

Quick Start Guide

IQ 35M Meter Series



HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Follow safe electrical work practices. See NFPA 70E in the USA, or applicable local codes.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Read, understand and follow the instructions before installing this product.
- Turn off all power supplying equipment before working on or inside the equipment.
- Any covers that may be displaced during the installation must be reinstalled before powering the unit.
- Use a properly rated voltage sensing device to confirm power is off.

DO NOT DEPEND ON THIS PRODUCT FOR VOLTAGE INDICATION

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

NOTICE

- This product is not intended for life or safety applications.
- Do not install this product in hazardous or classified locations.
- The installer is responsible for conformance to all applicable codes.
- Mount this product inside a suitable fire and electrical enclosure.

FCC PART 15 INFORMATION

NOTE: This equipment has been tested by the manufacturer 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 when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference in which case the user will be required to correct the interference at his own expense. Modifications to this product without the express authorization of the manufacturer nullify this statement.

CAUTION

RISK OF EQUIPMENT DAMAGE

- This product is designed only for use with 1V or 0.33V current transducers (CTs).
- DO NOT USE CURRENT OUTPUT (e.g. 5A) CTs ON THIS PRODUCT.**
- Failure to follow these instructions can result in overheating and permanent equipment damage.

Specifications

Measurement Accuracy: Real Power and Energy	IEC 62053-22 Class 0.5S, ANSI C12.20 0.5%
Input Voltage Characteristics: Measured AC Voltage	Min. 90 V _{LN} (156 V _{LL}) for stated accuracy UL Maximums: 600 V _{LL} (347 V _{LN}) CE Maximums: 300 V _{LN} (520 V _{LL}) 2.5 MΩ (L-N)/5 MΩ (L-L) 45 to 65 Hz
Impedance Frequency Range	
Input Current Characteristics: Measurement Input Range	0 to 0.333 VAC or 0 to 1.0 VAC (+20% over-range) 10.6 kΩ (1/3 V mode) or 32.1 kΩ (1 V mode)
Impedance	
Control Power: AC	5 VA max.; 90 V min. UL Maximums: 600 V _{LL} (347 V _{LN}) CE Maximums: 300 V _{LN} (520 V _{LL}) 3 W max.; UL and CE: 125 to 300 VDC 100 msec at 120VAC
DC *	
Ride Through Time	
Mechanical Characteristics: IP Degree of Protection (IEC 60529) Terminal Block Screw Torque	IP40 front display; IP20 Meter 3.5 in-lb (0.4 N-m) nominal/ 4.4 in-lb (0.5 N-m) max. 14 to 24 AWG T35 (35mm) DIN Rail per EN50022
Terminal Block Wire Size Rail	
Environmental Conditions: Operating Temperature Storage Temperature Humidity Range Altitude of Operation	-30° to 70°C -40° to 85°C <95% RH (non-condensing) 3 km max.
Metering Category: North America	CAT III; for distribution systems up to 347 V _{LN} /600 VAC _{LL} CAT III; for distribution systems up to 300 V _{LN} Per UL 508, EN61010
CE	FCC part 15 Class B, EN55011/EN61000 Class B (residential and light industrial) EN61000 Class A (heavy industrial)
Dielectric Withstand Conducted and Radiated Emissions	
Conducted and Radiated Immunity	
Safety: North America (cULus)	UL508 (open type device)/ CSA 22.2 No. 14-05 EN61010-1:2001
Europe (CE)	

* External DC current limiting is required. See Fuse Recommendations

For use in a Pollution Degree 2 or better environment only. A Pollution Degree 2 environment must control conductive pollution and the possibility of condensation or high humidity. Consider the enclosure, the correct use of ventilation, thermal properties of the equipment, and the relationship with the environment. Installation category: CAT II or CAT III

Provide a disconnect device to disconnect the meter from the supply source. Place this device in close proximity to the equipment and within easy reach of the operator, and mark it as the disconnecting device. The disconnecting device shall meet the relevant requirements of IEC 60947-1 and IEC 60947-3 and shall be suitable for the application. In the US and Canada, disconnecting fuse holders can be used. Provide overcurrent protection and disconnecting device for supply conductors with approved current limiting devices suitable for protecting the wiring. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the device may be impaired.

