

Monitoring & Notification

Facilities Monitoring System (FMS)

User Guide



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Product Registration

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The following information is located on the bottom of each FMS unit. Please have this information available whenever a technical support call is placed:

Product Model Number	_____
Product Serial Number	_____
Product Manufacture Date	_____

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SYSTEM OVERVIEW

1.1. Product Description

The Falcon Facilities Monitoring System (FMS) is a comprehensive system which provides additional equipment protection by monitoring critical operating parameters in enterprises, remote network facilities, communication rooms, remote and unmanned facilities, and critical support systems. The FMS is a stand alone system. It operates via embedded “firmware” that handles all data collection, alarm reporting, and multiple concurrent communication mediums.

The FMS typically monitors analog and dry contact outputs from devices such as temperature sensors, humidity sensors, gas detectors, smoke detectors, fire suppression systems, surveillance products (e.g., IP cameras), leak detection systems, power monitoring systems, uninterruptible power supplies (UPSs), power distribution units (PDUs), generators, DC power plants, commercial power, HVAC units, ATS, TVSSs, and access keypads.

The FMS performs internal diagnostics that check the Flash Program code, serial ports, RAM, non-volatile RAM, real-time clock, internal power supplies, relay drivers, analog to digital converter (ADC), and modem (optional). During operation, the FMS monitors its status and uses several LED indicators to report its condition.

The FMS embedded firmware enables system configuration, I/O setup, status inquiries, alarm reports, data logs, and troubleshooting. The FMS is menu driven and operates with any Web browser, ASCII terminal, or terminal emulation application (e.g., HyperTerminal).

1.2. Front Panel Indicators and Controls



Figure 1.1 FMS 2U Front Panel Indicators and Controls

Expansion Card Relay Status LEDs

- ◆ Green (On) if the relay is active-for Expansion Card A only.

Network LEDs – Two Network Status LEDs

- ◆ Link – Green if network link is established. Red if there is no connection.
- ◆ Active – Green (On) if transmitting or receiving data.

Communications LEDs – Four Modem Status LEDs

- ◆ TX - Green (On) if information is being transmitted.
- ◆ RX - Green (On) if information is being received.
- ◆ OH - Green (On) if the Modem detects a dial tone (off hook).
- ◆ CD - Yellow (On) if a carrier is detected.

System Status LED

- ◆ Flashes Red ten times per second during the initial boot up of the FMS, which is approximately 45 seconds. If the initial boot up fails, the LED continues to flash. This indicates a condition that requires service; users must contact RLE for more information. After the boot up, this LED turns off if no alarms are present, or turns solid if the unit is in an alarm condition.

Power LED – Green (On) if power is on.

System Power Switch – Used to turn power to the unit on and off.

1.3. Terminal Block Designations



Figure 1.2 FMS Terminal Block Designations

Table 1.1 Terminal Block Designations

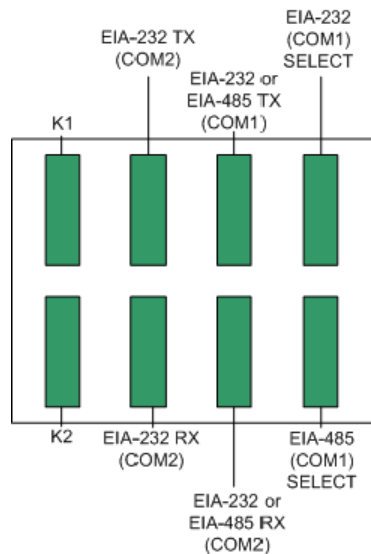
TB1-1	(+) Input for 24 or 48VDC (optional) power
TB1-2	(-) Input for 24 or 48VDC (optional) power
P1	24VDC wall adapter input (center +) (not available with 48VDC version)
TB2-1	24VDC positive (+) external output (power for sensors)
TB2-2	24VDC positive (+) external output (power for sensors)
TB2-3	Channel 1 positive (+)
TB2-4	Channel 1 negative (-)
TB2-5	Channel 2 positive (+)
TB2-6	Channel 2 negative (-)
TB2-7	Channel 3 positive (+)
TB2-8	Channel 3 negative (-)
TB2-9	Channel 4 positive (+)
TB2-10	Channel 4 negative (-)
TB3-1	Channel 5 positive (+)
TB3-2	Channel 5 negative (-)
TB3-3	Channel 6 positive (+)
TB3-4	Channel 6 negative (-)
TB3-5	Channel 7 positive (+)
TB3-6	Channel 7 negative (-)
TB3-7	Channel 8 positive (+)
TB3-8	Channel 8 negative (-)
TB3-9	24VDC ground external output (power for sensors)

Table 1.1 Terminal Block Designations

TB3-10	24VDC ground external output (power for sensors)
TB4-1	Relay 1 normally closed (NC)
TB4-2	Relay 1 normally open (NO)
TB4-3	Relay 1 common (C)
TB4-4	Relay 2 normally closed (NC)
TB4-5	Relay 2 normally open (NO)
TB4-6	Relay 2 common (C)
TB5-1	Keypad column 1
TB5-2	Keypad column 2
TB5-3	Keypad column 3
TB5-4	Keypad row 1
TB5-5	Keypad row 2
TB5-6	Keypad row 3
TB5-7	Keypad row 4
TB5-8	COM1 EIA-485 positive (+) (configurable)
TB5-9	COM1 EIA-485 negative (-) (configurable)
TB5-10	EIA-485 ground
SW1-1	Unit EIA-485 termination switch
SW1-2	Reserved for future use.
P2	COM1 EIA-232 male DB9 pin
P3	COM2 EIA-232 female DB9 pin connector (configurable)
P4	RJ11 telephone line connector
P5	RJ45 Ethernet 10/100BaseT connector

1.4. Rear Panel Indicators

The rear panel of the FMS houses a series of green LEDs. The chart below tracks indicator status when the corresponding green LED is illuminated:



Status	Indicator
K1 (Output Relay)	Relay is energized.
EIA-232 TX (COM2) Interface	Data is being transmitted.
EIA-232 or EIA-485 TX (COM1) Interface	Data is being transmitted.
EIA-232 (COM1) Select Interface	EIA-232 selected (P2)
K2 (Output Relay)	Relay is energized.
EIA-232 RX (COM2) Interface	Data is being received.
EIA-232 or EIA-485 RX (COM1) Interface	Data is being received.
EIA-485 (COM1) Select Interface	EIA-485 selected (TB5)

Figure 1.3 Rear Panel Indicators

1.5. SW1 Switch Settings

- ◆ SW1-1: EIA-485 Termination switch should be in the down position (ON) if the FMS is an end device on an EIA-485 network.
- ◆ SW1-2: Reserved for future use.

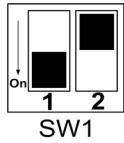


Figure 1.4 SW1-1 Switch and SW1-2 Switch

SW1-1 switch is in the down position (ON) and SW1-2 switch is in the up position (OFF).

GETTING STARTED

In order to get the FMS working, users must install the unit, wire and connect the power, and set the IP address. Any accessories for the FMS should also be connected at this time (e.g., keypad connection, Modbus connections, Expansion Cards, etc.)

2.1. Installation

The Falcon FMS comes in a 19 inch (.48m) rack mount enclosure. Install the FMS in the rack. Use the proper anchoring method to mount the unit securely. Supply either 24VDC (standard) or 48VDC (optional) to the unit.

**WARNING**

Units have different model numbers. Before applying power to the unit, verify the model number and power rating located on the back of the unit. The voltage indicator is the last number on the unit model number. The FMS will either be a 24VDC or a 48VDC.

2.2. Falcon FMS Wiring

RLE Technologies recommends an 18AWG stranded copper wire for connection from each monitored point to a terminal block (TB) connection on the FMS. RLE recommends no more than 500 feet (152.4m) of wire at this specification. If longer runs are needed, please contact RLE Technologies for application guidance. Shielded twisted pair wiring is recommended for analog signal transmitters being wired outside of conduit runs and dropped ceiling applications.

2.2.1 Power Supply and Ground Connections

Connect an 18AWG ground wire from the ground terminal to a suitable earth ground. For 24VDC model FMS, plug the wall adapter into P1 and a UPS outlet as shown below. The wall adapter has a 5 foot (1.524m) power cord. RLE Technologies recommends powering the FMS from a UPS supply to allow the FMS to send alarm notification during a power outage.

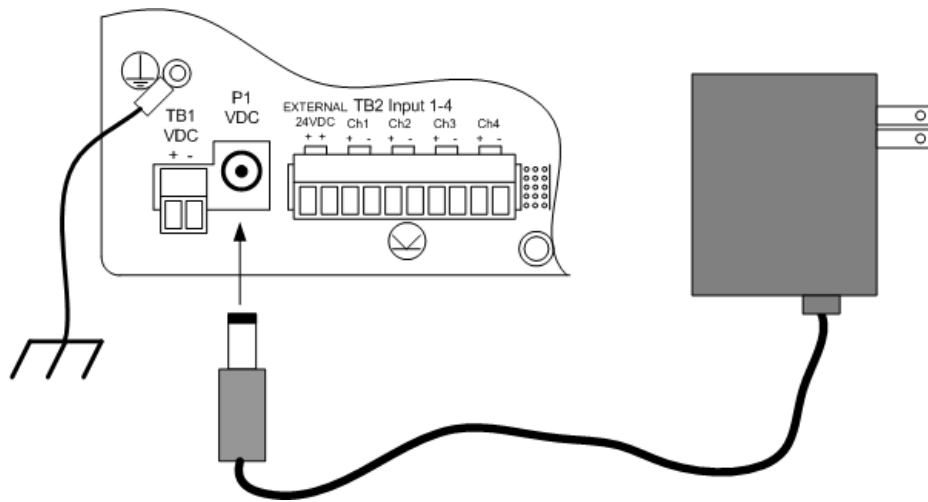


Figure 2.1 24VDC Power Supply Connection

For a 48VDC model FMS, connect a 48VDC supply through a circuit breaker to TB1 as shown below. In telecommunications applications, the 48VDC supply is typically connected to the 48VDC battery system through a DC distribution panel.

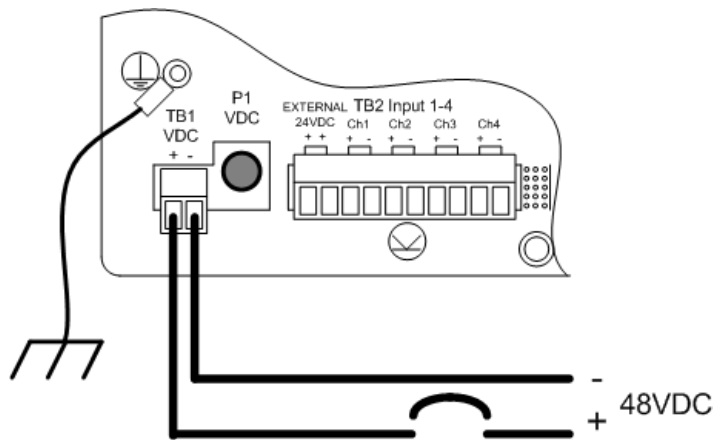


Figure 2.2 48VDC Power Supply Connection

2.2.2 Universal Input Connections

The eight non-isolated universal inputs are connected to TB2 and TB3. Universal input channels can be individually configured through the FMS to monitor a 4-20mA signal, a Normally Open (NO) dry contact, or a Normally Closed (NC) dry contact; see [Figure 2.3](#) for examples of typical sensor wiring. See [Appendix D, “FMS Accessories Wiring” on page 163](#), for further details on wiring other RLE accessory sensors.

Some temperature and humidity sensors have internal jumper settings that may be used to select sensor range and output voltage or current. Jumper settings should be set before power is applied to the equipment. **The sensor range (50–95°F, 22–122°F, etc.) should be documented at this time.** The sensor range is required to determine the gain and offset settings when configuring the input through software.

Note The Falcon has 24VDC available (TB2-1, TB2-2 +24VDC, TB3-9, TB3-10 24VDC comm.) to power external sensors. The 24VDC external supply is internally fused at 300mA.

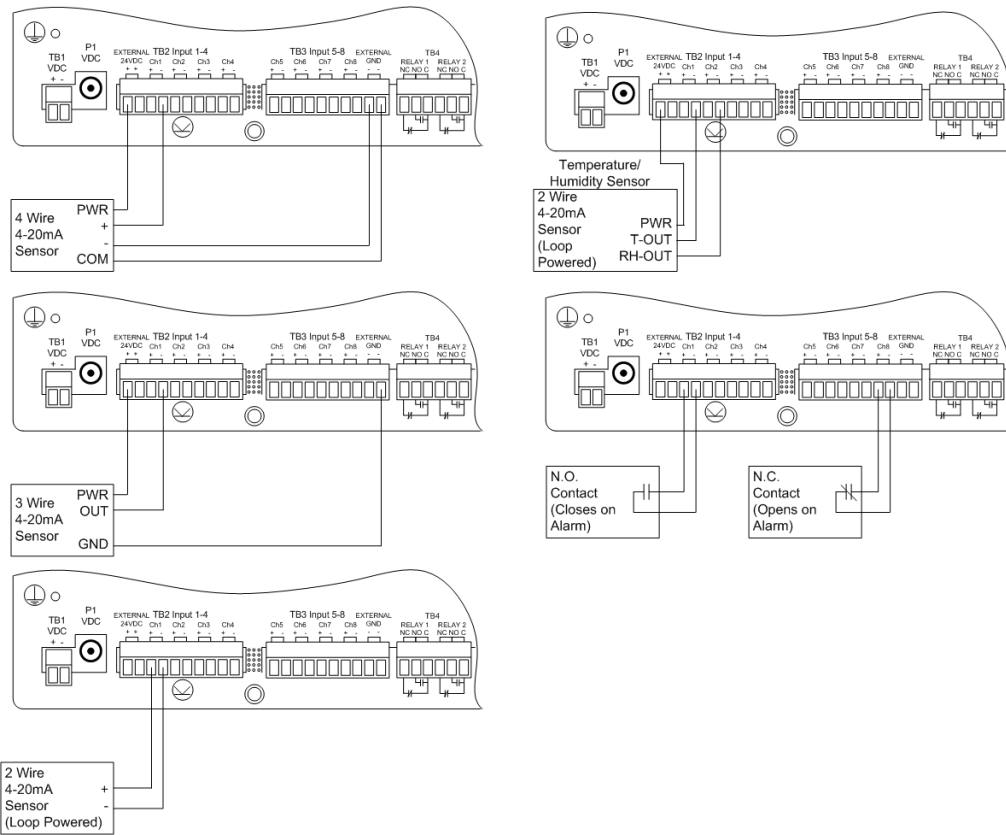


Figure 2.3 Universal Input Wiring Examples

Some equipment may have several dry contact outputs with a Common Ground. Connect this equipment as shown in [Figure 2.4](#).

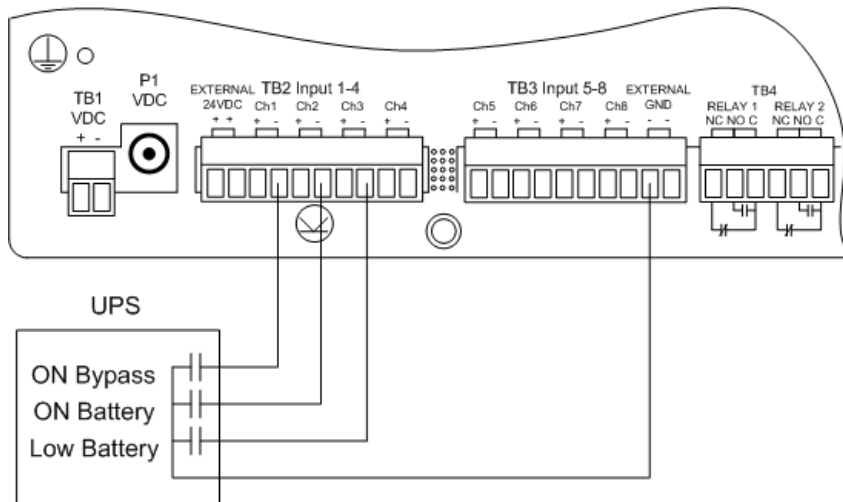


Figure 2.4 Dry Contact Inputs with Common Ground

2.2.3 Relay 1 and 2 Connections

Relay outputs may be used to unlatch doors, signal annunciators, signal IP cameras, and to turn on auxiliary equipment such as exhaust fans. Relay outputs are form c (spdt). Refer to specifications in [Appendix D, “FMS Accessories Wiring” on page 163](#), for relay contact ratings. Relays may be configured, through the FMS for Normally Open (NO—unsupervised or normally de-energized), or Normally Closed (NC—supervised or normally energized) operation; see [Figure 2.5](#) for examples.

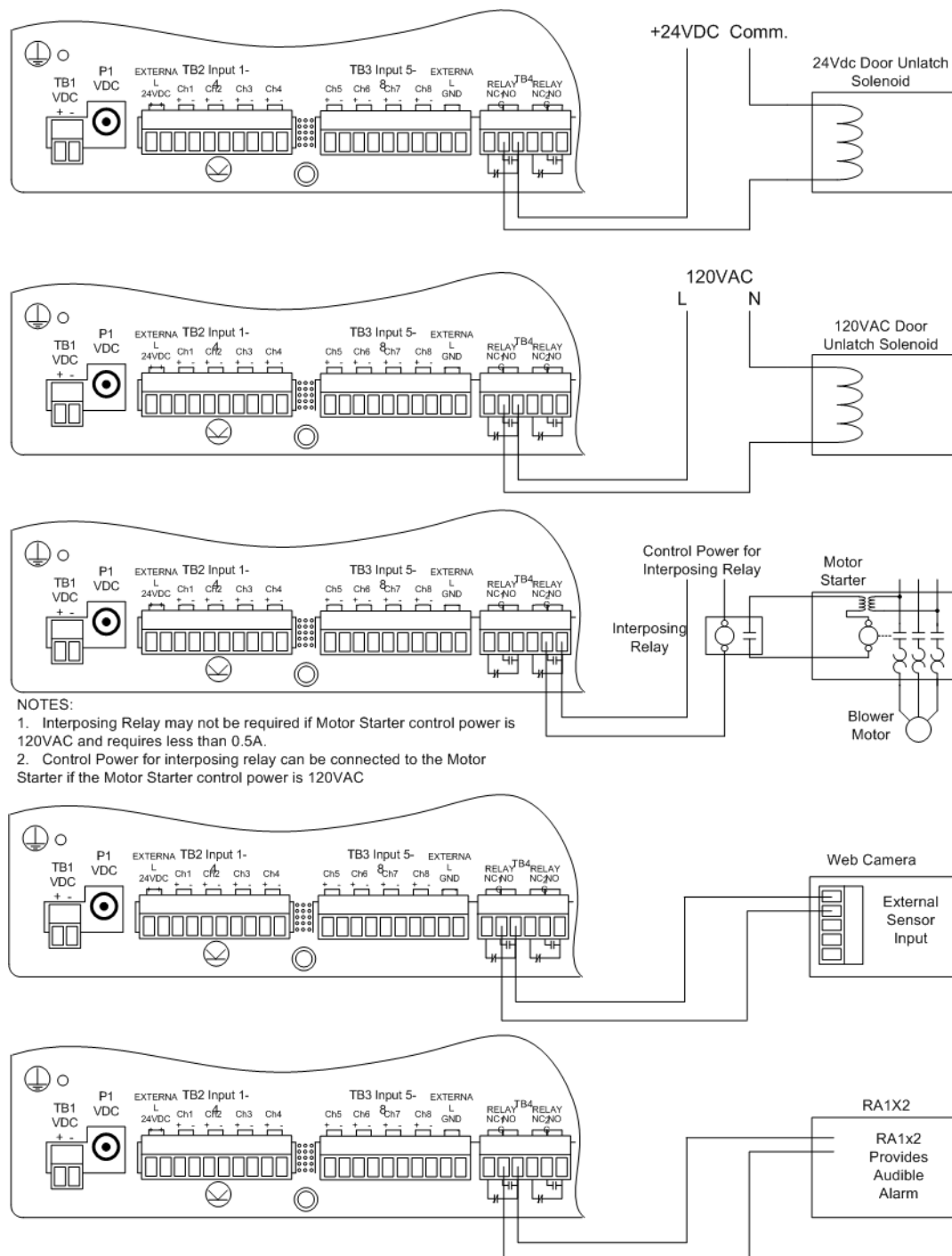


Figure 2.5 Relay Output Wiring Examples

2.2.4 Keypad Connection

The FMS has a 3 x 4 keypad interface. Entering a user code, configured through software, can activate a relay output which unlatches a door and allows an individual to enter the secure area. Entering the correct user code can also trigger a relay output to signal an IP camera to snap a picture and email it to a predefined recipient. Connect the keypad as shown in [Figure 2.6](#). For more information on configuring the keypad function, see [3.15.](#), “Keypad/DTMF Access Users” on page 66.

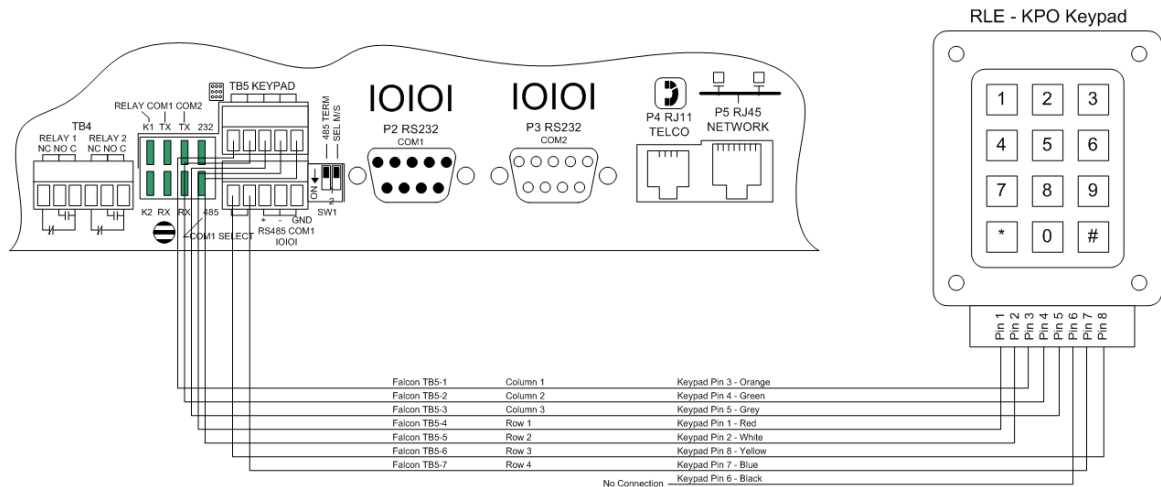


Figure 2.6 Keypad Wiring

2.2.5 EIA-232 COM2 Connection

The EIA-232 port can be connected to a PC for IP configuration, firmware downloads, and troubleshooting. It is typically a temporary connection. Connect the straight through, 9-pin, cable as shown in [Figure 2.7](#).

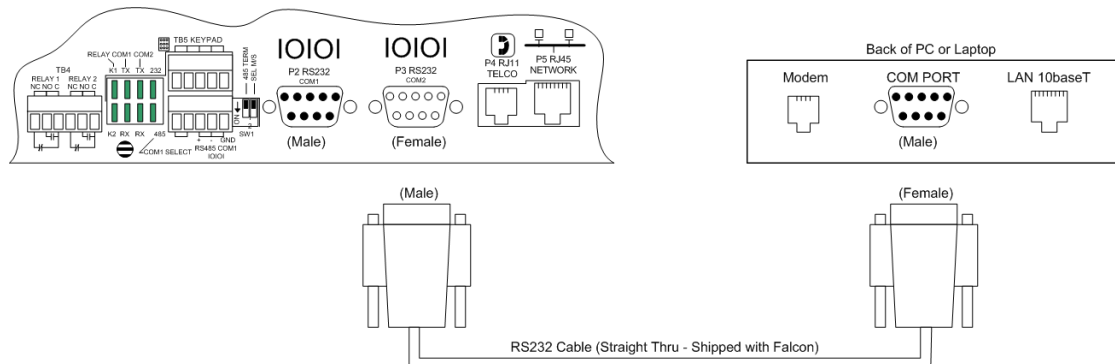


Figure 2.7 EIA-232 COM2 Connection

2.2.6 RJ11 Phone Line Connection

The FMS may contain an optional internal modem for dial in and dial out capabilities. The modem can be used for:

- ◆ Email notification through an Internet Service Provider (ISP).
- ◆ Remote connection to accomplish a variety of tasks, including: viewing alarms, changing IP Configurations, and acknowledging alarms.
- ◆ Remote alarm acknowledgment and access through DTMF. This allows a user to dial the FMS from a touch tone telephone-standard phone or cell phone-and enter an acknowledgment code or access code.
- ◆ Pager notification to an alpha-numeric pager or cell phone (TAP changer).

2.2.7 RJ45 Ethernet Connection

The FMS has an internal 10/100BASE-T Ethernet port used to configure and monitor the FMS. The Ethernet port supports Web browser access, email (SMTP), BACnet slave, Modbus slave, SNMP, BACnet master and Modbus master. [Figure 2.6](#) and [Figure 2.7](#) show the physical connections. [Figure 2.8](#) shows a direct connection between the FMS and a PC using the crossover cable supplied with the FMS. [Figure 2.9](#) shows a typical FMS connection on a subnet using a hub or switch and straight through CAT5 cables.

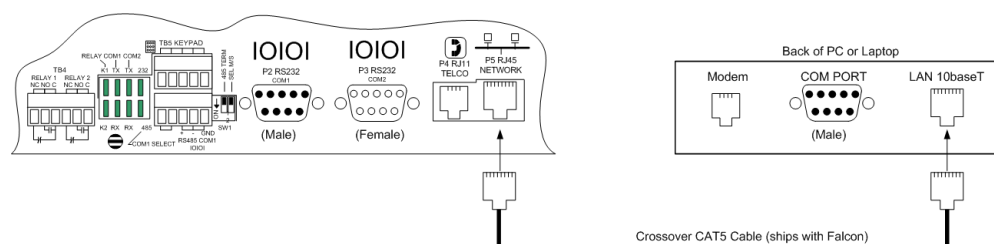


Figure 2.8 FMS Ethernet Connection to a PC using a Crossover Cable

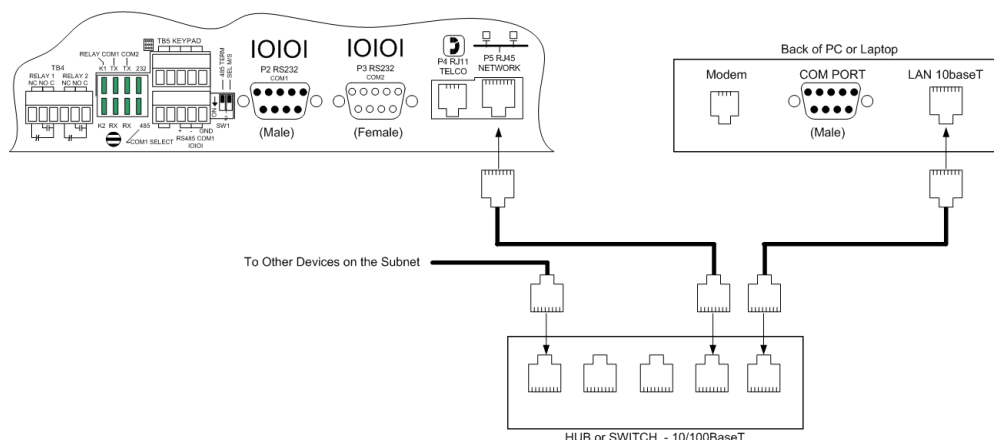


Figure 2.9 FMS Ethernet Connection to a PC on a Subnet

2.2.8 Modbus EIA-485 Connections

The FMS can function as a Modbus Master or Slave over an EIA-485, 2-wire hardware connection.

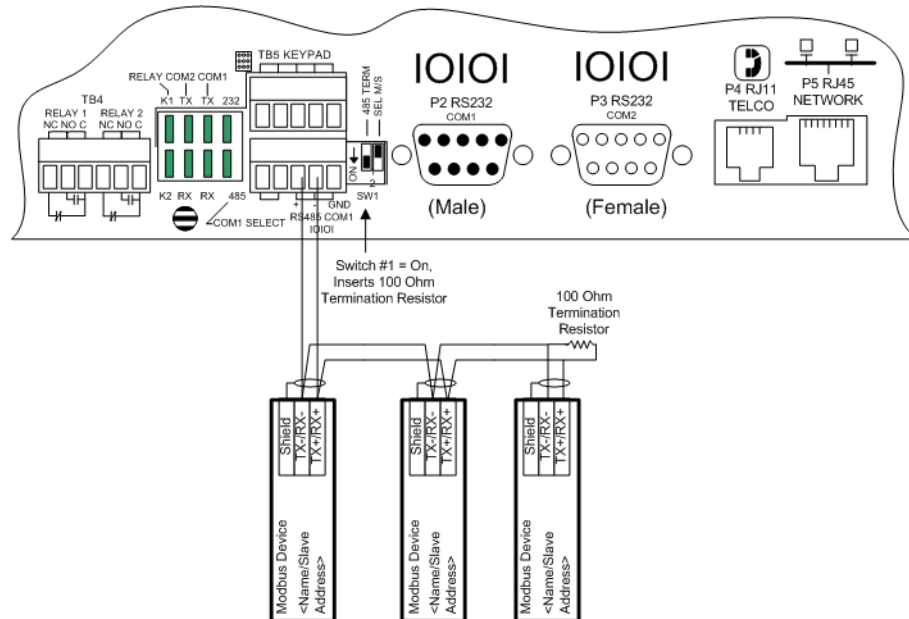


Figure 2.10 FMS EIA-485 Connection

2.2.9 Modbus EIA-232 Connections

The FMS can function as a Modbus Master or Slave over an EIA-232 hardware connection. The EIA-232 port is configured as a DTE device.

