

# E-Mon D-Mon<sup>®</sup> MMU-Style Meters KWH AND KWH/DEMAND

## INSTALLATION INSTRUCTIONS



**E-Mon**  
850 Town Center Drive  
Langhorne, PA 19047  
(800) 334-3666  
[www.emon.com](http://www.emon.com)  
[info@emon.com](mailto:info@emon.com)



62-0417-01

## **E-MON D-MON® MMU-STYLE METERS**

### ***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](mailto: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.*

# TABLE OF CONTENTS

Section 1.0	Safety Label Definitions and Information	4
Section 2.0	Precautionary and Safety Information	5
Section 3.0	Introduction to Multiple Meter Units (MMUs)	6
Section 3.1	Application	6
Section 3.2	General Description	6
Section 4.0	Description of Multiple Meter Units (MMUs)	7
Section 4.1	Class 1000/2000 Meters	7
Section 4.2	Class 3200 Meters	7
Section 4.3	Green Class Meters	7
Section 4.4	IDR (Interval Data Recorders)	7
Section 5.0	MMU Cabinet Installation	8
Section 5.1	MMU Cabinet Description	8
Section 5.2	MMU Cabinet Installation	8
Section 6.0	MMU Cabinet Wiring	10
Section 6.1	MMU Cabinet Wiring	10
Section 6.2	MMU Cabinet Wiring	11
Section 6.3	MMU Cabinet Wiring	11
Section 7.0	Individual Meter Wiring Diagrams and Installation Procedures	12
Section 7.1	Class 1000, 2000, and Green Class Meter Wiring Diagrams and Installation Procedures	12
Section 7.2	Class 3200 Meter Wiring Diagrams and Installation Procedures	13
Section 7.3	IDR (Interval Data Recorders) Wiring Diagrams and Installation Procedures	13
Section 7.4	Webmon Procedures	13
Appendix A	System Wiring Guides	14
Appendix B	System Wiring Guides	15
Appendix C	Modern System Configuration Diagrams	16
Appendix D	Hardwired System Configuration Diagrams	17
Appendix E	Hardwired System Configuration Diagrams (Continued)	18
Section 8.0	Troubleshooting	19
Section 9.0	Meter Technical Specifications	19
Section 10.0	Meter Limited Warranty	20

## 1.0 SAFETY LABEL DEFINITIONS AND INFORMATION

The MMU Style Meter may contain one or more of the following labels. Operator(s) should familiarize themselves with the meaning of each label to minimize risk.



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 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.

## 2.0 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.



### CAUTION

High voltages present on main PCB terminal block TB1 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.



### CAUTION

Failure to ground the enclosure creates a possible shock hazard. Do not operate the MMU Style Meter without a protective earth wire attached securely to the PE terminal screw. After installing protective earth wiring, secure the screw tightly (7 N-m torque.)



### CAUTION

NEVER open front panel of unit while unit has MAINS power applied. Failure to comply can increase the risk of serious injury and/or electrical shock.

# 3.0 INTRODUCTION TO MULTIPLE METER UNITS (MMU)

## 3.1 Application

This Install Manual describes a line of Multiple Meter Units (MMU) used in monitoring electrical usage in commercial, industrial, or institutional facilities. Voltage and current are continuously measured and updated to provide highly accurate, true RMS power information via current sensors.

## 3.2 General Description

The MMU allows for compact installation of multiple meters that allows for easy and centralized reading. A single MMU cabinet can be configured to contain up to 8, 16, or 24 meters of different voltage configurations (i.e. 208V and 480V).



Fig. 1. MMU 8 Cabinet.

## **4.0 DESCRIPTION OF MULTIPLE METER UNITS (MMU)**

MMU cabinets can be used to house Class 1000, Class 2000, Class 3200 and Green Class meters. IDR's, (Interval Data Recorders) can also be installed in the MMU cabinets with the meters.

