Eldridge Products, Inc.

EPI LIVE Modbus User Manual
80202202 r3

For use with EPICom LIVE Flow Meters

EPICom LIVE flowmeters are shipped with the RS232 communications protocol as the factory default. Prior to connecting a flowmeter to a RS485 Modbus RTU network, you must use our EPICom LIVE software to set up the flowmeter with the Modbus settings discussed in this manual.

www.epiflow.com

Eldridge Products, Inc.
475 Reservation Road
Marina, CA 93933

Tel: 800/321-3569
or 831/648-7777
Fax: 831/648-7780
Email:sales@epiflow.com

Table of Contents

Section A   Manual Revision History

This manual is provided for the EPICom LIVE Modbus Meters. Below are the details of the Revision History

80202202 r3 Revision – June 25, 2020

    a. BASE Revision vAEr00
- i. Added details for the new Big/Little Endian data format selection
- ii. Endian Data Format Configuration
  1. Big Endian Byte Order: 01 02 03 04
  2. Little Endian Byte Order: 03 04 01 02

    b. EPICom LIVE Revision vAEr00
- i. Added check box to MTR Dialog to configure Endian data configuration for Modbus
- ii. Added check box to Modbus dialog to view data received in either Big or Little Endian formats

80202202 r2 Revision – June 5, 2020

    a. BASE Revision vADr00
- iii. Added CMD 212 – Tracking Hold/Release
- iv. Added CMD 222 – Tracking Hold Duration

80202202 r1 Revision – April 30, 2020

    a. Initial Release of EPICom LIVE Modbus User Manual
    b. BASE Revision vACr00
- a. Added CMD 211 – Reset Totalizer
- b. Added CMD 213 – Set Range
- c. Added CMD 999 – Reset Meter
- d. All Write CMDs must have CMD 219 issued with the meter's password

Section B   Overview

The intention of this implementation is to communicate the Flow Rate, Flow Total, and Temperature (Temperature not available on all units) using the Modbus protocol on a RS485 physical layer.

This device is a slave device that supports the Modbus RTU protocol. It is assumed that the user has a copy of the Modbus specification or is Modbus literate. It is not the intention of this document to explain the specifics of the protocol. However, the document discusses the device's implementation of the specification. This device uses the RS485 physical layer to communicate the protocol.

If any aspect of the implementation does not meet the requirements for your application, please contact the factory regarding upgrading the firmware. Examples of potential upgrades would be other commands not supported, exception handling, device parameter configuration, etc.

RS485 Physical Layer

The slave device uses a RS485 port with no termination resistors applied on the device. The device's Modbus address, baud rate, parity is set by the user. See Section G for Instructions.

Modbus Address

Refer to Section F of this Manual for instructions on how to set the flowmeter's Modbus address.

EPI Modbus Information

- Supports Modbus RTU Communications only – All bytes come out High byte to Low byte order
- Modbus supported on the RS485 serial port. This port is half duplex and RTS is controlled by the firmware with no RTS signal
- Fastest Query rate should be >= 50mS
- Use RS232 Port to setup the Modbus Slave ID (CMD 210) – See Manual for using the RS232 port
    - You may change the RS485 baud rate (CMD 226) and the parity (CMD 233) via the RS232 serial port – See RS232 Manual
- Function codes supported. See sections below for specifics
    - 0x03 – Read Holding Registers
    - 0x10 – Write Holding Registers
    - 0x11 – Report Slave ID
- Firmware was verified using the following Modbus Master Simulator Utility:
    - http://www.baseblock.com/PRODUCTS/demosoftware.htm
- RS485 to USB Adapter used during validation
    - USB to RS485 Isolated Dongle
    - Recommended by EPI

Section C   Read Command Formatting

Report Slave ID

Request	Size	Value	Range
Slave ID	1 Byte	0xLL	LL = 1 to 127
Function Code	1 Byte	0x11	
CRC	2 Bytes	Calculated	

Response	Size	Value	Range
Slave ID	1 Byte	0xLL	LL = 1 to 127
Function Code	1 Byte	0x11	
Byte Count	1 Byte	0x26	
Serial Number	4 Byte	0xyyyyyyyy	Serial Number - Integer
Run Indicator Status	1 Byte	0xyy	0x00 – OFF, 0xFF = ON
Firmware Description	13 Bytes	ASCII	Name
Firmware Revision	8 Bytes	ASCII	Revision
Flow Engineering Units	4 Bytes	ASCII	Flow Units
Total Engineering Units	3 Bytes	ASCII	Total Units
Temperature Units	1 Byte	ASCII	C or F
Full Scale Value	4 Bytes	Float	Full Scale
CRC	2 Bytes	Calculated	

Error	Size	Value	Range
Slave ID	1 Byte	0xLL	LL = 1 to 127
Error Code	1 Byte	0x91	
Exception Code	1 Byte	0xLL	1-3 See Exception Code List
CRC	2 Bytes	Calculated	

Read Holding Register Commands

There are 2 EPI categories that are used to read information from the EPI Meters via Modbus

1. EPI Read Only Data Commands
    a. These registers contain real-time and static data particular to this meter
    b. These registers are single and multiple command reads
    c. The data formats vary depending on Command selected: ASCII, Integer, and Float
    d. See Table for "Number of Registers" returned per Data Command
        i. 1 Register = 2 Bytes, 2 Registers = 4Bytes, etc….
    e. For multiple register reads, Quantity of Registers = Sum of the "Number of Registers" per Data Command requested
    f. See Table below for commands
    g. See Section "Read Only EPI Data Commands"
        i. Command (Address) 0 starts the legacy mix of dynamic and static data
        ii. Command (Address) 50 starts the dynamic data
2. EPI Menu Commands
    a. These registers are similar to the standard EPI Command Menus
    b. These registers are single command reads
    c. See Table below for commands
    d. See Section "Read Single 32 Bit Data EPI Menu Commands"

The EPI Commands value is used in place of the register address in the definition of the command structure

Endian Data Format Configuration: Big Endian Byte Order: 01 02 03 04   Little Endian Byte Order: 03 04 01 02

Read Only EPI Data Commands

EPI only supports **"single and multiple"** EPI data commands per read operation. EPI data commands are a mix of ASCII, Integer, and float data values. See Table below for format per command. If multiple registers are requested these formats may be intermixed. To support these reads, EPI expects Read Holding Registers (Function Code 3) where the Quantity of the Registers is always equal to 2 * the number of registers (commands) of data you require. Any other quantity will respond with an error exception code = 3.

Request	Size	Value	Range
Slave ID	1 Byte	0xLL	LL = 1 to 127
Function Code	1 Byte	0x03	
Start Address	2 Bytes	EPI Data Command	See CMD List
Number of Registers	2 Bytes	Sum of "Number of Registers"	See CMD List
CRC	2 Bytes	Calculated	

Response	Size	Value	Range
Slave ID	1 Byte	0xLL	LL = 1 to 127
Function Code	1 Byte	0x03	
Byte Count	1 Byte	0xYY	YY = "Number of Registers" * 2
Data Value	TBD Bytes	TBD Formats	See CMD List for format and bytes
CRC	2 Bytes	Calculated	

Error	Size	Value	Range
Slave ID	1 Byte	0xLL	LL = 1 to 127
Error Code	1 Byte	0x83	
Exception Code	1 Byte	0xLL	1-3 See Exception Code List
CRC	2 Bytes	Calculated	

Read Single 32Bit Data EPI Menu Commands

EPI only supports **"single"** EPI menu command (register) per read operation. For EPI menu commands that are not ASCII data values, EPI supports a response of 32Bit size in the format of integer or float depending the format of the data of the EPI Menu Command selected. To support these reads, EPI expects Read Holding Registers (Function Code 3) where the Quantity of the Registers is always equal to 2. Any other quantity will respond with an error exception code = 3.

