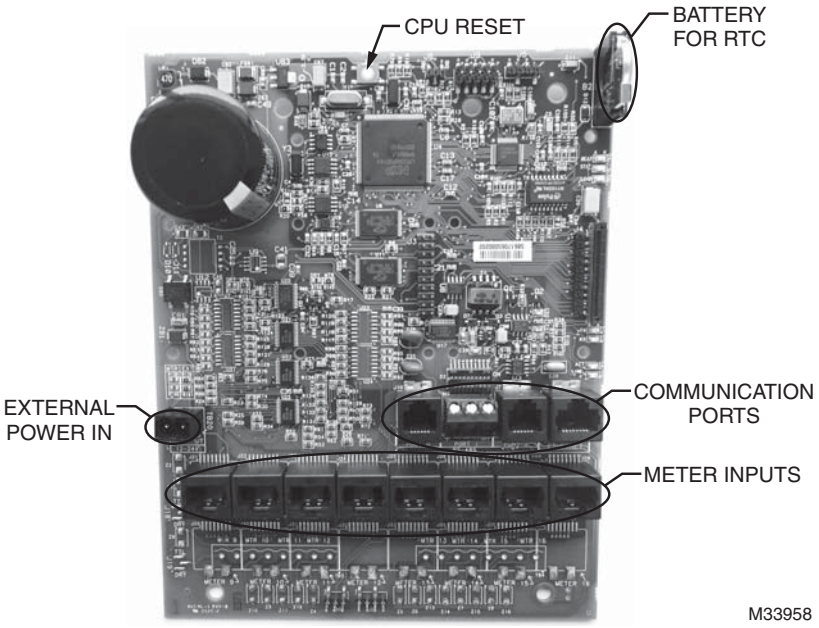
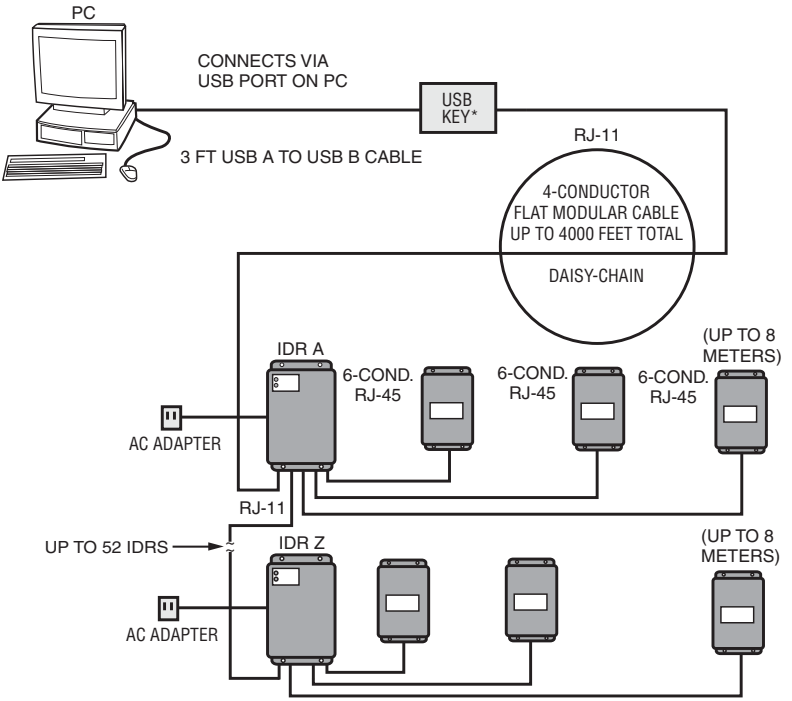


Fig. 11. IDR Modular Jack.

Appendix E - System Wiring Guides



NOTE: METERS 1-8 MUST BE INSTALLED WITHIN 500 FEET OF IDR.

CONNECTION	CABLE TYPE	CONNECTOR
IDR TO E-MON D-MON METERS 1-8	6-COND. 22-26 AWG (PINS 1 & 8 NOT USED)	RJ-45
IDR TO IDR	4-COND. 26 AWG	RJ-11
IDR TO USB KEY	4-COND. 26 AWG	RJ-11
USB KEY TO COMPUTER**	3 FT USB A to USB B Cable	RJ-45/DTE
IDR TO PULSE METER	2-COND. 14-22 AWG	

** SUPPLIED BY E-MON

NOTE: INTERIOR INTERCONNECTING COMMUNICATIONS ARE SUPPLIED WITH THE PRE-WIRED MMU-TYPE METERING CABINETS.

NOTE: WHEN CONSTRUCTING FIELD-INSTALLED CABLES, MODULAR CABLES MUST BE MADE SO THAT THE INDIVIDUAL WIRES GO THROUGH ON THE SAME PIN NUMBER.