 This symbol indicates an electrical shock hazard exists.

 Documentation must be consulted where this symbol is used on the product.

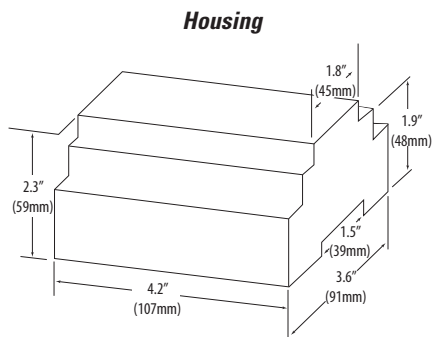


Powering Business Worldwide

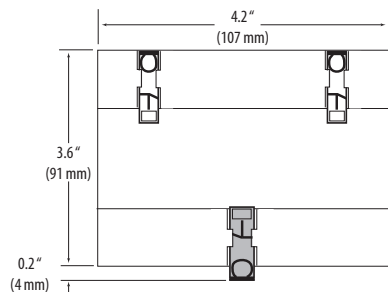
Additional Resources:
For a copy of the full installation guide for this product, visit www.eaton.com



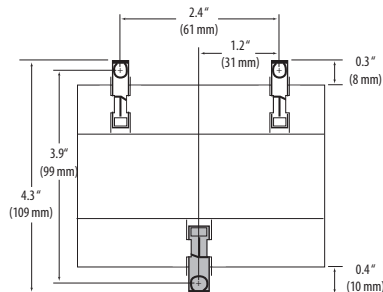
Dimensional Drawings



**Bottom View
(DIN Mount Configuration)**



**Bottom View
(Screw Mount Configuration)**

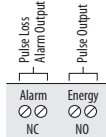


Product Identification

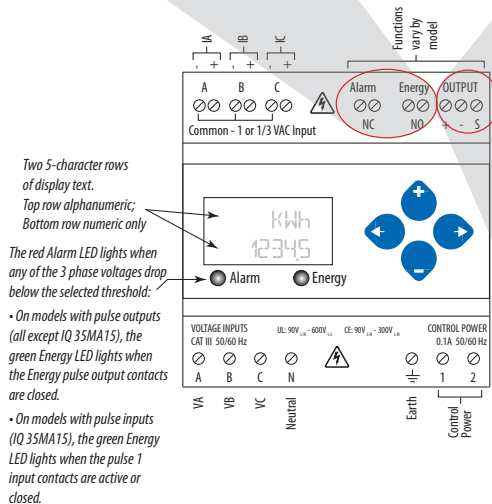
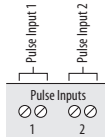
Model	Description	Output			
		Pulse	Alarm	Modbus	BACnet
IQ 35MA11	Pulse output only	•	•		
IQ 35MA12	Modbus output	•	•	•	
IQ 35MA13	Modbus output, data logging	•	•	•	
IQ 35MA15	BACnet MS/TP, data logging, Pulse contact inputs				•
IQ 35MA22	Modbus output, bidirectional	•	•	•	
IQ 35MA23	Modbus output, bidirectional, data logging	•	•	•	

Product Diagram

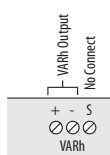
**IQ35MA11/IQ35MAx2/
IQ35MAx3**



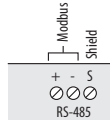
IQ 35MA15



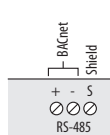
IQ 35MA11 - Pulse



IQ 35MAx2 and IQ 35MAx3 - Modbus



IQ 35MA15 - BACnet



Installation



Disconnect power prior to installation.



Any covers that may be displaced during the installation must be reinstalled before powering the unit.

Mount the meter in an appropriate electrical enclosure near equipment to be monitored.