Request	Size	Value	Range
Slave ID	1 Byte	0xLL	LL = 1 to 127
Function Code	1 Byte	0x03	
Start Address	2 Bytes	EPI Menu Command	See CMD List
Qty of Registers	2 Bytes	0x0002	
CRC	2 Bytes	Calculated	

Response	Size	Value	Range
Slave ID	1 Byte	0xLL	LL = 1 to 127
Function Code	1 Byte	0x03	
Byte Count	1 Byte	0x04	
Data Value	4 Bytes	0xyyyyyyyy	See EPI Manual for data description
CRC	2 Bytes	Calculated	

Error	Size	Value	Range
Slave ID	1 Byte	0xLL	LL = 1 to 127
Error Code	1 Byte	0x83	
Exception Code	1 Byte	0xLL	1-3 See Exception Code List
CRC	2 Bytes	Calculated	

Section D   Write Command Formatting

Write Holding Register Commands

EPI only supports **"single"** EPI menu commands per write operation. For EPI menu commands that are not ASCII data values, EPI supports 32Bit data size in the format of integer or float depending on the data of the EPI Command selected. To support these writes, EPI expects Write Holding Registers (Function Code 16) where the Quantity of the Registers is always equal to 2. Any other quantity will respond with an error code.

Prior to issuing any Write Commands, Issue Command 219 with the data equal to the Slave Device's Password; Factory default = 9001. This unlocks the device for data writes otherwise the device will respond with Error Exception Code = 3 for any write operations. If you set your own password, save it in a secure place to prevent loss and lockout from user variables.

To "Save" parameter changes to EEPROM, issue CMD 500. The 100 CMDs will reset automatically.

Endian Data Format Configuration: Big Endian Byte Order: 01 02 03 04   Little Endian Byte Order: 03 04 01 02

Write Single 32Bit Data Commands

Request	Size	Value	Range
Slave ID	1 Byte	0xLL	LL = 1 to 127
Function Code	1 Byte	0x10	
Start Address	2 Bytes	EPI Menu Command	See CMD List
Qty of Registers	2 Bytes	0x0002	
Bytes Count	1 Byte	0x04	
Register Value	4 Bytes	0xyyyyyyyy	See EPI Manual for data description
CRC	2 Bytes	Calculated	

Response	Size	Value	Range
Slave ID	1 Byte	0xLL	LL = 1 to 127
Function Code	1 Byte	0x10	
Start Address	2 Bytes	EPI Menu Command	See CMD List
Qty of Registers	2 Bytes	0x0002	
CRC	2 Bytes	Calculated	

Error	Size	Value	Range
Slave ID	1 Byte	0xLL	LL = 1 to 127
Error Code	1 Byte	0x90	
Exception Code	1 Byte	0xLL	1-3 See Exception Code List
CRC	2 Bytes	Calculated	

Section E   Exception Codes

EXCEPTION CODES

1. Unsupported Function Code
2. Unsupported EPI Menu Command
3. Invalid Register Quantity or Data Value or for writes, Not Unlocked

Section F   EPI MODBUS COMMAND LIST

Column Identifier

A – Command

B – R/W Access

vXX r xx – EPICom Live Meter Firmware Revision when change occurred and shows Read, Write, R/W capability for each command.

C – Format / Number of Registers

D - Menu Description

E - Command Details

Mix of Static and Dynamic EPI Read Only Data Commands

A	vAA r00	vAC r01	vAD r00	C	D	E
000	R	R	R	Float 2 Registers	Flow Rate	Returns the real time flow rate value
002	R	R	R	Float 2 Registers	Total	Returns the real time totalizer value
004	R	R	R	Float 2 Registers	Temperature	Returns the real time Gas Temperature; Not supported on all devices and will report 0
006	R	R	R	Integer 2 Registers	Serial Number	Returns the serial number
008	R	R	R	ASCII 2 Registers	Flow Units	Returns flow rate engineering units in 4 ASCII Characters
010	R	R	R	ASCII 2 Registers	Total Units	Returns Totalizer engineering units in 4 ASCII Characters
012	R	R	R	Float 2 Registers	Max Range	Returns Max Range
014	R	R	R	Float 2 Registers	Full Scale	Returns Full Scale
016	R	R	R	ASCII 1 Register	Temperature Units	Degrees F or C in 1 ASCII Character

018	R	R	R	Integer 1 Register	Alarm Relay 1 Status	Returns Alarm Relay status. 0=Deactivated and 1 = Activated;
020	R	R	R	Integer 1 Register	Alarm Relay 2 Status	Returns Alarm Relay status. 0=Deactivated and 1 = Activated;
022	R	R	R	ASCII 4 Registers	Event 1	Returns the Event 1 Selection in 16 ASCII Characters
024	R	R	R	ASCII 4 Registers	Event 2	Returns the Event 2 Selection in 16 ASCII Characters
026	R	R	R	ASCII 4 Registers	Event 3	Returns the Event 3 Selection in 16 ASCII Characters
028	R	R	R	ASCII 4 Registers	Event 4	Returns the Event 4 Selection in 16 ASCII Characters
030	R	R	R	Float 2 Registers	% of Full Scale	Returns the flow rate as a percentage of full-scale

Dynamic Read Only Data Commands

A	vAA r00	vAC r01	vAD r00	C	D	E
050	R	R	R	Float 2 Registers	Flow Rate	Returns the real time flow rate value
051	R	R	R	Float 2 Registers	Total	Returns the real time totalizer value
052	R	R	R	Float 2 Registers	Temperature	Returns the real time Gas Temperature
053	R	R	R	Integer 1 Register	Alarm Relay 1 Status	Returns Alarm Relay status. 0=Deactivated and 1 = Activated;
054	R	R	R	Integer 1 Register	Alarm Relay 2 Status	Returns Alarm Relay status. 0=Deactivated and 1 = Activated;
055	R	R	R	Float 2 Registers	% of Full Scale	Returns the flow rate as a percentage of full-scale