These units are briefly described below:

### **4.1 Class 1000/2000 Meters**

The Class 1000 and Class 2000 meters are power meters for use in sub metering applications. The devices take inputs from current sensors and the line voltage and output kW hours in pulses.

Refer to Sections 5, 6, & 7 for general installation instructions on installing Class 1000 or Class 2000 meters into a MMU Cabinet.

### **4.2 Class 3200 Meters**

The Class 3200 meter is a 3-element meter with communication. The device is used to monitor electric power usage after the utility meter and store kW and kVAR data for automatic meter reading.

Refer to Sections 5, 6, & 7 for general installation instructions on installing Class 3200 meters into a MMU Cabinet.

### **4.3 Green Class Meters**

The Green Class Meter is a power meter for use in sub metering applications. The devices take inputs from current sensors and the line voltage and output kW hours in pulses.

Refer to Sections 5, 6, & 7 for general installation instructions on installing Class 3200 meters into a MMU Cabinet.

### **4.4 IDR (Interval Data Recorders)**

The Interval Data Recorder (IDR) is an energy data collection device with communication. The device is used to count digital pulses of the utility meter and store data for automatic meter reading. Various communications types are provided, EZ7, Modbus RTU, Modbus TCP/IP, BACnet MS/TP, BACnet IP, and Lonworks TP/FT-10.

Refer to Sections 5, 6, & 7 for general installation instructions on installing IDR meters into a MMU Cabinet.

# 5.0 MMU CABINET INSTALLATION

## 5.1 MMU Cabinet Description

The MMU Cabinet is made from 14 or 16 gauge steel. The cabinet has an ANSI 61 gray exterior finish. It contains a seam that is continuously welded and ground smooth. The heavy gauge continuous hinge pin that connects the door and the enclosure body are removable. There are screw-down clamps located on the door for easy locking of the cabinet.

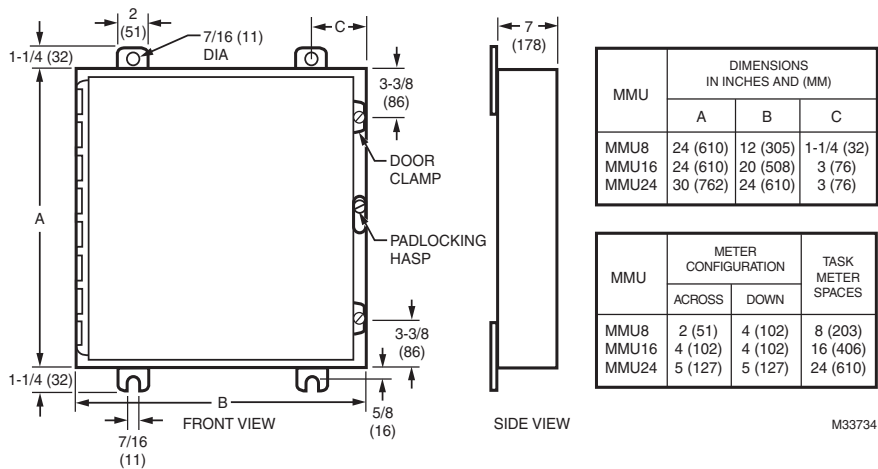


Fig. 2. Cabinet Dimensions.

## 5.2 MMU Cabinet Installation

The dimensions of the MMU8, MMU16, and MMU 24 cabinet are shown in Figure 2.

The MMU cabinet shall be mounted in an upright orientation as shown in Figure 3. The MMU cabinet must only be installed by personnel with the proper electrical licensing for the intended location.

Use appropriately sized mounting hardware to fasten the MMU enclosure to the selected mounting surface. The four housing mounting holes are located on the upper and lower mounting brackets.

Serviceability/field Repair Service and repair should be completed by qualified personnel only. Meters cannot be calibrated in the field. Adjustment is limited to reset of the meter display and should be performed by qualified personnel only. The configuration is stated on each meter nameplate.