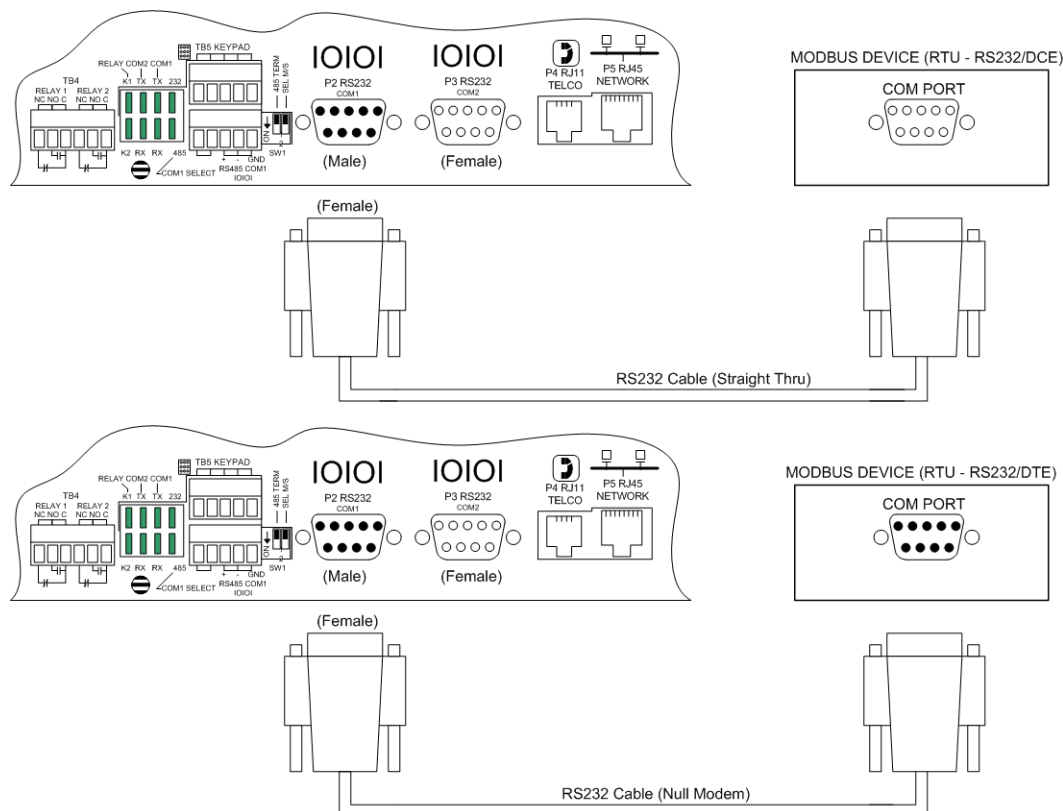


Figure 2.11 FMS EIA-232 Connection to a DCE or DTE Device

2.2.10 Expansion Card A Connections

A sticker identifying the expansion cards as A or C is located on each Expansion Card. The following wiring diagrams show the Expansion Card in slot 1. However, the Expansion Card may be in Slot 2, 3 or 4 based on the FMS configuration. The I/O for each card type appears on the back of the FMS for reference during field wiring; see [Figure 2.12](#) and [Figure 2.16](#) for typical wiring. For information on Expansion Card B, see [Appendix A, “FMS Expansion Cards”](#) on page 149.

Expansion Card A has 12 non-isolated analog input channels and 8 relay output channels. The analog input channels can be wired for 4-20ma, 0-5vdc, 0-10VDC, NO (normally open) dry contact or NC (normally closed) dry contact. The circuit board has internal jumpers to select an ma input or a voltage input. The factory default is set as a 4-20ma input. See [Appendix A, “FMS Expansion Cards”](#) on page 149, for jumper location and settings.

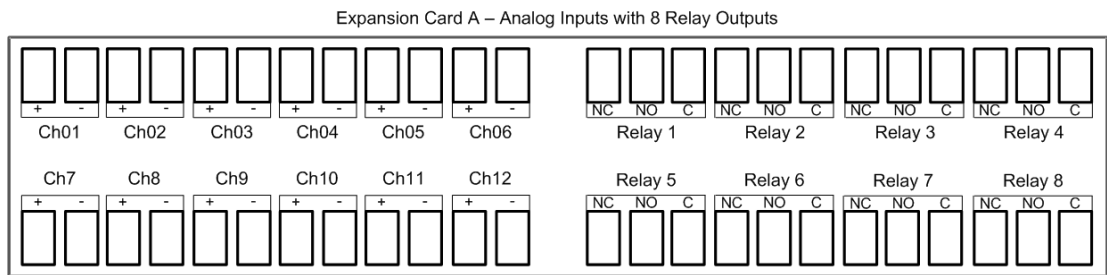


Figure 2.12 I/O Terminals for Expansion Card A

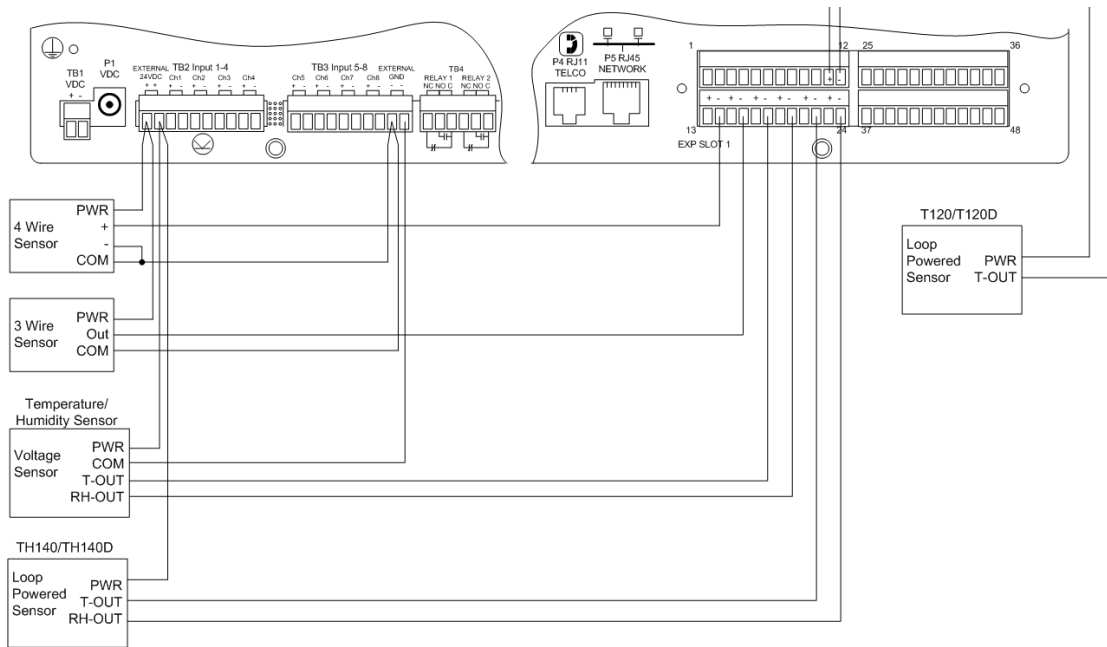


Figure 2.13 Analog Input Wiring for Expansion Card A

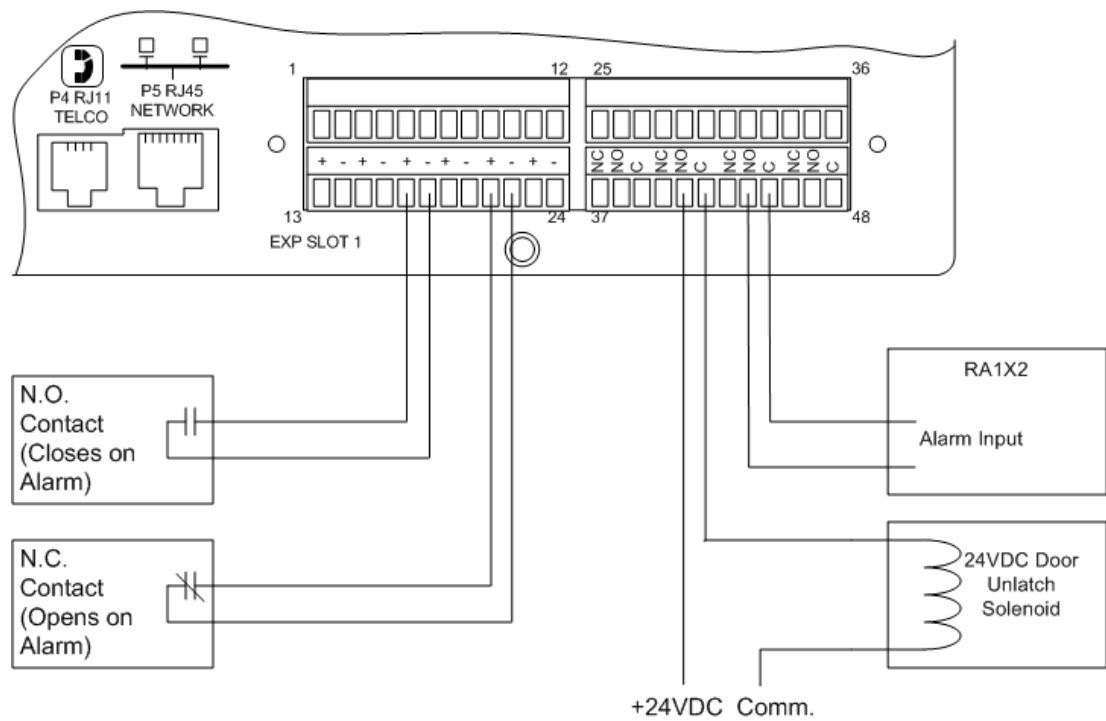


Figure 2.14 Dry Contact Inputs with Ground and Relay Outputs, Expansion Card A

2.2.11 Expansion Card C Connections

Expansion Card C has 24 dry contact input channels.

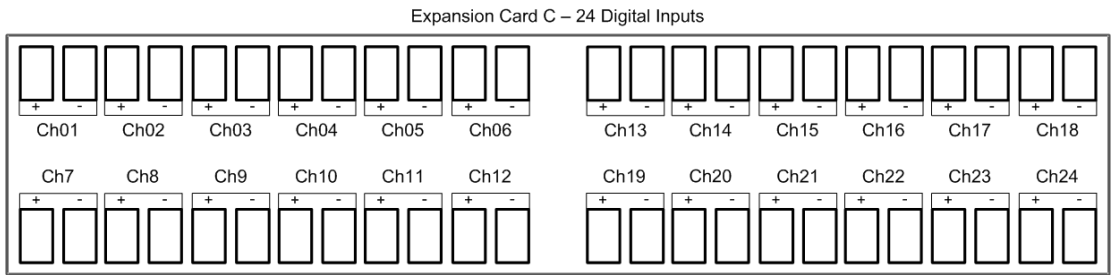


Figure 2.15 I/O Terminals for Expansion Card C

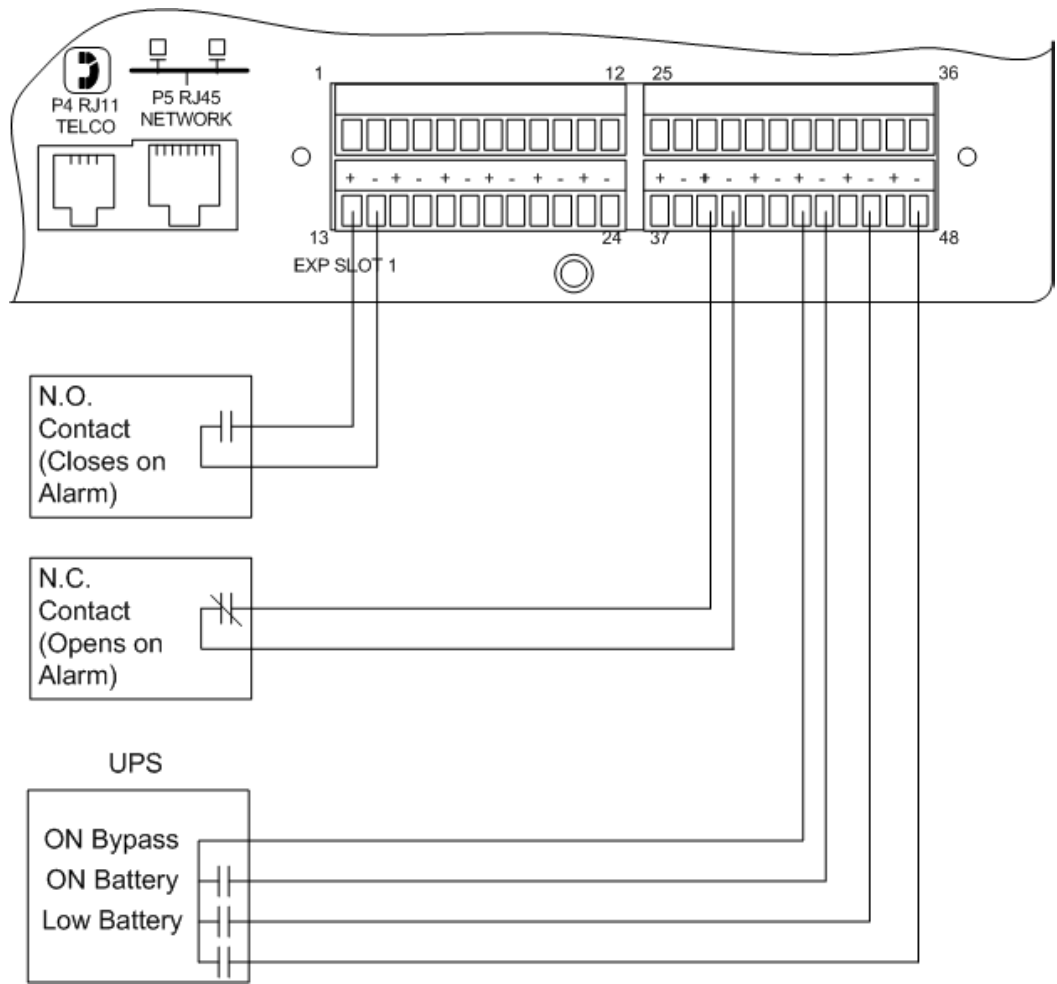


Figure 2.16 Typical Wiring for Expansion Card C

2.3. Communication

The FMS will not communicate over a user's network the first time it is connected to the network. The manufacturer programs the FMS with a default IP address: 10.0.0.188, Subnet Mask: 255.255.255.0. This default address must be changed to an IP address that corresponds with the user's network before the FMS can communicate over the network.

Follow the steps in this section to change the default address.

2.3.1 Set the FMS IP Address

There are three ways to set the FMS IP address:

- ◆ Via the ARP and PING commands
- ◆ Via the Web browser
- ◆ Via the EIA-232 interface

2.3.2 Set the IP Address Using the ARP and PING Commands

To set the IP address of a manufacturer programmed FMS, use the ARP (Address Resolution Protocol) command together with the PING (ICMP echo request) command. To use the ARP, you must know the Ethernet address of the FMS.

2.3.2.1 Obtain the Ethernet Address (MAC Address)

Each network device must have its own unique identification. This identification sets it apart from all other manufacturers and ensures that no two network devices have the same address. Each manufacturer must use a six digit numbering convention (six sets of two digits with both letters and numbers). The first three digits determine the actual manufacturer, and the remaining three digits determine the unique network serial number of each individual FMS.

A typical Ethernet address (also known as a MAC address - Media Access Control) from the FMS looks like this: 00:90:5B:00:02:45

The Ethernet (MAC) address for the FMS is on the model number sticker located on the bottom of the device.

2.3.2.2 Use the ARP Command

Once you know the Ethernet address of the FMS, use the ARP command with the correct parameters from any computer located on the FMS subnet (e.g., Class C with a subnet of 255.255.255.0).

For example, enter the following from a command prompt:

```
arp -s 192.168.1.14 00-90-5b-00-02-45
```

This command tells the computer (from which the ARP command was entered) that the network device with an IP address of 192.168.1.14 uses the Ethernet (MAC) address of 00-90-5b-00-02-45.

2.3.2.3 Use the PING Command

After the ARP command has been entered, the PING command must be entered from the same computer in order to set up the IP address of the FMS. The PING command will use the ARP entry added from 2.3.2.1, “Obtain the Ethernet Address (MAC Address)” on page 33, to send the IP address information directly to the FMS (which is just one of several methods to initially configure the IP address on a new FMS).

To do this, enter the following from a command prompt:

```
PING ip_address
```

Where “ip_address” is the IP address that was entered using the ARP command. In the above example, the following would be entered:

```
PING 192.168.1.14
```

This command changes the IP address of the FMS to: 192.168.1.14.

2.3.2.4 Troubleshooting the ARP/PING Commands

If problems are encountered, it may be for one of the following reasons:

- ◆ The FMS already has a non-default TCP/IP address. Once the IP address of the FMS has been changed from the default of 10.0.0.188, it is not possible to change it again with the ARP/PING commands. This method of setting up the FMS IP address can only be used on an FMS that still has its original default IP address, as shipped from the manufacturer.
- ◆ The device is not on the same Class C subnet as the computer from which the ARP/PING commands were sent. The FMS default router and Subnet Mask must be changed via a Web browser pointed at the FMS default IP address (i.e., <http://10.0.0.188>) or via a direct EIA-232 terminal connection to the FMS—both of which are alternate methods for setting up the FMS IP address.

2.3.3 Set the IP Address Using a Web Browser

- 1 Plug the blue and yellow crossover network cable that shipped with the FMS unit into the laptop or workstation that will be used to configure the FMS. This cable is not intended to be connected to a network hub.
- 2 Write down the computer's IP address and Subnet Mask. Then change the IP address and Subnet Mask of the computer from its existing address to one that will allow it to communicate with the FMS, such as 10.0.0.180. It may be beneficial to set the IP address to one that is one number different from the FMS IP address. Consult the computer's manual or your IT Department before attempting this.
- 3 Connect the other end of the network cable to the Ethernet port on the back of the FMS. Access the FMS through a Web browser by typing the IP address (10.0.0.188) into the location bar. Enter the FMS user name and password when prompted.

Note The default user name is “falcon” and there is no default password – leave the password field empty.

- 4 Select the **Configuration Menu** link, then select the **System** link. Select the **IP Configuration Menu** link and change the IP address, Subnet Mask, and default Gateway to one provided by the network administrator. Press the **Submit Changes** button. The FMS will save the new IP address and reboot. Once the FMS reboots, the system status LED stops flashing. Use the new IP address and reset the computer to its original IP address and Subnet Mask.
- 5 Change the IP address of the computer back to its original IP address. If the computer was configured as DHCP (the network domain controller assigns an IP address) return it to this state. This may require assistance from your IT Department, or consult the computer's manual.
- 6 The computer and the FMS are now both configured to communicate on the network. Both should be accessible via the network. Connect the PC and the FMS to the network. From the PC Web browser, type in the IP address of the FMS. Enter the user name and password as stated above to verify network access to the FMS.

2.3.4 Set the FMS IP Address using an EIA-232 Connection

To use the EIA-232 interface:

- 1 Connect the EIA-232 port (P3 - Com2) on the FMS to a terminal or PC running terminal emulation software (HyperTerminal) with a 9-pin male-female straight through serial cable.
- 2 Set the appropriate communication port to **9600 baud, NO parity, 8 data bits, 1 stop bit, (9600/N/8/1)**, and **no software or hardware flow command**.
- 3 Once the terminal emulation software starts, press **Enter** on the keyboard and the FCF> should appear. If the FCF> does not appear, check the communication settings and make sure the unit is powered on.
- 4 **IP Address:** From the FCF> type "**IP**" then press <enter> to view the current IP address. To change the IP address, type IP, <space> and the new address to be assigned, then press the enter key, example: IP 192.168.1.225 <enter>.
- 5 **Subnet Mask:** From the FCF> type "**NM**" then <enter> to view the current Netmask address. To change the Netmask address, type NM, <space> and the new address to be assigned, then press the enter key, example: NM 255.255.255.243 <enter>.
- 6 **Default Gateway:** From the FCF> type "**DG**" then press <enter> to view the current Default Gateway address. To change the Default Gateway address, type DG, <space> and the new address to be assigned, then press the enter key, example: DG 192.168.1.1 <enter>.
- 7 Every time you make a change the Falcon FMS will automatically save the changes.

See [Chapter 6, "EIA-232 Interface" on page 133](#), for more information on the EIA-232 command set.

Notes:

FMS CONFIGURATION

3.1. FMS Web Interface Overview

The FMS Web interface provides a convenient way to configure basic settings from any Internet-enabled computer. This chapter will walk users through the steps of configuring the FMS. It will cover the following configuration options:

- ◆ Inputs and Relays
- ◆ System
- ◆ Alarm management
- ◆ Trends
- ◆ Clock
- ◆ Schedules
- ◆ Battery
- ◆ URL Links 1-5
- ◆ URL Links 6-10
- ◆ Links
- ◆ Nest/Egg

- ◆ Modem/Phone Numbers/Pagers
- ◆ Keypad/DTMF Access Users

- ◆ Internet Protocol
- ◆ User Administration (Web Access)

- ◆ Network Statistics
- ◆ ICMP Ping

- ◆ Email/DNS
- ◆ Network Time Protocol

- ◆ SNMP/Syslog
- ◆ BACnet
- ◆ Com Port1/Modbus/Telnet
- ◆ Modbus Slave Units

- ◆ Flash Program

- ◆ Product Registration

The FMS is shipped to the user with the IP address configured as 10.0.0.188 and a Subnet Mask of 255.255.255.0. The user name is preconfigured as *falcon*. The unit is configured without a password; when a password is requested, leave the space blank.

Note The appearance of the login window is browser-dependent.

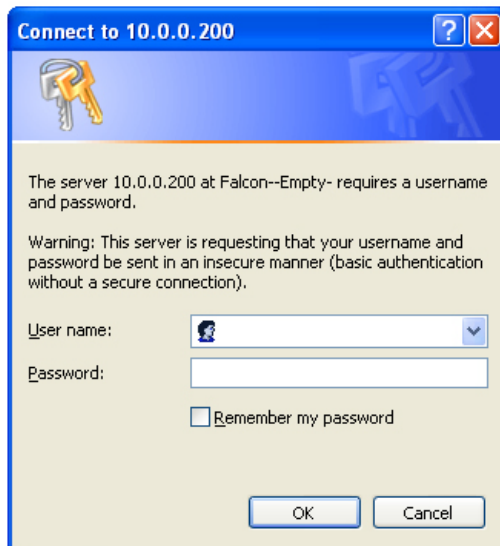


Figure 3.1 Initial Login for the FMS

These pre-configurations can be customized through the System link on the Configuration Menu of the Web interface. To change the FMS IP address, refer to 2.3.1, “Set the FMS IP Address” on page 33.

The “Smart Browsing” feature available with some browsers complicates use of the FMS Web interface. To avoid complications, turn off Smart Browsing.

3.2. Homepage

To access the FMS Homepage, type the IP address of the FMS into the location bar of the Web browser. When the prompt appears, enter the default user name (falcon) and password (none-leave blank).



Figure 3.2 Top Bar on the FMS Home Page

The top of the page provides links to other pages for additional monitoring, control and configuration. To configure the FMS, select the **Configuration** option from the Top bar of the FMS Homepage.

The **Configuration** page allows authorized users—with administrator or read-write privileges—to adjust the FMS settings. Each link on the Configuration page displays more information about specific configuration settings.

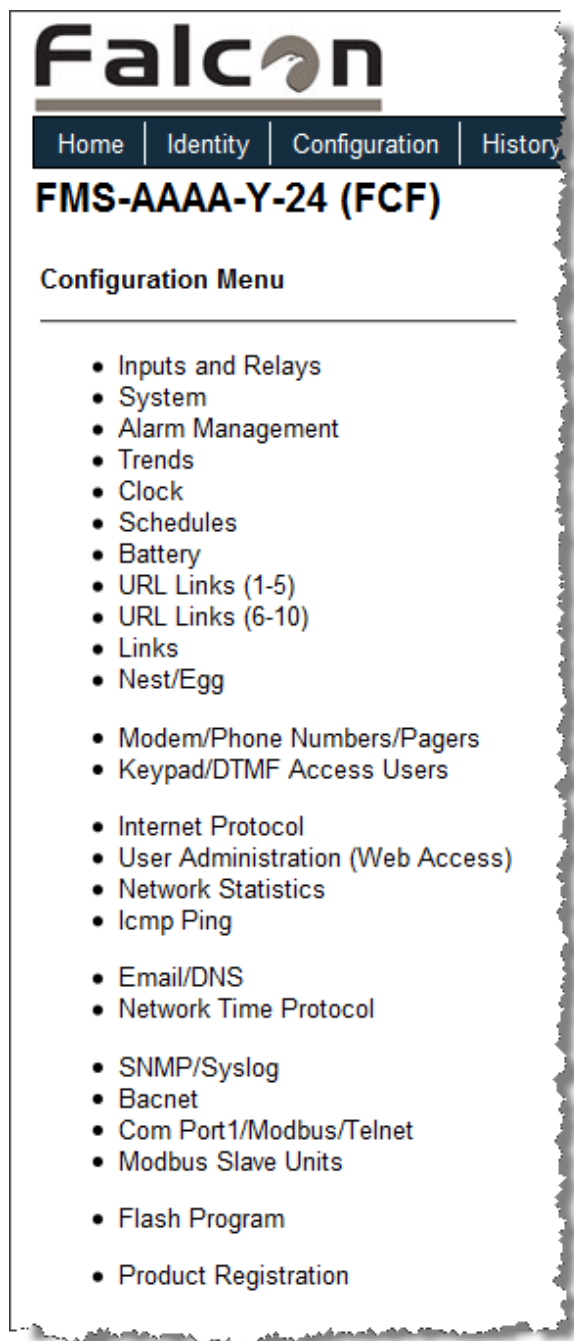


Figure 3.3 FMS Configuration Menu

3.3. Inputs and Relays

Inputs							
S.Ch (#)	Label	S.Ch (#)	Label	S.Ch (#)	Label	S.Ch (#)	Label
I (1)	Server Isle A	Eas (2)	Server Room	I (3)	Server Isle B	Nor (4)	Server Room
Al (5)	FM200 System	Alar (6)	Water Leak	Alar (7)	Water Leak	Alar (8)	Water Leak
I 1.1 (9)	Server Isle C	I 1.2 (10)	(Demo) Alarm	I 1.3 (11)	Server Isle D	Wes 1.4 (12)	Server Room
I 1.5 (13)	Server Isle F	I 1.6 (14)	Server Isle G	Sou 1.7 (15)	Server Room	I 1.8 (16)	Server Isle I
I 1.9 (17)	Server Isle J	I 1.10 (18)	Server Isle K	I 1.11 (19)	Server Isle L	I 1.12 (20)	Server Isle M
Room 2.1 (33)	Generator	Fl 2.2 (34)	UPS Room 5th	Tem 2.3 (35)	Outside Air	Fl 2.4 (36)	MCC Room 3rd
Offic 2.5 (37)	1st Floor	Offic 2.6 (38)	2nd Floor	Motor/ 2.7 (39)	Elevator	Cl 2.8 (40)	Tape Storage
2.9 (41)	ANALOG #2.9	2.10 (42)	ANALOG #2.10	2.11 (43)	ANALOG #2.11	2.12 (44)	ANALOG #2.12
3.1 (57)	ANALOG #3.1	3.2 (58)	ANALOG #3.2	3.3 (59)	ANALOG #3.3	3.4 (60)	ANALOG #3.4
3.5 (61)	ANALOG #3.5	3.6 (62)	ANALOG #3.6	3.7 (63)	ANALOG #3.7	3.8 (64)	ANALOG #3.8
3.9 (65)	ANALOG #3.9	3.10 (66)	ANALOG #3.10	3.11 (67)	ANALOG #3.11	3.12 (68)	ANALOG #3.12
4.1 (81)	ANALOG #4.1	4.2 (82)	ANALOG #4.2	4.3 (83)	ANALOG #4.3	4.4 (84)	ANALOG #4.4
4.5 (85)	ANALOG #4.5	4.6 (86)	ANALOG #4.6	4.7 (87)	ANALOG #4.7	4.8 (88)	ANALOG #4.8
4.9 (89)	ANALOG #4.9	4.10 (90)	ANALOG #4.10	Service 4.11 (91)	Out Of	Act 4.12 (92)	Dry Contact
Temper 5.1 (105)	Internal	Humidi 5.2 (106)	Internal				

Figure 3.4 FMS Input/Output Configuration Menu

Input and Relay allows users to program specific parameters for each FMS input and relay. Different FMS models allow different numbers of inputs and relays. Only installed inputs and relays are displayed. Inputs and relays are identified by their name and slot channel number (S.Ch). Clicking an input link will display one of three input configuration pages: (1) Main Board Inputs 1-8, (2) Expansion Card “A” Inputs or (3) Expansion Card “C” Inputs.

Note Users must push the Submit Changes button after they configure each input. Changes not submitted before proceeding to the next input will be lost.

3.3.1 Main Board Input Configuration (Channels 1-8)

To configure the FMS main board inputs (channels 1-8), select the appropriate input number. A page similar to [Figure 3.5](#) will appear.

Configuration: Input #1

Current Readings: Raw = 18.757 mA Calc = 73.2

Submit Changes
Next Input >>

Select Input type: ANALOG 4-20 MA
 Gain: 25
 Offset: -44
 Hysteresis: 0
 Unit of Measure: Deg
 Alarm Delay: 0 Seconds
 Label: Server Isle A Temperature
 Label (Digital input normal):
 "OR Gate" Relay (1-16) Control: 0
 "OR Gate" Relay (17-32) Control: 0
 Email Recipient Notification:

☐ 1: support@rlotech.com
☐ 3: exchange@rlotech.com
☐ 5:
☐ 7:

☐ 2: engineering@rlotech.com
☐ 4: 1235551212@textmycell.com
☐ 6:
☐ 8:

Physical
 High Limit2: 200
 High Limit1: 100
 Low Limit1: 0
 Low Limit2: 0
 Pager Alarms: 0,0,0,0
 Digital Alarm ID: 10
 Alarm ID: 13
 Alarm ID: 11
 Alarm ID: 12
 Alarm ID: 14

Alarm Disable by Schedule: ☒ None ☐ A ☐ B
 Snmp Trap: ☒ Enabled ☐ Disabled ☐ Disabled during Schedule A ☐ Disabled during Schedule B
 Trap Recipients: ☒ 1: ☒ 2:
☒ 3: ☒ 4:
 High1/Low1 Snmp Traps: ☒ Enabled ☐ Disabled
 Display Value: ☒ Signed ☐ Unsigned
 Individual Ground Type (digital in only): ☒ Individual Ground ☐ Common Ground
 BACnet Instance: ai:1 BACnet Units: 0

Figure 3.5 FMS Main Board Input Configuration

The number of the input that is being configured appears in the upper bar. Options on this configuration page are described below.