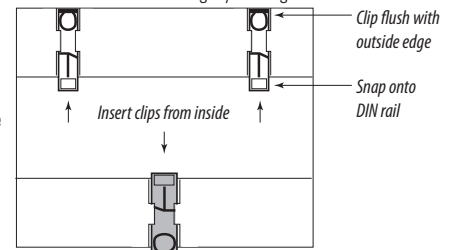
Do not install on the load side of a Variable Frequency Drive (VFD).

For Bidirectional models, observe correct CT orientation.

The meter can be mounted in two ways: on standard 35 mm DIN rail or screw-mounted to the back of the enclosure.

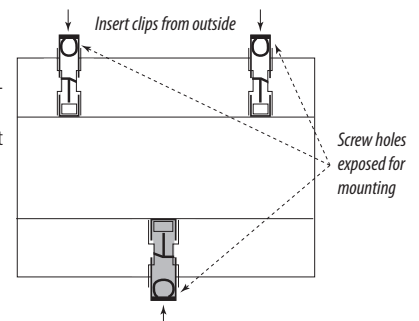
A. DIN Rail Mounting

1. Attach mounting clips to the underside of the housing by sliding them into the slots from the inside. The stopping pegs must face the housing, and the outside edge of the clip must be flush with the outside edge of the housing.
2. Snap the clips onto the DIN rail. See diagram of the underside of the meter.
3. To prevent horizontal shifting across the DIN rail, use two Eaton IQ35M-DRSC end stop clips or equivalent.



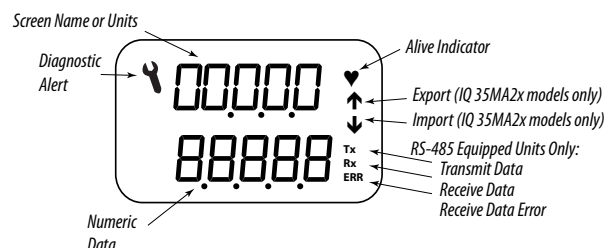
B. Screw Mounting

1. Attach the mounting clips to the underside of the housing by sliding them into the slots from the outside. The stopping pegs must face the housing, and the screw hole must be exposed on the outside of the housing.
2. Use three #8 screws (not supplied) to mount the meter to the back of the enclosure. See diagram of the underside of the meter.

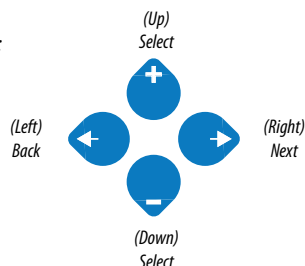


Display Diagram

LCD Screen:



Buttons:



Supported system types

The meter has a number of different possible system wiring configurations (see Wiring Diagrams, page 9-10). To configure the meter, set the System Type via the User Interface, Modbus register 130 (IQ35MAx2 and IQ35MAx3), or BACnet Analog Value Object AV2 (IQ 35MA15). The System Type tells the meter which of its current and voltage inputs are valid, which are to be ignored, and if neutral is connected. Setting the correct System Type prevents unwanted energy accumulation on unused inputs, selects the formula to calculate the Theoretical Maximum System Power, and determines which phase loss algorithm is to be used. The phase loss algorithm is configured as a percent of the Line-to-Line System Voltage (except when in System Type 10) and also calculates the expected Line to Neutral voltages for system types that have Neutral (12 & 40).