The MMU enclosure is not supplied with knockouts. The installer will make the necessary entrances to the enclosure to supply entry for the voltage and current sensor conductors. The conduit and fittings must be appropriate for the application and installed in a manner to meet national and local electrical codes.

Spaces not occupied by meters will have a blank metal cover over the display window.



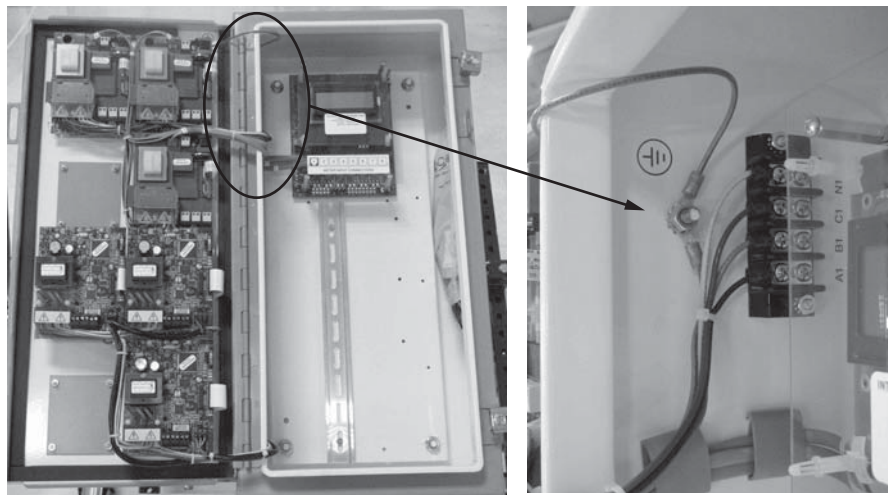
**Fig. 3. Example of an 8 Meter MMU Enclosure.**

## 6.0 MMU CABINET WIRING

### 6.1 General Wiring Instructions

Wiring of the individual MMU meters are the same as for a stand-alone meter. See section 7.0.

Refer to the Individual Meter Installation Manual for individual meter wiring.



M33744

**Fig. 4. MMU Terminal.**

Some MMU units may come from the factory already pre-wired for the voltage to the installed meters. When supplied this way, there will be a terminal block located inside the MMU that is labeled A, B, C, N. See Figure 4. The letters refer to the three phases and neutral connections already made to the meters. The power only has to be landed on the terminal block in order to power all of the meters in the MMU.

As with the stand-alone meters, the power wires must be fused. The size of the fuse will be determined by the number of meters installed in the MMU. The Littelfuse KLDR series are used for this component. Each meter point requires 1/10 amp fusing. With 8 meters, a one amp fuse would be acceptable.

The **current sensor** wiring is installed by bringing in the leads from their source and landing them on the appropriate terminals on the meter's sensor input terminals.

The proper current sensor wiring to each meter is described in each individual Meter Installation Manual. The MMU style meters are wired the same way, but it is important that proper routing procedures are followed when the current sensor conductors are installed.

- a. The sensor leads cannot be installed randomly and should be bundled together when they are routed to the meters which are mounted on the door of the MMU. They shall be secured and routed away from the power wiring and the communication cabling. They shall be bundled with appropriate means such as clamps, wire ties, spiral wrap, etc.
- b. To avoid damage to the bundled conductors when the door is opened and closed, tubing, guides, spiral wrap, clamps, or other approved means shall be used. This is required to provide proper protection and stress relief for the conductors.
- c. All wiring is to be routed away from any points that may possibly damage or abrade the insulation - such as sharp edges, screw threads, burrs, or any other item that may have been installed in the MMU enclosure. The final wiring must allow the door to freely open and close without coming in contact with anything that could damage it.

**NOTE:** Following the proper wiring procedures will help to assure a satisfactory installation.

**NOTE:** Units housed in UL type 1 enclosures must only be installed in indoor locations, where they will not be affected by the elements

## 6.2 Grounding

The meters and enclosure must be properly grounded for safety. A protective earth ground lug is provided for this purpose.