Start of EPI Specific Menu 100 Commands

A	vAA r00	vAC r01	vAD r00	C	D	E
100	R	R	R	Integer	Engineering Units	Returns the Engineering units currently active
101	W	W	W	Integer	SCFS	Sets Engineering units to: Standard Cubic Feet / Second
102	W	W	W	Integer	SCFM	Sets Engineering units to: Standard Cubic Feet / Minute
103	W	W	W	Integer	SCFH	Sets Engineering units to: Standard Cubic Feet / Hour
104	W	W	W	Integer	SCFD	Sets Engineering units to: Standard Cubic Feet / Day
105	W	W	W	Integer	LB/S	Sets Engineering units to: Pounds / Second
106	W	W	W	Integer	LB/M	Sets Engineering units to: Pounds / Minute
107	W	W	W	Integer	LB/H	Sets Engineering units to: Pounds / Hour
108	W	W	W	Integer	LB/D	Sets Engineering units to: Pounds / Day
109	W	W	W	Integer	STPM	Sets Engineering units to: Standard Tons / Minute
110	W	W	W	Integer	SCIM	Sets Engineering units to: Standard Cubic Inches / Minute
111	W	W	W	Integer	SCIH	Sets Engineering units to: Standard Cubic Inches / Hour
112	W	W	W	Integer	SFPS	Sets Engineering units to: Standard Feet / Second
113	W	W	W	Integer	SFPM	Sets Engineering units to: Standard Feet / Minute
114	W	W	W	Integer	BTUM	Sets Engineering units to: British Thermal Units / Minute
115	W	W	W	Integer	BTUH	Sets Engineering units to: British Thermal Units / Hour
116	W	W	W	Integer	MCFD	Sets Engineering units to: Thousands of Cubic Feet / Day

117	W	W	W	Integer	MMCFD	Sets Engineering units to: Millions of Cubic Feet / Day
118	W	W	W	Integer	NCMS	Sets Engineering units to: Normal Cubic Meters / Second
119	W	W	W	Integer	NCMM	Sets Engineering units to: Normal Cubic Meters / Minute
120	W	W	W	Integer	NCMH	Sets Engineering units to: Normal Cubic Meters / Hour
121	W	W	W	Integer	NCMD	Sets Engineering units to: Normal Cubic Meters / Day
122	W	W	W	Integer	SLPS	Sets Engineering units to: Standard Liters / Second
123	W	W	W	Integer	SLPM	Sets Engineering units to: Standard Liters / Minute
124	W	W	W	Integer	SLPH	Sets Engineering units to: Standard Liters / Hour
125	W	W	W	Integer	SCCM	Sets Engineering units to: Standard Cubic Centimeters / Minute
126	W	W	W	Integer	KG/S	Sets Engineering units to: Kilograms / Second
127	W	W	W	Integer	KG/M	Sets Engineering units to: Kilograms / Minute
128	W	W	W	Integer	KG/H	Sets Engineering units to: Kilograms / Hour
129	W	W	W	Integer	KG/D	Sets Engineering units to: Kilograms / Day
130	W	W	W	Integer	MTPM	Sets Engineering units to: Metric Tons / Minute
131	W	W	W	Integer	NMPS	Sets Engineering units to: Normal Meters / Second
132	W	W	W	Integer	NMPM	Sets Engineering units to: Normal Meters / Minute
133	W	W	W	Integer	NMPH	Sets Engineering units to: Normal Meters / Hour
134	W	W	W	Integer	Nm/s	Sets Engineering units to: Normal Liters / Second
135	W	W	W	Integer	Nm/m	Sets Engineering units to: Normal Meters / Minute
136	W	W	W	Integer	Nm/h	Sets Engineering units to: Normal Meters / Hour

137	W	W	W	Integer	SCMH	Sets Engineering units to: Standard Cubic Meters / Hour
138		W	W	Integer	NLPM	Sets Engineering units to: Normal Liters / Minute
139		W	W	Integer	NLPH	Sets Engineering units to: Normal Liters / Hour

Start of EPI Specific Menu 200 Commands

A	vAA r00	vAC r01	vAD r00	C	D	E
211		W	W	Integer	Clear L, H, T	This menu item allows you to Clear the Total, Flow High, Flow Low, and All three above 1 – Clear Low Flow Reading 2 – Clear High Flow Reading 3 - Clear Totalizer (CMD 237 = 0 Only) 4 - Clear all the above
212			R/W	Integer	Track Hold	Enable / Disable Flow Tracking. Freezes Flow Rate, Gas Temperature, and 0-5 and 4-20mA at time of enable. Totalizer will continue incrementing at the frozen flow rate. This works in conjunction with CMD 222. Tracking will automatically revert back to Hold disable by 212 or 222 which ever is sooner.
213		R/W	R/W	Integer	Set Range	A specific meter range is selected by entering 1–5 in this menu item. If a flow meter has only one calibrated meter range, the factory will program it as meter range #1 and meter ranges #2–5 will not be valid. The flow meter can also be set up to allow external switching between stored ranges by entering "0" at the prompt. However, this disables the keypad functions.: Careful, putting the meter in this state will allow anyone to push the MIN / MAX buttons which will temporarily change the meter range if they are pushed during run mode. See EPICom LIVE Firmware Manual for more details
217		R/W	R/W	Integer	PW Enable	Enable / Disable Pointwise Correction (PW) 0 = Disable, 1 = Enable See 750 menus for Pointwise Correction details.
219	W	W	W	Integer	Unlock	This menu item is used to enter the pre-set integer password that unlocks the flowmeter's settings. You can access any number of menu items while the settings are unlocked. The settings are locked again when the flowmeter is returned to Run Mode. Factory default is 9001

222			R/W	Integer	Hold Duration	Used with menu 212 for Tracking Hold. This menu is the hold duration in minutes. See menu 212 for further explanation.
237	R	R	R	Integer	Clear Total PSWD Mode	This menu item provides the current Totalizer Password Mode setting

Start of EPI Specific Menu 400 Commands

A	vAA r00	vAC r01	vAD r00	C	D	E
401	R	R/W	R/W	Integer	Set Event	This menu item selects the specific relay Event (Ev1–Ev4) to which a response condition is assigned.
402	W	W	W	Integer	Disabled	This menu item causes the current active Event to ignore all response conditions.
403	R/W	R/W	R/W	float	Flow Trip High	This menu item sets the current active Event to respond to a flow rate that is higher than the preset value.
404	R/W	R/W	R/W	float	Flow Trip Low	This menu item sets the current active Event to respond to a flow rate that is lower than the preset value.
405	R/W	R/W	R/W	Integer	MAX Button	This menu item sets the current active Event to respond when the MAX key on the LCD panel is pressed or when Mode 1 is grounded.
406	R/W	R/W	R/W	Integer	MIN Button	This menu item sets the current active Event to respond when the MIN key on the LCD panel is pressed or when Mode 2 is grounded.
407	R/W	R/W	R/W	Integer	Timer	This menu item sets current active Event to respond to a time duration, such as a pulsed output. Enter the desired preset duration value in units of 50ms.
408	R/W	R/W	R/W	float	Total	This menu item sets the current active Event to respond to an elapsed total. Enter the desired preset value in the current engineering units (whole numbers only – no decimals).

409	R/W	R/W	R/W	Integer	Pulse Out	This menu item sets the current active Event to respond to an elapsed flow total. This function is used with remote data collection systems which count the pulses to generate an elapsed flow total.
						Enter a value to activate a relay for every X number of units on the totalized flow.
						Example: If Menu 100 has submenu 102 (SCFH) selected then if 1000 is entered for this submenu 409-PulseOut then this event will trip the relay for each 1000 SCFH of flow.
						Any whole number between 1 and 65535 may be entered at the prompt (>), but we recommend decimal values (1, 10, 100, . . .).
						A timer function must be associated with this menu item to release the relay from the active state (*see menu item 407-Timer*). The timer must be set fast enough to release the relay before the next preset total value is reached.
410	R/W	R/W	R/W	Integer	Trip Delay	This menu item sets the response delay for the current active Event. Enter the desired value in increments of 50ms (20 = 1 second). The acceptable values are 1– 255.
411	R/W	R/W	R/W	Integer	Temp Trip Low	This menu item sets the gas temperature value for the high temperature trip point.
412	R/W	R/W	R/W	Integer	Temp Trip Low	This menu item sets the gas temperature value for the low temperature trip point.