* CONTACT E-MON FOR USB-ONLY CONNECTION.

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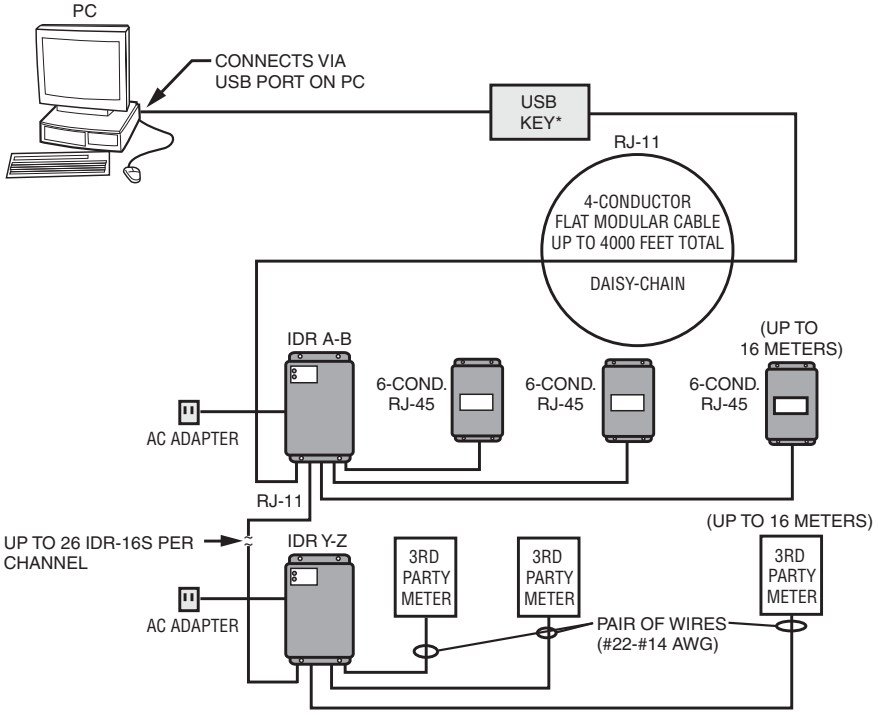
Appendix F - System Wiring Guides



NOTE: METERS 1-8 MUST BE INSTALLED WITHIN 500 FEET OF IDR.

CONNECTION	CABLE TYPE	CONNECTOR
IDR TO E-MON D-MON METERS 1- 16	6-COND. 22-26 AWG (PINS 1 & 8 NOT USED)	RJ-45
IDR TO USB KEY	4-COND. 26 AWG	RJ-11
IDR TO RS-232 KEY 2000	4-COND. 26 AWG	RJ-11
RS-232 KEY 2000 TO COMPUTER**	8-COND. 22-26 AWG FLAT MODULAR CABLE	RJ-45/DTE
IDR TO PULSE METER	2-COND. 14-22 AWG	

** SUPPLIED BY E-MON

NOTE: INTERIOR INTERCONNECTING COMMUNICATIONS ARE SUPPLIED WITH THE PRE-WIRED MMU-TYPE METERING CABINETS.

NOTE: WHEN CONSTRUCTING FIELD-INSTALLED CABLES, MODULAR CABLES MUST BE MADE SO THAT THE INDIVIDUAL WIRES GO THROUGH ON THE SAME PIN NUMBER.

* CONTACT E-MON FOR USB-ONLY CONNECTION.