Current Readings: Displays the input current as sensed by the FMS and the calculated value based on the offset and gain settings.

Example: The example illustrated above shows a current input of 14.771mA from the temperature sensor. The FMS converts this value to 79.6°F. When the input Type is Digital NO, Digital NC or Digital Status, the measured Raw Current Reading will typically be 0mA or 24mA (depending on input). The Calculated Value will be a 0 or 1, with 1 representing an alarm condition.

Select Input Type: Select based on the type of device connected to the input channel. Options include:

- ◆ **Not Configured:** Select when there is nothing connected to the input.
- ◆ **Analog 4-20mA:** Select when the device connected to the input provides a 4-20mA output.
- ◆ **Digital NO:** Select when the device connected to the input is a dry contact that is normally open and closes on an alarm condition.
- ◆ **Digital NC:** Select when the device connected to the input is a dry contact that is normally closed and open on an alarm condition.
- ◆ **Digital Status:** Select when the device connected to the input is a dry contact that only needs to be monitored (status only), without alarms.

Select Input Type:

- ◆ **Physical:** This allows users to configure the channel to display a sensor that is wired to a FMS Input, Channel 1 - 104.
- ◆ **Modbus Import:** This allows users to employ a channel to display Modbus Register information on the main page of the FMS. Virtual Slots can be added to the main page of the FMS to display more Modbus Points; see [Chapter 5, “Communication” on page 97](#).

Gain and Offset: Applies only to Analog 4-20mA input types. Inputs like temperature, humidity, pressure, etc. connected to the FMS convert information to a 4-20mA signal. The FMS reads this raw 4-20mA signal and calculates a value based on the input and the predetermined gain and offset settings. The idea is to determine the correct gain and offset values so that the FMS calculates and displays an accurate reading. Without setting the correct gain and offset, the FMS will not convert the raw data correctly. As a result, missed alarms or nuisance alarms could occur.

To set gain and offset values, click the **Calculator** link.

4-20ma Gain/Offset Calculator: Input #2
Current Readings: Raw = 6.213 mA Calc = 42.8
Gain: 25
Offset: 4
Sensor Range High 20ma = 129
Sensor Range Low 4ma = 29
Calculate

[Return to Input 2 Configuration](#)

Figure 3.6 Gain and Offset Calculator

Enter the sensor's range and press the **Calculate** button. Click the **Return to Input 1 Configuration** link so that the gain and offset fields are automatically entered with the correct offset and gain settings. Gain and offset values can also be determined by using the following formulas:

Gain for 4-20mA Transducer = (Sensor High Range Value- Sensor Low Range Value) / 4
Offset for 4-20mA Transducer = Sensor Low Range Value - Gain

Example: Temperature sensor with a sensing range of 50-95°F - displayed in Fahrenheit
 Gain = $(95-50) / 4 = 11.25$
 Offset = $50 - 11 = 38.75$

Example: Temperature sensor with a sensing range of 50-95°F - displayed in Celsius
 Convert 50-95°F to 10-35°C and use the Celsius range for the calculations
 Gain = $(35-10) / 4 = 6.25$
 Offset = $10 - 6 = 3.75$

Example: Humidity sensor with a range of 0 - 100% RH
 Gain = $(100-0) / 4 = 25$
 Offset = $0 - 25 = -25$

Hysteresis (Deadband): The number that designates the amount an input reading must sway from its preset alarm reading before it is classified as returned to normal. The Hysteresis provides a dead band around the limit settings to prevent several alarms and return to normal alarms when the input is the same as a limit setting.

The Hysteresis applies when the input type is Analog 4-20mA and is active for High Limit 1, High Limit 2, Low Limit 1 and Low Limit 2.

Example: A temperature sensor alarms when it reaches its High Limit 1 of 80°F. If Hysteresis is set at four, the sensor must register less than 76°F before the FMS reports it as returned to normal. In another example, a humidity sensor alarms when it reaches its Low Limit 2 of 30% RH. If the Hysteresis is set at five, the humidity must register more than 35% before the FMS reports it as returned to normal.

Unit Of Measure (UOM): The 10 character field used to assign a unit of measure label to analog values, such as °F, °C, % RH, Amps, Volts, PSI, etc. The unit of measure field is only required when the input type is Analog 4-20mA. The unit of measure field is displayed on the Main Menu and in notification (email/pager messages and SNMP Trap).

Alarm Delay: The amount of time the FMS waits to send an alert after an alarm condition is detected. The FMS uses this same time delay to report a return to normal after the alarm condition clears. The alarm delay is active for all input types except Not Configured.

Example: An input is configured as a digital NO, labeled "CRAC UNIT ALARM" and has an alarm delay of 10 seconds. When the CRAC unit alarms, it closes the contact to the FMS. If the CRAC unit returns to normal and opens the contact to the FMS within the 10 second alarm delay, no alarm is generated in the FMS. If the CRAC unit remains in alarm for 10 seconds or more, the FMS records the alarm and generates notification per the input settings. If the CRAC unit returns to normal and alarms within the 10 second alarm delay, the FMS does not record it as a return to normal. Once the CRAC unit returns to normal for the 10 second alarm delay, the FMS records a return to normal and generates notification per the FMS settings.

High Limit 2: Applies only when the input type is Analog 4-20mA. The FMS will record an alarm and send notification when the FMS calculated value exceeds this limit. The High Limit 1 and High Limit 2 are disabled when they are both set to 0. High Limit 2 will also activate any designated relays.

High Limit 1: Applies only when the input type is set for Analog 4-20mA. The FMS will record an alarm and send notification when the FMS calculated value exceeds this limit. The High Limit 1 and High Limit 2 are disabled when they are both set to 0.

Low Limit 1: Applies only when the input type is Analog 4-20mA. The FMS will record an alarm and send notification when the FMS calculated value falls below this limit. The Low Limit 1 and Low Limit 2 are disabled when they are both set to 0.

Low Limit 2: Applies only when the input type is Analog 4-20mA. The FMS will record an alarm and send notification when the FMS calculated value falls below this limit. The Low Limit 1 and Low Limit 2 are disabled when they are both set to 0. Low Limit 2 will also activate any designated relays.

Alarm Dial Out (Internal Modem): The list of up to five pager numbers to which the FMS sends alarm notification. The numbers correspond to phone numbers configured from the Configure Phone Number links at the bottom of the Modem Configuration page. Separate each ID number with a comma. Enter zero to disable. The FMS will dial the lowest number listed regardless of the order the numbers are listed; see 3.14., “Modem/Pagers” on page 62 for more information.

Example: If the Alarm dial out string is set to “3, 5, 1, 0, 0,” the FMS will dial Pager #1, Pager #3 and then Pager #5 when an alarm occurs. Pager notification will be sent when an input alarms (high limit 2, high limit 1, low limit 1, low limit 2 is exceeded or the digital input is in alarm). The “Dial Back on Returns” option on the Pager Configuration page determines if the FMS will send a page when an input returns to normal; see 3.14., “Modem/Pagers” on page 62.

Label: Used for input identification. Applies to all input types except “Not Configured.” For Analog input types, this label is displayed on the FMS Main Menu and the Input Configuration Menu. When the input alarms and/or returns to normal, the label is included in the Alarm History and notification messages. For Digital NO and Digital NC inputs, the label is displayed on the FMS Main Menu, Input Configuration Menu, Alarm History page and in notification messages only when the device is in alarm. For Digital Status inputs, the label is displayed on the FMS Main Menu when the input is on. When the input turns on, the label is also included in the Digital Status History.

Label (Digital input normal): Applies to input types Digital NO, Digital NC and Digital Status. This field may be left blank. If it is left blank, the FMS displays the Label (from above). This label is displayed on the main page when the input is normal, in the Alarm History when the input returns to normal and in notification messages. For Digital Status inputs, the label is displayed on the Home page when the input is off. When the input turns off, the label is also included in the Digital Status History.

Relay Configuration Link: Used to assign a High Level 2, Low Level 2, or Digital Alarm generated by this input to the OR gate function block of the Relay Control Logic to a specific relay. To select the relay(s), click on the link and check the relay box(es). See Appendix G, “Relay Control Logic” on page 183.

Email Recipient Notification: Designates up to eight email addresses for notification if the input goes into alarm. Email addresses will be displayed once they are entered on the Email Configuration page. Email notification will be sent to recipients whose names are checked when an input alarms and, if designated, when an alarm returns to normal.

Alarm Disable by Schedule: Used to designate a period of time the input will be disabled or inactive. To do this, select either the A or B schedules, which are defined in the Schedule Configuration menu. Within the scheduled time, the point on the Main Menu will turn Blue to indicate that the input is currently being disabled during its scheduled time. Once the scheduled time has past, the point will reactivate and return to its normal color.

SNMP Trap: Used to enable or disable traps. The trap can also be disabled during one of the schedules.

High1/Low1 SNMP Traps: Used to disable the first level analog alarm until the alarm reaches the more critical level 2.

Display Value: Used to show either Signed or Unsigned Values for the Displayed value calculated by the FMS.

Example: If a selected value is Unsigned, the FMS will not display a negative number on the calculated reading.

Note Press the Submit Changes button when done to save all changes.

Individual Ground Type (digital in only): Defines the type of digital input as either Individual Ground or Common Ground.

- ◆ **Individual Ground:** Used if the monitored input is a single relay contact and two contacts-common and NO or NC-are accessible.
- ◆ **Common Ground:** Used if multiple relays are to be monitored that have the commons bussed or tied together (only one common input connection) and only the NO or NC contacts are available for each individual relay output. See the example below or see 2.2., “Falcon FMS Wiring” on page 22, for more information.

Example: Configure input channels 1-2 for Individual Ground, and configure input channels 4-6 for Common Ground.

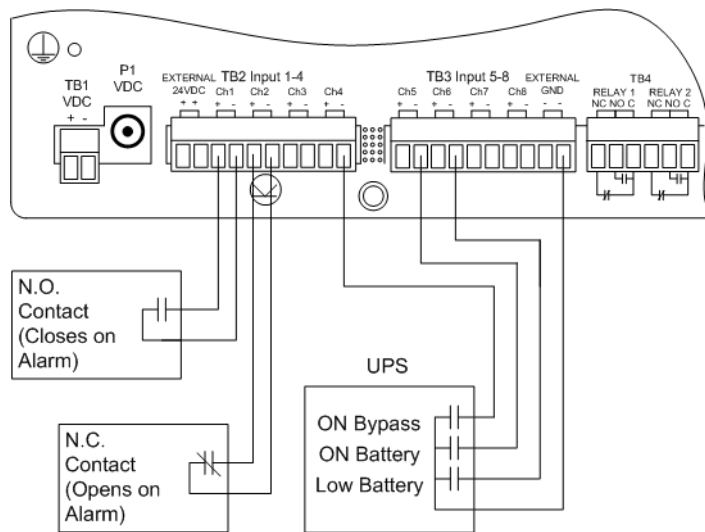


Figure 3.7 NOI/NC Wiring Example

BACnet Instance: The BACnet object identifier. It is a numerical code used to identify the input. This code must be unique within the BACnet device.

BACnet Units: A numerical code used to assign engineering units to this BACnet Instance. Refer to the BACnet standard for further information.

3.3.2 Expansion Card “A” Input Configuration

To configure Expansion Card A, select the desired input or relay from the Input and Relay Configuration page; see [Figure 3.4, “FMS Input/Output Configuration Menu” on page 41](#). While units will vary depending on individual configurations, Expansion Card A is typically numbered 1.1-1.12, 2.1-2.12, etc.

Figure 3.8 Expansion Card “A” Configuration Page

This page will be displayed when configuring an input on an Expansion Card “A.” It is identical to the FMS Main Board Input Configuration page—see [3.3.1, “Main Board Input Configuration \(Channels 1-8\)” on page 42](#)—with the following exceptions:

- ◆ The Expansion Card “A” does not except common ground digital inputs. Therefore, the option for Individual Ground Type (digital in only) is removed.
- ◆ Analog 0-5VDC and Analog 0-10VDC options are added to the Input Type. The Expansion Card “A” accepts analog inputs individually configurable through internal jumpers, as 4-20mA, 0-5VDC or 0-10VDC.

3.3.3 Expansion Card “C” Input Configuration

To configure Expansion Card C, select the desired input or relay from the Input and Relay Configuration page; see [Figure 3.4, “FMS Input/Output Configuration Menu” on page 41](#). While units will vary depending on individual configurations, Expansion Card C is typically numbered 1.1-1.24, 2.1-2.24, etc.

The screenshot displays the 'Configuration: Input #2.1 (33)' page. At the top, it shows 'Current Readings: Raw = digital Calc = 0.0'. Below this is a 'Submit Changes' button and navigation links '<< Prev Input' and 'Next Input >>'. The configuration options include:

- Select Input type:** A dropdown menu set to 'DIGITAL NC'.
- Physical:** A dropdown menu set to 'Physical'.
- Digital Alarm ID:** A text field containing '2010'.
- Alarm Delay:** A text field set to '0' with a 'Seconds' label.
- Pager Alarms:** A text field containing '0,0,0,0,0'.
- Label:** A text field containing 'Input #2.1'.
- Label (Digital input normal):** A text field containing 'Input #2.1'.
- "OR Gate" Relay (1-16) Control:** A text field set to '0' with a 'Relay Configuration' link.
- "OR Gate" Relay (17-32) Control:** A text field set to '0'.
- Email Recipient Notification:** Eight checkboxes labeled 1 through 8. Checkboxes 1 and 2 are checked, with email addresses 'rstelzer@rletech.com' and an empty field next to them.
- Alarm Disable by Schedule:** Three radio buttons: 'None' (selected), 'A', and 'B'.
- Snmp Trap:** Four radio buttons: 'Enabled' (selected), 'Disabled', 'Disabled during Schedule A', and 'Disabled during Schedule B'.
- Trap Recipients:** Four checkboxes labeled 1 through 4. All four are checked. Next to them are IP addresses: '1: 10.0.0.230', '2: ', '3: ', and '4: '.
- BACnet Instance:** A text field containing 'bi:33'.
- BACnet Units:** A text field containing '0'.

Figure 3.9 Expansion Card “C” Configuration Page

[Figure 3.9](#) will be displayed when configuring inputs for Expansion Card “C.” It is similar to the FMS Main Board Input Configuration page—see [3.3.1, “Main Board Input Configuration \(Channels 1-8\)” on page 42](#)—with the following exceptions:

- ◆ The Input Type options do not include Analog 4-20mA since Expansion Card “C” only accepts dry contact inputs.
- ◆ The Gain, Offset, Hysteresis, Unit of Measure, High Limit 2, High Limit 1, Low Limit 1, and Low Limit 2 are not available since Expansion Card “C” does not accept analog inputs.
- ◆ The option for Individual Ground Type (digital in only) is removed. Expansion Card “C” accepts Individual and Common Ground inputs; however, it does not require any software configuration.

3.3.3.1 Internal Temperature and Internal Humidity Configuration (Optional)

Internal Temperature, Ch. 105, and Internal Humidity, Ch. 106, have the same options as a standard channel configured as an analog input, but the gain value cannot be changed-it has a fixed value internally. The Input Type for Internal Temperature is used to specify and display the input in Fahrenheit or Celsius.

3.3.4 Relay Configuration

Figure 3.10 Relay Configuration Page

A screen similar to [Figure 3.10](#) will be displayed when configuring relays. The following options are available on this page:

Type: Each relay output can be configured for one of the following types-only one type per relay output:

- ◆ **NO (Non-Supervised):** Configures the relay output to be normally de-energized. The relay output will energize when activated by an input or by a schedule. The silkscreen labeling for the relay outputs (NC, NO and C) refer to the state of the relay output when it is de-energized.
- ◆ **NC (Supervised):** Configures the relay output to be normally energized. The relay output will de-energize when activated by an input or by a schedule. The silkscreen labeling for the relay outputs (NC, NO and C) refer to the state of the relay output when it is de-energized.
- ◆ **Force On:** Energizes the relay out and allows a user with Read-Write or Administrator privileges to turn on a relay output for control or testing purposes.
- ◆ **Force Off:** Energizes the relay out and allows a user with Read-Write or Administrator privileges to turn off a relay output for control or testing purposes.
- ◆ **Button Controlled:** Adds a button to the Relay Control page allowing users with Read-Only privileges to turn on or off a relay output for control purposes.

- ◆ **Keypad Controlled:** Configures the relay output to be controlled by a keypad code or DTMF code. The User Code Configuration link appears to the right of the Label field once the Keypad Controlled option is selected and submitted; see [Figure 3.11](#). The User Code Configuration link allows users to link which access code will activate the relay output.

Access Keypad/Relay #1 Configuration

Submit Changes

#	Id Code:	User Name:	K1
1	1590	Fred	☒
2			☒
3			☒
4			☒
5			☒
6			☒
7			☒
8			☒
9			☒
10			☒
11			☒
12			☒
13			☒
14			☒
15			☒
16			☒
17			☒
18			☒
19			☒
20			☒

[Return to Relay 1 Configuration](#)

Figure 3.11 Keypad/Relay Configuration

Label: Used for relay identification. This label appears on the Relay Status and Relay Control pages.

BACnet Instance: The BACnet object identifier. It is a numerical code used to identify the input. This code must be unique within the BACnet device.

OR'd Alarm IDs: Displays the Alarm IDs of the inputs specified through the Relay Configuration link on the Input Configuration Menu. The Alarm IDs displayed can be translated by using [Appendix E, “Alarm ID Reference Tables” on page 169](#). The Alarm IDs are also displayed on the Input Configuration page. The Relay Control Logic diagram in [Appendix G, “Relay Control Logic” on page 183](#), shows how the OR'd Alarm IDs, AND'd Alarm IDs and the Combo Gate are internally connected.

AND'd Alarm IDs: Allows up to four Alarm IDs (High Limit, Low Limit or Digital Alarms) to be specified for the AND Gate Function Block input of the Relay Control Logic. Alarm IDs can be obtained from [Appendix E, “Alarm ID Reference Tables” on page 169](#). The Alarm IDs are also displayed on the Input Configuration page. The Combo Gate Function Block of the Relay

Control Logic will either OR or AND the OR'd Alarm and AND'd Alarm inputs together. The Relay Control Logic diagram in [Appendix G, “Relay Control Logic” on page 183](#), shows how the OR'd Alarm IDs, AND'd Alarm IDs and the Combo Gate are internally connected.

On-Delay Time: Specifies the number of seconds the Relay Control Logic will be delayed before activating the relay on alarm.

On-Duration Time: Specifies how long the relay will be active after a valid alarm combination is recognized through the Relay Control Logic. A positive number entry in seconds will keep the relay in its alarm state (activated) for the fixed period specified. A negative number entry in seconds will keep the relay in its alarm state (activated) after the alarm condition has returned to normal for the fixed period specified. A zero entry will configure the relay to be active until the alarm condition returns to normal.

Latch Mode (Non-Latching, Latching, Silenceable): Latching will cause the relay to latch, or remain in its alarm state, when activated until it is reset by the user. If latching is selected, the on-duration time function will be disabled.

Schedule: Designates which of the schedules (None, A or B) the relay will follow. The schedules are specified in the Configuration Menu. If schedule A or B is selected, all other function blocks of the Relay Control Logic for that relay will be disabled. This allows the relay output to be energized based on day-of-week and time-of-day.

Logic Diagram: Refer to [Appendix G, “Relay Control Logic” on page 183](#), for a complete relay logic diagram.

3.4. System

The **System** link allows users to configure basic FMS information. the FMS IP Address and Point-to-Point Protocol may also be configured through this menu via the IP Configuration Menu link. See [Chapter 8, “Point-to-Point Protocol” on page 139](#), for more information.

Figure 3.12 System Configuration Page

System Name: Appears on the FMS Main Menu. The system name is also included as part of email and pager notifications.

Web Title Bar Text: Appears at the top of every FMS webpage. This text will be visible when the FMS webpage is minimized.

Web Refresh Rate: The rate at which the FMS webpages refresh themselves within the Web browser. Only pages that display monitoring points are automatically refreshed (e.g., Main Menu, Relay Status, View Points, and Modbus Slave pages). The default is 0 seconds (disabled), but is typically set for 15 to 30 seconds.



WARNING

Do not set the Web refresh rate lower than 5 seconds. This could cause the screen to freeze or lock up.

PDA Screen Width: Sets the width of the PDA webpages in the FMS to match the PDA device. The PDA webpages can be accessed from the Web browser by entering /pda after the IP Address (e.g., 10.0.0.188/pda). The FMS includes a PDA webpage view for the Main Menu, Identity and Alarm History pages only.

RLE Falcon	
FMS-AAAA-Y-24 (FCF)	
Inputs -	
1 Server Isle A Temperature	73.2 Deg
2 Server Room East Humidity	42.8 %RH
3 Server Isle B Temperature	73.4 Deg
4 Server Room North Humidity	42.9 %RH
5 FM200 System Normal	
6 No Water Leak (CRAC1.001)	
7 No Leak Alarm (CRAC1.002)	
8 No Leak Alarm (CRAC1.003)	
Relays -	
RELAY #1	Normal
RELAY #2	Normal
Option Slots	
Slot #1	
Slot #2	
Slot #3	
Slot #4	
Modbus/Bacnet Units	
System Menu	
Identity	
Alarm History	

Figure 3.13 PDA Width Configuration

Analog Average: Allows users to change the averaging method for analog inputs. Normally, the system samples analog points once a second while tracking high and low values for each analog point. After sixty seconds, the high and low values for these points and the average of these readings are recorded in the Minute Log. To alter this method of averaging, change the value to one of the values listed in the drop down menu. Zero or one maintains the method described above; a higher value changes the method of averaging, and the manner by which high and low values are recorded. See [Appendix B, “Analog Averaging” on page 159](#).

HTML Main Page Points: Determines the number of monitoring points displayed on the Main Menu. With the default of “0,” the Summary Alarm Box, Internal Temperature and Humidity Box and a link to View All Points are displayed. Settings greater than “0” will display the selected points with links to the remaining points. It is typical to display all installed points. If the FMS is continuously monitored with a Web browser, it may be desirable to set the HTML Main Page Points to “0” and monitor the View all Points page.

Digital Status Color: Determines the color of Digital Status points on the Main Menu when the input is turned on. The options are green, gold and magenta. Typically, points are configured to be green and turn red on alarm. However, inputs configured for Digital Status do not trigger notification. For these points, this setting determines the color of the point when the input is on.

Note Changes take effect once the Submit Changes button is clicked.

Html Alarm History Display: This option allows users to choose how alarms are acknowledged in the Alarm History page. The FMS is defaulted to “And all acknowledgments.” This means that at least two people must acknowledge the alarm for the history to show it has been acknowledged. If users want to allow only one person to acknowledge the alarm to have the Alarm History page log it, select the “Or the acknowledgments.”

3.5. Alarm Management

Figure 3.14 Alarm Settings Menu

The **Alarm Management** link allows users to perform the following tasks:

- ◆ Acknowledge current FMS alarms.
- ◆ Clear the FMS Alarm and Access History Logs.
- ◆ Enter the appropriate code or user's initials to acknowledge or clear alarm histories.
- ◆ Enable or disable maintenance time.
- ◆ Designate a maintenance window by selecting the **Set Maintenance Time** button, which will disable alarm notifications for a designated period of time.
- ◆ Enable or disable alarm logging during the maintenance window.

3.6. Trends

Trends					
#	Point	Type	Interval	Info	Format
1	1	Physical	1 Min	Expedient WI-TS	Format Trend 1
2	2	Physical	5 Min	ANALOG #2	Format Trend 2
3	3	Physical	15 Min	ANALOG #3	Format Trend 3
4	4	Physical	1 Hour	ANALOG #4	Format Trend 4
5	5	Physical	2 Hour	ANALOG #5	Format Trend 5
6	6	Physical	4 Hour	ANALOG #6	Format Trend 6
7	7	Physical	6 Hour	ANALOG #7	Format Trend 7
8	8	Physical	8 Hour	ANALOG #8	Format Trend 8

Figure 3.15 Trends Configuration Page

Allows users to configure the FMS to have custom trending on analog point, physical or Modbus.

There are 32 points available on the FMS that can have selectable time intervals assigned to the points, being 1, 5, 15 minute, 1, 2, 4, 6, and 8 hour intervals. Enter the physical channel or Modbus index number in the point field. Select either physical or Modbus/bacnet from the type field. Select the interval desired from the drop down in from the interval field. Click on the Format Trend XX button on the right hand side of the screen once your information has been filled out for that #.

3.7. Clock

Figure 3.16 Clock Configuration

The **Clock** page allows users to set the date and time on the FMS internal clock.

- ◆ Enter the date using a MM/DD/YY format, where MM is a two digit month, DD is a two digit day, and YY is a two digit year.
- ◆ Enter the time using a HH/MM/SS format, where HH is a two digit hour (1-24), MM is a two digit minute, and SS is a two digit second.

3.8. Schedules

Figure 3.17 Schedule Configuration

The **Schedules** page allows users to schedule the activation and deactivation of relay outputs. This is useful for cycling redundant equipment such as chillers, generators, etc. Relays are assigned these schedules through the Relay Configuration menus. **Begin DOW** is the day of the week the schedule will begin. **End DOW** is the day of the week the schedule will end.

3.9. Battery

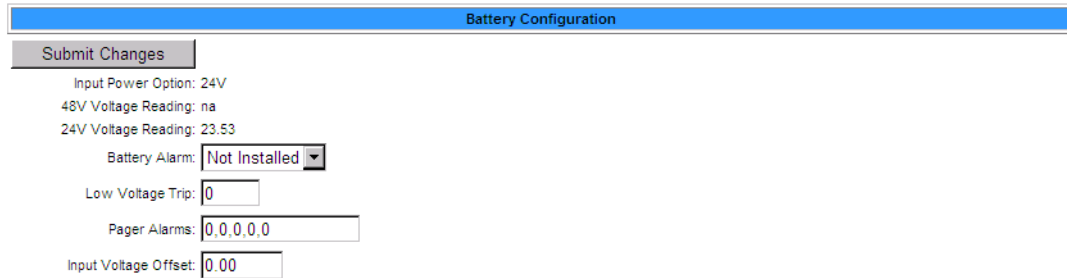


Figure 3.18 Battery Page

The **Battery** page allows users to configure power monitoring when the FMS is running off a 48V battery.

Low Voltage Trip: The input voltage value below which an alarm occurs.

Alarm Dial Out: Specifies which of the pre-programmed phone numbers and which order to dial them if a low input voltage condition occurs.

Input Voltage Offset: A negative or positive number used to adjust the input voltage reading: + adds offset and - subtracts offset.

3.10. URL Links (1-5)

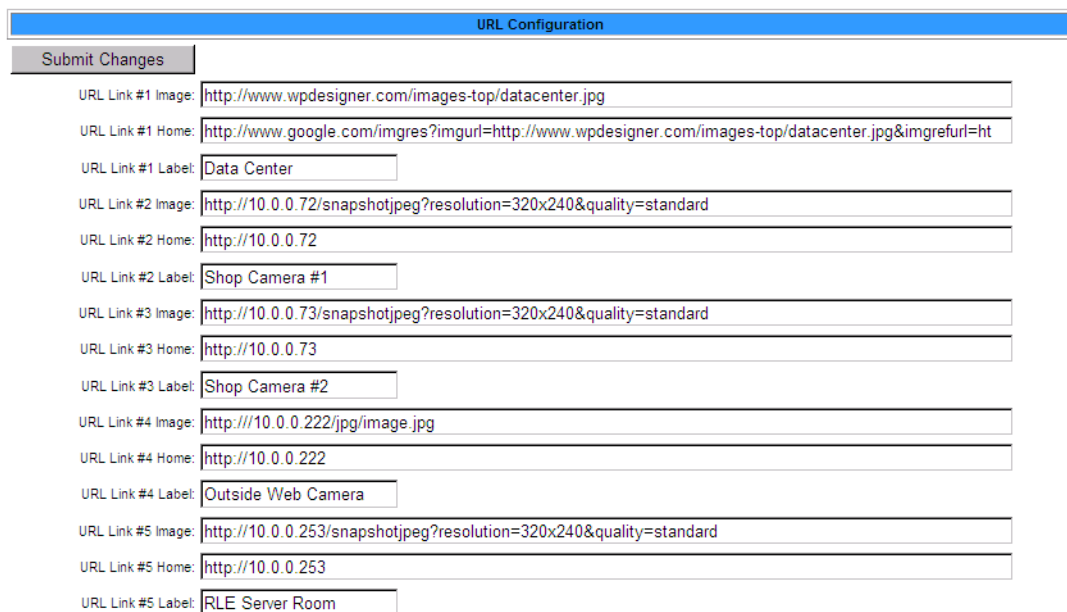


Figure 3.19 URL (1-5) Links Configuration

The Main Menu of the FMS Web interface displays a large image and links to other images. These images can be graphics, logos or images from an IP camera. The **URL Links (1-5)** page allows users to specify which images and URLs will be available from the first five links on the FMS Main Menu.

For Axis207 Web Cameras set the URL link to the following:

- ◆ URL Link #x Image: <http://xxx.xxx.xxx.xxx/jpg/image.jpg>
- ◆ URL Link #x Home: <http://xxx.xxx.xxx.xxx>
- ◆ URL Link #x Label: Enter the Camera's Label

For Panasonic KX-HCM110A Web Cameras, set the URL link to the following:

- ◆ URL Link #x Image:
<http://xxx.xxx.xxx.xxxsnapshotjpeg?resolution=320x240&quality=standard>
- ◆ URL Link #x Home:
<http://xxx.xxx.xxx.xxx/ImageViewer?Mode=Motion&resolution=320x240&quality=standard>
- ◆ URL Link #x Label: Enter the Camera's Label

3.11. URL Links (6-10)

URL Configuration	
Submit Changes	
URL Link #6 Image:	http://www.arapahoebasin.com/ABasin/assets/images/webcams/webcam2/abasincam2.jpg
URL Link #6 Home:	http://www.arapahoebasin.com
URL Link #6 Label:	Arapahoe Basin, CO
URL Link #7 Image:	http://www.rsn.com/files/webcams/546.jpg
URL Link #7 Home:	http://www.rsn.com
URL Link #7 Label:	Copper Mountain, CO
URL Link #8 Image:	http://www.mtn-resorts.com/webcam/mtncam.jpg
URL Link #8 Home:	http://www.steamboatcam.com/
URL Link #8 Label:	Steamboat Springs, CO
URL Link #9 Image:	http://www.brecklivecam.com/BreckenridgeSouthcamera.jpg?1259859825187
URL Link #9 Home:	http://www.brecklivecam.com
URL Link #9 Label:	Breckenridge, CO
URL Link #10 Image:	http://aspenwebcam.com/web/cam2
URL Link #10 Home:	http://aspenwebcam.com/
URL Link #10 Label:	Aspen, CO

Figure 3.20 URL (6-10) Links Configuration

The **URL Links (6-10)** page allows users to specify which images and URLs will be available from links 6-10 on the FMS Main Menu.