Start of EPI Specific Menu 500 Commands

A	vAA r00	vAC r01	vAD r00	C	D	E
500	W	W	W	Integer	Run Mode	If meter unlocked it stores changed data and relocks the flowmeter; Always Reboots the meter
501	W	W	W	Integer	Run Mode	If meter unlocked it stores changed data and relocks the flowmeter; Never Reboots the meter

Start of EPI Specific Menu 750 Commands

See CMD 217 to Enable/Disable this Correction

A	vAA r00	vAC r01	vAD r00	C	D	E
751	R/W	R/W	R/W	float	Point-Wise Correction 5%	Point-Wise Correction 5%. This value is a %correction between -100 and 100% for this range. Consult Manual and factory for further details
752	R/W	R/W	R/W	float	Point-Wise Correction 10%	Point-Wise Correction 5%. This value is a %correction between -100 and 100% for this range. Consult Manual and factory for further details
753	R/W	R/W	R/W	float	Point-Wise Correction 15%	Point-Wise Correction 5%. This value is a %correction between -100 and 100% for this range. Consult Manual and factory for further details
754	R/W	R/W	R/W	float	Point-Wise Correction 20%	Point-Wise Correction 5%. This value is a %correction between -100 and 100% for this range. Consult Manual and factory for further details
755	R/W	R/W	R/W	float	Point-Wise Correction 25%	Point-Wise Correction 5%. This value is a %correction between -100 and 100% for this range. Consult Manual and factory for further details
756	R/W	R/W	R/W	float	Point-Wise Correction 30%	Point-Wise Correction 5%. This value is a %correction between -100 and 100% for this range. Consult Manual and factory for further details
757	R/W	R/W	R/W	float	Point-Wise Correction 35%	Point-Wise Correction 5%. This value is a %correction between -100 and 100% for this range. Consult Manual and factory for further details
758	R/W	R/W	R/W	float	Point-Wise Correction 40%	Point-Wise Correction 5%. This value is a %correction between -100 and 100% for this range. Consult Manual and factory for further details
759	R/W	R/W	R/W	float	Point-Wise Correction 45%	Point-Wise Correction 5%. This value is a %correction between -100 and 100% for this range. Consult Manual and factory for further details
760	R/W	R/W	R/W	float	Point-Wise Correction 50%	Point-Wise Correction 5%. This value is a %correction between -100 and 100% for this range. Consult Manual and factory for further details

761	R/W	R/W	R/W	float	Point-Wise Correction 55%	Point-Wise Correction 5%. This value is a %correction between -100 and 100% for this range. Consult Manual and factory for further details
762	R/W	R/W	R/W	float	Point-Wise Correction 60%	Point-Wise Correction 5%. This value is a %correction between -100 and 100% for this range. Consult Manual and factory for further details
763	R/W	R/W	R/W	float	Point-Wise Correction 65%	Point-Wise Correction 5%. This value is a %correction between -100 and 100% for this range. Consult Manual and factory for further details
764	R/W	R/W	R/W	float	Point-Wise Correction 70%	Point-Wise Correction 5%. This value is a %correction between -100 and 100% for this range. Consult Manual and factory for further details
765	R/W	R/W	R/W	float	Point-Wise Correction 75%	Point-Wise Correction 5%. This value is a %correction between -100 and 100% for this range. Consult Manual and factory for further details
766	R/W	R/W	R/W	float	Point-Wise Correction 80%	Point-Wise Correction 5%. This value is a %correction between -100 and 100% for this range. Consult Manual and factory for further details
767	R/W	R/W	R/W	float	Point-Wise Correction 85%	Point-Wise Correction 5%. This value is a %correction between -100 and 100% for this range. Consult Manual and factory for further details
768	R/W	R/W	R/W	float	Point-Wise Correction 90%	Point-Wise Correction 5%. This value is a %correction between -100 and 100% for this range. Consult Manual and factory for further details
769	R/W	R/W	R/W	float	Point-Wise Correction 95%	Point-Wise Correction 5%. This value is a %correction between -100 and 100% for this range. Consult Manual and factory for further details
770	R/W	R/W	R/W	float	Point-Wise Correction 100%	Point-Wise Correction 5%. This value is a %correction between -100 and 100% for this range. Consult Manual and factory for further details

Start of EPI Specific Menu 800 Commands

A	vAA r00	vAC r01	vAD r00	C	D	E
811	R/W	R/W	R/W	float	C Factor	This value is a multiplier used to adjust the P-Curve linearization. It is normally set to 1.0, but may be adjusted based the Installation Guidelines, or to correct for aberrations in sensor readings. The C Factor can also be used to change standard conditions (STP) or to apply a density factor (vapor density) when changing the engineering units from volumetric units (SCFM, NCMH, etc.) to gravimetric units (Lbs/Hr, Kg/Hr, etc.) in flowmeters calibrated for gases other than air.
813	R/W	R/W	R/W	float	Pipe Area	This value is the cross-sectional area of the flow section or process line. The units of measure are determined by the engineering units selected (see menu items 101–136). For example, if the current engineering units are SCFM, then the menu item 813 value must represent square feet (F^2). A value of one (1) may be used if the current engineering units represent velocity (SFPM, NMPS, etc.) or if the flow meter is an "inline" style with its own flow section. Changing this menu will recalculate menu 814.
814		R/W	R/W	float	Pipe ID	***Use this menu to change the pipe ID of the selected pipe entry from menu 815.*** Changing this menu will recalculate menu 813

816	R/W	R/W	R/W	float	Flow Cutoff	This menu item is used to set a percentage of the Full Scale value (menu item 840-FScale) as the minimum readable flow rate. Actual flow rates below this minimum value will be treated as No Flow. The display will show "Low" instead of the real-time flow rate, no additional elapsed flow will be recorded, the 0-5VDC signal will drop to 0VDC, and the 4-20mA signal will drop to 4mA. For example, if the full scale is 1000 SCFM, a value of 10 (10%) will cause the flowmeter to ignore flow rates below 100 SCFM or less. When the actual flow rate increases above this value, all of the flowmeter's functions will resume.
840	R/W	R/W	R/W	float	Full Scale	This menu item is used to adjust the scaling of the 0 – 5VDC and 4 – 20mA output signals. To change this value, enter the desired value at the prompt, and then press Enter. (The meter settings must be unlocked to make this change.) The meter will accept the new value and return to the data entry prompt. To verify the change, return to this menu. EPI does not recommend going above the factory established FS by more than +20% and does not specify the accuracy above +10% of FS. It is also ok to adjust this value below FS as needed for external equipment requirements.

Section G   Flowmeter Configuration Sub-Menus

The submenus for Modbus are shown below. It is assumed that the user has a basic familiarity with the EPICom LIVE™ firmware, its menu system and the process for data entry. The menuing system is accessed by using the 4-button keypad or by EPICom LIVE™ Software.

200 *Utility* Submenus

210-Modbus Address	This menu item is used to set the Modbus address for the flowmeter. The value can be 1 to 127.