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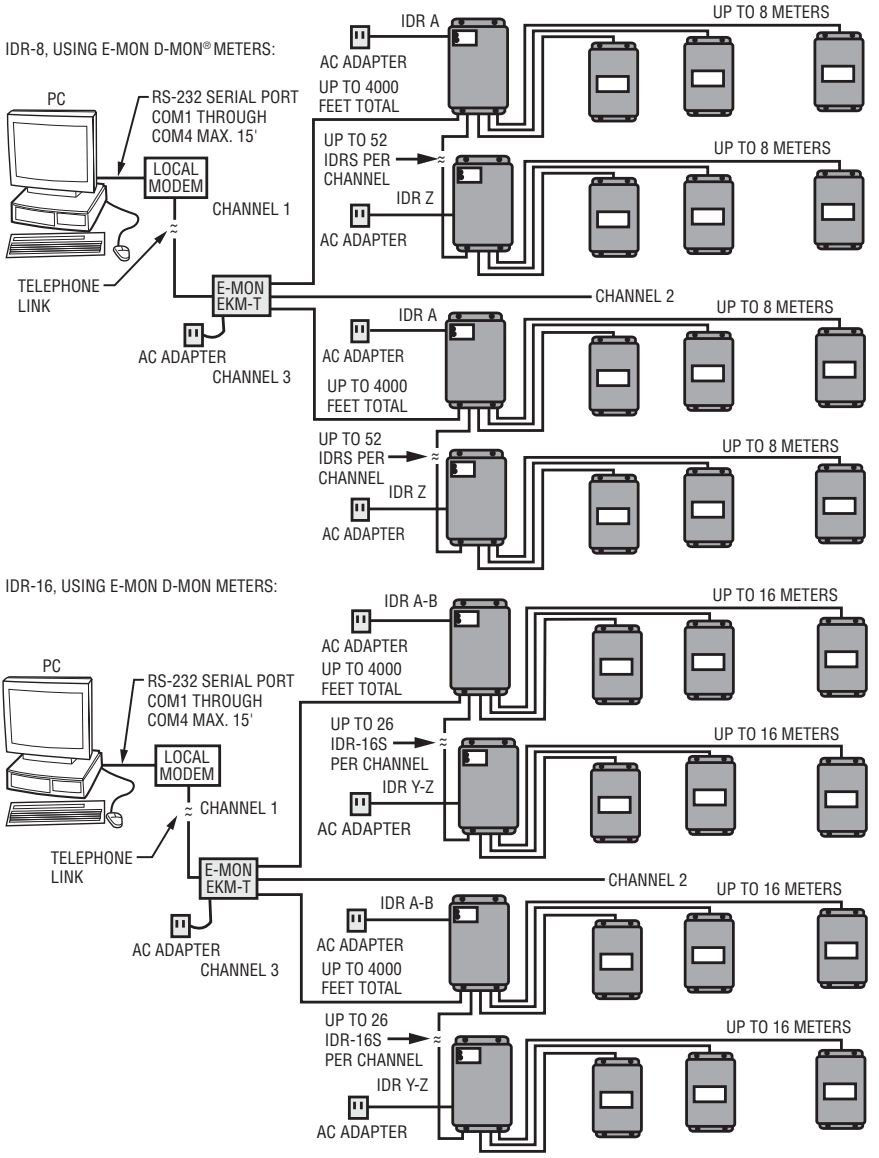
Appendix G - Modem System Configuration Diagrams



NOTES: METERS 1-8 (OR 1-16) MUST BE INSTALLED WITHIN 500 FEET OF IDR.
METERS 1-8 (OR 1-16) USE 6-CONDUCTOR CABLE.

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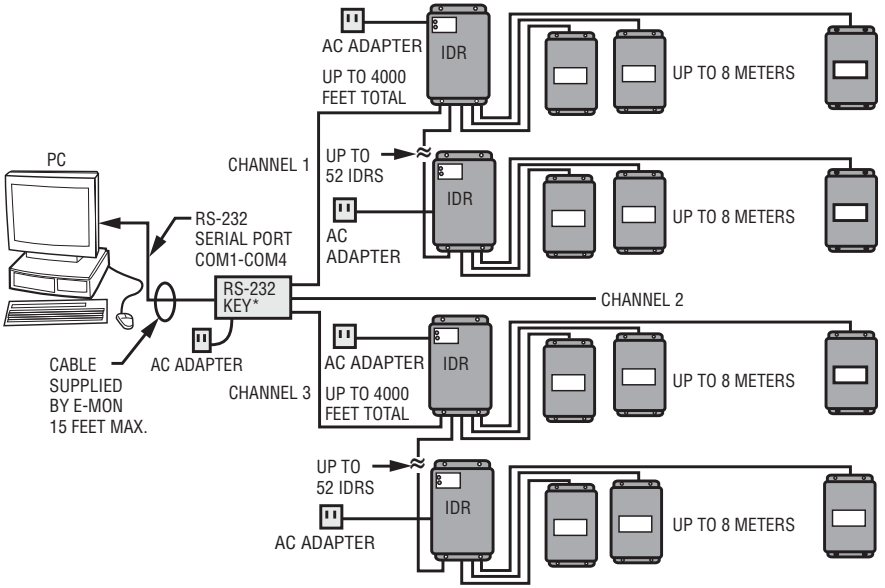
Appendix H - Hard Wired System Configuration Diagrams

IDR-8, USING E-MON D-MON® METERS:



NOTES: METERS 1-16 MUST BE INSTALLED WITHIN 500 FEET OF IDR.
METERS 1-16 USE 6-CONDUCTOR CABLE

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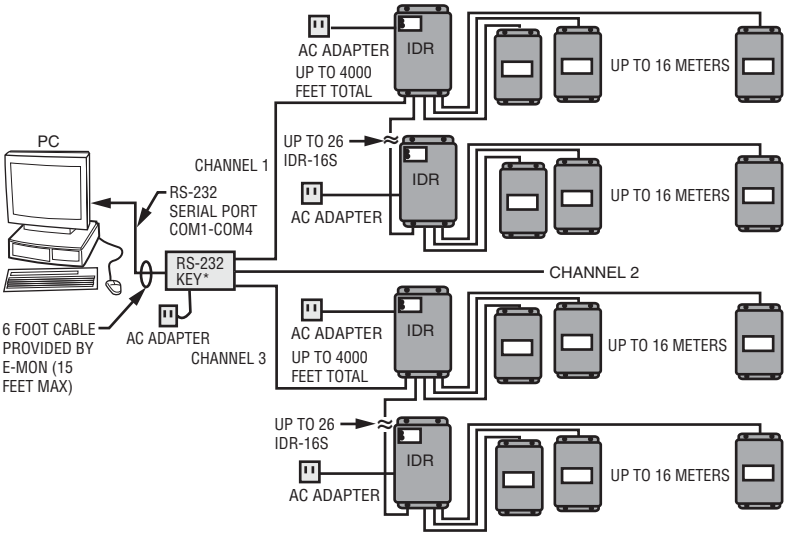
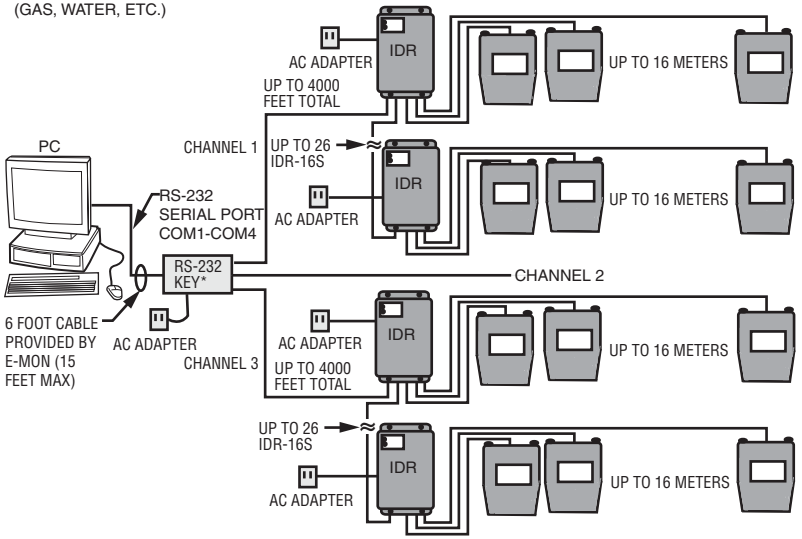
Appendix I - Hard Wired System Configuration Diagrams (Continued)

IDR-16, USING E-MON D-MON® METERS



NOTES: METERS 1-16 MUST BE INSTALLED WITHIN 500 FEET OF IDR.
METERS 1-16 USE 6-CONDUCTOR CABLE.

IDR-16, USING OTHER UTILITY-TYPE METERS
(GAS, WATER, ETC.)



NOTES: METERS MUST BE INSTALLED WITHIN 500 FEET OF IDR.
METER CONNECTED WITH A PAIR OF #22-#14 AWG CONDUCTORS.

M33742

Appendix J - IDR Technical Specifications

Enclosure:	Lockable steel JIC box NEMA 12
Dimensions:	9.5” H x 6.75” W x 3.875” D
Knockouts:	Three (3) on bottom of enclosure (3/4” Cond.)
Power Supply:	Powered by 120 VAC adapter
Back Up:	Lithium Power Cell CR2032 (10 year lifetime)
LED Indicators	BEAT, STATUS, TX, RX, ACT, LINK
Inputs:	IDR-8: Eight (8) eight-pin modular ports or Eight (8) 2-screw plug-in terminals
	IDR-16: Sixteen (16) eight-pin modular ports
Max Pulse Input:	<600 pulses per minute (50% duty cycle)
Data Storage:	36 days @ 5-minute sampling intervals 72 days @ 15-minute sampling intervals
Interface with:	E-Mon D-Mon submeters, electric utility meters, third-party submeters, gas meters, water meters, BTU meters, and any meter equipped with a contact pulse output (using available 2-screw terminals.)
Power Consumption:	2 watts maximum, 1.2 watts typical
Processor:	32-bit;12 MHz main clock, 60 MHz internal
Real-Time Clock:	100-year clock/calendar automatically makes changes to standard/daylight savings time
Communications:	Serial, RS-485, 2-wire, half duplex. Optically isolated from all other circuits. 9600 bps standard.

Appendix K - Meter Limited Warranty

Subject to the exclusions listed below, E-Mon 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. E-Mon 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 E-mon'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 E-Mon.

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 E-Mon'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 E-Mon's control or other force majeure events or (v) used in conjunction with equipment, components, accessories, parts or materials not supplied or approved by E-Mon.

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 E-MON 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.

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E-Mon
850 Town Center Drive
Langhorne, PA 19047
www.emon.com
info@emon.com

62-0394-03 JPG 01-14
Printed in United States

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