Failure to ground the enclosure creates a possible shock hazard. There are two terminals that attach to the base ground stud.

Do not operate without protective earth wire attached securely to the PE terminal screw. After installing the protective earth wiring, secure the screw tightly (7 N-m torque).



**Fig. 5. Base Ground Stud.**

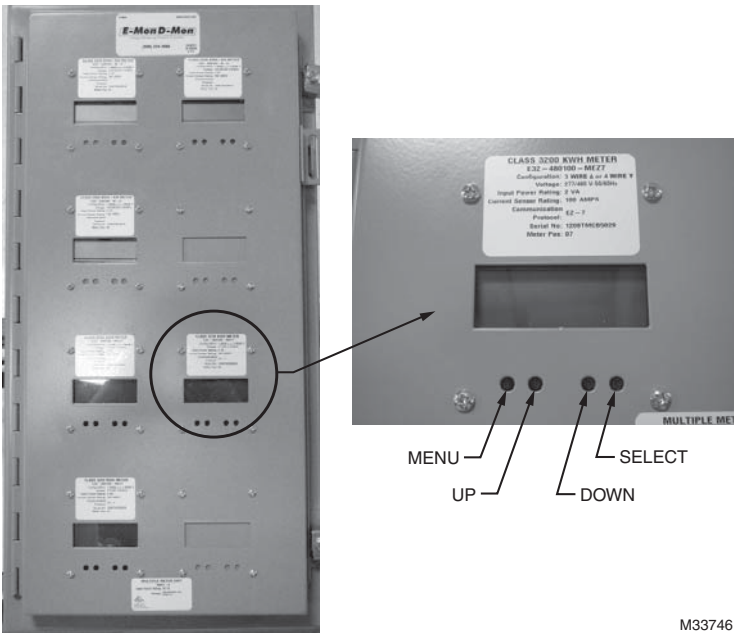
## 6.3 RS485 Communication Wiring

The **RS485 Communication** wiring is installed by connecting the leads to the appropriate terminals on the 3-position RS485 terminal strip mounted on the back panel of the enclosure. **The wiring terminals are labeled GND, HIGH, and LOW** to correspond to the appropriate connections of the communication cabling. **Tighten the terminals to 9 in-lbs of torque.** *Class 1 rated, Belden 1120A cable (600V) is to be used for communication wiring in MMU enclosures. The communication cabling must be routed away from the mains wiring.*

# 7.0 INDIVIDUAL METER WIRING DIAGRAMS AND INSTALLATION PROCEDURES

## 7.1 Class 1000, 2000 and Green Class Meter Wiring Diagrams and Installation Procedures

Wiring of each individual MMU meter is the same as for it's respective stand-alone meter. Refer to the stand alone Class 1000, 2000, and Green Class Meter Installation Manuals for detailed wiring diagrams, and installation procedures. The menu buttons on the Class 1000 MMU, 2000 MMU, and Green Class MMU Meters are in the same positions as a stand alone Class 1000, 2000 or Green Class Meters. The MMU Menu Buttons are identified in the figure below. If you have any questions, contact E-Mon at 800-334-3666.



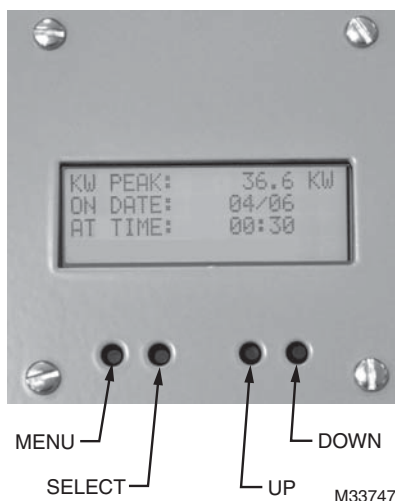
M33746

Fig. 6. Class 1000, 2000, and Green Class Meter Menu Buttons.