Values that are not valid in a particular System Type will display as "—" on the User Interface or as QNAN in the Modbus registers or BACnet Analog Input objects

		CTs		Voltage Connections			System Type		Phase Loss Measurements			Wiring Diagram
Number of wires	Qty	ID	Qty	ID	Type	Modbus Register 130 or BACnet Analog Value object AV2	User Interface: SETUP> S SYS	VLL	VLN	Balance		Diagram number
Single-Phase Wiring												
2	1	A	2	A, N	L-N	10	1L + 1n		AN			1
2	1	A	2	A, B	L-L	11	2L	AB				2
3	2	A, B	3	A, B, N	L-L with N	12	2L + 1n	AB	AN, BN	AN-BN		3
Three-Phase Wiring												
3	3	A, B, C	3	A, B, C	Delta	31	3L	AB, BC, CA		AB-BC-CA		4
4	3	A, B, C	4	A, B, C, N	Grounded Wye	40	3L + 1n	AB, BC, CA	AN, BN, CN	AN-BN-CN & AB-BC-CA		5, 6

To avoid distortion, use parallel wires for control power and voltage inputs.

The following symbols are used in the wiring diagrams on the following page.

Symbol	Description
	Voltage Disconnect Switch
	Fuse (installer is responsible for ensuring compliance with local requirements. No fuses are included with the meter.)
	Earth ground
	Current Transducer
	Potential Transformer
	Protection containing a voltage disconnect switch with a fuse or disconnect circuit breaker. The protection device must be rated for the available short-circuit current at the connection point.

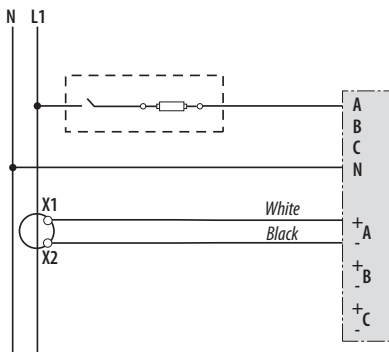
Wiring Diagrams

For IQ 35MA1x models, CTs are not polarity sensitive. No need to observe orientation.

For IQ 35MA2x models, CTs are polarity sensitive. Observe correct orientation as shown below.

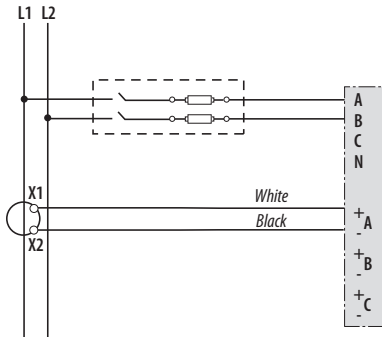
**Diagram 1: 1-Phase Line-to-Neutral
2-Wire System 1 CT**

USE SYSTEM TYPE 10 (1L + 1n)



**Diagram 2: 1-Phase Line-to-Line 2-Wire
System 1 CT**

USE SYSTEM TYPE 11 (2L)



**Diagram 3: 1-Phase Direct Voltage
Connection 2 CT**

USE SYSTEM TYPE 12 (2L + 1n)

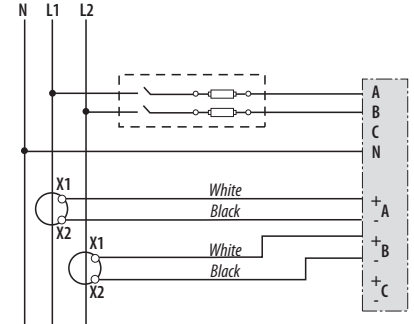
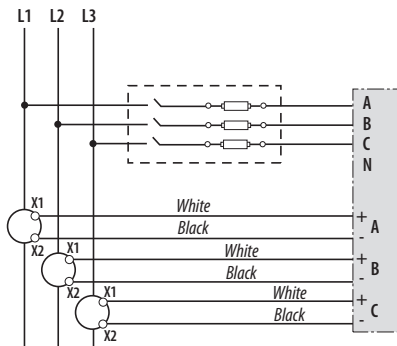


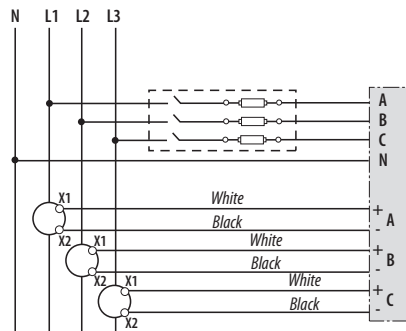
Diagram 4: 3-Phase 3-Wire 3 CT no PT

USE SYSTEM TYPE 31 (3L)