226-SetRS485Baud	This menu item adjusts the baud rate of the RS485 port. 1 = 9600 2 = 14400 3 = 19200 4 = 28800 5 = 33400 6 = 38400 7 = 56000 8 = 57600 9 = 76800 10 = 115200

233-SetRS485Parity	This menu item adjusts the parity of the RS485 port. 0 = 1 8 NONE 1 1 = 1 8 EVEN 1 2 = 1 8 ODD 1 3 = 1 8 NONE 2

Section H   EPICom LIVE Configuration Method

EPICom LIVE™ software is compatible with Master-Touch™ firmware versions. It includes the Modbus menu selections and a separate Modbus Dialog for communication with as many as eight (8) flowmeters. It is assumed that the user has a basic familiarity with the EPICom software, its menu system and the process for data entry.

To prepare for this process, check the RS232 and Modbus Comm Port numbers to which the flowmeter is connected by viewing Hardware Device Manager on your PC and make note of these ports. You must also know the Parity values required by your system or network. Please refer to Section B of this Manual for the menu descriptions.

Terminal Method - Step by Step Instructions

Use the following directions to set up Master-Touch™ for Modbus communications.

- Launch EPICom LIVE
- Confirm the RS232 Comm Port connection settings for the flowmeter in the View/Settings menu
- Click on the MTR menu icon in the EPICom LIVE tool bar to connect to the flowmeter
- Click the Terminal Button within the MTR Dialog
- After the start up screen appears, hold down the period (.) key until 100 Menus screen appears
- Type in "9001" at the prompt and press the Enter key to unlock the microprocessor settings
- Type in "210" at the prompt and press the Enter key to go to **Menu 210**
- Type in a value from 1 to 127 at prompt and press the Enter key

NOTE: This sets the Modbus Address to 1–127. This address must be unique for each flowmeter on the same network.

- Type in "226" at the prompt and press the Enter key to go to **Menu 226**
- Type in a number between 1 and 8, corresponding to the desired Baud rate, and press the Enter key
- Type in "233" at the prompt and press the Enter key to go to **Menu 233**
- Type in a number between 1 and 4, corresponding to the desired Parity setting, and press the Enter key
- Type in "500" and press the Enter key to return the flowmeter to Run Mode

The flowmeter is now ready to communicate via RS485 Modbus RTU. Please refer to the instructions for your Modbus system or network for further directions.

Section I   EPICom LIVE Modbus Dialog

Use the following directions to set up the Modbus Module to communicate with the flowmeter:

- Select View on EPICom tool bar
- Select the Settings menu
- Select the Modbus Comm Port Tab (picture next page)
- Select the same Comm Port as the USB Serial Port noted in Device Manager
- Select the Baud rate that matches the set up in the flowmeter
- Select the Parity setting that matches the set up in the flowmeter
- Select OK to exit Settings window
- Select the Modbus icon to launch the EPI Modbus module (pictures next page)

The selected Comm port # and baud rate are shown in the Modbus Module. Confirm that the Modbus Address in the top left field is the same address that you set in Menu 210 of Firmware

NOTE: If this is not correct then redo the settings instructions

- Select the Static Data (CMD 17) button

The flowmeter should be displaying Serial Number and Full Scale

NOTE: If this "times out", there is a problem with your RS485 connection or your flowmeter

- Enter "2" in the Update Every Seconds field, select the radio button then click the Dynamic Data (CMD 3) button. The CMD 3 will change to STOP in the button

In the Top Left Box you will see the Flow Rate and Total the same as the flow rate and total on the meter display

There is a Big Endian check box that allow the data received from the meter to be represented in either Big Endian (Checked) or Little Endian (Unchecked)

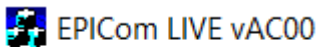To end the real-time communication, select the STOP button

You can repeat this procedure to connect to as a many as eight EPI flowmeters.