3.12. Links

Links Configuration

Submit Changes

Link 1 Ip Address: 10.0.0.209

Link 2 Ip Address: 10.0.0.210

Link 3 Ip Address: 10.0.0.211

Link 4 Ip Address: 10.0.0.212

Figure 3.21 Links Configuration Page

The Main Menu allows users to link to up to four other FMS units. The **FMS Links** page allows users to designate the IP Addresses of these additional FMS units.

3.13. Nest/Egg

The Nest/Egg page allows users to configure the FMS Nest/Egg capabilities. More specifically, the FMS contains a webpage, or “Nest,” that can monitor up to 32 other FMSs, or “Eggs.” The Nest will display the name and a summary alarm from each Falcon Egg. The summary alarm status of each Egg will automatically refresh based on the Web refresh rate determined for that individual FMS.

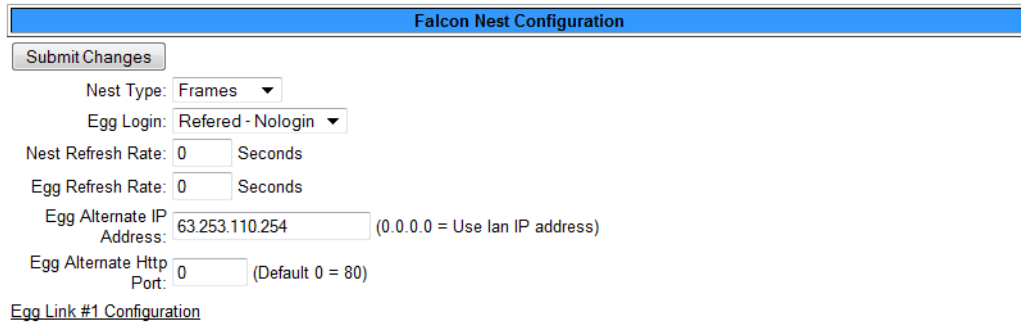
The Nest also provides a link for each Falcon Egg. When an alarm occurs, the summary alarm box turns red and the operator can select the link to open the alarming FMS webpage to view the alarm.

Once configured, a “Falcon Nest” link appears at the bottom of the Main Menu. Clicking the “Falcon Nest” link opens the Falcon Nest page where all configured Falcon Eggs are displayed; see [Figure 3.22](#).

0	No Alarms	FMS-AAAA-Y-24 (FCF)
2	Alarms!	Sever Room A Fort Collins
4	No Alarms	8126
6	No Alarms	FMS20U
8	No Alarms	FMS32
10	Alarms!	FMS-X-N-24
1	Alarms!	Technical Support F1000
3	No Alarms	Burn In Room Falcon
5	No Alarms	2006
7	No Alarms	uninitialized
9	Alarms!	FalconLite (FLS8)
11	Alarms!	FMS-ABCM-N-24

Figure 3.22 Nest Egg Configuration Page

3.13.1 Falcon Nest Configuration



The screenshot shows a web browser window with a blue header bar labeled "Falcon Nest Configuration". Below the header is a "Submit Changes" button. The configuration options are as follows:

- Nest Type: Frames (dropdown menu)
- Egg Login: Referred - Nologin (dropdown menu)
- Nest Refresh Rate: 0 Seconds (input field)
- Egg Refresh Rate: 0 Seconds (input field)
- Egg Alternate IP Address: 63.253.110.254 (input field) (0.0.0.0 = Use lan IP address)
- Egg Alternate Http Port: 0 (input field) (Default 0 = 80)

At the bottom of the form, there is a link labeled "Egg Link #1 Configuration".

Figure 3.23 Nest Configuration

The **Falcon Nest** link appears at the bottom of the Main Menu after the Nest/Egg has been configured. The Falcon Nest page and all configured Falcon Eggs are displayed. The **Nest Type** option enables or disables the Falcon nest page. Selecting “Frames” enables the nest page.

3.13.2 Egg Configuration

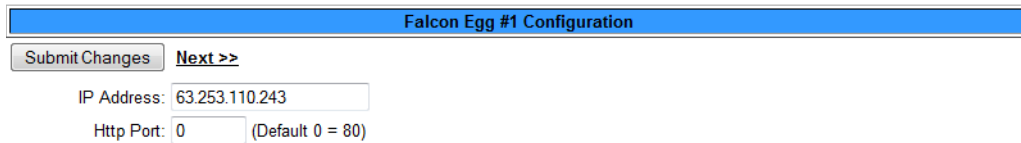


Figure 3.24 Egg Configuration

The **Egg #1 Configuration** link on the Falcon Nest page allows users to enter the IP Address and HTTP port for each Falcon Egg. The HTTP port can be changed for added security. The HTTP port must be set the same as the FMS HTTP configuration setting, located under the System Configuration Menu.

3.14. Modem/Pagers

The **Modem** link allows users to configure the FMS internal modem. This instructs the FMS when, how, and whom to call when an alarm occurs; see definitions below for more information.

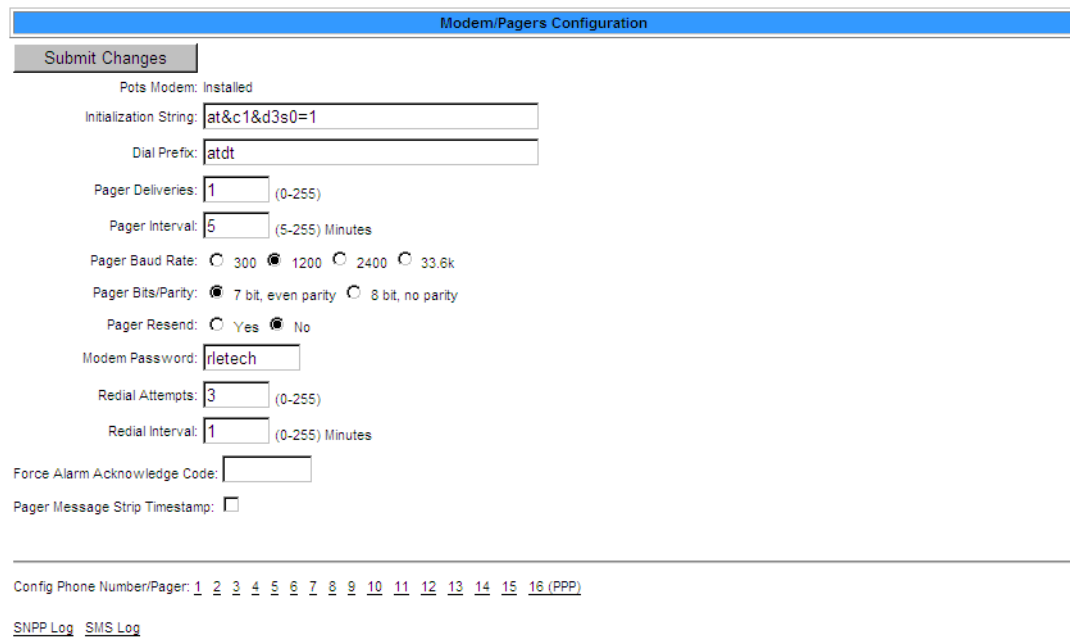


Figure 3.25 Modem Configuration

Initialization String: A maximum of 38 characters. **&c1 and &d3 are mandatory.** **s0=1** sets the modem to answer after one ring. **s0=0** disables the auto answer and prevents dial-in access.

Dial Prefix: Should be a specific Hayes compatible command or dial modifier depending on pager requirements. It is also limited to 38 characters. The default is set to **atdt**.

Pager Deliveries: Designates the number of times (0-255) the pager is called until the alarm is acknowledged. Pagers are called in sequence.

Example: If Pager Deliveries is set to 3 and pagers 1, 7, and 10 are programmed to be notified, the FMS dials 1, 7, 10, 1, 7, 10, 1, 7, 10. As soon as the alarm is acknowledged, the FMS quits dialing the pagers with that particular access code. Pagers with different access codes are still dialed.

Pager Interval: Determines the number of minutes to wait between redials.

Pager Baud Rate: Allows users to determine the connection speed. Select 300, 1200, 2400 or 33.6k.

Pager Bits/Parity: Allows the user to set the pager communications settings. Select 7 bit, even parity or 8 bit, no parity to match the settings of the pager service provider's TAP service phone number.

Pager Resend: Select yes for the FMS to send all unacknowledged alarms in the Alarm History Menu. Select no to send only the last unacknowledged alarm. If no is selected, the FMS will auto-acknowledge all alarms associated with that particular pager once a successful page has occurred.

Modem Password: Defines a remote access password, seven characters maximum. The password is used when remotely logging into the FMS through a modem.

Redial Attempts: Determines the number of times (1–255) to call a number until the call is successful. Enter 0 to disable this function.

Redial Interval: Establishes the number of minutes (1–255) to wait between redials. Enter 0 to disable this function.

Force Alarm Acknowledge Code: Establishes a code that acknowledges all unacknowledged alarms. This acts as a master code and can override all other alarm acknowledge codes.

Pager Message Strip Timestamp: Check to remove the alarm timestamp from the pager message. This reduces the size of the pager message as the user can estimate when the alarm occurred based on when the page was received.

Note Changes take effect once the Submit Changes button is clicked.

3.14.1 Configure Phone Numbers

The screenshot shows a web form titled "Phone Number 1 Configuration". At the top left is a "Submit Changes" button. Below it, the status "Pots Modem: Installed" is displayed. The "Select Phone type:" dropdown menu is set to "None". There are input fields for "TAP Number/SNPP Server:", "Pager Id:", and "Acknowledge Code:". At the bottom, the "Dial Back on Returns:" option has radio buttons for "Yes" and "No", with "No" being selected. A navigation bar at the bottom contains links for "Config Phone Number:" followed by numbered links 1 through 16, and a link for "(PPP)".

Figure 3.26 Phone Number Configuration

A screen similar to [Figure 3.26](#) is accessed through the **Config Phone Number** link at the bottom of the Modem Configuration page. This screen allows users to configure pager and cell phone numbers that are used for alarm notification.

Select Phone Type: Determines which type of device the FMS calls. Choose the **Alphanumeric Pager/Cell Phone** option to dial an alphanumeric pager or cell phone. Choose SMS/TEXT/GSM if using a GSM modem that is connected to the FMS COM1 EIA-232 port or SNPP for paging over Ethernet (this is a feature some cell/pager provider do not support).

TAP Number/SNPP: Enter the pager service number for alphanumeric pager or cell phone entries. If using the SMS/TEXT/GSM, enter the cell phone number to dial. Each comma after the number represents a two second delay. This delay allows time for the service to answer before requesting the pager ID. *Typically, it will only be necessary to use one comma between pager numbers.* However, based on set-up and pager services, users may need to experiment with the number of commas that are used. In some cases, a 9 must be entered to access an outside line.

Pager ID: Mandatory for numeric and alphanumeric pagers.

- ◆ **Alphanumeric pager:** The ID entered is sent to the paging service along with all queued alarm messages. The ID is the unique PIN for a specific pager. The ID may be a maximum of 16 characters.
- ◆ **Numeric pager:** The ID entered may be configured to deliver different numeric messages. The ID can contain 15 characters: any combination of the numerals 0 through 9 and a * or #. These are the only characters that will be transmitted to the paging service. A \$ can be added or inserted anywhere in the message. This is converted into a 5 digit alarm code: YZZZZ.

Y - Binary Alarm Condition: 1=on, 0=return to normal (RTN)

ZZZZ - Alarm ID Number; see the [Appendix E, “Alarm ID Reference Tables”](#) on page 169.

Example: A **10011** message is an Input 1, High Limit 1 Alarm. A **04030** message means that Digital Input #83 (in slot 4) has Returned to Normal.

Note When using the \$, if multiple unacknowledged alarms are present in the Alarm History Log, the alarm code will be 99999.

An effective numeric page depends largely on the parameters established by the paging service. Users may need to experiment with different parameters in order to achieve desired results.

Acknowledgement Code: Any number, up to six digits, used to acknowledge receipt of an alarm and to terminate any additional call outs for this phone number. This code will acknowledge only those alarms sent to this phone number. The alarms can be acknowledged using this code by dialing the FMS with a touch tone phone and entering this code followed by the # sign. It can also be acknowledged by selecting the Acknowledge Alarms button on the bottom of the Alarm History page.

Multiple phone numbers can use the same acknowledge code. This allows one user to acknowledge alarms sent to multiple pager numbers.

Note The Acknowledge Code should be different than the access codes. If this code is the same as one of the access codes, the Falcon will acknowledge the alarms associated with the acknowledge code, enter a successful entry in the Access Log, and activate the relay outputs which are set for keypad activation.

Dial Back on Returns: Determines whether to call the number again once the alarm condition returns to normal.

Note Changes will not go into effect until the Submit Changes button is clicked.

3.14.2 Configure Phone Number 16 (PPP)

Phone Number 16 (PPP-DUN) Configuration

Submit Changes

DUN Phone #:

DUN User Name:

DUN Password:

Config Phone Number: [1](#) [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) [8](#) [9](#) [10](#) [11](#) [12](#) [13](#) [14](#) [15](#) [16 \(PPP\)](#)

Figure 3.27 Phone Number 16 (PPP) Configuration

This page is accessed through the **16 (PPP)** link at the bottom of the Modem Configuration page. This screen allows users to configure a dial-up networking account.

DUN Phone #: Specifies the phone number of the Internet Service Provider (ISP) to connect to.

DUN User Name: Enter your Internet Service Provider (ISP) account user name.

DUN Password: Enter the password associated with the Internet Service Provider (ISP) account.

3.15. Keypad/DTMF Access Users

Keypad/DTMF Access User Configuration							
Submit Changes							
#	Id Code:	User Name:	Type:	#	Id Code:	User Name:	Type:
1	1590	fred	Permanent	2	2	User #2	Permanent
3	3	User #3	Permanent	4	4	User #4	Permanent
5	5	User #5	Permanent	6	6	User #6	Permanent
7	7	User #7	Permanent	8	8	User #8	Permanent
9	9	User #9	Permanent	10	10	User #10	Permanent
11	11	User #11	Permanent	12	12	User #12	Permanent
13	13	User #13	Permanent	14	14	User #14	Permanent
15	15	User #15	Permanent	16	16	User #16	Permanent
17	17	User #17	Permanent	18	18	User #18	Permanent
19	19	User #19	Permanent	20	20	User #20	Permanent
							Permanent Temporary

Temporary Time: Disabled	Set Temporary Time
Temporary Time Remaining: 0:00:00 (HH:MM:SS)	

Figure 3.28 Sample URL (6-10) Links Configuration

The **Keypad/DTMF Access Users** link allows configuration of a maximum of 20 access codes and user names. The access code can be up to six digits long. The user name can be up to 20 characters long. Each ID Code/User can be selected as a “Permanent” or “Temporary” type. Temporary users are only allowed access during the time specified in the Temporary Time drop box. This time may be set by selecting the Set Temporary Time button.

Once the time frame has expired, the temporary users will not be allowed access. However, their information will remain in the Keypad/DTMF field until it is manually removed. While temporary users will not be allowed access to a facility after their allotted time slot, no alarm notification will be transmitted if they try to re-enter the facility through the keypad. Their information must be manually removed from the system in order to activate the alarm notification.

3.16. Internet Protocol

Web User Configuration				
Submit Changes				
#	User Name:	Password:	Privilege:	Last Web Access:
1	falcon		Administrator	02/05/10 18:47:56
2	John Doe	read	Read-only	
3	Jane Smith	write	Read-write	
4			None	
5			None	
6			None	
7			None	
8			None	

Figure 3.29 Sample IP Configuration Menu

The **IP Configuration** link found on the System Configuration page allows users to change a variety of settings, including the FMS IP Address (used in point-to-point “PPP”), Default Router and Net Mask. Contact a network administrator to obtain a valid IP Address for the network. Then, type the appropriate IP Address, Net Mask (subnet), and Default Router into their respective fields.

IP Address: Field used for setting the Falcon FMS IP address.

Net Mask: Field used for setting the Falcon FMS Subnet Mask address

Def Route: Field used for setting the Falcon FMS Default Gateway address.

HTTP Port: The FMS broadcasts its webpages on Port: 80 of the IP Address assigned. A zero in the field block defaults the FMS to Port: 80. This can be changed to a specific port allowing increased security of the webpage broadcast.

TFTP Server Enable (udp port: 69): This setting opens or closes Port 69 on the LAN connection to the FMS. The TFTP port is used to upgrade firmware and save and load configurations. It can be disabled for security reasons and only opened for short periods of time during firmware upgrades; see [Chapter 9, “Loading Firmware and Configuration Data” on page 141](#), for more information.

TCP Max Seg Size: This adjusts the size of the web page packets being broadcast. Default size is set to 1436, you may need to set it to 536 for VPN access or satellite uplink networks.

PPP Server: Sets the IP Address of the FMS network connection when accessing the FMS via its internal modem. This is required to allow a remote PC to view the FMS webpages over a dial-up connection; see [Chapter 8, “Point-to-Point Protocol” on page 139](#), for more information.

PPP Assignment: Sets the IP Address of the remote PC’s network connection when accessing the FMS via its internal modem. This is required to allow a remote PC to view the FMS webpages over a dial-up connection. The remote PC’s dial-up settings should be set to “Obtain an IP Address Automatically.”

3.17. User Administration (Web Access)

Web User Configuration			
Submit Changes			
#	User Name:	Password:	Privilege:
1	falcon		Administrator
2	John	Doe	Read-only
3	Jane	Smith	Read-write
4			None
5			None
6			None
7			None
8			None

Figure 3.30 Web Access Configuration

The **User Administration (Web Access)** page allows the administrator to configure eight separate accounts, usernames, passwords and privileges for Web access accounts.

- ◆ **Read-Only** privileges allow the user to view the Main Menu, Keypad Access History, Alarm History, Event History, Digital Data History, Identity, Relay Status, Relay Control and URL Links webpages. The Configuration page cannot be viewed or changed by a Read-Only user. A Read-Only user can acknowledge alarms by entering their acknowledge code at the bottom of the Alarm History page. A Read-Only user cannot change any settings.
- ◆ **Read-Write** privileges allow the user to have full access to all pages (viewing and changing) except the User Administration (Web Access) page shown above.
- ◆ **Administrator** privileges allow the user to have full access to all pages including the User Administration (Web Access) page shown above.

3.18. Network Statistics

```

Netstats for Mac: 00:90:5B:04:03:28 IP: 10.0.0.204

ints:      5511      inpackets:  5494      processed:  5495
refused:    0      arp:      1866      ip:         3593
tx sent:   1958      tx refused:  0      tcp retries: 0
tcp_timeouts:7

RMON_T_DROP      = 0      RMON_T_PACKETS  = 1958
RMON_T_BC_PKT    = 8      RMON_T_MC_PKT   = 0
RMON_T_CRC_ALIGN = 0      RMON_T_UNDERSIZE = 0
RMON_T_FRAG      = 0      RMON_T_JAB      = 0
RMON_T_COL       = 0      RMON_T_P64      = 457
RMON_T_P65TO127  = 1179   RMON_T_P128TO255 = 18
RMON_T_P256TO511 = 16      RMON_T_P512TO1023 = 288
RMON_T_P1024TO2047 = 0    RMON_T_P_GTE2048 = 0
RMON_T_OCTETS    = 291293  IEEE_T_DROP     = 0
IEEE_T_FRAME_OK  = 0      IEEE_T_1COL     = 0
IEEE_T_MCOL      = 0      IEEE_T_DEF      = 0
IEEE_T_LCOL      = 0      IEEE_T_EXCOL    = 0
IEEE_T_MACERR    = 0      IEEE_T_MACERR   = 0
IEEE_T_CSERR     = 1958   IEEE_T_SQE      = 0
IEEE_T_FDXFC     = 0      IEEE_T_OCTETS_OK = 291293
RMON_R_PACKETS   = 6373   RMON_R_BC_PKT   = 2681
RMON_R_CRC_ALIGN = 0      RMON_R_UNDERSIZE = 0
RMON_R_OVERSIZE  = 0      RMON_R_FRAG     = 0
RMON_R_JAB       = 0      RMON_R_RESVD_0  = 0
RMON_R_P64       = 3458   RMON_R_P64      = 3458
RMON_R_P65TO127  = 1707   RMON_R_P128TO255 = 77
RMON_R_P256TO511 = 1106   RMON_R_P512TO1023 = 25
RMON_R_P_GTE2048 = 0      RMON_R_1024TO2047 = 0
RMON_R_OCTETS    = 768595 IEEE_R_DROP     = 0
IEEE_R_FRAME_OK  = 5518   IEEE_R_CRC      = 0
IEEE_R_ALIGN     = 0      IEEE_R_MACERR   = 0
IEEE_R_FDXFC     = 0      IEEE_R_OCTETS_OK = 500996

```

[Refresh netstats page](#)

Figure 3.31 Network Statistics Page

Network Statistics: Displays network and EIA-485 statistics including: network packets received, packets transmitted, and errors.

3.19. ICMP Ping

Figure 3.32 ICMP Ping Page

ICMP Ping: Allows a user to ping an IP address from the FMS. The results of the ping will display below in the “Last Ping Results” table.

3.20. Email/DNS

Figure 3.33 E-mail Configuration Page

The **email** page allows users to configure the FMS to send notifications via email when inputs are in an alarm state. The FMS will send one email message per alarm instance to a maximum of eight email recipients.

Access Type: Specifies whether to send the message through a local network or over a PPP dial-up connection.

DNS Servers: Information provided by your Internet Service Provider. It is needed to deliver the email message.

Mail (SMTP) Server: Specifies the email server used to receive and send mail.

Mail Sender Address: The address displayed in the “From” field of the email message.

Mail Subject: Displayed in the subject field of the received email messages. Adding &m inserts the MAC Address of the FMS into the email subject line. This ensures the email subject is always unique to a FMS.

Mail Recipient (1)–Mail Recipient (8): Specifies the addresses of up to eight email recipients.

SMTP User Name: Used for ESMTP. Use the recommended default setting unless instructed differently by your IT Department.

SMTP Password: Used for ESMTP. Use the recommended default setting unless instructed differently by your IT Department.

SMTP Authentication: Used for ESMTP. Use the recommended default setting unless instructed differently by your IT Department.

3.21. Network Time Protocol (NTP)

Network Time Protocol (NTP) Configuration

Submit Changes

Network Time (NTP) Server: (IP address or hostname)

Update Interval: (5-1440 Minutes - 0 for disabled)

Select Time Zone:

Daylight Savings Time:

DST Begin Date:

DST End Date:

Mail Server DNS address logged for: "smtp.bizmail.yahoo.com" 69.147.95.65
 Mail Server Dns TTL: 72
 Ntp server Ip Addr: 132.163.4.101

sysUpTime (/100): 1314
 LastNtpRequestTime: 0
 LastNtpResponseTime: 0
 NextNtpRequestTime: 0
 LastTransmitTimestamp: 00000000
 Last Ntp Update: ST (UTC 0)

Figure 3.34 Network Time Protocol (NTP) Configuration Page

Network Time Protocol (NTP) is widely used on the Internet to synchronize computer clocks to national standard time or Coordinated Universal Time (UTC). It synchronizes the time of a computer or server—in this case, the FMS—to another server or reference time source. NTP is important in maintaining a high level of accuracy and reliability in time stamped events. This page allows users to configure the FMS NTP feature.

Network Time (NTP) Server: The IP address or hostname of the Network Time Protocol Server with which the FMS will synchronize. Examples of public NTP Servers include “us.pool.ntp.org” and “time.nist.gov.”

Update Interval: The time in minutes the FMS takes to request time updates from the NTP Server. This can be set from 5-1440 minutes. Enter 0 to disable.

Retry Interval: The time in seconds the FMS waits before retrying a failed connection to the NTP Server. This can be set from 10-120 seconds.

Select Time Zone: Enter the time zone in which the FMS resides.

Daylight Savings Time: Select the hour Daylight Savings Time occurs. Typically, this is 2:00 A.M. local time.

DST Begin Date: Enter the date Daylight Savings Time will begin.

DST End Date: Enter the date Daylight Savings Time will end.

3.22. SNMP/Syslog

SNMP/Syslog Configuration			
Submit Changes			
MIB-2 System			
System Name:	FMS-CCCC-N-24 (FCF)		
System Contact:	Technical Support		
System Location:	Technical Support Office		
V1/V2C Community Names			
Get/Read:	public		
Set/Write:	public		
Trap:	public		
Traps			
Select Snmp Trap Type:	V1-Trap		
Max Inform Retries:	0 (0-999) (0=unlimited)		
Persistent Trap/Inform Interval:	0 (1-999) Minutes (0=Send Once)		
Analog Trap varbinds:	☒ Value/UOM/Label ☐ Label Only		
Trap Type:	☒ AlarmEntryAdded ☐ falconPortTraps		
Configuration Changed Trap Community:	0 (1-4, 0=Disabled)		
Input Trap Delivery:	☒ LAN ☐ ppp		
Trap Destinations			
#	IP Address	TrapEnable	Syslog Message
1	0.0.0.0	☐	☐
2	10.0.0.69	☒	☐

Figure 3.35 SNMP Configuration Page

SNMP/Syslog Configuration allows users to configure SNMP and Syslog notification options; see definitions below:

System Name: Appears on the FMS Main Menu and is included as part of email and pager notifications. The System Name can also be viewed and changed in the System Configuration Menu.

System Contact: Lists the individual responsible for the FMS. The System Contact is only available through SNMP Gets and is not included in email, pager, or SNMP Trap notifications.

System Location: Lists the location of the FMS. It is used to help identify the FMS when viewing the webpages. The System Location is not included in email, pager, or SNMP Trap notifications.

Select Snmp Trap Type: This drop down lists the three types of SNMP versions; V1-Trap, V2C-Trap, and V2C-Inform. Optional SNMPv3 for users in North America

Persistent Traps: Enables the FMS to issue continuous SNMP Traps until an alarm acknowledgement is received by the FMS or until the alarming point returns to normal. The parameter is a user defined time interval that is set in minutes. Traps can be acknowledged from the Alarm Management page. The SNMP Traps do not include any delivery verification. A Persistent Trap setting of 5 or 10 minutes will trigger the FMS to send the Trap on a regular interval in case the previous Trap did not reach the Network Management System (NMS). Typically, the NMS can be set to ignore duplicate Traps to prevent re-arming at the NMS.

Analog Trap Varbinds: Used for communication to an NMS via SNMP Traps. The default will add the Value, UOM (Unit of Measure), and the Label fields. The FMS can be configured to send only the label on analog Traps, if preferred. This makes analog Traps the same format as digital Traps which may make parsing the Traps easier for the NMS.

Trap Type: The default is set to send an “Alarm Entry Added” type Trap. The Trap Type can be set to a Port Type Trap (falconPortTraps). Selecting “AlarmEntryAdded” enables the “AlarmEntryAdded” and “AlarmEntryRemoved” Trap. An “AlarmEntryAdded” Trap will be sent anytime a new alarm is added to the Alarm History log. The contents of the “AlarmEntryAdded” Trap contain the Alarm Label. The NMS can receive the Trap, extract and display the Alarm Label. An “AlarmEntryRemoved” Trap will be sent anytime a Return to Normal Alarm is added to the Alarm History log. The contents of the “AlarmEntryRemoved” Trap contain the Alarm Label. Selecting “falconPortTraps” enables two Traps per FMS input: a “FalconPortxxTrap” and a “FalconPortxxTrapClear.” For example, when input #1 goes into alarm, the FMS sends a “FalconPort01Trap.” When input #1 returns to normal, the FMS sends a “FalconPort01TrapClear.”

Selecting “AlarmEntryAdded” makes configuring the NMS easier, since the NMS only needs to be configured for a couple Traps. Choosing “falconPortTraps” requires more configuration at the NMS, but may make it easier to display, set severity, and parse the data in the NMS.

Trap Delivery: Determines if the SNMP Trap is sent out the LAN connection or dials out and sends the SNMP Trap over the modem connection. If PPP is selected, the dial-up connection, or phone number 16, needs to be configured. Phone numbers are configured through the Modem Configuration page by clicking the 16 (PPP) link.

Input Trap Delivery: Selects between LAN or PPP (modem/dial-up).

Communities: Identifies devices that receive SNMP Traps and/or Syslog messages from the FMS and interacts with the FMS over the network. To add a device to the Communities list,

select a community number posted as “empty.” Enter the receiving device's IP Address and a string that identifies the device. An IP Address of 0.0.0.0 in this field allows any device to access the FMS through an MIB browser. Select “Write” if the device will have Read/Write network access. This allows the FMS to be configured over the network. Select “Traps” if the device will receive Traps from the FMS.

3.23. BACnet

Bacnet Configuration

Submit Changes

BACnet Device Name:Tech Support FMS-AAAA-Y-24 (FCF)

BACnet Device ID:7201

BACnet Description:Falcon-CF

Bacnet UDP Port:0(0 = 47808)

Bacnet BBMD-BDT:
Falcon IP Address: 63.253.110.254:0 Mask: 32 (FFFFFFF)

(Primary) #1 IP Address:0.0.0.0Port:0Mask:0(1-32)

#2 IP Address:0.0.0.0Port:0Mask:0(1-32)

#3 IP Address:0.0.0.0Port:0Mask:0(1-32)

#4 IP Address:0.0.0.0Port:0Mask:0(1-32)

Bacnet Packet Log

Property Identifiers Supported

BACnet_Present_Value

BACnet_Object_Identifier

BACnet_Object_Name

BACnet_Object_Type

BACnet_Event_State

BACnet_Status_Flags

BACnet_Out_Of_Service

BACnet_Units

BACnet_Time_delay

Bacnet Device Objects

BACnet_Object_Identifier

BACnet_Object_Name

BACnet_Object_Type

BACnet_System_Status

BACnet_Vendor_Name

BACnet_Vendor_Id

BACnet_Model_Name

BACnet_Firmware_Revision

BACnet_App_Software_Revision

BACnet_Location

BACnet_Description

BACnet_Protocol_Version

BACnet_Conformance_Class

BACnet_Services_Supported

BACnet_Object_Types_Supported

BACnet_Object_List

BACnet_Max_APDU

BACnet_Segment_Supported

BACnet_Segment_Timeout

BACnet_APDU_Timeout

BACnet_APDU_Retries

BACnet_Bindings

Figure 3.36 BACnet Configuration Pages

BACnet Device Name, BACnet Device ID, and BACnet Description: Required for the FMS to allow Building Management System (BMS) to poll the FMS inputs using the BACnet protocol over LAN connections. For further information regarding BACnet Device Name, BACnet Device, and BACnet Description, consult the BACnet Standard or your IT Department.