## 7.2 Class 3200 Meter Wiring Diagrams and Installation Procedures

Wiring of each individual Class 3200 MMU meter is the same as for its respective stand-alone meter. Refer to the stand alone Class 3200 Meter Installation Manual for detailed wiring diagrams and installation instructions. If you have any questions, contact E-Mon at 800-334-3666.

**NOTE:** The menu buttons on the Class 3200 MMU Meter are reversed from the stand alone Class 3200 Meters. The menu buttons positions are identified in the figure below.



**Fig. 7. The Menu Buttons on a Class 3200 MMU Meter are Reversed from the Stand Alone Version.**

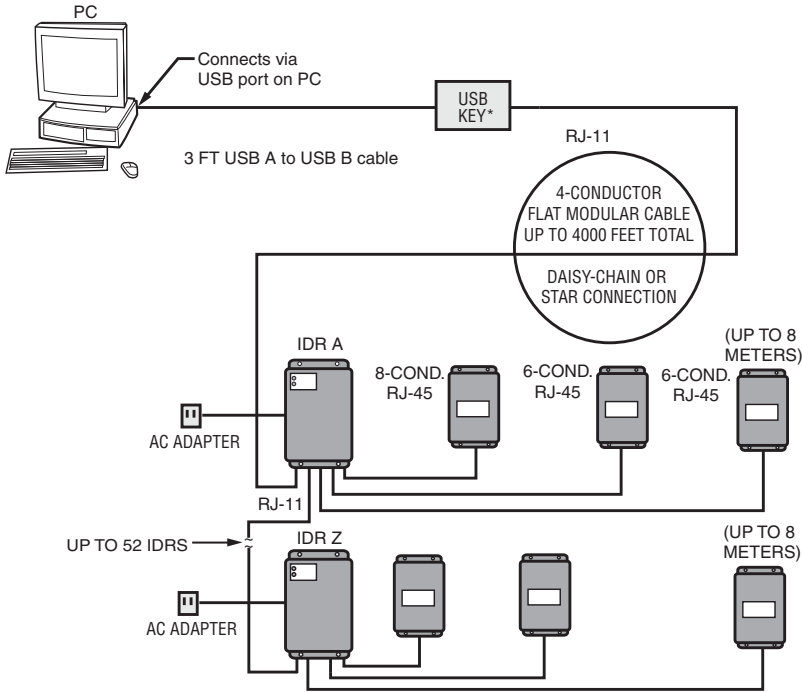
## 7.3 IDR (Interval Data Recorders) Wiring Diagrams and Installation Procedures

Refer to the IDR Installation Manual for detailed wiring diagrams and installation instructions. If you have any questions, contact E-Mon at 800-334-3666.

## 7.4 Webmon Procedures

Refer to the Webmon literature for MMU information. If you have any questions, contact E-Mon at 800-334-3666.