Always use the top left Modbus window as the first flowmeter. If this window is left blank, the Modbus Module will not communicate with any of the other connected flowmeters.
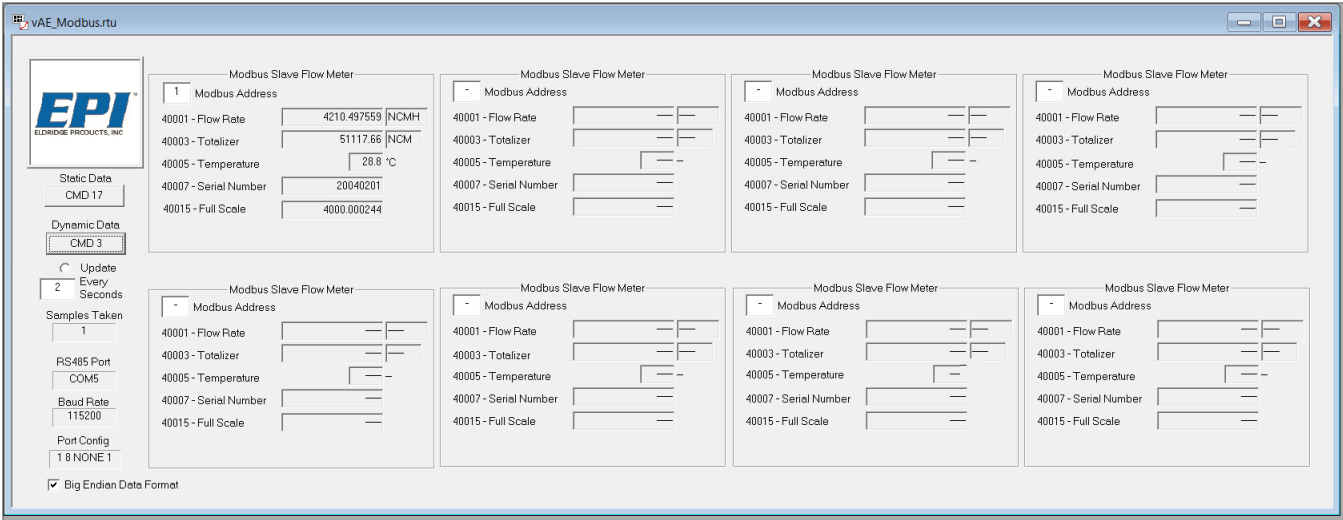
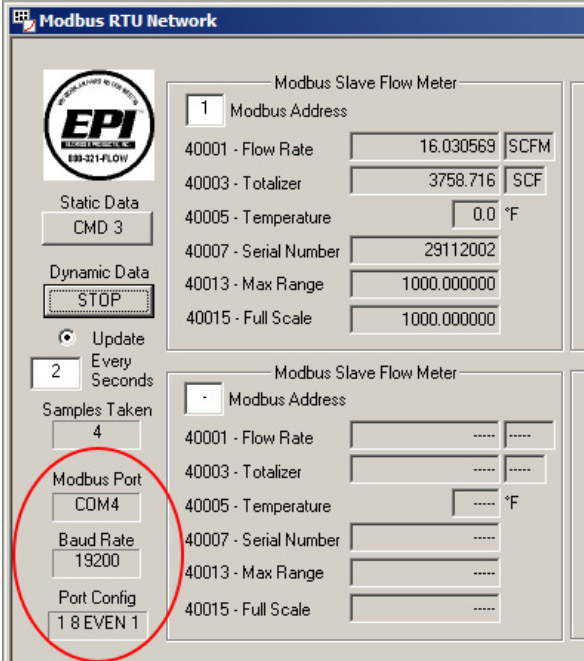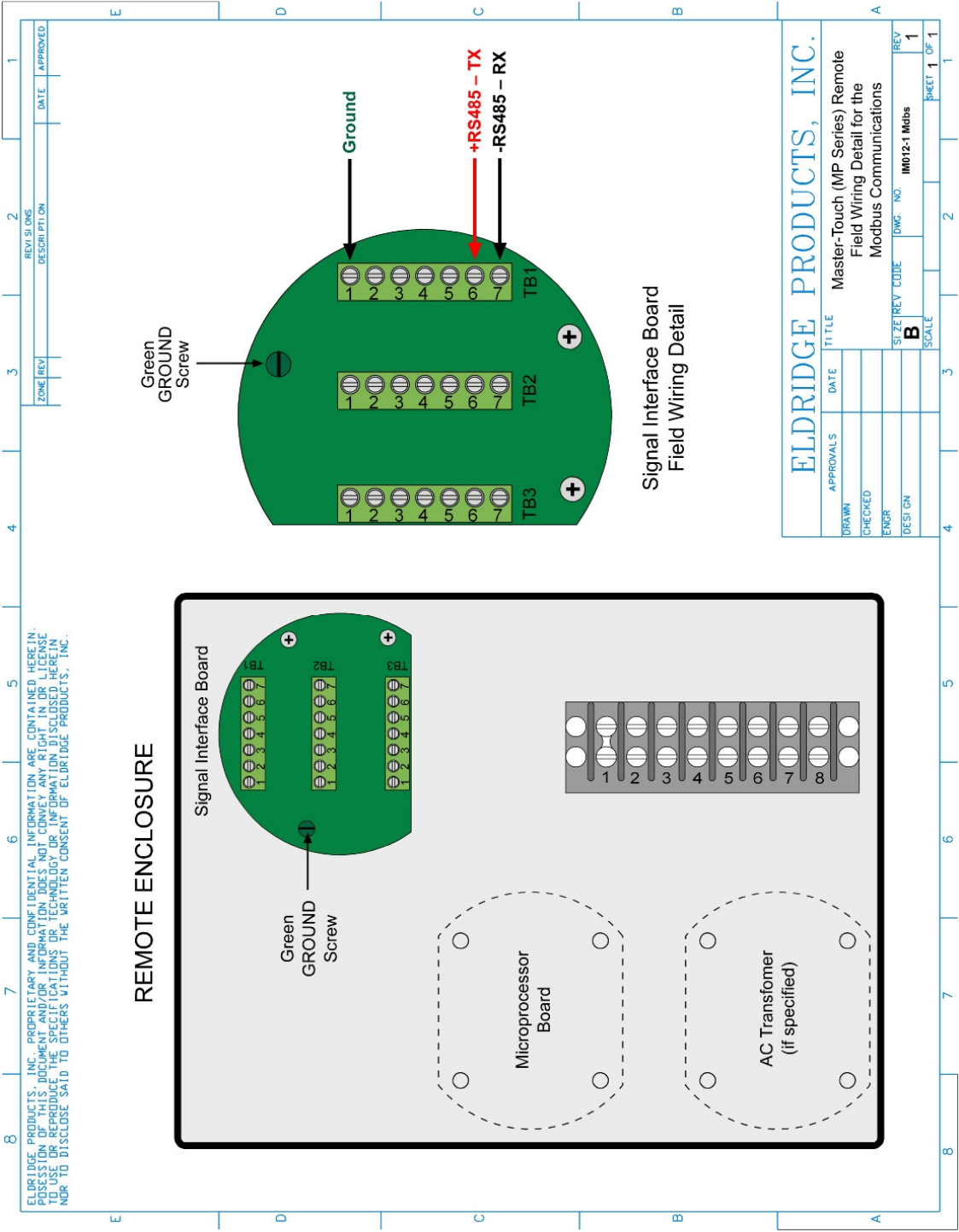## Settings Window / Modbus Comm Port
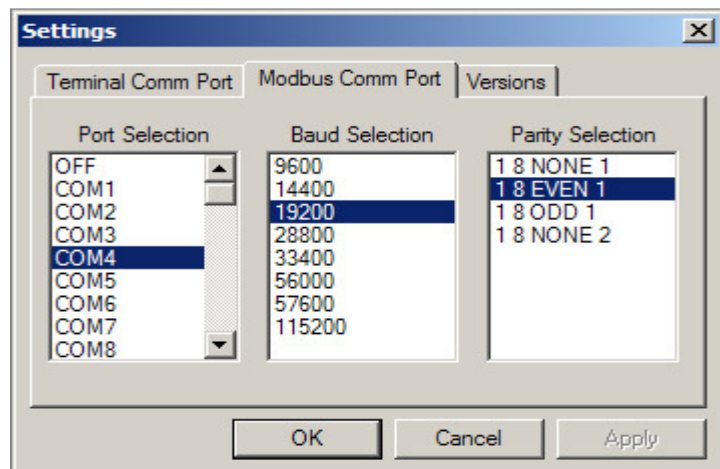
Modbus Icon

Modbus Module

Modbus Settings

Section J   Modbus Wiring

The following drawings show the wiring details for Modbus connections.

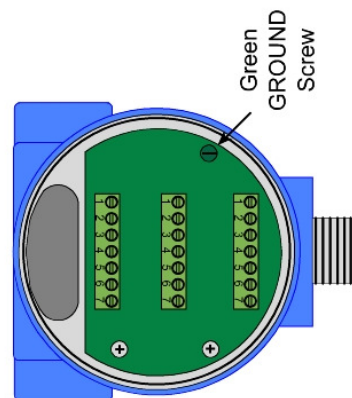ELDRIDGE PRODUCTS, INC.