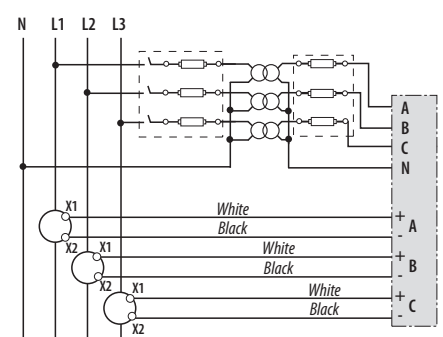
**Diagram 5: 3-Phase 4-Wire Wye Direct
Voltage Input Connection 3 CT**

USE SYSTEM TYPE 40 (3L + 1n)



**Diagram 6: 3-Phase 4-Wire Wye
Connection 3 CT 3 PT**

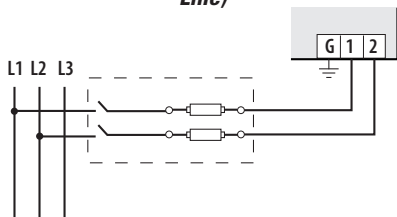
USE SYSTEM TYPE 40 (3L + 1n)



Warning: CT negative terminals are referenced to the meter's neutral (N) and may be elevated from ground.

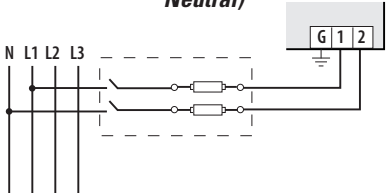
Control Power

**Direct Connect Control Power (Line to
Line)**



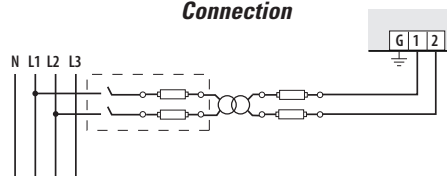
Line to Line from 90VAC to 600VAC (UL) (520 VAC CE). In UL installations, the lines may be floating (i.e. a delta). If any lines are tied to an earth (i.e. a corner grounded delta), see the Line to Neutral installation limits. In CE installations, the lines must be neutral (earth) referenced at less than 300VAC_{L-N}.

**Direct Connect Control Power (Line to
Neutral)**



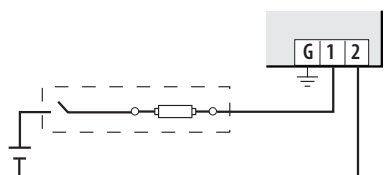
Line to Neutral from 90VAC to 347VAC (UL) or 300VAC (CE)

**Control Power Transformer (CPT)
Connection**



The Control Power Transformer may be wired L-N or L-L.
Output to meet meter input requirements

Direct Connect Control Power (DC)



DC Control Power from 125VDC to 300VDC (UL and CE max.).

Fuse Recommendations:

Keep the fuses close to the power source (obey local and national code requirements).

For selecting fuses and circuit breakers, use the following criteria:

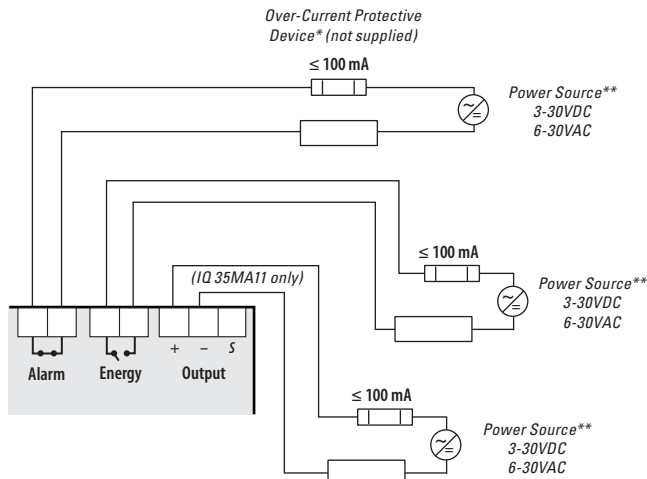
- Current interrupt capacity should be selected based on the installation category and fault current capability.
- Over-current protection should be selected with a time delay.
- The voltage rating should be sufficient for the input voltage applied.
- Provide overcurrent protection and disconnecting means to protect the Wiring. For DC installations, the installer must provide external circuit protection (suggested: 0.5A, time delay fuses).
- The earth connection is required for electromagnetic compatibility (EMC) and is not a protective earth ground.