Appendix A - System Wiring Guides

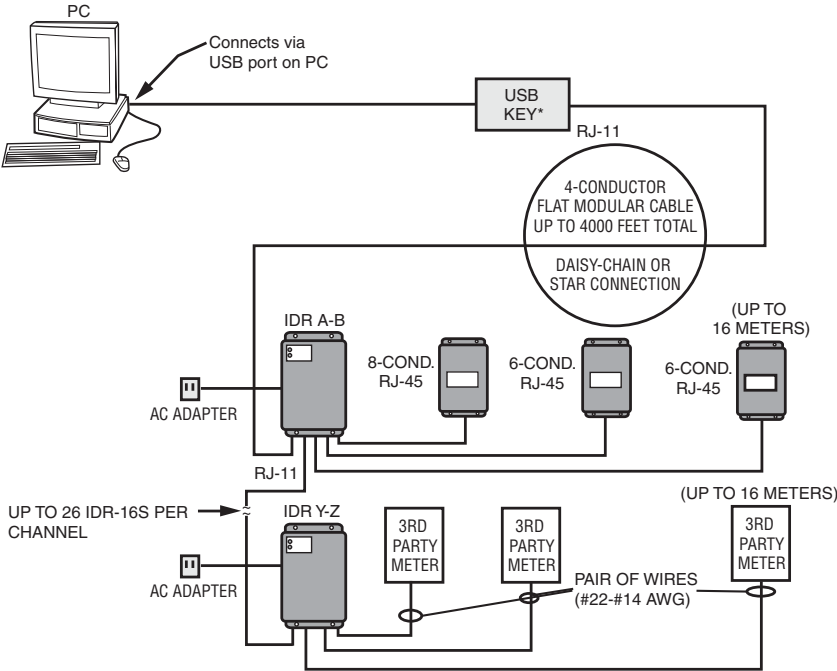


NOTE: METERS 1-8 MUST BE INSTALLED WITHIN 500 FEET OF IDR.

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.		

M33481

# Appendix B - System Wiring Guides

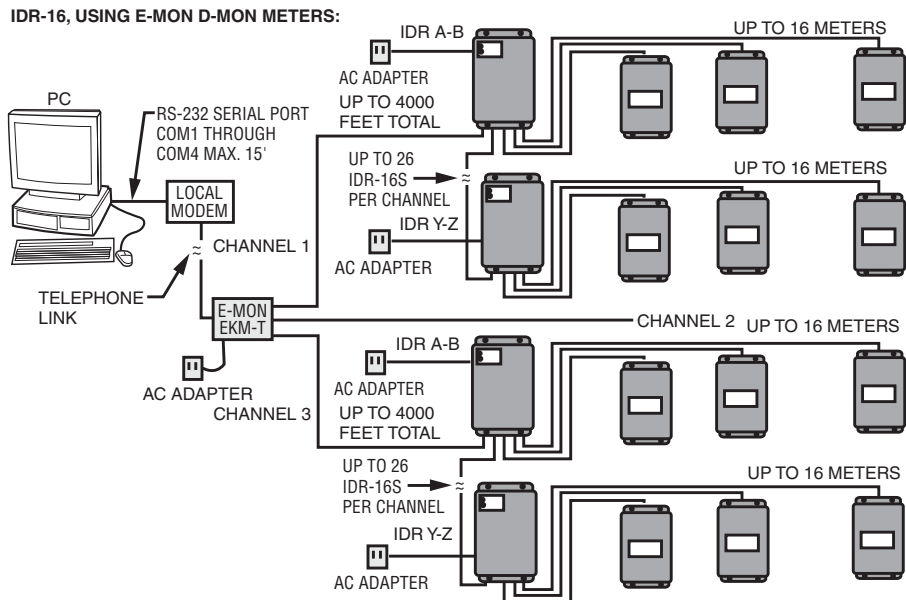
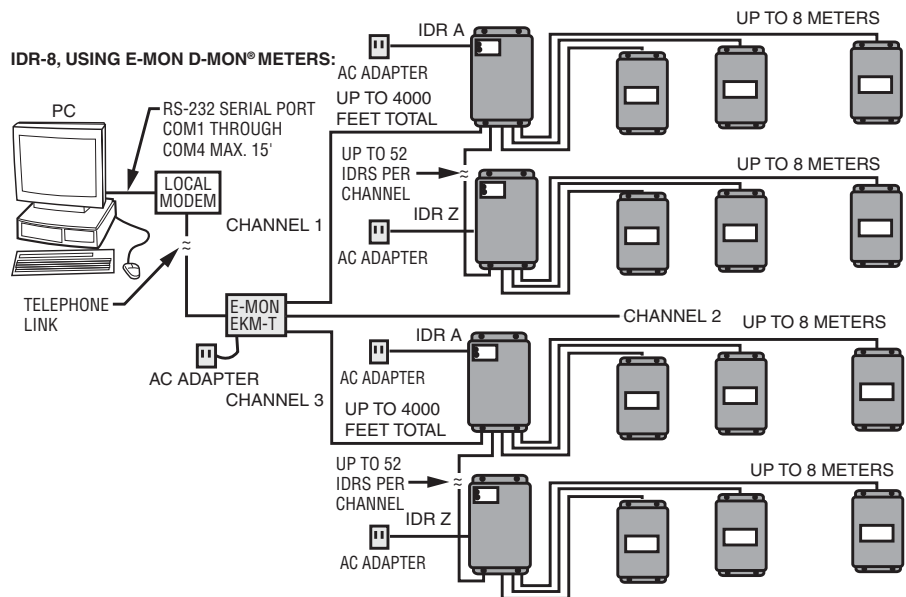