REVISIONS
ZONE | REV | DESCRIPTION | DATE | APPROVED

ELDRIDGE PRODUCTS, INC. PROPRIETARY AND CONFIDENTIAL INFORMATION ARE CONTAINED HEREIN. POSSESSION OF THIS DOCUMENT AND/OR INFORMATION DOES NOT CONVEY ANY RIGHT IN OR LICENSE TO USE OR REPRODUCE THE SPECIFICATIONS OR TECHNOLOGY OR INFORMATION DISCLOSED HEREIN NOR TO DISCLOSE SAID TO OTHERS WITHOUT THE WRITTEN CONSENT OF ELDRIDGE PRODUCTS, INC.
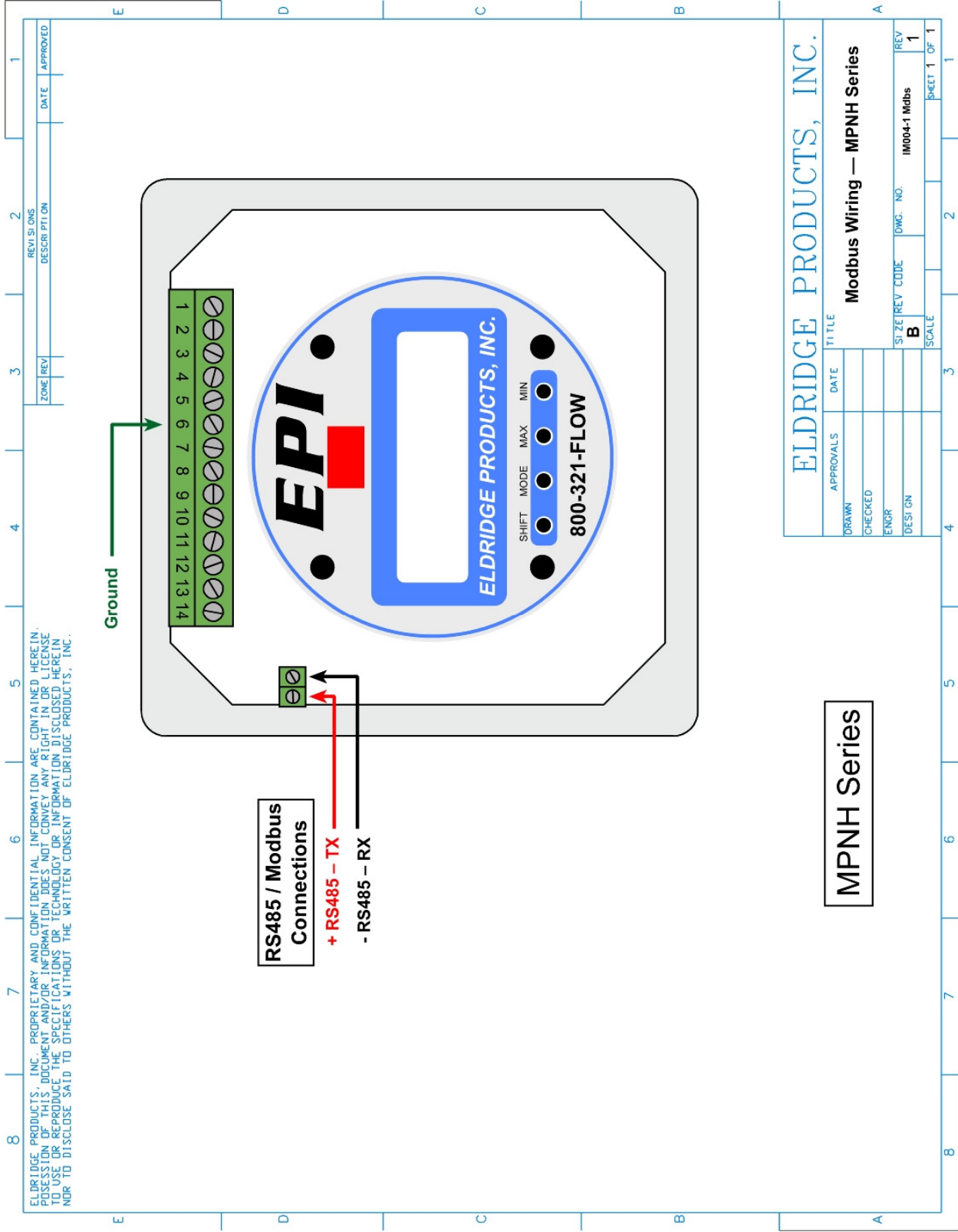
Ground

+RS485 – TX
-RS485 – RX

TB1
1 2 3 4 5 6 7

Green GROUND Screw

TB2
1 2 3 4 5 6 7

TB3
1 2 3 4 5 6 7
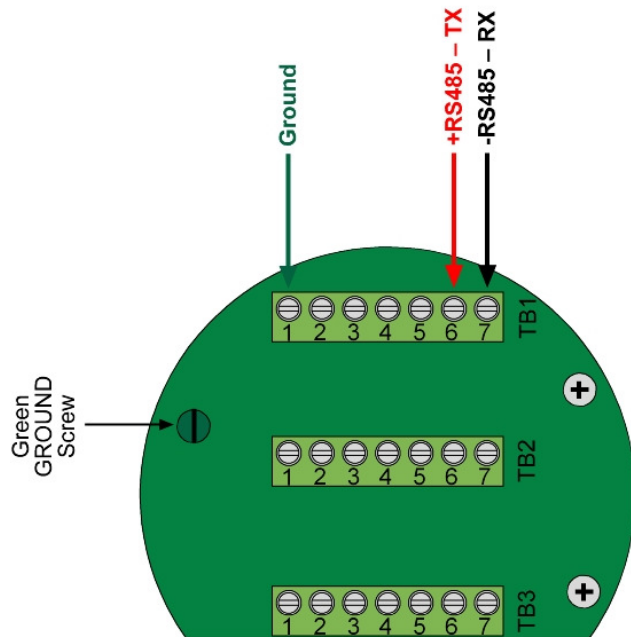
Signal Interface Board
Field Wiring Detail