Wiring Notes:

- Use 14-24 gauge wire for all connections.
- When tightening terminals, ensure that the correct torque is applied: 3.5 - 4.4 in-lb (0.4-0.5 N-m).

Solid-State Pulse Output (IQ 35MA11, IQ 35MA12, IQ 35MA13, and IQ 35MA2x Only)

These models have one normally open (N.O.) KZ Form A output and one normally closed (N.C.) KY output. One is dedicated to energy (Wh), and the other to Alarm. The IQ 35MA11 also provides an additional N.O. reactive energy (VARh) contact. See the Setup section for configuration information.



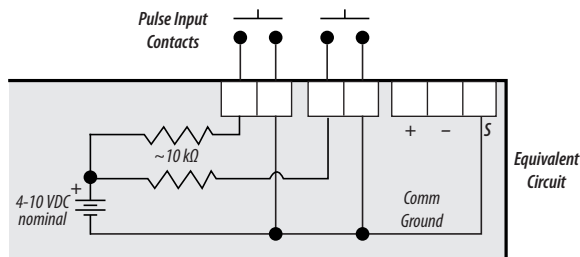
The solid state pulse outputs are rated for 30VAC/DC nom. Maximum load current is 100mA at 25°C. Derate 0.56mA per °C above 25°C (e.g. 86mA@50°C).

* The over-current protective device must be rated for the short circuit current at the connection point.

** All pulse outputs and communication circuits are only intended to be connected to non-hazardous voltage circuits (SELV or Class 2). Do not connect to hazardous voltages.

Pulse Contact Inputs (IQ 35MA15 Only)

The IQ 35MA15 has two inputs with pulse accumulators for solid state or mechanical contacts in other sensors, such as water or gas flow meters. These inputs are isolated from the measured circuits and referenced to the communication signal ground. Use with contacts that do not require current to remove oxidation.

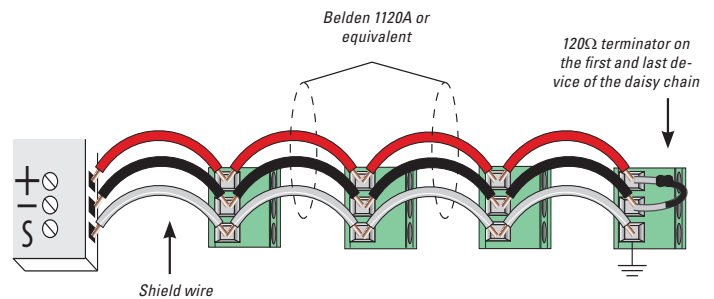


RS-485 Communications (Modbus and BACnet models only)

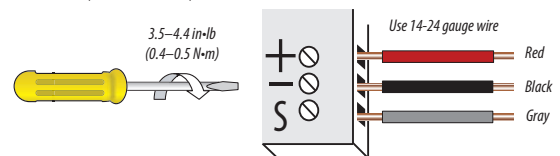
Daisy-chaining Devices to the Power Meter

The RS-485 slave port allows the power meter to be connected in a daisy chain with up to 63 2-wire devices. In this bulletin, communications link refers to a chain of devices that are connected by a communications cable.