NOTE: METERS 1-8 MUST BE INSTALLED WITHIN 500 FEET OF IDR.

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.		

M33482

Appendix C - Modem System Configuration Diagrams



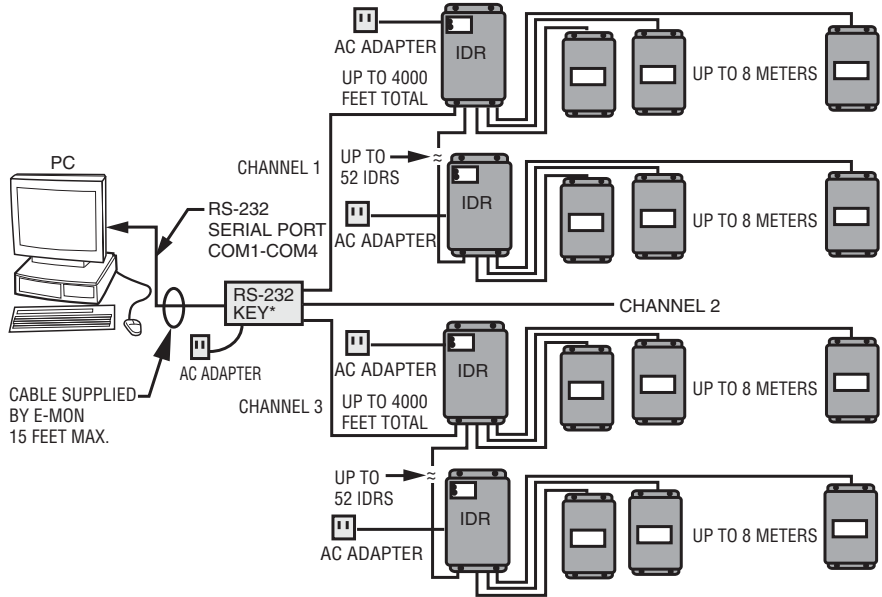
NOTES: METERS 1-8 (OR 1-16) MUST BE INSTALLED WITHIN 500 FEET OF IDR.  
METERS 1-8 (OR 1-16) USE 6-CONDUCTOR CABLE.

M33483



# Appendix D - Hardwired System Configuration Diagrams

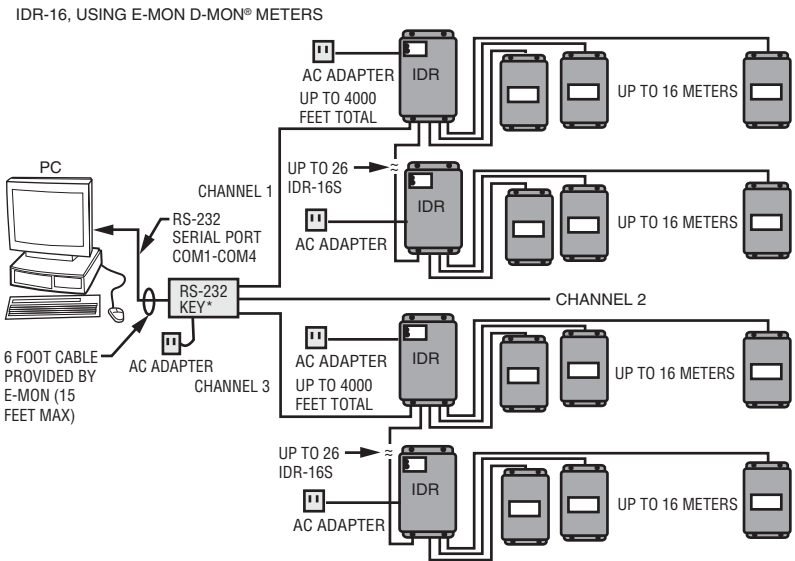
IDR-8, USING E-MON D-MON® METERS:



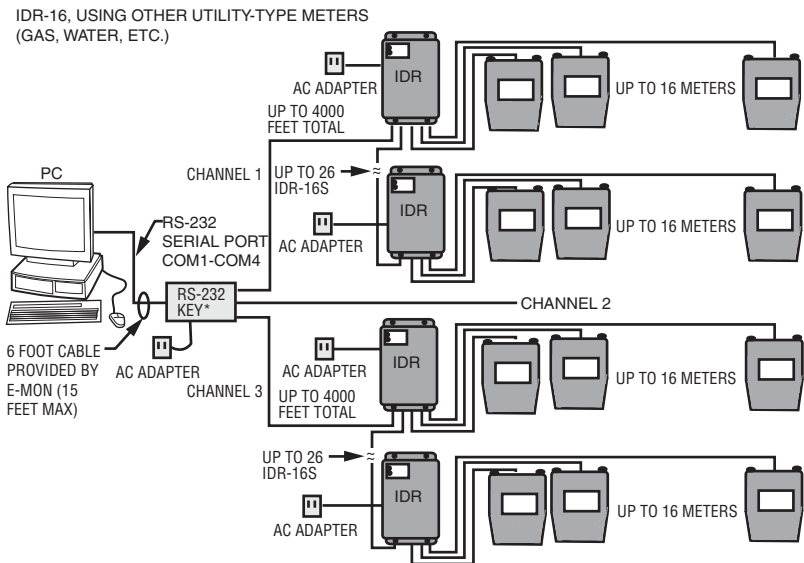
NOTES: METERS 1-16 MUST BE INSTALLED WITHIN 500 FEET OF IDR.  
METERS 1-16 USE 6-CONDUCTOR CABLE

M33484

# Appendix E - Hardwired System Configuration Diagrams



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



NOTES: METERS MUST BE INSTALLED WITHIN 500 FEET OF IDR.  
METER CONNECTED WITH A PAIR OF #22-#14 AWG CONDUCTORS. M33485

## **8.0 TROUBLESHOOTING**

The E-Mon D-Mon® meters are calibrated and tested at the factory before being packaged and shipped. If installed properly and in accordance with these installation instructions, your E-Mon D-Mon meter should provide years of trouble-free service. If the meter should not function, the following guide will assist in troubleshooting the installation.

Refer to the individual Meter Installation Manual for detailed troubleshooting information.

If you have any questions, contact E-Mon at 800-334-3666 BEFORE removing the meter.

## **9.0 METER TECHNICAL SPECIFICATIONS**

Refer to the individual Meter Installation Manual for detailed technical specifications.

## 10.0 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. 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.
7. 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. EXCEPT AS EXPRESSLY PROVIDED HEREIN, E-MON MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED WITH RESPECT TO ANY PRODUCTS, PARTS OR SERVICES PROVIDED BY E-MON INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
8. PRODUCTS OR COMPONENTS DISTRIBUTED, BUT NOT MANUFACTURED, BY E-MON ARE NOT WARRANTED BY E-MON 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.

### E-Mon

850 Town Center Drive

Langhorne, PA 19047

[www.emon.com](http://www.emon.com)

[info@emon.com](mailto:info@emon.com)

© U.S. Registered Trademark  
© 2012 E-Mon  
62-0417-01 JPG Rev. 04-12  
Printed in United States