3.24. Modbus/Com Port 1

The **Modbus/COM1 Configuration** pages allow users to configure Com Port 1 or Modbus features. If Modbus is not configured, there will be no Modbus options in the drop down box. Configuration for the Modbus/ Com Port 1 Configuration are explained in greater detail in 5.3., “Modbus/COM1 Configuration (Modbus Master and Slave)” on page 101.

Notes The FMS unit does not come with Modbus communication. The EXP-MBCS option installed in order to have the option of configuring Modbus Communication. To configure a unit, contact RLE.

Figure 3.37 will only be displayed if the EXP-MBCS option is installed.

Modbus / Com Port 1 Configuration

Submit Changes

Modbus/TCP Slave Enable: ☒ Yes ☐ No

Modbus/TCP Slave Unit Identifier: (1-254, 0 = disabled)

Serial Com 1 Protocol Type: Modbus Master Generic - 16 Units

Serial Baud Rate: ☐ 1200 ☐ 2400 ☒ 9600

Serial Interface Type: ☐ EIA-485 ☒ EIA-232

Telnet Inactivity Timeout: Minutes

Modbus Serial Slave Address: (1-254, 0 = disabled)

Master Poll Timeout: (1 - 10) Seconds

Master Poll Interval: (250 - 2000) mS

Master Retry Attempts: (1 - 99)

BCM Zero Amp Alarm Level: (0.000 - 1.000)

BCM Status Display: ☒ Left-Right ☐ Vertical

[Modbus Slave Register Display Log](#)

[Modbus Packet Log](#)

[Reset Modbus Port](#)

[Modbus Master Poll Data Log](#)

[SMS/Text Modem Log](#)

Figure 3.37 Modbus/Com1 Configuration

3.25. Modbus/Slave Units

The **Modbus Slave Unit Configuration** can only be configured after the Modbus/Com Port 1 Communication has been set-up; see [Figure 3.38](#). In other words, users must tell the FMS that they are using it for Modbus communication before users can configure the Modbus slave units.

The **Slave Unit Configuration** page will change depending on what type of Serial Protocol users set it up for (i.e., Modbus Master BCM - 4 Units, Modbus Master Generic - 16 Units, or Modbus Master BCM - 16 Units) selected on the Modbus/COM1 Configuration page; see [Figure 3.25 on page 62](#). For more information on Modbus Slave Unit configuration see [5.3.](#), “[Modbus/COM1 Configuration \(Modbus Master and Slave\)](#)” on page 101.

The screenshot displays the 'Modbus / Com Port 1 Configuration' web interface. At the top is a blue header bar with the title. Below it is a 'Submit Changes' button. The configuration options include:

- Modbus/TCP Slave Enable:** Radio buttons for 'Yes' (selected) and 'No'.
- Modbus/TCP Slave Unit Identifier:** A text input field containing '1', with a note '(1-254, 0 = disabled)'.
- Serial Com 1 Protocol Type:** A dropdown menu set to 'Modbus Slave'.
- Serial Baud Rate:** Radio buttons for 1200, 2400, and 9600 (selected).
- Serial Interface Type:** Radio buttons for EIA-485 (selected) and EIA-232.
- Telnet Inactivity Timeout:** A text input field containing '0', followed by the unit 'Minutes'.
- Modbus Serial Slave Address:** A text input field containing '0', with a note '(1-254, 0 = disabled)'.
- Master Poll Timeout:** A text input field containing '3', with a note '(1 - 10) Seconds'.
- Master Poll Interval:** A text input field containing '250', with a note '(250 - 2000) mS'.
- Master Retry Attempts:** A text input field containing '5', with a note '(1 - 99)'.
- BCM Zero Amp Alarm Level:** A text input field containing '0.000', with a note '(0.000 - 1.000)'.
- BCM Status Display:** Radio buttons for 'Left-Right' (selected) and 'Vertical'.

At the bottom of the form, there are several links: [Modbus Slave Register Display Log](#), [Modbus Packet Log](#), [Reset Modbus Port](#), [Modbus Master Poll Data Log](#), and [SMS/Text Modem Log](#).

Figure 3.38 Modbus Generic Slave Unit Configuration

Modbus BCM Unit Configuration					
Unit #	Protocol	Access	Address	Unit Description	Register Link
<u>1</u>	Standard	Serial	0	BCM #1	
<u>2</u>	Standard	Serial	0	BCM #2	
<u>3</u>	Standard	Serial	0	BCM #3	
<u>4</u>	Standard	Serial	0	BCM #4	
<u>5</u>	Standard	Serial	0	BCM #5	
<u>6</u>	Standard	Serial	0	BCM #6	
<u>7</u>	Standard	Serial	0	BCM #7	
<u>8</u>	Standard	Serial	0	BCM #8	
<u>9</u>	Standard	Serial	0	BCM #9	
<u>10</u>	Standard	Serial	0	BCM #10	
<u>11</u>	Standard	Serial	0	BCM #11	
<u>12</u>	Standard	Serial	0	BCM #12	
<u>13</u>	Standard	Serial	0	BCM #13	
<u>14</u>	Standard	Serial	0	BCM #14	
<u>15</u>	Standard	Serial	0	BCM #15	
<u>16</u>	Standard	Serial	0	BCM #16	

Figure 3.39 Modbus BCM 16-Unit Configuration Page

Modbus BCM Unit Configuration					
Unit #	Protocol	Access	Address	Unit Description	Register Link
<u>1</u>	Standard	Serial	1	BCM #1	Registers
<u>2</u>	Standard	Serial	2	BCM #2	Registers
<u>3</u>	Standard	Serial	3	BCM #3	Registers
<u>4</u>	Standard	Serial	4	BCM #4	Registers

Figure 3.40 Modbus BCM 4-Unit Configuration Page

Notes Refer to the “MIB Files Information” document located on the FMS webpage of the RLE website (www.rletech.com) for more information on the SNMP Trap format and MIB Files.

Changes will not go into effect until the Submit Changes button is clicked.

Press the Submit Changes button after configuration is complete or all access user configuration changes will be lost.

The Acknowledge code should be different than the access codes. If this code is the same as one of the access codes, the Falcon will acknowledge the alarms associated with the acknowledge code, enter a successful entry in the Access log and activate the relay outputs which are set for keypad activation.

Press the Submit Changes button when done to save all schedule changes.

Press the Submit Changes button when done to save all changes.

When the information is complete, click Submit Changes for the changes to take effect.

3.26. Flash Program

Flash Program Configuration

Changes accepted.

Flash #1 Program: FCF V8.4.13	Eof: FFD27530 (EOT)	Size: 1209648	(Active)
Flash #2 Program: FCF V8.4.13	Eof: FFD27530 (EOT)	Size: 1209648	(Backup)

Erase Backup

Copy Flash2 to Flash1

[Download Base Configuration File \(.cfg - 32k\)](#)

[Download Modbus Configuration File \(.mfq - 32k\)](#)

[Download FCF Configuration File \(.xfg - 128k\)](#)

Configuration/flash update from your computer:

Browse...

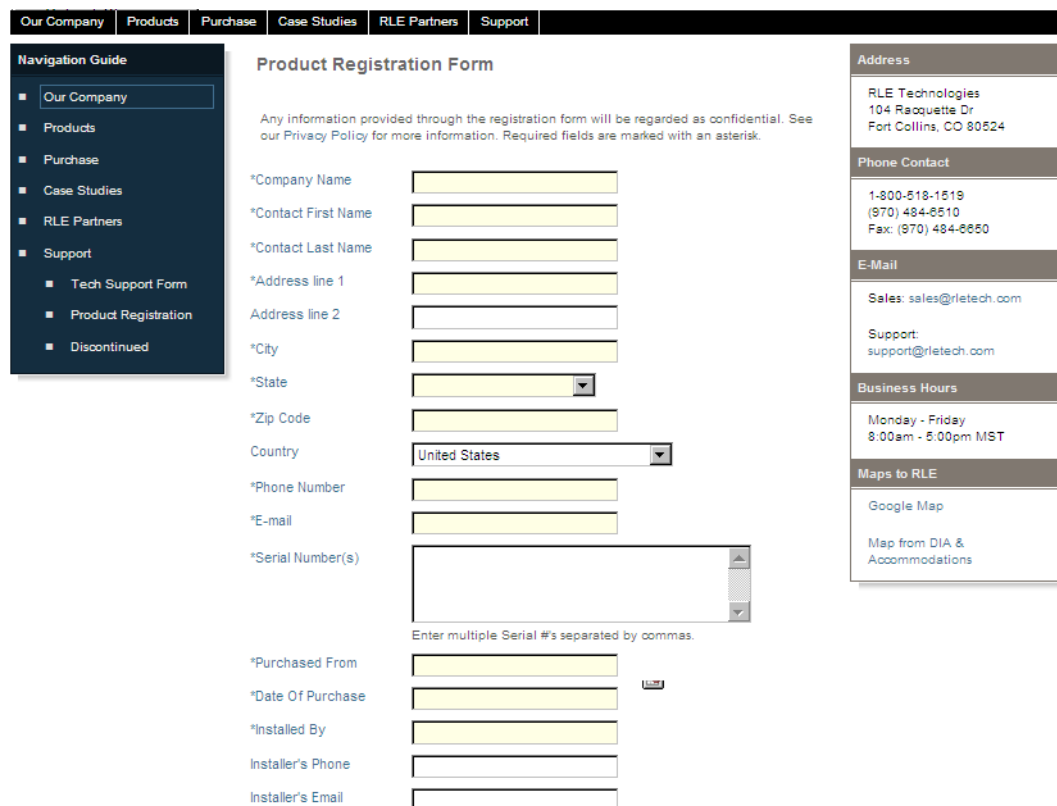
Upload

Note: This version also supports configuration and program updates via TFTP.

Figure 3.41 Flash Program Configuration Page

The **Flash Program** link displays the Flash Program Configuration page, which allows you to load firmware as well as save and load configuration files for the FMS. For instructions and more information, see [Chapter 9, “Loading Firmware and Configuration Data”](#) on page 141.

3.27. Product Registration



Navigation Guide

- Our Company
- Products
- Purchase
- Case Studies
- RLE Partners
- Support
 - Tech Support Form
 - Product Registration
 - Discontinued

Product Registration Form

Any information provided through the registration form will be regarded as confidential. See our Privacy Policy for more information. Required fields are marked with an asterisk.

*Company Name

*Contact First Name

*Contact Last Name

*Address line 1

Address line 2

*City

*State

*Zip Code

Country

*Phone Number

*E-mail

*Serial Number(s)

Enter multiple Serial #'s separated by commas.

*Purchased From

*Date Of Purchase

*Installed By

Installer's Phone

Installer's Email

Address

RLE Technologies
104 Raquette Dr
Fort Collins, CO 80524

Phone Contact

1-800-518-1519
(970) 484-8510
Fax: (970) 484-8650

E-Mail

Sales: sales@rletech.com
Support: support@rletech.com

Business Hours

Monday - Friday
8:00am - 5:00pm MST

Maps to RLE

[Google Map](#)
[Map from DIA & Accommodations](#)

Figure 3.42 Product Registration Webpage

The **Product Registration** link allows users to register their FMS with RLE at the time of configuration. The FMS IP Address, Subnet Masks, and Default Gateway must be configured before this link will be operational. Once configured, complete the registration form and click the Register button to submit your information to RLE.

To access RLE's Web site from any browser, enter <http://www.rletech.com> in the address field.

FMS WEB INTERFACE

The FMS Web interface provides a convenient way to check and monitor the FMS status via the Web. To access the **FMS Main Menu**, or **Home page**, type the IP address of the FMS into the location bar of the Web browser. When the prompt appears, enter the default user name (**falcon**) and password (**none-leave blank**); for more information on accessing the FMS Home page, see [Chapter 3, “FMS Configuration”](#) on page 37.

4.1. Main Menu/ Home Page

The Falcon logo (default), IP camera image and/or company logo can be displayed on the Main Menu; see [3.2., “Homepage”](#) on page 39, for more information. [Figure 4.1](#) shows an example of what the FMS homepage could look like when configured.

Falcon

Home Identity Configuration History Relays URL Links Refresh

FMS-AAAA-Y-24 (FCF)

Thu 04/22/10 10:34:11

Alarms Present		Internal Sensor: 88.2 DegF 19 %RH	
1 Server Isle A Temperature 73.2 Deg	8 No Leak Alarm (CRAC1.003)	1.7 (15) Server Room South Humidity 43.7 %RH	2.2 (34) UPS Room 5th Floor 71.5 Deg
2 Server Room East Humidity 42.8 %RH	1.1 (9) Server Isle C Temperature 70.9 Deg	1.8 (16) Server Isle I Temperature 69.5 Deg	2.3 (35) Outside Air Temperature 76.6 Deg
3 Server Isle B Temperature 73.4 Deg	1.2 (10) (Demo) Status normal	1.9 (17) Server Isle J Temperature 70.7 Deg	2.4 (36) MCC Room 3rd Floor Temperature 67.6 Deg
4 Server Room North Humidity 42.9 %RH	1.3 (11) Server Isle D Temperature 70.8 Deg	1.10 (18) Server Isle K Temperature 67.5 Deg	2.5 (37) 1st Floor Office Temperature 74.8 Deg
5 FM200 System Normal	1.4 (12) Server Room West Humidity 42.7 Deg	1.11 (19) Server Isle L Temperature 71.6 Deg	2.6 (38) 2nd Floor Office Temperature 73.4 Deg
6 No Water Leak (CRAC1.001)	1.5 (13) Server Isle F Temperature 70.8 Deg	1.12 (20) Server Isle M Temperature 65.7 Deg	2.7 (39) Elevator Motor/Controls Room Temperature 85.7 Deg
7 No Leak Alarm (CRAC1.002)	1.6 (14) Server Isle G Temperature 67.5 Deg	2.1 (33) Generator Room 84.7 Deg	2.8 (40) Tape Storage Closet 67.6 Deg

View Points: 29-56 View All Points

Veris 8036 #1	Veris 8036 #5	Veris 8036 #9	Falcon F110
Veris 8036 #2	Veris 8036 #6	Veris 8036 #10	LD2000 Leak Detection Module
Veris 8036 #3	Veris 8036 #7	EDS-Vii	
Veris 8036 #4	Veris 8036 #8	Falcon F-series F3400	

IP Address: 63.253.110.254 Falcon-CF Falcon Nest 82009 RLE Technologies

Server Room

Server Room Lower Manhattan Vancouver
 CSU Fort Collins CO Peak8 Breckenridge Beaver Creek CO
 Killinton VT Capital Denver CO Atlanta GA
 Chicago IL

Figure 4.1 Example of a Configured FMS

The bottom of the FMS Main Menu features columns that list the FMS configured inputs. The number of inputs displayed is configurable from the Configuration menu; see [Chapter 3, “FMS Configuration” on page 37](#). Each input has a box with its number, name, and status. The box is shaded to signal the inputs status. Color codes are as follows

Table 4.1 Color Definitions

Color	Description
Green	Input is normal-not in an alarm state.
Yellow	Analog inputs only-input is in a high alarm 1 or low alarm 1 state.
Red	Analog input is in a high alarm 2 or low alarm 2 state. Digital input is in an alarm state.
Blue	Alarm/Input disabled by a schedule.
White (no shading)	Input is not configured-spare point for future use.
Magenta, Green, or Gold	Digital Status point is on. This color is configurable under the System Configuration Menu.

4.2. Identity

The screenshot shows the Falcon FMS web interface. The top navigation bar includes links for Home, Identity, Configuration, History, Relays, URL Links, and Refresh. The main content area is titled "FMS-AAAA-Y-24 (FCF)" and displays system information in two columns. The left column lists hardware and software details, while the right column lists expansion cards and modem information. A status bar at the bottom shows the IP address and the device name "Falcon-CF".

FMS-AAAA-Y-24 (FCF)		Modem	
Model Number	FMS/FCF	Expansion Card #1	Installed
System Name	FMS-AAAA-Y-24 (FCF)	Expansion Card #2	A - 12AI/8RO
System Up Time	0 days 5 hrs 47 mins 36 secs	Expansion Card #3	A - 12AI/8RO
System Contact	Technical Support	Expansion Card #4	A - 12AI/8RO
System Location	Technical Support Office	Exp-M Option	Permanent
Current Time	Thu 04/22/10 10:38:51		
PCB Version	01 CPU: MCF5270		
Firmware Version	FCF V8.3.11		
Bootloader Version	FCFBOOT V2.1.3		
MAC Address	00:90:5B:04:02:C8		
IP Address	63.253.110.254		
Net Mask	255.255.255.240		
Def Route	63.253.110.241		

IP Address: 63.253.110.254 Falcon-CF

Figure 4.2 Identity Menu

Identity displays basic FMS information including Model Number, System Name, MAC Address, Expansion Cards installed, Firmware Version, and IP Address.

4.3. Configuration

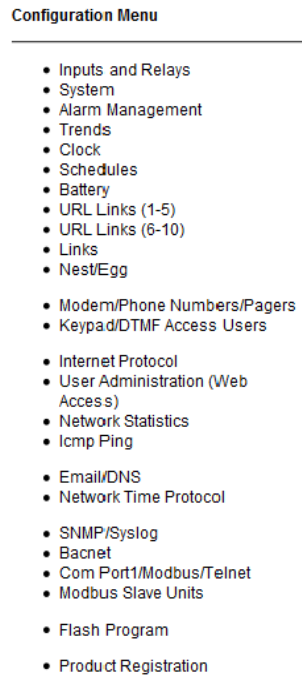


Figure 4.3 Configuration Page

The **Configuration** link provides access to a series of menus from which qualified users can make adjustments to the FMS settings; see [Chapter 3, “FMS Configuration” on page 37](#), for more details.

4.4. Alarm History

Alarm History displays the last 256 alarms captured by the FMS. Alarms are ranked from most recent (top of the list) to least recent (bottom of the list); see “[Alarm History Page](#)” on page 84.

FMS-CCCC-N-24 (FCF)

Color Code: [Unacknowledged \(page/email\)](#) - [Unacknowledged](#) -- [Acknowledged](#) -- [Return to Normal](#)
 Alarm History - Total Entries: 256 Page 1 of 3 [Page 1](#) [Page 2](#) [Page 3](#)

AH009-0014-RTN -01/24/10 07:57:13 67 Deg Wl-TS
 AH008-0012-RTN -01/24/10 07:57:13 67 Deg Wl-TS
 AH007-0014-Low2 -01/24/10 07:57:12 -25 Deg Wl-TS
 AH006-0012-Low1 -01/24/10 07:57:12 -25 Deg Wl-TS
 AH005-0014-RTN -01/24/10 07:44:05 67 Deg Wl-TS
 AH004-0012-RTN -01/24/10 07:44:05 67 Deg Wl-TS
 AH003-0014-Low2 -01/24/10 07:44:04 -25 Deg Wl-TS
 AH002-0012-Low1 -01/24/10 07:44:04 -25 Deg Wl-TS
 AH001-1090-RTN -01/19/10 14:51:34 Dry Contact Input Normal
 AH256-1050-RTN -01/19/10 14:51:26 Dry Contact Input Normal
 AH255-0070-On -01/19/10 14:50:32 ANALOG #7
 AH254-0013-RTN -01/19/10 14:38:08 80 Deg Wl-TS
 AH253-0011-RTN -01/19/10 14:38:08 80 Deg Wl-TS
 AH252-0013-High2-01/19/10 14:36:58 804 Deg Wl-TS
 AH251-0011-High1-01/19/10 14:36:58 804 Deg Wl-TS
 AH250-0014-RTN -01/19/10 14:31:58 80 Deg Wl-TS
 AH249-0012-RTN -01/19/10 14:31:58 80 Deg Wl-TS

Figure 4.4 Alarm History Page

The following format is used to record each alarm entry:

AH###-ID-Condition-Date Time (Value UOM) Label

- ◆ AH### is the alarm entry index.
- ◆ ID is the alarm identifier number; see [Appendix E, “Alarm ID Reference Tables”](#) on page 169.
- ◆ Condition is On, High1, High2, Low1, Low2, or RTN (Returned to Normal).
- ◆ Date and Time is the internal date and time stamp of the alarm condition.
- ◆ Label is the alarm descriptor, up to 64 characters long.
- ◆ Value and Unit of Measure (UOM) is captured for analog channels only. The value recorded is the actual analog value that exceeded its alarm threshold.

The Alarm History log entries are color-coded as follows:

Table 4.2 Alarm History Log Entries

Color	Description
Red	A point that is configured for dial out (pager) is in alarm and is unacknowledged. The alarm will be red if the point is configured for both pager and email notification.
Orange	A point that is not configured for dial out (pager) is in alarm and is unacknowledged.
Blue	The alarm has been acknowledged.
Black	The alarm has returned to normal.

Unacknowledged dial out alarms (marked in red) can be acknowledged from this page. To do so, type the appropriate code in the box at the bottom of the page and click the Acknowledge Alarms by Code button. Acknowledge codes are set under the Phone Number or Email Configuration pages; see [Chapter 3, “FMS Configuration” on page 37](#), for more information on configuring phone numbers.

4.5. Event History

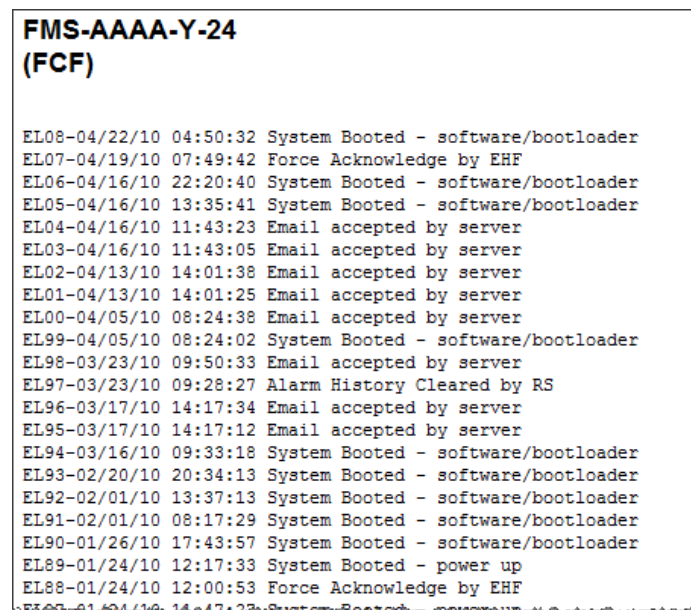


Figure 4.5 Event History Page

Event History displays the past 100 events, as recorded by the FMS. Typical events that are logged include System Booted, Email Accepted by Server, No Dial Tone, Busy, No Carrier, Page Successful, Alarm History Cleared, Digital Status History Cleared, Force Acknowledge by <initials>, Program Upload - TFTP.

4.6. Digital Status History

FMS-CCCC-N-24 (FCF)

```

SH094-4230-On -01/24/10 07:57:04 Digital Status Input Activated
SH093-4220-On -01/24/10 07:57:04 Digital Status Input Activated
SH092-4210-On -01/24/10 07:57:04 Digital Status Input Activated
SH091-4200-On -01/24/10 07:57:04 Digital Status Input Activated
SH090-4190-On -01/24/10 07:57:04 Digital Status Input Activated
SH089-4230-On -01/24/10 07:43:56 Digital Status Input Activated
SH088-4220-On -01/24/10 07:43:56 Digital Status Input Activated
SH087-4210-On -01/24/10 07:43:56 Digital Status Input Activated
SH086-4200-On -01/24/10 07:43:56 Digital Status Input Activated
SH085-4190-On -01/24/10 07:43:56 Digital Status Input Activated
SH084-4230-On -01/19/10 14:27:50 Digital Status Input Activated
SH083-4220-On -01/19/10 14:27:50 Digital Status Input Activated
SH082-4210-On -01/19/10 14:27:50 Digital Status Input Activated
SH081-4200-On -01/19/10 14:27:50 Digital Status Input Activated
SH080-4190-On -01/19/10 14:27:50 Digital Status Input Activated
SH079-1150-On -01/19/10 14:27:50 Dry Contact Input Alarm
SH078-1140-On -01/19/10 14:27:50 Dry Contact Input Alarm
SH077-1130-On -01/19/10 14:27:50 Dry Contact Input Alarm
SH076-4230-On -01/19/10 13:50:25 Digital Status Input Activated
SH075-4220-On -01/19/10 13:50:25 Digital Status Input Activated
SH074-4210-On -01/19/10 13:50:25 Digital Status Input Activated
SH073-4200-On -01/19/10 13:50:25 Digital Status Input Activated
SH072-4190-On -01/19/10 13:50:25 Digital Status Input Activated
SH071-1150-On -01/19/10 13:50:25 Dry Contact Input Alarm
SH070-1140-On -01/19/10 13:50:25 Dry Contact Input Alarm

```

Figure 4.6 Digital Status History Page

Digital Status History displays a history of the state of digital points configured as “Status” points. A digital input can be configured as NO (normally open), NC (normally closed) or Status. If the digital input is configured as Status, it will not alarm, but any changes will be noted and appear on this page. The log displays the past 100 status changes, as recorded by the FMS.

4.7. Keypad Access

Home	Identity	Configuration	History	Relays	URL Links	Refresh					
			Alarm	Event	Digital Status	Keypad Access	Web Access	Data	Trends	Trap Log	
FMS-CCCC-N-24 (FCF)											
AL07-*****-12/07/09 10:41:18 Access Granted - User #9											
AL06-*****-12/07/09 10:41:07 Access Granted - User #8											
AL05-*****-12/07/09 10:40:56 Access Granted - User #7											
AL04-*****-12/07/09 10:40:17 Access Granted - User #9											
AL03-*****-12/07/09 10:40:05 Access Granted - User #8											
AL02-*****-12/07/09 10:39:54 Access Granted - User #7											
AL01-*****-11/21/09 12:38:04 Access Granted - fred											
IP Address:						Falcon-CF					

Figure 4.7 Keypad Access History View

Keypad Access History displays the last 100 entries captured by the FMS. The following information is displayed:

- ◆ Access Log Index (ALxxx)
- ◆ Date and Time of Event
- ◆ Access Granted or Denied
- ◆ Access denied is entered into the log when three consecutive invalid codes are entered.
- ◆ Access is granted when a valid code is entered followed by the # key. The * key clears the code allowing a user to reenter their code.
- ◆ Method of Entry (keypad or DTMF)
- ◆ Access Code Description

4.8. Web User Access Log



The screenshot displays a window titled "FMS-CCCC-N-24 (FCF)" containing a list of user access events. Each line represents a log entry with a unique ID, a timestamp, and the username.

ID	Timestamp	User
WU022	01/24/10 07:57:21	falcon
WU021	01/24/10 07:43:54	falcon
WU020	01/19/10 14:31:30	falcon
WU019	01/19/10 13:50:23	falcon
WU018	01/19/10 12:57:39	falcon
WU017	01/19/10 12:45:14	falcon
WU016	01/19/10 12:12:26	falcon
WU015	01/19/10 11:28:20	falcon
WU014	01/19/10 11:19:27	falcon
WU013	01/18/10 15:41:59	falcon
WU012	01/18/10 13:12:17	falcon
WU011	01/15/10 16:24:18	falcon
WU010	12/28/09 14:19:27	falcon
WU009	12/28/09 13:54:26	User2:
WU008	12/04/09 16:16:21	falcon
WU007	12/03/09 08:46:19	falcon
WU006	12/02/09 16:27:48	falcon
WU005	12/02/09 16:23:36	falcon
WU004	12/01/09 12:58:03	falcon
WU003	11/24/09 09:00:26	falcon
WU002	11/24/09 08:11:49	falcon
WU001	11/23/09 09:16:45	falcon

Figure 4.8 Web User Access Log

The **Web User Access Log** records the most recent 100 Web interface users.

4.9. Data

FMS-AAAA-Y-24 (FCF)

CH	Description	60 Minute	24 Hour	7 Day
1	Server Isle A Temperature	Text Graph	Text Graph	Text Graph
2	Server Room East Humidity	Text Graph	Text Graph	Text Graph
3	Server Isle B Temperature	Text Graph	Text Graph	Text Graph
4	Server Room North Humidity	Text Graph	Text Graph	Text Graph
5	Server Isle A-3 Temperature	Text Graph	Text Graph	Text Graph
6	Server Isle A-3 Humidity	Text Graph	Text Graph	Text Graph
7	Telco Closet	Text Graph	Text Graph	Text Graph
8	MCC Room	Text Graph	Text Graph	Text Graph
1.1 (9)	Server Isle C Temperature	Text Graph	Text Graph	Text Graph
1.3 (11)	Server Isle D Temperature	Text Graph	Text Graph	Text Graph
1.4 (12)	Server Room West Humidity	Text Graph	Text Graph	Text Graph
1.5 (13)	Server Isle F Temperature	Text Graph	Text Graph	Text Graph
1.6 (14)	Server Isle G Temperature	Text Graph	Text Graph	Text Graph
1.7 (15)	Server Room South Humidity	Text Graph	Text Graph	Text Graph
1.8 (16)	Server Isle I Temperature	Text Graph	Text Graph	Text Graph
1.9 (17)	Server Isle J Temperature	Text Graph	Text Graph	Text Graph
1.10 (18)	Server Isle K Temperature	Text Graph	Text Graph	Text Graph
1.11 (19)	Server Isle L Temperature	Text Graph	Text Graph	Text Graph
1.12 (20)	Server Isle M Temperature	Text Graph	Text Graph	Text Graph
2.1 (33)	Generator Room	Text Graph	Text Graph	Text Graph
2.2 (34)	UPS Room 5th Floor	Text Graph	Text Graph	Text Graph
2.3 (35)	Outside Air Temperature	Text Graph	Text Graph	Text Graph
2.4 (36)	MCC Room 3rd Floor Temperature	Text Graph	Text Graph	Text Graph
2.5 (37)	1st Floor Office Temperature	Text Graph	Text Graph	Text Graph
2.6 (38)	2nd Floor Office Temperature	Text Graph	Text Graph	Text Graph
2.7 (39)	Elevator Motor/Controls Room Temperature	Text Graph	Text Graph	Text Graph
2.8 (40)	Tape Storage Closet	Text Graph	Text Graph	Text Graph
TS	Internal Temperature Sensor	Text Graph	Text Graph	Text Graph
HS	Internal Humidity Sensor	Text Graph	Text Graph	Text Graph
Modbus Points 1-58				
Modbus Points 59-116				
Modbus Points 117-174				
Modbus Points 175-232				

Figure 4.9 Data History Page

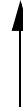
Data History provides an intermediate page to assist in navigating to the desired data. Only points configured as analog 4-20mA are shown.