NOTES:



- The terminal's voltage and current ratings are compliant with the requirements of the EIA RS-485 communications standard.
- The RS-485 transceivers are ¼ unit load or less.
- RS-485+ has a 47 kΩ pull up to +5V, and RS-485- has a 47 kΩ pull down to Shield (RS-485 signal ground).
- Wire the RS-485 bus as a daisy chain from device to device, without any stubs. Use 120 Ω termination resistors at each end of the bus (not included).
- Shield is not internally connected to Earth Ground.
- Connect Shield to Earth Ground somewhere on the RS-485 bus.
- Use 14 to 24 gauge wire for all connections.
- When tightening terminals, ensure that the correct torque is applied: 3.4-4.4 in-lb (0.4-0.5 N-m).



Quick Setup Instructions

Use this section to enter:

- Modbus or BACnet communication parameters
- CT (Current Transducer) output voltage and input current ranges
- The service type to be monitored

These instructions assume the meter is set to factory defaults. If it has been previously configured, all optional values should be checked. For more options (i.e., Potential Transformer ratios, etc.) and the full setup instructions, see the full installation guide for the specific model at www.eaton.com.

A. To Navigate to the Setup screens:

1. Press or repeatedly until **SETUP** screen appears.
2. Press to get to the **PASSW** screen.
3. Press to move through the digits. Use the or buttons to enter your password (the default is 00000).
4. Press to move to the first Setup screen (**S CT** on IQ 35MA11, **S COM** on IQ 35MAx2 and IQ 35MAx3, **S BRC** on IQ 35MA15)
5. Use or to select the parameter screen you want to set.
6. After you set the parameters you want, use or to select the next Setup screen or to exit the Setup screens (return to **SETUP**).

B. To Enter Modbus communication parameters (IQ 35MAx2 and IQ 35MAx3 models only):

1. Navigate to the **S COM** (set communications) Setup screen (see section A above).
2. Press to go to the **ADDR** screen and through the address digits. Use or to select the Modbus address (default is 004).
3. Press to accept the value and go to the **BAUD** screen. Use or to select the baud rate (default is 9600).
4. Press to go to the **PAR** screen. Use or to select the parity (default is NONE).
5. Press to go back to the **S COM** screen.

C. To Enter BACnet communication parameters (IQ 35MA15 models only)

1. Navigate to the **S BRC** (set BACnet) Setup screen (see section A above).
2. Press to go to the **MAC** screen and through the address digits. Use or to select the BACnet MAC address (default is 004).
3. Press to accept the value and go to the **KBAUD** screen. Use or to select the baud rate (default is 160K).
4. Press to go to the **ID1** screen and through the upper four digits of the Device Instance. Use or to select the ID digits (default is a pseudo-random number).
5. Press to accept the value and go to the **ID2** screen and through the lower three digits of the Device Instance. Use or to select the ID digits (default is a pseudo-random number).
6. Press to accept the value and go back to the **S BRC** screen.

D. To Enter the CT (Current Transducer) output voltage and input current ranges:

1. Navigate to the **S CT** (Set Current Transducer) Setup screen (see section A above).
2. Press to go to the **CT V** screen. Use or to select the voltage mode Current Transducer output voltage (default is 0.33).
3. Press to go to the **CT S2** screen and through the digits. Use or to select the CT size in amps (default is 400). accept the value and
4. Press to accept the value and go back to the **S CT** screen.

E. To Enter the service type to be monitored:

1. Navigate to the **S SYS** (Set System) Setup screen (see section A above).
2. Press to go to the **SYSTM** screen. Use or to select the configuration (see wiring diagrams - default is 3L-4N).
3. Press to go back to the **S SYS** screen.

China RoHS Compliance Information (EFUP Table)

部件名称	产品中有毒有害物质或元素的名称及含量Substances					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr (VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电子线路板	X	0	0	0	0	0
0 = 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。 X = 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T11363-2006标准规定的限量要求。						
Z000057-0A						



Eaton Corporation
Electrical Sector
1111 Superior Ave.
Cleveland, OH 44114
United States
877-ETN-CARE (877-386-2273)
Eaton.com

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