Green GROUND Screw
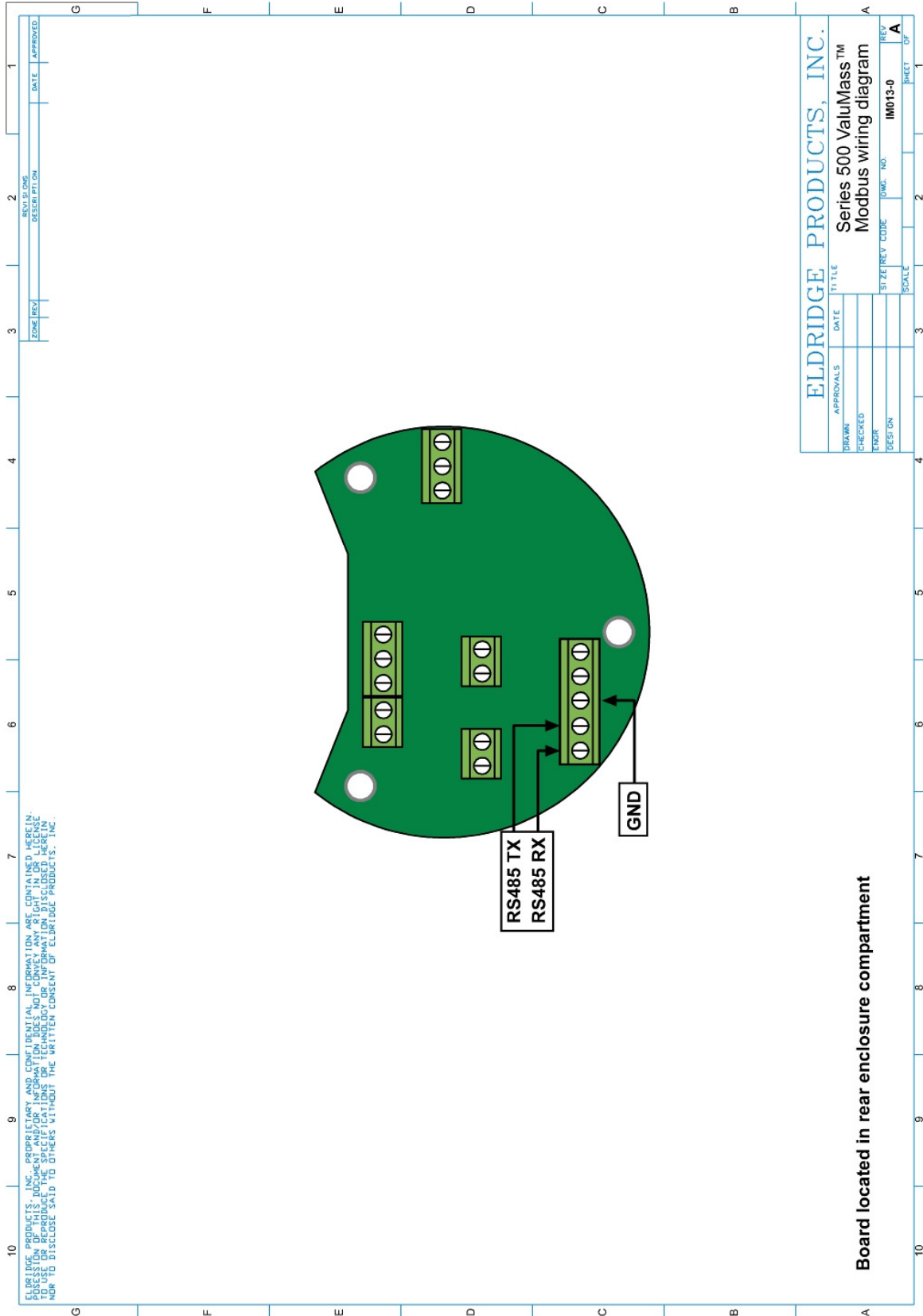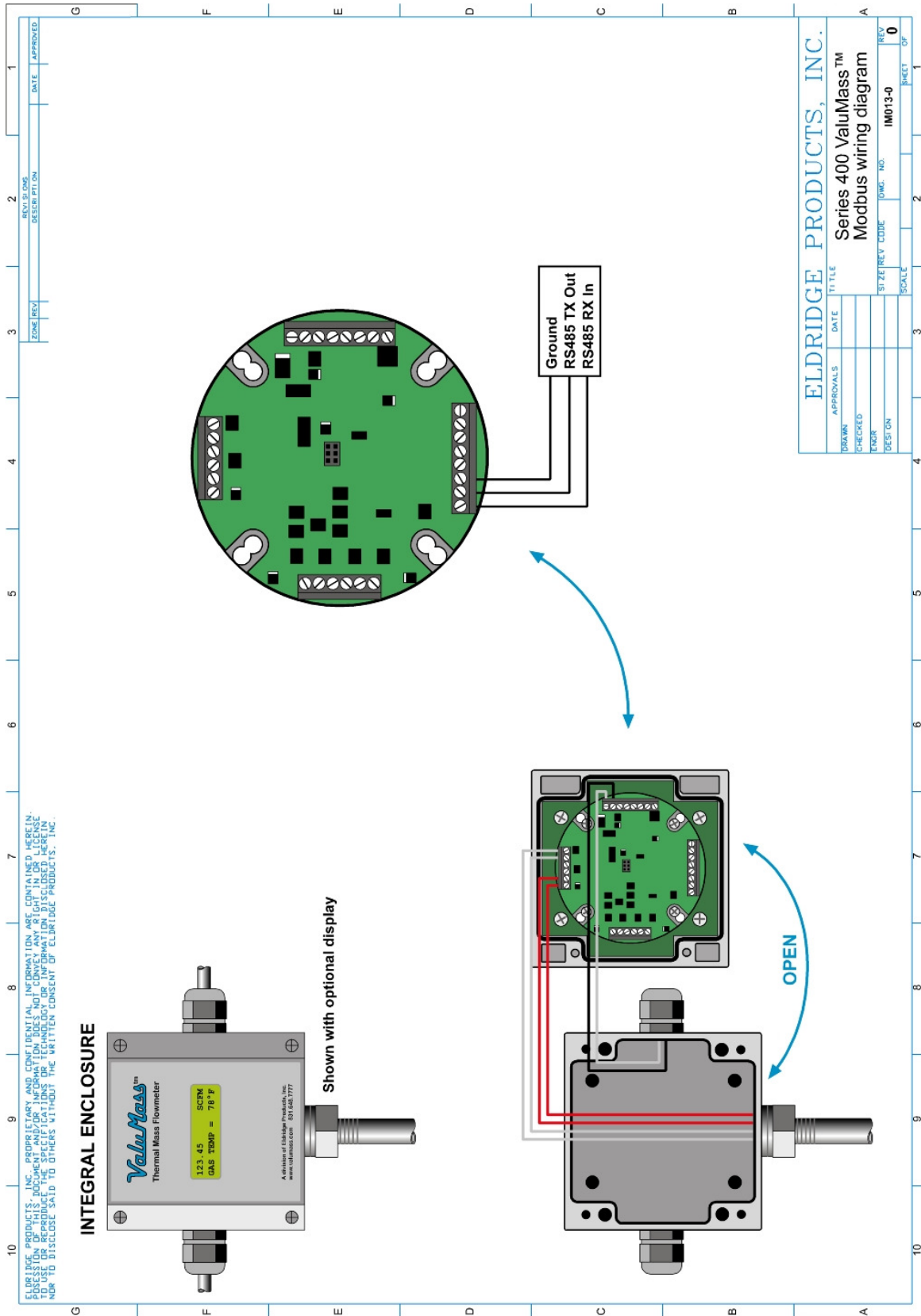
Back of
Explosion-Proof
Enclosure

ELDRIDGE PRODUCTS, INC.

TITLE
Master-Touch (MP Series) Integral
Field Wiring Detail for the
Modbus Communications

APPROVALS | DATE
DRAWN
CHECKED
ENGR
DESIGN

SIZE | REV CODE | DWG. NO. IM011-1 Mdbs
SCALE

REV A
SHEET 1 OF 1

ELDRIDGE PRODUCTS, INC.

Modbus Wiring — MPNH Series

TITLE

SIZE: B REV CODE DWG. NO. IM004-1 Mdbs REV 1

SHEET 1 OF 1

SCALE

APPROVALS DATE

DRAWN
CHECKED
ENGR
DESIGN

REVISIONS
ZONE | REV | DESCRIPTION | DATE | APPROVED

Ground

RS485 / Modbus Connections

+ RS485 – TX
- RS485 – RX

EPI
ELDRIDGE PRODUCTS, INC.
800-321-FLOW

SHIFT MODE MAX MIN

MPNH Series

ELDRIDGE PRODUCTS, INC. PROPRIETARY AND CONFIDENTIAL INFORMATION ARE CONTAINED HEREIN. POSSESSION OF THIS DOCUMENT AND/OR INFORMATION DOES NOT CONVEY ANY RIGHT IN OR LICENSE TO USE OR REPRODUCE THE SPECIFICATIONS OR TECHNOLOGY OR INFORMATION DISCLOSED HEREIN NOR TO DISCLOSE SAID TO OTHERS WITHOUT THE WRITTEN CONSENT OF ELDRIDGE PRODUCTS, INC.

Board located in rear enclosure compartment

RS485 TX
RS485 RX
GND

ELDRIDGE PRODUCTS, INC.

Series 500 ValuMass™
Modbus wiring diagram

IM013-0

Series 400 ValuMass™ Modbus wiring diagram

ELDRIDGE PRODUCTS, INC.

Ground
RS485 TX Out
RS485 RX In

INTEGRAL ENCLOSURE

Shown with optional display

OPEN

ValuMass™
Thermal Mass Flowmeter

SCFM
123.45
GAS TEMP = 78° F

A division of Eldridge Products, Inc.
www.valumass.com
831.648.7777