- ◆ The **Modbus Points** links at the bottom of the page are shown if the FMS is equipped with the EXP-MBCS option. These links provide access to the Modbus Data History pages.
- ◆ Click the **Text** or **Graph** link for each sensor or Modbus point to view the history in text or graph format. If you choose to view a sensor's or point's history in text format, you can download the data to a comma separated value (.csv) file.

4.9.1 Minute, Hour, and Day View

Channel: Modbus Unit #1 (1) 40269			
Data Type: Minute			
Description: Voltage L-L			
Unit of Measure: ---			
Date Time	Avg	High	Low
04/30/10 08:48	480	480	480
04/30/10 08:54	480	480	480
04/30/10 08:59	480	480	480
04/30/10 09:05	480	480	480
04/30/10 09:10	480	480	480
04/30/10 09:16	480	480	480
04/30/10 09:21	480	480	480
04/30/10 09:26	480	480	480
04/30/10 09:32	480	480	480
04/30/10 09:37	480	480	480
04/30/10 09:43	480	480	480
04/30/10 09:48	480	480	480
04/30/10 09:54	480	480	480
04/30/10 09:59	480	480	480
Return			

[Download CSV File](#)



This link is located on the right side of every Text data history page

Figure 4.10 Minute Page

The **Minute**, **Hour**, and **Day** links on the Data History page display the detailed information the FMS records in its logs. The Minute log displays the high, low, and average values per minute for the last 60 minutes. The Hour log displays the high, low, and average values per hour for the last 24 hours. The Day log displays the high, low, and average values per day for the last seven days. These values can be downloaded to a comma separated value (.csv) file via the Data History Text Downloads button.

4.9.2 Data History Text Downloads

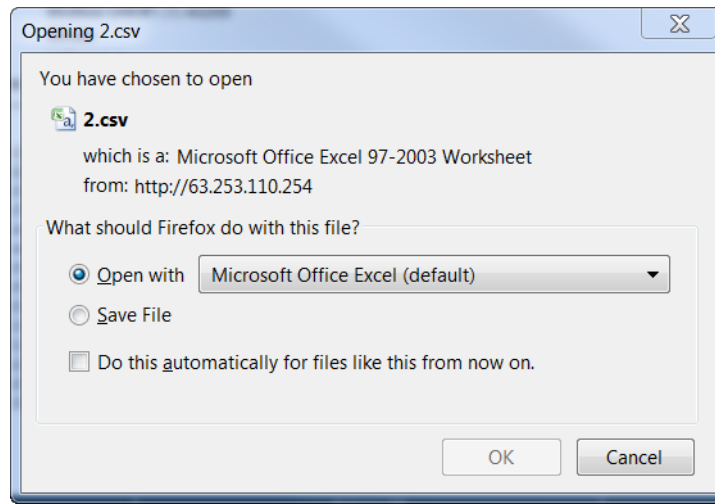
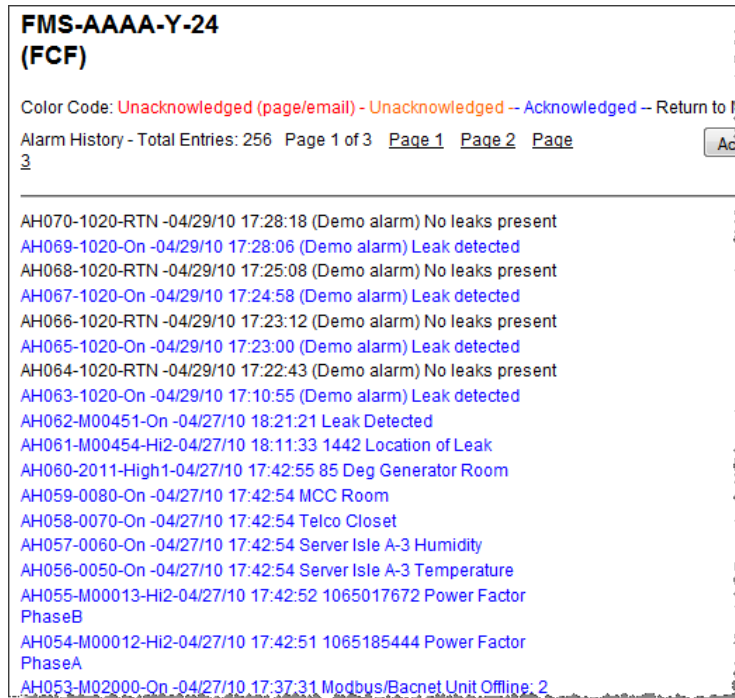


Figure 4.11 Data History Text Downloads Window

When you choose the Download CSV File link from a Data History Text page (either minute, hour, or day), you have the option to open the file or save it using a standard Windows pop-up screen.

4.9.2.1 Alarm History Text (alarmhistory.txt)



 [Download Alarmhistory.txt](#)

This link is located on the right side of the Alarm History page

Figure 4.12 Alarm History Text Page

The **alarmhistory.txt** link opens the Alarm History log as a text (.txt) file in the Web browser. Select “Download Alarmhistory.txt” to save the file to the hard drive.

4.9.3 Graph

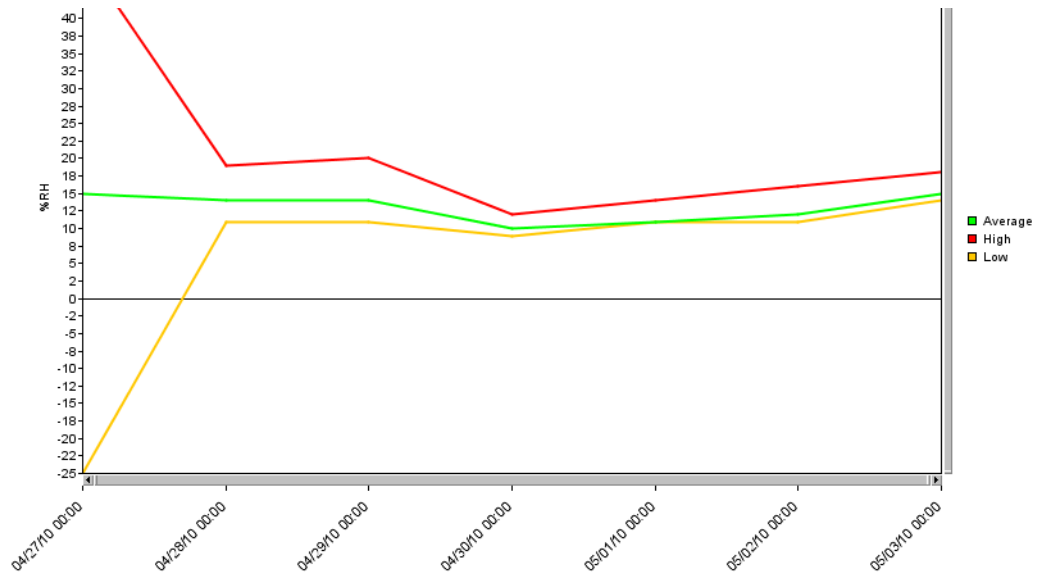


Figure 4.13 FMS Graph

This graph allows users to see a Java-based line graph of any analog point on the Falcon FMS. Using the mouse, stretch or compress the X-axis to adjust the resolution of the time display. Stretch or compress the Y-axis to adjust the resolution of the analog value. Hover over the legend to display the graphed values.

The first time you display a graph, you might see the following Java image as Java loads on your system:



Figure 4.14 Java Loading Image

4.10. Trends

Point	Description	Graph	CSV
1	Server Isle A Temperature	Graph	CSV
2	Server Room East Humidity	Graph	CSV
3	Server Isle B Temperature	Graph	CSV
4	Server Room North Humidity	Graph	CSV
5	Server Isle A-3 Temperature	Graph	CSV
6	Server Isle A-3 Humidity	Graph	CSV
7	Telco Closet	Graph	CSV
8	MCC Room	Graph	CSV
9	Meter #1 Energy KWH	Graph	CSV
10	Meter #2 Energy KWH	Graph	CSV
11	Meter #3 Energy KWH	Graph	CSV
12	Meter #4 Energy KWH	Graph	CSV
13	Meter #5 Energy KWH	Graph	CSV
14	Meter #6 Energy KWH	Graph	CSV
15	Meter #8 Energy KWH	Graph	CSV
16	Meter #8 Energy KWH	Graph	CSV
17	Meter #9 Energy KWH	Graph	CSV
18	Meter #10 Energy KWH	Graph	CSV
19	Server Isle C Temperature	Graph	CSV
20	Server Isle D Temperature	Graph	CSV
21	Server Room West Humidity	Graph	CSV
22	Server Isle F Temperature	Graph	CSV
23	Server Isle G Temperature	Graph	CSV
24	Server Room South Humidity	Graph	CSV
25	Server Isle I Temperature	Graph	CSV
26	Server Isle J Temperature	Graph	CSV
27	Sensor 2-1 Temperature	Graph	CSV
28	Sensor 3-1 Temperature	Graph	CSV
29	900MHz Wi-THS Temperature	Graph	CSV
30	900MHz Wi-THS Humidity	Graph	CSV
31	900MHz Wi-TS Temperature	Graph	CSV
32	418MHz TH-Bapi Temperature	Graph	CSV

Figure 4.15 Extended Trends Page

Users can view a Java-based graph or download a .CSV file by clicking on the links on this page. The Falcon FMS can be configured for up to 32 points physical and/or Modbus that can have extended trending times assigned to.

4.11. Trap Log

FMS-CCCC-N-24 (FCF)

```
01/24/10 07:57:13 ip:xx.xx.xx.xx-ICMP: Dest unreachable: 10.0.0.69 UDP port 162
01/24/10 07:57:13 ip:xx.xx.xx.xx-ICMP: Dest unreachable: 10.0.0.69 UDP port 162
01/24/10 07:57:13 ip:10.0.0.69-ch:001-Return-LowAlarm2-Sent
01/24/10 07:57:13 ip:10.0.0.69-ch:001-Return-LowAlarm1-Sent
01/24/10 07:57:12 ip:xx.xx.xx.xx-ICMP: Dest unreachable: 10.0.0.69 UDP port 162
01/24/10 07:57:12 ip:xx.xx.xx.xx-ICMP: Dest unreachable: 10.0.0.69 UDP port 162
01/24/10 07:57:12 ip:10.0.0.69-ch:001-Alarm-LowAlarm2-Sent
01/24/10 07:57:12 ip:10.0.0.69-ch:001-Alarm-LowAlarm1-Sent
01/24/10 07:57:02 ip:xx.xx.xx.xx-ICMP: Dest unreachable: 10.0.0.69 UDP port 162
```

Figure 4.16 Example Trap Log

Allows users to view trap information sent from the Falcon FMS to a Network Management Software (NMS).

4.12. Relay Status

FMS-AAAA-Y-24 (FCF) Thu 04/22/10 11:12:00

Relay Status					
Channel	Type	Status	Schedule	Description	Action
K1	Keypad Controlled	Normal	None	RELAY #1	
K2	Keypad Controlled	Normal	None	RELAY #2	
K1.1 (3)	NO (Non-Supervised)	Normal	None	RELAY #1.1	
K1.2 (4)	NO (Non-Supervised)	Normal	None	RELAY #1.2	
K1.3 (5)	NO (Non-Supervised)	Normal	None	RELAY #1.3	
K1.4 (6)	NO (Non-Supervised)	Normal	None	RELAY #1.4	
K1.5 (7)	NO (Non-Supervised)	Normal	None	RELAY #1.5	
K1.6 (8)	NO (Non-Supervised)	Normal	None	RELAY #1.6	
K1.7 (9)	NO (Non-Supervised)	Normal	None	RELAY #1.7	
K1.8 (10)	Button Controlled	Normal	None	Channel #10 Alarm Relay	Set Relay K10
K2.1 (11)	NO (Non-Supervised)	Normal	None	RELAY #2.1	
K2.2 (12)	NO (Non-Supervised)	Normal	None	RELAY #2.2	
K2.3 (13)	NO (Non-Supervised)	Normal	None	RELAY #2.3	

Figure 4.17 Example Relay Status Page

Relay Status displays the current status of each FMS relay output. The Status field is color coded. White indicates the relay output is de-energized; red indicates that the relay output is energized.

Relay Control contains a button for each relay output that is configured for button control. Selecting the button turns on the associated relay output. Pressing the button again will turn it off.

4.13. URL Links

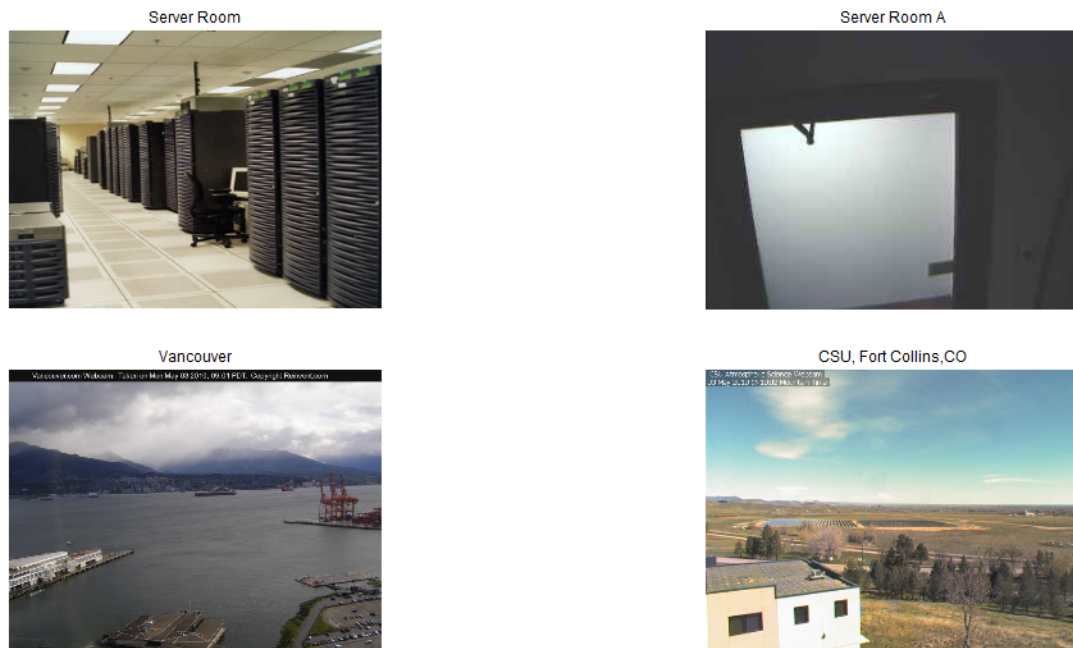


Figure 4.18 Example Still Images from IP Cameras

URL Links displays still images (.jpg) from all IP cameras and other URLs linked to the FMS.

COMMUNICATION

5.1. Modbus

The FMS supports the following from the factory:

- ◆ Modbus Master (RTU) over EIA-485 or EIA-232
- ◆ Modbus Slave (RTU) over EIA-485 or EIA-232
- ◆ Modbus Master (TCP/IP)
- ◆ Modbus Slave (TCP/IP Port 502) over Ethernet

The FMS can operate as a Master over EIA-485 (or EIA-232) and as a Slave over Ethernet at the same time. The FMS can operate as a Slave over EIA-485 (or EIA-232) and as a Slave over Ethernet at the same time. The FMS can NOT operate as a Master over EIA-485 (or EIA-232) and as a Slave over EIA-485 (or EIA-232) at the same time.

5.2. Hardware Connections

The Modbus connections are located on the back of the FMS. There are status LEDs to indicate if COM Port 1 is configured (in software) for EIA-232 or EIA-485. The COM Port 1 Transmit and Receive LEDs are also located on the back of the FMS.

5.2.1 EIA-232

The EIA-232 COM Port 1 on the FMS is used to connect the FMS-as a Modbus Master-to one Modbus Slave device, or it is used to connect a Modbus Master device to the FMS as a Modbus Slave. The Modbus EIA-232 (DTE) is active over COM1 (DB9 male connector). The EIA-232 port allows communications between the FMS and one other device (point to point connection). The EIA-232 port has maximum cable length of 50 feet (15.2m).

Table 5.1 COM1 DB9 Male Pin Out

Pin	Description
Pin 1	= Data Carrier Detect
Pin	= Receive Data
Pin 3	= Transmit Data
Pin 4	= Data Terminal Ready
Pin 5	= Signal Ground
Pin 6	= No Connection
Pin 7	= Request to Send (internally connected to Pin 8)
Pin 8	= Clear to Send (internally connected to Pin 7)
Pin 9	= No Connection

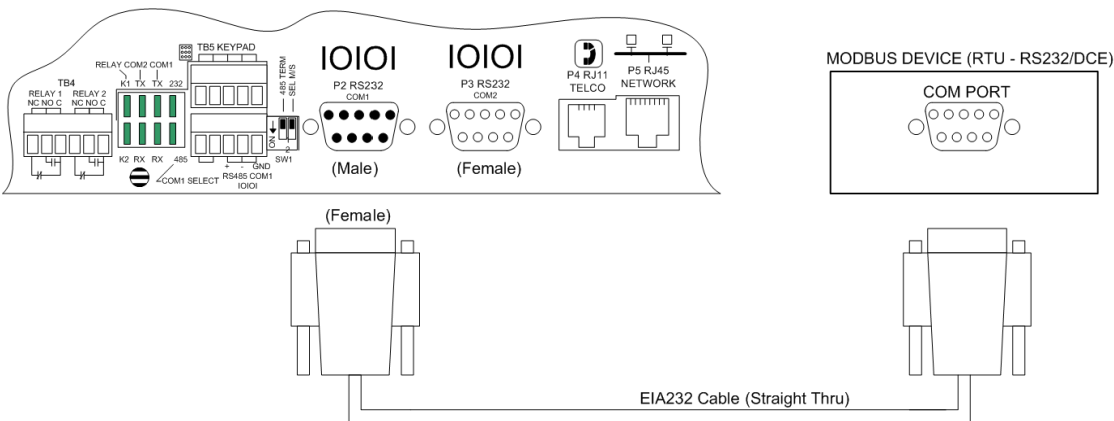


Figure 5.1 FMS Modbus EIA-232 Connection to an EIA-232 DCE Device

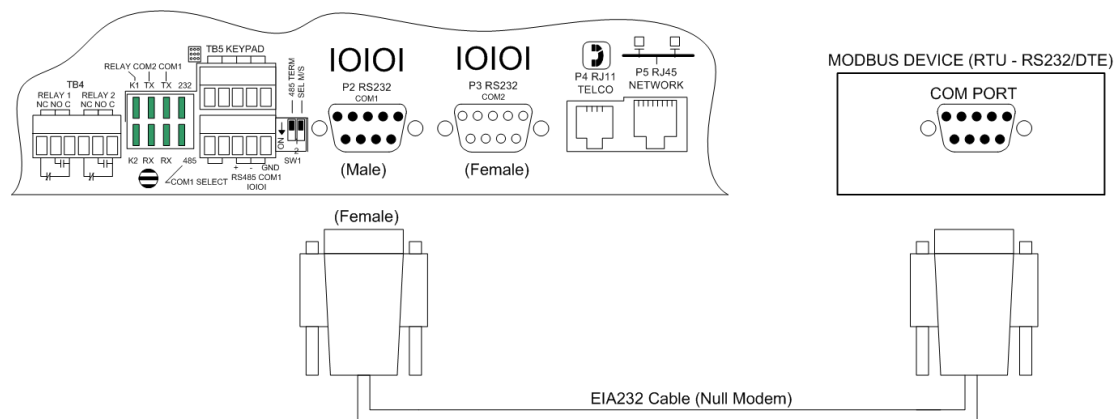


Figure 5.2 FMS Modbus EIA-232 Connection to an EIA-232 DTE Device

5.2.2 EIA-485

The EIA-485 COM Port 1 on the FMS is used to connect the FMS-as a Modbus Master-to one or more Modbus Slave devices or it is used to connect a Modbus Master device to the FMS as a Modbus Slave. The Modbus EIA-485 is active over COM1 (TB5 Pins 8, 9 and 10). The EIA-485 port allows communications between one Modbus Master and one or more Modbus Slave devices. EIA-485 can accommodate up to 4,000 feet (1,219m) of cable length. There are many variations on how terminals are labeled on EIA-485 2-wire (e.g., some devices use (+) and (-) or A and B, and some use (-) and (+) or B and A. Therefore, if a Slave unit is not responding, try swapping the wires.

Table 5.2 COM1 TB5 Pin Out

Pin	Description
Pin 8	= EIA-485(+)
Pin 9	= EIA-485(-)
Pin 10	= Ground

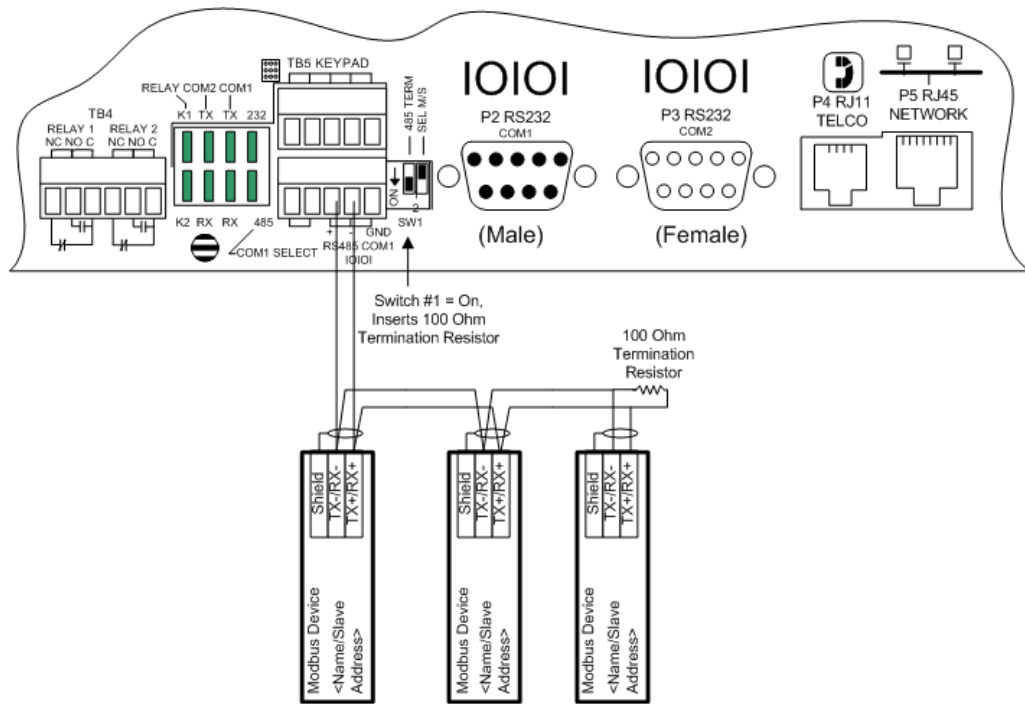


Figure 5.3 EIA-485 Wiring Connections

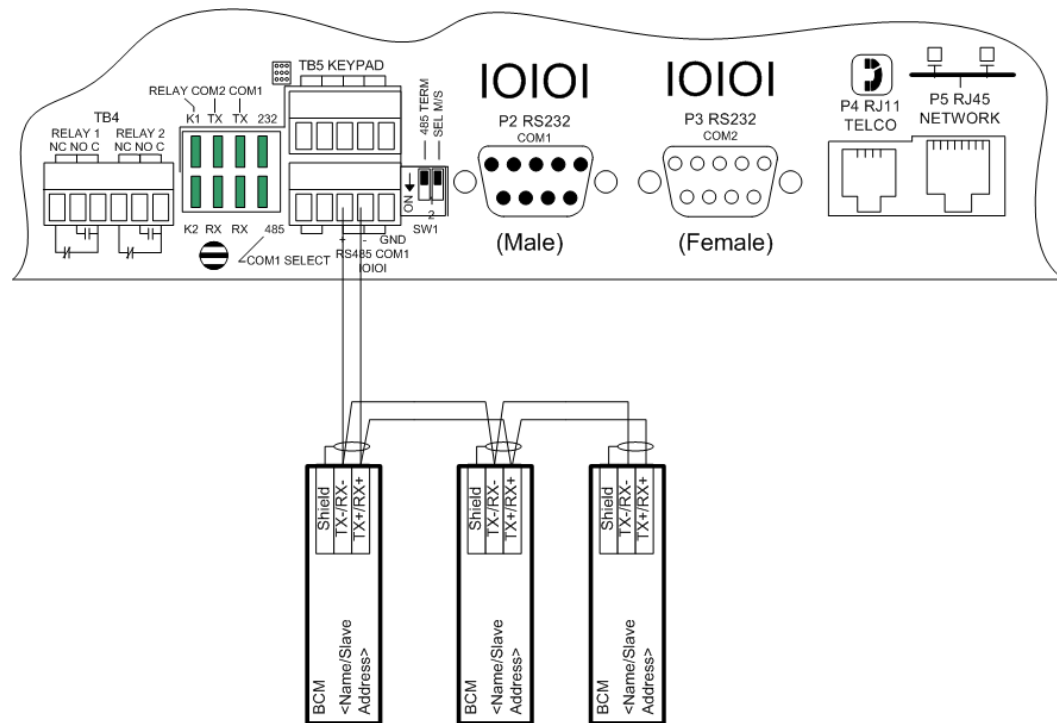


Figure 5.4 EIA-485 Wiring to RLE/Veris BCMs (Branch Circuit Monitors)

5.3. Modbus/COM1 Configuration (Modbus Master and Slave)

The **Modbus/COM1 Configuration** page allows users to configure the FMS Modbus features. Enter the information as required. [Figure 5.5](#) shows a Modbus/COM Port 1 link.

To access this page, select Com Port1/Modbus/Telnet from the Configuration Menu.

Modbus / Com Port 1 Configuration

Modbus/TCP Slave Enable: ☒ Yes ☐ No

Modbus/TCP Slave Unit Identifier: (1-254, 0 = disabled)

Serial Com 1 Protocol Type:

Serial Baud Rate: ☐ 1200 ☐ 2400 ☒ 9600

Serial Interface Type: ☐ EIA-485 ☒ EIA-232

Telnet Inactivity Timeout: Minutes

Modbus Serial Slave Address: (1-254, 0 = disabled)

Master Poll Timeout: (1 - 10) Seconds

Master Poll Interval: (250 - 2000) mS

Master Retry Attempts: (1 - 99)

BCM Zero Amp Alarm Level: (0.000 - 1.000)

BCM Status Display: ☒ Left-Right ☐ Vertical

[Modbus Slave Register Display Log](#)
[Modbus Packet Log](#)
[Reset Modbus Port](#)
[Modbus Master Poll Data Log](#)
[SMS/Text Modem Log](#)

Links to Modbus and modem logs

Figure 5.5 Example Modbus/COM1 Configuration—Modbus Master

Modbus / Com Port 1 Configuration

Modbus/TCP Slave Enable: ☒ Yes ☐ No

Modbus/TCP Slave Unit Identifier: (1-254, 0 = disabled)

Serial Com 1 Protocol Type: Modbus Slave

Serial Baud Rate: ☐ 1200 ☐ 2400 ☒ 9600

Serial Interface Type: ☒ EIA-485 ☐ EIA-232

Telnet Inactivity Timeout: Minutes

Modbus Serial Slave Address: (1-254, 0 = disabled)

Master Poll Timeout: (1 - 10) Seconds

Master Poll Interval: (250 - 2000) mS

Master Retry Attempts: (1 - 99)

BCM Zero Amp Alarm Level: (0.000 - 1.000)

BCM Status Display: ☒ Left-Right ☐ Vertical

[Modbus Slave Register Display Log](#)
[Modbus Packet Log](#)
[Reset Modbus Port](#)
[Modbus Master Poll Data Log](#)
[SMS/Text Modem Log](#)

Figure 5.6 Modbus / COM Port 1 Link—Modbus Slave

Modbus/TCP Slave Enable: Enables the FMS as a Modbus Slave over Ethernet TCP/IP.

Modbus/TCP Slave Unit Identifier: Sets the FMS Modbus/TCP Slave address (1-254).

Serial Com1 Protocol Type: Configures the Serial COM Port 1 (EIA-232 or EIA-485) Master or Slave operation. The options are:

- ◆ **None:** Disables Modbus support on Serial Port COM1.
- ◆ **Modbus Master Generic - 16 Units:** Modbus Master Generic-16 Units is the most typical configuration for the FMS when using Modbus communication. Select this option when there is at least one Slave unit that is not an RLE/Veris BCM. This option can be configured to poll data from up to 16 Slave devices.
- ◆ **Modbus Master BCM - 4 Units:** Select this option when there are 1 to 4 BCMs (Branch Circuit Monitors) and no other Slave devices. This option enables webpages that are unique to the BCM allowing for easier setup. SNMP (Get, Set and Traps) is supported for the BCMs.
- ◆ **Modbus Master BCM - 16 Units:** Select this option when there are 5 to 16 BCMs and no other Slave devices. This option enables webpages that are unique to the BCM allowing for easier setup. SNMP (Get, Set and Traps) is not supported for the BCMs. SNMP is still supported for the local I/O (Inputs 1 - 104). If SNMP is required for the BCMs, additional FMSs are required to allow a maximum of 4 BCMs per FMS.
- ◆ **Modbus Slave:** Enables the FMS to operate as a Modbus Slave over the Serial Port COM1.
- ◆ **None-BACnet/IP:** Enables the FMS operate as a BACnet Master and request data from BACnet devices.

- ◆ **Telnet:** Enables the FMS to communicate via Serial Com Port 1.
- ◆ **SMS/Text:** Enables the FMS to communicate to a SMS modem via Serial Com Port 1.

Serial Baud Rate: Sets the Serial COM Port 1 to 1200, 2400 or 9600 Baud. All the devices connected to the FMS Serial COM Port 1 must be set to operate at the same Baud rate.

Serial Interface Type: Enables the FMS Modbus to operate on the EIA-485 or EIA-232 COM Port 1.

Telnet Inactivity Timeout: Allows users to set the Telnet Inactivity Timeout in minutes. This time tells the FMS when to timeout of the Telnet communication.

Modbus Serial Slave Address: Required when the Serial Protocol is set to “Modbus Slave.” This option sets the FMS Modbus Slave address for the Serial COM Port 1. Each Slave device on the Modbus network must have a unique address.

EIA-485 DE TX Delay: Normally left at the 10ms default and is active only when the Serial Interface Type is “EIA-485.” During the start of transmission, the transmit line is driven high for this amount of time prior to transmitting the message. The time is adjustable from 0ms to 99ms.

EIA-485 DE Off Delay: Normally left at the default of 10ms and is active only when the Serial Interface Type is “EIA-485.” After a message is sent, the transmit line is held high for this amount of time prior to turning off. The time is adjustable from 10 to 990ms.

Modbus Master Poll Timeout: Sets the amount of time the FMS waits for a response from the Slave device before moving on to read the next register. It is normally set to the default of one second and is active only when the Serial Protocol is set to “Modbus Master Generic - 16 Units,” “Modbus Master BCM - 4 Units” or “Modbus Master BCM - 16 Units.” It is adjustable from 1 to 10 seconds.

Modbus Master Poll Interval: Sets the amount of time when a response is received from a Slave to when the FMS will ask for the next register and is adjustable from 250 to 2000ms. It is normally left at the 250ms default and is active only when the Serial Protocol is set to a Modbus Master option. The interval effects the overall scan rate. If the FMS is configured to read 60 Modbus variables and the poll interval is set to 1000ms (1second), each Modbus variable will be read approximately once per minute.

Master Retry Attempts: Determines how many times the FMS will request the same register when there is no response from the Slave before moving on to read the next register. It is normally left at the default of one second and is adjustable from 1 to 99 seconds.

Enable Virtual Slot #1-4: Enables additional virtual inputs for use with the FMS main interface. These virtual points can be used in conjunction with Modbus registers to allow individual alarming, notification and relay activation per Modbus register.

BCM Zero Amp Level Alarm: Determines if the branch circuit current is zero (CB open or tripped). It is active when Serial Protocol is set to “Modbus Master BCM - 4 Units” or “Modbus Master BCM - 16 Units.” This applies to all branch circuits in all the BCMs. Each branch circuit has a “Zero Amp” Enable to enable or disable the zero amp alarm. This setting is adjustable from 0 to 1 Amp.

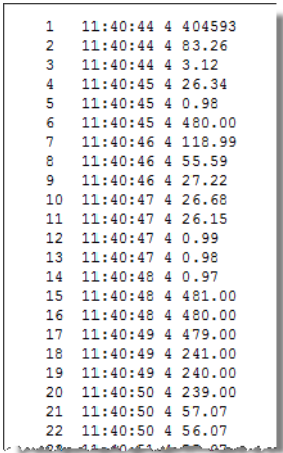
BCM Status Display: Displays the how the BCM status is displayed (i.e, left/right or vertical).

5.3.1 Modbus Master Poll Data Log

This link allows users to view the raw data the FMS receives from the Slave(s).

Table 5.3 Modbus Master Poll Data Log

Column	Description
Column 1	= Falcon Modbus Master Register Number (1-628).
Column 2	= Time the Data is received, in HH (hour): MM (minute): SS (second) format where HH is a number 1-24.
Column 3	= Number of Bytes Reserved for Data. This will be 2 unless the Modbus Master register is configured to read a Long or Float value, in which case it would be 4.
Column 4	= Slave Data in decimal form



1	11:40:44	4	404593
2	11:40:44	4	83.26
3	11:40:44	4	3.12
4	11:40:45	4	26.34
5	11:40:45	4	0.98
6	11:40:45	4	480.00
7	11:40:46	4	118.99
8	11:40:46	4	55.59
9	11:40:46	4	27.22
10	11:40:47	4	26.68
11	11:40:47	4	26.15
12	11:40:47	4	0.99
13	11:40:47	4	0.98
14	11:40:48	4	0.97
15	11:40:48	4	481.00
16	11:40:48	4	480.00
17	11:40:49	4	479.00
18	11:40:49	4	241.00
19	11:40:49	4	240.00
20	11:40:50	4	239.00
21	11:40:50	4	57.07
22	11:40:50	4	56.07

Figure 5.7 Example Modbus Master Poll Data Log

5.3.2 Modbus Slave Register Display Log

This link displays the current contents of the FMS Slave Registers. The rows correspond to the FMS channel numbers (inputs 1–104) with each row containing the Modbus Slave Registers that pertain to that particular input.

Modbus slave register map/values			
40001 - 40106 Input "live" values			
40200 Number of alarms present			
40201 - 40306 Input alarm bitfield (Inputs 1-106)			
Value of 0 = No Alarm			
Bit:0 = High1 Alarm			
Bit:1 = Low1 Alarm			
Bit:2 = High2 Alarm			
Bit:3 = Low2 Alarm			
Bit:4 = Digital Alarm			
40401 - 40506 Input configuration (Inputs 1-106)			
0 = Not Installed			
1 = Not Configured			
2 = Analog 4-20ma			
3 = Digital NO			
4 = Digital NC			
5 = Digital Status			
6 = Analog 0-5V			
7 = Analog 0-10V			
1:	40001: 73	40201: 0	40401: 2 (a)
2:	40002: 42	40202: 0	40402: 2 (a)
3:	40003: 73	40203: 0	40403: 2 (a)
4:	40004: 43	40204: 0	40404: 2 (a)
5:	40005: 0	40205: 0	40405: 3 (a)
6:	40006: 0	40206: 0	40406: 3 (a)
7:	40007: 0	40207: 0	40407: 3 (a)
8:	40008: 0	40208: 0	40408: 3 (a)
9:	40009: 70	40209: 0	40409: 2 (a)
10:	40010: 0	40210: 0	40410: 3 (a)
11:	40011: 70	40211: 0	40411: 2 (a)
12:	40012: 42	40212: 0	40412: 2 (a)
13:	40013: 70	40213: 0	40413: 2 (a)
14:	40014: 67	40214: 0	40414: 2 (a)
15:	40015: 43	40215: 0	40415: 2 (a)
16:	40016: 69	40216: 0	40416: 2 (a)
17:	40017: 70	40217: 0	40417: 2 (a)
18:	40018: 67	40218: 0	40418: 2 (a)

Figure 5.8 Modbus Slave Register Display Log

Table 5.4 Modbus Slave Register Display Log

Column		Description
Column 1	=	Displays the Falcon Channel or Input Number (1-104).
Column 2	=	Displays the Falcon Slave Register Number for the Channel Input Reading.
Column 3	=	Displays the Value of the Current Channel Input. Channels configured for digital will be a "0" when the input is normal and "1" when the input is in alarm.
Column 4	=	Displays the Falcon Slave Register Number for the Channel Input Alarm Status.
Column 5 (see note)	=	Displays the Contents of the Channel Input Alarm Register.
		0 = No Alarm
		1 = High 1 Alarm
		2 = Low 1 Alarm
		4 = High 2 Alarm
		8 = Low 2 Alarm
Column 5 (see note)		10 = Digital Alarm
Column 6	=	Displays the Falcon Slave Register Number for the Channel Input Configuration Status.
Column 7	=	Displays the contents of the Channel Input Configuration Register.
		0 = Not Installed
		1 = Not Configured
		2 = Analog 4-20mA
		3 = Digital NO
		4 = Digital NC
		5 = Digital Status
		6 = Analog 0–5VDC
		7 = Analog 0–10 VDC
Column 8	=	Provides Additional Information for the Falcon Input
		(0) = Input is Not Installed (an Expansion Card not installed for this channel).
		(a) = This Channel is an Analog Input (Main Board input or Expansion Card "A").
		(d) = This Channel is a Digital Input (Expansion Card "C").
		(R) = This Channel is a Relay Output.

Note The number displayed will be the sum of all active alarms. For example, if an input is above the High1 and High2 limits, the number displayed will be 5 (1 + 4 = 5).

5.3.3 Modbus Packet Log

This link displays a log of the Modbus packets that the FMS is sending and receiving.

```
0003062706 M0013 485-Tx: 01 03 01 1C 00 02 04 31
0003062716 M0013 485-Rx: 01 03 04 3F 78 51 EC 4A 23
0003062736 M0014 485-Tx: 01 03 01 1E 00 02 A5 F1
0003062746 M0014 485-Rx: 01 03 04 43 F0 80 00 8E 44
0003062766 M0015 485-Tx: 01 03 01 20 00 02 C4 3D
0003062792 M0015 485-Rx: 01 03 04 43 F0 00 00 EF 84
0003062812 M0016 485-Tx: 01 03 01 22 00 02 65 FD
0003062832 M0016 485-Rx: 01 03 04 43 EF 80 00 BF 82
0003062852 M0017 485-Tx: 01 03 01 24 00 02 85 FC
0003062872 M0017 485-Rx: 01 03 04 43 71 00 00 BF AC
0003062892 M0018 485-Tx: 01 03 01 26 00 02 24 3C
0003062902 M0018 485-Rx: 01 03 04 43 70 00 00 EE 6C
0003062922 M0019 485-Tx: 01 03 01 28 00 02 45 FF
0003062932 M0019 485-Rx: 01 03 04 43 6F 00 00 DF AA
0003062952 M0020 485-Tx: 01 03 01 2A 00 02 E4 3F
0003062962 M0020 485-Rx: 01 03 04 42 74 FE 4B AE 06
0003062982 M0021 485-Tx: 01 03 01 2C 00 02 04 3E
0003062992 M0021 485-Rx: 01 03 04 42 70 FE 4B EF C7
0003063020 M0022 485-Tx: 01 03 01 2E 00 02 A5 FE
0003063030 M0022 485-Rx: 01 03 04 42 6C FE 4B 2E 01
0003063050 M0023 485-Tx: 01 03 01 30 00 02 C5 F8
```

Figure 5.9 Modbus Packet Log

Table 5.5 Modbus Packet Log

Column	Description
Column 1	= System Up Time.
Column 2	= Modbus Master Register Number.
Column 3	= Direction of Packet:
	OUT = Packet Sent from the Falcon (Master Request).
	IN = Packet Received by the Falcon (Slave Response).
Column 4	= Modbus Packet.

5.3.4 Reset Modbus Port

This link allows users to reset the Modbus port so that the contents of the polling registers will be cleared.

[Modbus Reset](#)

[Return](#)

Figure 5.10 Modbus Rest Port Confirmation

5.4. Configuring Inputs and Relays for Slave Units (Modbus and BACnet)

Select any input not currently in use.

Inputs							
S.Ch (#)	Label	S.Ch (#)	Label	S.Ch (#)	Label	S.Ch (#)	Label
T (1)	Server Isle A	Eas (2)	Server Room	T (3)	Server Isle B	Nor (4)	Server Room
Al (5)	FM200 System	Alar (6)	Water Leak	Alar (7)	Water Leak	Alar (8)	Water Leak
1.1 (9)	Server Isle C	1.2 (10)	(Demo) Alarm	1.3 (11)	Server Isle D	1.4 (12)	Server Room
1.5 (13)	Server Isle F	1.6 (14)	Server Isle G	1.7 (15)	Server Room	1.8 (16)	Server Isle I
1.9 (17)	Server Isle J	1.10 (18)	Server Isle K	1.11 (19)	Server Isle L	1.12 (20)	Server Isle M
2.1 (33)	Generator Room	2.2 (34)	UPS Room 5th Fl	2.3 (35)	Outside Air Tem	2.4 (36)	MCC Room 3rd Fl
2.5 (37)	1st Floor Offic	2.6 (38)	2nd Floor Offic	2.7 (39)	Elevator Motor/	2.8 (40)	Tape Storage Cl
2.9 (41)	ANALOG #2.9	2.10 (42)	ANALOG #2.10	2.11 (43)	ANALOG #2.11	2.12 (44)	ANALOG #2.12
3.1 (57)	ANALOG #3.1	3.2 (58)	ANALOG #3.2	3.3 (59)	ANALOG #3.3	3.4 (60)	ANALOG #3.4
3.5 (61)	ANALOG #3.5	3.6 (62)	ANALOG #3.6	3.7 (63)	ANALOG #3.7	3.8 (64)	ANALOG #3.8
3.9 (65)	ANALOG #3.9	3.10 (66)	ANALOG #3.10	3.11 (67)	ANALOG #3.11	3.12 (68)	ANALOG #3.12
4.1 (81)	ANALOG #4.1	4.2 (82)	ANALOG #4.2	4.3 (83)	ANALOG #4.3	4.4 (84)	ANALOG #4.4
4.5 (85)	ANALOG #4.5	4.6 (86)	ANALOG #4.6	4.7 (87)	ANALOG #4.7	4.8 (88)	ANALOG #4.8
4.9 (89)	ANALOG #4.9	4.10 (90)	ANALOG #4.10	4.11 (91)	Out Of Service	4.12 (92)	Dry Contact Act
5.1 (105)	Internal Temper	5.2 (106)	Internal Humidi				

Figure 5.11 Input and Relay Configuration Menu

This page allows users to configure the input features.

Configuration: Input #1

Current Readings: Raw = 18.757 mA Calc = 73.2

[Submit Changes](#) [Next Input >>](#)

Select Input type: ANALOG 4-20 MA Physical Digital Alarm ID: 10

Gain: 25 Calculator High Limit2: 200 Alarm ID: 13

Offset: -44 High Limit1: 100 Alarm ID: 11

Hysteresis: 0 Low Limit1: 0 Alarm ID: 12

Unit of Measure: Deg Low Limit2: 0 Alarm ID: 14

Alarm Delay: 0 Seconds Pager Alarms: 0,0,0,0

Label: Server Isle A Temperature

Label (Digital input normal):

"OR Gate" Relay (1-16) Control: 0 [Relay Configuration](#)

"OR Gate" Relay (17-32) Control: 0

Email Recipient Notification:

☐ 1: support@rletech.com ☐ 2: engineering@rletech.com

☐ 3: exchange@rletech.com ☐ 4: 1235551212@textmycell.com

☐ 5: ☐ 6:

☐ 7: ☐ 8:

Alarm Disable by Schedule: ☒ None ☐ A ☐ B

Snmp Trap: ☒ Enabled ☐ Disabled ☐ Disabled during Schedule A ☐ Disabled during Schedule B

Trap Recipients: ☒ 1: ☒ 2:

☒ 3: ☒ 4:

High1/Low1 Snmp Traps: ☒ Enabled ☐ Disabled

Display Value: ☒ Signed ☐ Unsigned

Individual Ground Type (digital in only): ☒ Individual Ground ☐ Common Ground

BACnet Instance: ai:1 BACnet Units: 0

Figure 5.12 Individual Input Configuration Screen

Select Input Type: Select the type based on the values of the register is measured in a normal state. Change the drop down menu from “Physical” to “Modbus Import” and submit changes before continuing. Once Modbus Import has been submitted, a new field will appear called Register/Instance Index. Once this has been configured as a Modbus Import, the physical channel is no longer available for additional equipment.

Register/Instance index: Enter the register index number on the register screen for the selected function.

High Limit 2/1: Enter the high value(s) at which the user wants to be notified in an alarm state.

Low Limit 2/1: Enter the low value(s) at which the user wants to be notified in an alarm state.

Default Value: Enter the value at which the unit is in a normal state.

Hysteresis: Enter the value that designates the amount an input must sway from its present alarm reading before it is classified as returned to normal.

Unit of Measure: Enter the value at which the unit outputs data.

Alarm Delay: Enter the alarm time delay in seconds.

Alarm Dial Out: Enter the phone number configuration entry ID for up to five pager numbers to which the FMS will send notification when any alarm for this slave occurs. The entry ID numbers correspond to phone numbers configured from the phone number links at the bottom of the Modem Configuration page. Separate the ID numbers with commas. Enter zero (0) to disable. The FMS will dial the lowest number listed regardless of the order the numbers are listed.

Label: Enter a label to describe the input being monitored.

“OR gate” Relay Control: Enter the value displayed in the relay control table in [Appendix G, “Relay Control Logic” on page 183](#). Select the appropriate value of the relay to activate it. Or, add the respective values of the appropriate alarm condition. To activate more than one output relay, each input can have individual control values.

Email Recipient Notification: Check the recipient email addresses that require notification when any alarm occurs on this slave. Email addresses are displayed once they are entered on the email configuration page.

Alarm Disable by Schedule: Select the Schedule the user desires

SNMP Trap: Allows users to configure SNMP Trap notification options.

High1/Low1 SNMP Traps: Determines how the notification is sent.

Individual Ground Type: Select ground type

BACnet Instance: This is a BACnet object identifier. The BACnet Instance is a numerical code used to identify the input. This code must be unique within the BACnet device. Refer to the BACnet standard for further information.

BACnet Units: Designated BACnet engineering unit, which represents the units of measurement for the input. Refer to the BACnet standard for further information.

5.5. Modbus/Slave Units Configuration—Modbus Generic (Typical)

This Modbus Slave Unit Configuration page is available when the FMS is configured for “Modbus Master Generic - 16 Units.” This is used to configure the information regarding the Modbus Slave device that the FMS will poll data from.

To access this page, select Modbus Slave Units from the Configuration Menu.

Modbus Slave Unit Configuration				
Unit #	Protocol	Access	Address	Unit Description
<u>1</u>	Standard	Serial	1	Veris 8036 #1
<u>2</u>	Standard	Serial	2	Veris 8036 #2
<u>3</u>	Standard	Serial	3	Veris 8036 #3
<u>4</u>	Standard	Serial	4	Veris 8036 #4
<u>5</u>	Standard	Serial	5	Veris 8036 #5
<u>6</u>	Standard	Serial	6	Veris 8036 #6
<u>7</u>	Standard	Serial	7	Veris 8036 #7
<u>8</u>	Standard	Serial	8	Veris 8036 #8
<u>9</u>	Standard	Serial	9	Veris 8036 #9
<u>10</u>	Standard	Serial	10	Veris 8036 #10
<u>11</u>	Standard	TCP	1	FDS-Wi
<u>12</u>	Standard	TCP	1	Falcon F-series F3400
<u>13</u>	Standard	TCP	1	Falcon F110
<u>14</u>	Standard	TCP	1	LD2000 Leak Detection Module
<u>15</u>	Standard	Serial	0	(Blank)
<u>16</u>	Standard	Serial	0	(Blank)
Modbus Registers 1-100 Modbus Registers 101-200 Modbus Registers 201-300 Modbus Registers 301-400 Modbus Registers 401-500 Modbus Registers 501-600 Modbus Registers 601-628 Read / Preset Register				

Figure 5.13 Modbus Slave Unit Configuration

5.5.1 Unit Number Links

Select the Slave's **Unit #** link, located on the left side of the screen, to display the individual unit configuration page. See [Figure 5.13](#) for the location of the **Unit#** links.

Figure 5.14 Example Modbus Slave Unit

Communications: Configures the FMS to send Modbus requests to a specific slave device over either a serial connection (EIA-232 or EIA-485) or over TCP/IP. This configuration can be different for each slave unit.

RTU Station Address: Enter the address of the Modbus Slave device. Be sure this matches the address programmed on the particular Slave device.

Protocol: The FMS supports three versions of the Modbus protocol:

- ◆ Modbus Standard
- ◆ Modbus Extended
- ◆ JBus

Selecting these options will configure the FMS to send appropriate requests to each slave device. Refer to the documentation of the slave device for proper configuration.

Description: Enter a description for the Slave device.

Alarm Dial Out: Enter the Phone Number Configuration Entry ID for up to five pager numbers to which the FMS will send notification when any alarm for this Slave occurs. The Entry ID numbers correspond to phone numbers configured from the Configure Phone Number links at the bottom of the Modem Configuration page. Separate the ID numbers with commas. Enter zero to disable. The FMS will dial the lowest number listed regardless of the order the numbers are listed.

Example: If the Alarm dial out string is set to “3, 5, 1, 0, 0,” the FMS will dial Pager #1, Pager #3 and then Pager #5 when an alarm occurs.

Email Recipient Notification: Check the recipient email addresses that require notification when any alarm occurs on this Slave. Email addresses are displayed once they are entered on the Email Configuration page.

5.5.2 Modbus Register Links

Selecting a Modbus Register link at the bottom of the Modbus Slave Unit Configuration page will display a page similar to the one shown in [Figure 5.15](#). This page is used to navigate among the Modbus Master configuration registers.

Modbus Register Configuration			
# -Ut-Reg	Label	# -Ut-Reg	Label
1 -1	40259-Energy KWH	51 -2	40307-Minimum Demand KW
2 -1	40261-Demand KW	52 -2	40309-Maximum Demand KW
3 -1	40263-Reactive Power VAR	53 -3	40259-Energy KWH
4 -1	40265-Apparent Power VA	54 -3	40261-Demand KW
5 -1	40267-Power Factor	55 -3	40263-Reactive Power VAR
6 -1	40269-Voltage L-L	56 -3	40265-Apparent Power VA
7 -1	40271-Voltage L-N	57 -3	40267-Power Factor
8 -1	40273-Current-Amps	58 -3	40269-Voltage L-L
9 -1	40275-Demand PhaseA-KW	59 -3	40271-Voltage L-N
10 -1	40277-Demand PhaseB-KW	60 -3	40273-Current-Amps
11 -1	40279-Demand PhaseC-KW	61 -3	40275-Demand PhaseA-KW
12 -1	40281-Power Factor PhaseA	62 -3	40277-Demand PhaseB-KW
13 -1	40283-Power Factor PhaseB	63 -3	40279-Demand PhaseC-KW
14 -1	40285-Power Factor PhaseC	64 -3	40281-Power Factor PhaseA
15 -1	40287-Voltage A-B	65 -3	40283-Power Factor PhaseB
16 -1	40289-Voltage B-C	66 -3	40285-Power Factor PhaseC

Figure 5.15 Modbus Register Configuration Menu

Selecting a link to an individual register displays the configuration options for that register; see [Figure 5-16](#). Instructions for completing the options on this page are described below.

Modbus Register #1 Configuration	
Submit Changes	Next >>
Unit: 1 (0 - 16) (Modbus Std)	
Register/Offset: 40259 (10000 - 49999)	
Type: Float	
Scaler: 1	
Offset: 0 (-32767..32767 or -2000000000)	
Bitflag: 0 (Read Holding/Input Registers Only)	
Word Order: ☒ Big-Endian ☐ Little-Endian	
Label: Energy KWH	
Log Index: 0 (Range: 1-232 None=0)	
UOM Conversion: None	
Bacnet Instance: ai:1001	
Snmp Old: Index: 1.3.6.1.4.1.3184.1.5.1.12.4.3.1.1.1 Type: 1.3.6.1.4.1.3184.1.5.1.12.4.3.1.2.1 Data: 1.3.6.1.4.1.3184.1.5.1.12.4.3.1.3.1 Label: 1.3.6.1.4.1.3184.1.5.1.12.4.3.1.4.1	
Return	

Figure 5.16 Individual Modbus Configuration Screen

Unit: Enter the Slave Unit Number. This is *not* the Slave address, but the Slave Unit Number shown on the Modbus Slave Unit Configuration page; see [Figure 5.13](#), “Modbus Slave Unit Configuration” on page 111.

Register: Enter the Register Number for the data to be read. The Register Number is located on the Slave Units Modbus Register Map; see 5.8.1, “Slave Register Map” on page 121.

Type: Select the Data Type of the Register.

- ◆ Unsigned Int
- ◆ Signed Int
- ◆ Long
- ◆ Float
- ◆ Alarm Bit/ ON= ALARM
- ◆ Alarm Bit/ OFF=ALARM
- ◆ Status Bit - No Log
- ◆ Status Bit - Logged
- ◆ Coil Status
- ◆ Input Status

Note Refer to the manufacturer's equipment guide for the register numbers and the data type.

Scaler: Select a multiplier for the data value.

Bitflag: Applies to Data Types, Alarm Bit, Status Bit-Logged and Status Bit - No Log. Selects which bit is read from the 16 bit register value.

Word Order: Applies to Data Types Long and Float. Long and Float Data Types read two consecutive registers. The word order selects if the first register is the larger or smaller part of the number.

Label: Enter a label to describe the Data Point.

Log Index: Applies to Data Types Signed Int, Unsigned Int, Long and Float. The FMS has 232 entries reserved for logging (Min, Hour and Day Logs). Enter a value of 1 to 232 if the point is to be internally logged on the FMS. Each register to be logged requires a unique entry number.

UOM Conversion: Select an appropriate unit of measure conversion if polled data is not in the format desired.

- ◆ deg C - deg F (1,10,100,1000 Scale)
- ◆ deg C - deg F (1/32 Scale)
- ◆ kPa - PSI (1/8, 1/28 Scale)

5.5.3 Read/Preset Single Register

The **Read/Preset Single Register** link at the bottom of the Modbus Slave Unit Configuration page displays the following. This page reads or writes individual registers for troubleshooting and for configuring Slave parameters.

Read / Preset Single Register

Submit Changes

Unit: 0 (1-16)

Register: 0 (Preset 4xxxx)

Data: ☒ Decimal ☐ Hex

R/W: ☒ Read ☐ Set/Write

Last Data Exchange:

Figure 5.17 Read/Preset Single Register Page

5.6. Modbus/Slave Units Configuration – Modbus Master BCM – 4

This **Modbus Slave Unit Configuration** page is available when the FMS is configured for Modbus Master BCM - 4 Units and is used to configure the information regarding the Modbus Slave BCMs from which the FMS will poll data.

To access this page, select Modbus Slave Units from the Configuration Menu (you must have already configured the Com Port1/Modbus/Telnet setting to Modbus Master BCM - 4 Units).

Modbus BCM Unit Configuration					
Unit #	Protocol	Access	Address	Unit Description	Register Link
1	Standard	Serial	0	BCM #1	
2	Standard	Serial	0	BCM #2	
3	Standard	Serial	0	BCM #3	
4	Standard	Serial	0	BCM #4	

Figure 5.18 Modbus BCM-4 Unit Configuration

5.6.1 Unit Number Links

Select the Slave’s **Unit #** link to display the following page and allow for individual Slave configuration. Instructions for completing the options on this page are described below.

Modbus BCM #1 Configuration

Submit Changes

Next >>

Communications:

☒ Serial

☐ TCP IP Address: 0.0.0.0

RTU Station Address:

0

(1-254, 0 = disabled)

Protocol:

Modbus Std

Description:

BCM #1

Pager Alarms:

0,0,0,0,0

Email Recipient Notification

☐ 1: support@rlotech.com

☐ 2: engineering@rlotech.com

☐ 3: exchange@rlotech.com

☐ 4: 1235551212@textmycell.com

☐ 5:

☐ 6:

☐ 7:

☐ 8:

Return

Figure 5.19 Individual Slave Configuration Screen

Communications: Configures the FMS to send Modbus requests to a specific slave device over either a serial connection (EIA-232 or EIA-485) or over TCP/IP. This configuration can be different for each slave unit.

RTU Station Address: Enter the address of the Modbus Slave device. Be sure this matches the address set by the Dip Switches on the BCM. Each BCM requires a unique address.

Protocol: The FMS supports three versions of the Modbus protocol:

- ◆ Modbus Standard
- ◆ Modbus Extended
- ◆ JBus

Selecting these options will configure the FMS to send appropriate requests to each slave device. See the documentation of the slave device for proper configuration.

Description: Enter a description for the BCM.

Alarm Dial Out: Enter the Phone Number Configuration Entry ID for up to five pager numbers to which the FMS will send notification when any alarm for this Slave occurs. The Entry ID numbers correspond to phone numbers configured from the Configure Phone Number links at the bottom of the Modem Configuration page. Separate the ID numbers with commas. Enter zero to disable. The FMS will dial the lowest number listed regardless of the order the numbers are listed.

Example: If the Alarm dial out string is set to “3, 5, 1, 0, 0,” the FMS will dial Pager #1, Pager #3 and then Pager #5 when an alarm occurs.

Email Recipient Notification: Check the recipient email addresses that require notification when any alarm occurs on this BCM. Email addresses are displayed once they are entered on the Email Configuration page.

5.6.2 Modbus Register Links

Clicking a **Modbus Registers** link next to the BCM on the Modbus BCM Unit Configuration page displays the following page.

BCM #1				
CB	Label	Value	CB	Label
1	BCM #1 Circuit Breaker #1	1.353	2	BCM #1 Circuit Breaker #2
3	BCM #1 Circuit Breaker #3	5.018	4	BCM #1 Circuit Breaker #4
5	BCM #1 Circuit Breaker #5	2.475	6	BCM #1 Circuit Breaker #6
7	BCM #1 Circuit Breaker #7	1.324	8	BCM #1 Circuit Breaker #8
9	BCM #1 Circuit Breaker #9	2.070	10	BCM #1 Circuit Breaker #10
11	BCM #1 Circuit Breaker #11	0.000	12	BCM #1 Circuit Breaker #12
13	BCM #1 Circuit Breaker #13	4.565	14	BCM #1 Circuit Breaker #14
15	BCM #1 Circuit Breaker #15	4.806	16	BCM #1 Circuit Breaker #16
17	BCM #1 Circuit Breaker #17	0.000	18	BCM #1 Circuit Breaker #18
19	BCM #1 Circuit Breaker #19	0.000	20	BCM #1 Circuit Breaker #20
21	BCM #1 Circuit Breaker #21	0.000	22	BCM #1 Circuit Breaker #22
23	BCM #1 Circuit Breaker #23	0.000	24	BCM #1 Circuit Breaker #24
25	BCM #1 Circuit Breaker #25	0.000	26	BCM #1 Circuit Breaker #26
27	BCM #1 Circuit Breaker #27	0.000	28	BCM #1 Circuit Breaker #28
29	BCM #1 Circuit Breaker #29	0.000	30	BCM #1 Circuit Breaker #30
31	BCM #1 Circuit Breaker #31	2.015	32	BCM #1 Circuit Breaker #32
33	BCM #1 Circuit Breaker #33	0.000	34	BCM #1 Circuit Breaker #34
35	BCM #1 Circuit Breaker #35	0.000	36	BCM #1 Circuit Breaker #36
37	BCM #1 Circuit Breaker #37	0.000	38	BCM #1 Circuit Breaker #38
39	BCM #1 Circuit Breaker #39	0.000	40	BCM #1 Circuit Breaker #40
41	BCM #1 Circuit Breaker #41	8.560	42	BCM #1 Circuit Breaker #42

Figure 5.20 Modbus Registers (BCM) Page

5.6.2.1 CB# Links

Pressing a **CB # (CH#)** link displays the Circuit Breaker Configurations for each BCM.

BCM #1					
CB	Label	Value	CB	Label	Value
1	BCM #1 Circuit Breaker #1	1.385	2	BCM #1 Circuit Breaker #2	1.357
3	BCM #1 Circuit Breaker #3	4.766	4	BCM #1 Circuit Breaker #4	0.000
5	BCM #1 Circuit Breaker #5	2.667	6	BCM #1 Circuit Breaker #6	0.000
7	BCM #1 Circuit Breaker #7	1.265	8	BCM #1 Circuit Breaker #8	9.104
9	BCM #1 Circuit Breaker #9	1.341	10	BCM #1 Circuit Breaker #10	0.000
11	BCM #1 Circuit Breaker #11	0.000	12	BCM #1 Circuit Breaker #12	0.000
13	BCM #1 Circuit Breaker #13	4.517	14	BCM #1 Circuit Breaker #14	0.000
15	BCM #1 Circuit Breaker #15	4.774	16	BCM #1 Circuit Breaker #16	0.266
17	BCM #1 Circuit Breaker #17	0.000	18	BCM #1 Circuit Breaker #18	0.000
19	BCM #1 Circuit Breaker #19	0.000	20	BCM #1 Circuit Breaker #20	0.000
21	BCM #1 Circuit Breaker #21	0.000	22	BCM #1 Circuit Breaker #22	0.000
23	BCM #1 Circuit Breaker #23	0.000	24	BCM #1 Circuit Breaker #24	0.000
25	BCM #1 Circuit Breaker #25	0.000	26	BCM #1 Circuit Breaker #26	0.000
27	BCM #1 Circuit Breaker #27	0.000	28	BCM #1 Circuit Breaker #28	0.000
29	BCM #1 Circuit Breaker #29	0.000	30	BCM #1 Circuit Breaker #30	0.000
31	BCM #1 Circuit Breaker #31	1.458	32	BCM #1 Circuit Breaker #32	0.000
33	BCM #1 Circuit Breaker #33	0.000	34	BCM #1 Circuit Breaker #34	0.000
35	BCM #1 Circuit Breaker #35	0.000	36	BCM #1 Circuit Breaker #36	0.000
37	BCM #1 Circuit Breaker #37	0.000	38	BCM #1 Circuit Breaker #38	0.000
39	BCM #1 Circuit Breaker #39	0.000	40	BCM #1 Circuit Breaker #40	0.000
41	BCM #1 Circuit Breaker #41	1.930	42	BCM #1 Circuit Breaker #42	0.000

Figure 5.21 Circuit Breaker Configurations for Individual BCMs

Label: Enter a label to describe the circuit breaker. The label is included in notifications and for identification on the Slave Unit Monitoring page.

Zero Amp Enable: Check to enable alarm and notification if the branch circuit current falls below the zero amp level as set on the Modbus /COM Port 1 Configuration page.

Breaker Size: Enter the circuit breaker size in the BCM.

Warning Threshold: Enter the warning threshold level-in percent-in the BCM.

Alarm Threshold: Enter the alarm threshold level-in percent-in the BCM.

Warning Time Delay: Enter the warning time delay-in seconds-in the BCM.

Alarm Time Delay: Enter the alarm time delay-in seconds-in the BCM.

5.7. Modbus/Slave Units Configuration – Modbus Master BCM – 16

This **Modbus Slave Unit Configuration** for Modbus Master BCM-16 Units is used to configure the information regarding the Modbus Slave BCMs that the FMS will poll data from. Setup is the same as the 4 BCM option, except that the FMS can be configured to monitor 16 BCMs. See 5.4., “[Configuring Inputs and Relays for Slave Units \(Modbus and BACnet\)](#)” on page 108 for details on how to configure the FMS unit for Modbus Master BCM-16.

Note The 16 BCM option does not support SNMP for the BCMs. SNMP is still supported for the other Falcon features.

Modbus BCM Unit Configuration					
Unit #	Protocol	Access	Address	Unit Description	Register Link
1	Standard	Serial	0	BCM #1	
2	Standard	Serial	0	BCM #2	
3	Standard	Serial	0	BCM #3	
4	Standard	Serial	0	BCM #4	
5	Standard	Serial	0	BCM #5	
6	Standard	Serial	0	BCM #6	
7	Standard	Serial	0	BCM #7	
8	Standard	Serial	0	BCM #8	
9	Standard	Serial	0	BCM #9	
10	Standard	Serial	0	BCM #10	
11	Standard	Serial	0	BCM #11	
12	Standard	Serial	0	BCM #12	
13	Standard	Serial	0	BCM #13	
14	Standard	Serial	0	BCM #14	
15	Standard	Serial	0	BCM #15	
16	Standard	Serial	0	BCM #16	

Figure 5.22 Modbus BCM-16 Unit Configuration Page

5.8. Additional Modbus Information

5.8.1 Slave Register Map

Table 5.6 Slave Register Map

Register	Description	Range
40001	Input #1 value	-32678 – 32767
..	..	..
40104	Input #104 value	-32678 – 32767
40105	Internal Temperature Sensor	-32678 – 32767
40106	Internal Humidity Sensor	-32678 – 32767
40107-40187	Reserved	
40188-40193	MAC address	00:90:5b:01:01:01
40194-40197	IP address	10.0.0.203
40198	Model Number	100
40199	Firmware Version	73
40200	Number of Alarms Present	0 – 65535
40201	Input #1 alarm bit map	0 – 0x0010
..	..	..
40304	Input #104 alarm bit map	0 – 0x0010
40305	Internal Temperature Sensor - alarm bit map	0 – 0x0010
40306	Internal Humidity Sensor - alarm map	0 – 0x0010
40307-40400	Reserved	
40401	Input #1 config code	0 – 7
..	..	..
40504	Input #104 config code	0 – 7

5.8.2 Alarm Bit Map (Reg 40201--40306)

Table 5.7 Alarm Bit Map

Bit Map	Description
0x0000	= No Alarm
B:0 0x0001	= High1 Alarm
B:1 0x0002	= Low1 Alarm
B:2 0x0004	= High2 Alarm
B:3 0x0008	= Low2 Alarm
B:4 0x0010	= Digital Alarm

5.8.3 Configuration Codes (Reg 40401–40504)

Table 5.8 Configuration Codes

Code	Description
0	= Not Installed
1	= Not Configured
2	= Analog 4-20ma
3	= Digital NO
4	= Digital NC
5	= Digital Status
6	= Analog 0-5V
7	= Analog 0-10V

5.9. BACnet Slave Units Configuration – BACnet/IP Master

The BACnet Configuration page allows the user to enable the FMS for BACnet Master or BACnet slave configuration.

Note The FMS has BACnet slave capabilities automatically built in. For the FMS to be a Master on the BACnet network “Master Protocol Selection” must be set to BACnet.

BACnet Device Name: The name of the FMS as it will appear on the BACnet network

BACnet Device ID: The unique identifier for the FMS on the BACnet network

BACnet Description: The description of the FMS as it will appear on the BACnet network

BACnet UDP Port: The port to which the FMS will respond to BACnet requests. The default number of zero in this field will configure the FMS to listen on the standard BACnet port of 47808; see the BACnet standard for more information.

BACnet BBMD-BDT, FMS IP Address, #1 IP Address, #2 IP Address, #3 IP Address, #4 IP Address: These fields give the user a reference and edit capabilities of the BACnet Broadcast Distribution Table. These fields *do not* need to be configured by the user. If the FMS is acting as a BACnet router, these fields will automatically be populated by the BACnet network controller.

Preset Input Instance Numbers: Clicking this button tells the FMS to auto populate the BACnet Instance Number field on each available input. The BACnet Instance Number field can be configured manually by the user but this button gives the user a more efficient way to assign default values to this field; see [5.9.4, “BACnet Instance Register Links” on page 127](#), for more details.

5.9.1 BACnet Configuration

This BACnet Slave Unit Configuration page is available when the FMS is configured for “BACnet/IP” and is used to configure the information regarding the Modbus Slave Units that the FMS will poll data; see 5.4., “Configuring Inputs and Relays for Slave Units (Modbus and BACnet)” on page 108, for details on how to configure an input for a BACnet slave device.

Bacnet Configuration

Submit Changes

BACnet Device Name:

Tech Support FMS-AAAA-Y-24 (FCF)

BACnet Device ID:

7201

BACnet Description:

Falcon-CF

Bacnet UDP Port:

0

(0 = 47808)

Bacnet BBMD-BDT:

Falcon IP Address: 63.253.110.254:0 Mask: 32 (FFFFFFFF)

(Primary) #1 IP Address:

0.0.0.0

Port:

0

Mask:

0

(1-32)

#2 IP Address:

0.0.0.0

Port:

0

Mask:

0

(1-32)

#3 IP Address:

0.0.0.0

Port:

0

Mask:

0

(1-32)

#4 IP Address:

0.0.0.0

Port:

0

Mask:

0

(1-32)

Bacnet Packet Log

Property Identifiers Supported

BACnet_Present_Value	BACnet_Object_Identifier	BACnet_Object_Name
BACnet_Object_Type	BACnet_Event_State	BACnet_Status_Flags
BACnet_Out_Of_Service	BACnet_Units	BACnet_Time_delay

Bacnet Device Objects

BACnet_Object_Identifier	BACnet_Object_Name	BACnet_Object_Type
BACnet_System_Status	BACnet_Vendor_Name	BACnet_Vendor_Id
BACnet_Model_Name	BACnet_Firmware_Revision	BACnet_App_Software_Revision
BACnet_Location	BACnet_Description	BACnet_Protocol_Version
BACnet_Conformance_Class	BACnet_Services_Supported	BACnet_Object_Types_Supported
BACnet_Object_List	BACnet_Max_APDU	BACnet_Segment_Supported
BACnet_Segment_Timeout	BACnet_APDU_Timeout	BACnet_APDU_Retries
BACnet_Bindings		

Figure 5.23 BACnet Configuration Page

BACnet Device Name: The name of the FMS as it will appear on the BACnet network

BACnet Device ID: The unique identifier for the FMS on the BACnet network

BACnet Description: The description of the FMS as it will appear on the BACnet network

BACnet UDP Port: The port to which the FMS will respond to BACnet requests. The default number of zero in this field will configure the FMS to listen on the standard BACnet port of 47808; see the BACnet standard for more information.

BACnet BBMD-BDT, FMS IP Address, #1 IP Address, #2 IP Address, #3 IP Address, #4 IP Address: These fields give the user a reference and edit capabilities of the BACnet Broadcast Distribution Table. These fields *do not* need to be configured by the user. If the FMS is acting as a BACnet router, these fields will automatically be populated by the BACnet network controller.

Present Input Instance Numbers: Clicking this button tells the FMS to auto populate the BACnet Instance Number field on each available input. The BACnet Instance Number field can be configured manually by the user but this button gives the user a more efficient way to assign default values to this field; see 5.9.4, “[BACnet Instance Register Links](#)” on page 127, for more details.

5.9.2 BACnet Slave Unit Configuration

This **BACnet Slave Unit Configuration** page is available when the FMS is configured for “BACnet/IP” and is used to configure the information regarding the Modbus Slave Units that the FMS will poll data; see 5.4., “[Configuring Inputs and Relays for Slave Units \(Modbus and BACnet\)](#)” on page 108, for details on how to configure an input for a BACnet slave device.

Bacnet Unit Configuration		
Unit #	Address	Unit Description
1	0.0.0.0	(Blank)
2	0.0.0.0	(Blank)
3	0.0.0.0	(Blank)
4	0.0.0.0	(Blank)
5	0.0.0.0	(Blank)
6	0.0.0.0	(Blank)
7	0.0.0.0	(Blank)
8	0.0.0.0	(Blank)
9	0.0.0.0	(Blank)
10	0.0.0.0	(Blank)
11	0.0.0.0	(Blank)
12	0.0.0.0	(Blank)
13	0.0.0.0	(Blank)
14	0.0.0.0	(Blank)
15	0.0.0.0	(Blank)
16	0.0.0.0	(Blank)
Bacnet Instances 1-50 Bacnet Instances 51-100 Bacnet Instances 101-150 Bacnet Instances 151-200 Bacnet Instances 201-250 Bacnet Instances 251-300 Bacnet Instances 301-350 Bacnet Instances 351-400 Bacnet Instances 401-450 Bacnet Instances 451-500 Bacnet Instances 501-550 Bacnet Instances 551-600 Bacnet Instances 601-628		
Bacnet Packet Log		
Bacnet Master Data Log		

Figure 5.24 BACnet Unit Configuration

5.9.3 Unit Number Links

Select the Slave’s **Unit #** link to display the following page and allow for individual Slave configuration. See Section 5.4., “Configuring Inputs and Relays for Slave Units (Modbus and BACnet)” on page 108 for details on how to configure the option presented here.

Bacnet Slave #01 Configuration

Submit Changes

Next >>

IP Address: 0.0.0.0

Port: 0 (0=47808)

Description:

Pager Alarms: 0,0,0,0

Email Recipient Notification

☐ 1: ttfletcher@rlotech.com

☐ 2:

☐ 3:

☐ 4:

☐ 5:

☐ 6:

☐ 7:

☐ 8:

[Return](#)

Figure 5.25 Individual Slave Unit Configuration Page

Return to the BACnet Unit Configuration page and click on a BACnet Instances link at the bottom of the page to configure individual instances (registers).

Bacnet Instance Configuration Menu									
#	Unit	Type	Instance	Label	#	Unit	Type	Instance	Label
1	0	Analog Input	0	Register #1	26	0	Analog Input	0	Register #26
2	0	Analog Input	0	Register #2	27	0	Analog Input	0	Register #27
3	0	Analog Input	0	Register #3	28	0	Analog Input	0	Register #28
4	0	Analog Input	0	Register #4	29	0	Analog Input	0	Register #29
5	0	Analog Input	0	Register #5	30	0	Analog Input	0	Register #30
6	0	Analog Input	0	Register #6	31	0	Analog Input	0	Register #31
7	0	Analog Input	0	Register #7	32	0	Analog Input	0	Register #32
8	0	Analog Input	0	Register #8	33	0	Analog Input	0	Register #33
9	0	Analog Input	0	Register #9	34	0	Analog Input	0	Register #34
10	0	Analog Input	0	Register #10	35	0	Analog Input	0	Register #35
11	0	Analog Input	0	Register #11	36	0	Analog Input	0	Register #36
12	0	Analog Input	0	Register #12	37	0	Analog Input	0	Register #37
13	0	Analog Input	0	Register #13	38	0	Analog Input	0	Register #38
14	0	Analog Input	0	Register #14	39	0	Analog Input	0	Register #39
15	0	Analog Input	0	Register #15	40	0	Analog Input	0	Register #40
16	0	Analog Input	0	Register #16	41	0	Analog Input	0	Register #41
17	0	Analog Input	0	Register #17	42	0	Analog Input	0	Register #42
18	0	Analog Input	0	Register #18	43	0	Analog Input	0	Register #43
19	0	Analog Input	0	Register #19	44	0	Analog Input	0	Register #44
20	0	Analog Input	0	Register #20	45	0	Analog Input	0	Register #45
21	0	Analog Input	0	Register #21	46	0	Analog Input	0	Register #46
22	0	Analog Input	0	Register #22	47	0	Analog Input	0	Register #47
23	0	Analog Input	0	Register #23	48	0	Analog Input	0	Register #48
24	0	Analog Input	0	Register #24	49	0	Analog Input	0	Register #49
25	0	Analog Input	0	Register #25	50	0	Analog Input	0	Register #50

[Return](#)

Figure 5.26 BACnet Instance Configuration

5.9.4 BACnet Instance Register Links

Selecting a **BACnet Instances** link at the bottom of the BACnet Slave Unit Configuration page displays the following. [Figure 5.27](#) shows the navigation screen for configuring the BACnet registers.

Figure 5.27 BACnet Configuration Registers Page

Selecting a link to an individual register displays the configuration options for that register. See [5.4.](#), “[Configuring Inputs and Relays for Slave Units \(Modbus and BACnet\)](#)” on page 108, for details on how to configure the option presented here.

5.10. Telnet

The FMS supports a Telnet connection over IP port 23. When properly configured a telnet user can use the Com1 port of the FMS to communicate to external EIA-232 enabled devices. For instance, a user could properly configure the FMS, open a telnet session and then connect to an LD5100 interface over Com1 EIA-232.

5.10.1 Hardware Connections

The Com1 port is located on the back of the FMS. The COM1 Transmit and Receive LEDs are also located on the back of the FMS.

The EIA-232 port allows communications between the FMS and one other device (point-to-point connection). The EIA-232 port has maximum cable length of 50 feet (15.2m).

Table 5.9 COM1 DB9 Male Pin Out

Pin	Description
Pin 1	= Data Carrier Detect
Pin 2	= Receive Data
Pin 3	= Transmit Data
Pin 4	= Data Terminal Ready
Pin 5	= Signal Ground
Pin 6	= No Connection

Table 5.9 COM1 DB9 Male Pin Out

Pin	Description
Pin 7	= Request to Send (internally connected to Pin 8)
Pin 8	= Clear to Send (internally connected to Pin 7)
Pin 9	= No Connection

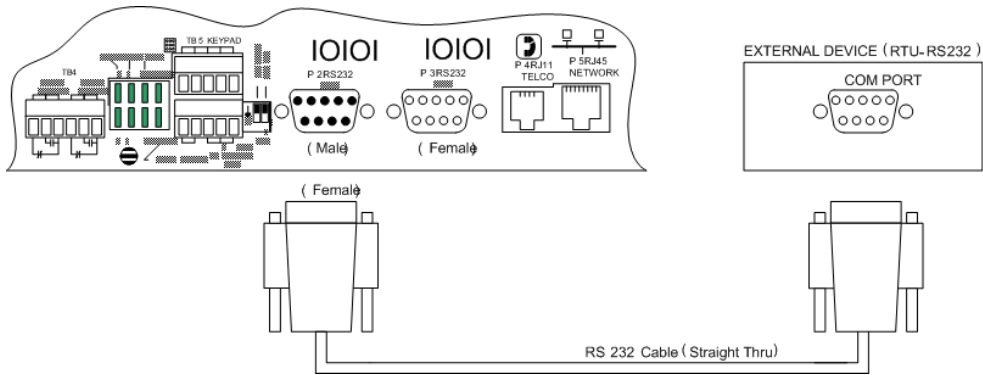


Figure 5.28 FMS Connection to an EIA-232 Device

5.10.2 Telnet/COM1 Configuration

The COM1 Port/Modbus/Telnet Configuration page allows the user to configure the FMS Telnet features.

Modbus / Com Port 1 Configuration

Submit Changes

Modbus/TCP Slave Enable: ☒ Yes ☐ No

Modbus/TCP Slave Unit Identifier: (1-254, 0 = disabled)

Serial Com 1 Protocol Type:

Telnet

Serial Baud Rate: ☐ 1200 ☐ 2400 ☒ 9600

Serial Interface Type: ☐ EIA-485 ☒ EIA-232

Telnet Inactivity Timeout: Minutes

Modbus Serial Slave Address: (1-254, 0 = disabled)

Master Poll Timeout: (1 - 10) Seconds

Master Poll Interval: (250 - 2000) mS

Master Retry Attempts: (1 - 99)

BCM Zero Amp Alarm Level: (0.000 - 1.000)

BCM Status Display: ☒ Left-Right ☐ Vertical

[Modbus Slave Register Display Log](#)

[Modbus Packet Log](#)

[Reset Modbus Port](#)

[Modbus Master Poll Data Log](#)

[SMS/Text Modem Log](#)

Figure 5.29 Telnet/COM1Configuration Page

Serial Protocol: Configures the Serial COM Port 1 (EIA-232 or EIA-485) Master or Slave operation. The options are:

- ◆ **None:** Disables Modbus support on Serial Port COM1.
- ◆ **Modbus Slave:** Enables the FMS to operate as a Modbus Slave over the Serial Port COM1.
- ◆ **Telnet:** Enables telnet connections to the FMS and communication with an external EIA-232 device through the COM1 port.

Serial Baud Rate: Sets the Serial COM Port 1 to 1200, 2400 or 9600 Baud. All the devices connected to the FMS Serial COM Port 1 must be set to operate at the same Baud rate.

Serial Interface Type: Enables the FMS Modbus to operate on the EIA-485 or EIA-232 COM1 Port.

Telnet Inactivity Timeout: Sets the amount of time for the FMS to timeout due to inactivity. The time is adjustable from 0 to 999 minutes.

5.10.3 Telnet Communication

To access a device through the FMS:

- 1 Connect a nine-pin, straight-through serial cable to the FMS and to the other device.

Once you connect the serial cable, the FMS automatically switches to EIA-232 mode.

- 2 On the FMS Web interface, select the Com Port1/Modbus/Telnet link from the Configuration Menu.

The following page displays. Notice that the Serial Interface Type is EIA-232.

Modbus / Com Port 1 Configuration

Modbus/TCP Slave Enable: ☒ Yes ☐ No
Modbus/TCP Slave Unit Identifier: (1-254, 0 = disabled)
Serial Com 1 Protocol Type: Telnet ▼

Serial Baud Rate: ☐ 1200 ☐ 2400 ☒ 9600
Serial Interface Type: ☐ EIA-485 ☒ EIA-232
Telnet Inactivity Timeout: Minutes
Modbus Serial Slave Address: (1-254, 0 = disabled)
Master Poll Timeout: (1 - 10) Seconds
Master Poll Interval: (250 - 2000) mS
Master Retry Attempts: (1 - 99)
BCM Zero Amp Alarm Level: (0.000 - 1.000)
BCM Status Display: ☒ Left-Right ☐ Vertical

[Modbus Slave Register Display Log](#)
[Modbus Packet Log](#)
[Reset Modbus Port](#)
[Modbus Master Poll Data Log](#)
[SMS/Text Modem Log](#)

- 3 If necessary, select a different baud rate. The default is 9600.

- 4 Open a Command Prompt window and type the following:

Telnet[sp](Falcon IP address)[sp](Port number)

See the example in [Figure 5.30](#).

Note If the FMS is going to be looped back into itself, the Command Prompt line feed must be set to carriage return (CR) only.



WARNING

Do not Telnet back into the Falcon. This could cause severe problems, including system freezing or complete shutdown of the system.

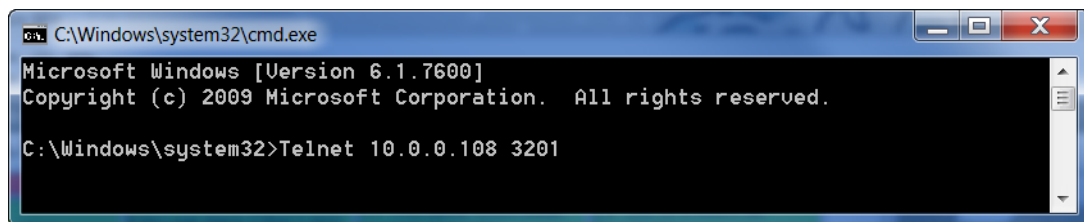


Figure 5.30 Telnet Communication, IP Address of 10.0.0.108, Port 3201

Press **Enter**. The device connects.

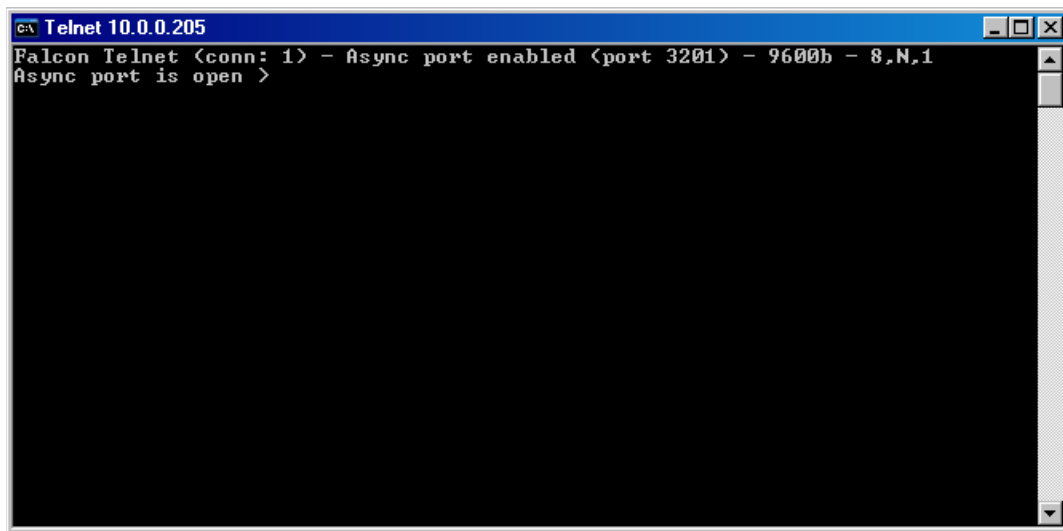


Figure 5.31 Example Telnet Connection Showing Specific Parameters

Once a Telnet connection is established, the menu displays for the connected device. Menus vary depending on the device.

Notes:

EIA-232 INTERFACE

The FMS EIA-232 interface provides a more detailed and intricate view of the FMS. It also allows a user to access more elaborate configuration options. It also allows users to access more elaborate IP configurations and diagnostics.

In order to proceed through this chapter, the FMS must be connected to a PC via the EIA-232 port. If the FMS is not yet connected to a PC, connect the FMS EIA-232 COM2 port as follows:

- 1 Connect the EIA-232 port on the FMS to a terminal or PC running terminal emulation software (HyperTerminal) with a 9-pin male-female straight through serial cable.
- 2 Set the appropriate COM Port to **9600 baud, NO parity, 8 data bits, 1 stop bit, (9600/N/8/1)**, and **no software or hardware flow control**.
- 3 Once the terminal emulation software starts, press **Enter** on the keyboard, then press **?** and the Main Menu should appear. If the Main Menu does not appear, check the communication settings and make sure the unit is powered on.



WARNING

The Bootloader section is designed for experienced technicians or users responsible for maintaining the system. Exit immediately if you have not been trained in the use of the Bootloader commands. Contact RLE for more information regarding the commands in this section.

6.1. Unit Start Up

When the unit is powered up, diagnostic tests are performed and the Flash Program code is verified. The main system code is executed after a five second delay. During the boot up sequence, the System Status LED will flash at a rapid rate of 10 flashes per second. If the System Status LED continues to flash for more then 20 seconds, there is a fault with the unit and service is required, contact RLE Tech support for more information.

6.2. Flash Executable Code

After the boot up sequence, the main program executes from Flash memory. In order to run properly, the unit must have a unique MAC address (assigned by the manufacturer) and an IP address. The factory default for the IP address is 10.0.0.188. If the unit is connected to the enterprise's network, an IP address must be obtained from the network administrator. The FMS must be reconfigured with this new IP address. This reconfiguration can be done in the field; see the [Table 6.1](#).

Once the system reaches this point, press **Enter** to display the System Main Menu.

6.3. Main Menu

All system functions begin in the Main Menu. Users can display information, execute commands and display submenus for additional inquiry and system configuration functions.

Table 6.1 EIA-232 Main Menu

Command	Description	Function
netcfg	Network Configuration	netcfg displays the current MAC address, IP address, subnet mask, default gateway. Users can set the MAC address, IP address, Subnet mask, default gateway, ping, network debug, network statistics, arp table, mail trace1, mail trace2 and test email.
time	Display Date/Time	time displays the FMS current time and date. To enter the time manually, type time one space then the current time in 24 hour format, including the seconds; e.g., hh:mm:ss
date	Display Date/Time	date displays the FMS current time and date. To enter the date manually, type date one space then the current time date; e.g., mm/dd/yy.
reset	bootloader Menu	reset displays the FMS bootloader menu. The options are mac, ip, nm, dg, nd, ns, arp, ping, time, date, reset, id, blank, erase prgm, load prgm xmodem, erase saX, run, diag and rlyx.
id	Firmware Identification	id displays the FMS unit name, firmware file name and file size.

6.3.1 Network Configuration – netcfg

Typing `netcfg` at the command prompt on the Main Menu displays the **Network Configuration Menu** that lists all items for system setup and configuration. This menu may be password protected. If it is, the password must be entered when the **SC** menu selection is made. To enter the password, type **SC**, press the space bar once, and then type the appropriate password; see [Table 6.2](#) for the Main Configuration Menu Options.

Table 6.2 Main Configuration Menu Options (SC)

Command	Description	Function
mac	Media Access Control	MAC will display the current MAC address for the FMS. The MAC address should never be changed on the FMS, if it needs to be changed, contact RLE Technologies.
ip	Internet Protocol	IP is the network address that is part of the TCP/IP protocol suite for the FMS to communicate over the network.
nm	Subnet Mask	nm allows users to configure the subnet mask address for the network.
dg	Default Gateway	dg allows the user to configure the default gateways/router address for the network.
ping	ICMP Ping	ping allows users to send a communication request to other network device top check for network conductivity.
nd	Network Debug	nd allows users to troubleshoot the network devices seen by the FMS.
ns	Network Statistics	ns allows users to view the network activity seen by the FMS.
arp	Address Resolution Protocol	arp allows users to view the arp table entries by the FMS.
mt1	Mail Trace 1	mt1 allows users a simple view of the communications between the mail server and FMS while trying to sending an email.
mt2	Mail Trace 2	Mt2 allows users a detailed view of the communications between the mail server and FMS while sending an email.
tm	Test Mail	tm allows users to generate a test email from the FMS to the mail server. Users can view the communication between the FMS and mail server. The email page must be configured for this test feature to work.

6.3.1.1 Bootloader Menu

The **bootloader menu** is accessed by typing `reset` at the command prompt. This menu is used to establish IP/TCP and PPP interaction with the network. The FMS must be set up with an IP address, Subnet Mask, and default router. These addresses can be obtained from your Network Administrator or IT Department. To enable the SNMP receiving stations, or to create communities, the FMS MIB, provided on a CD with every unit, must be loaded on a system(s) running a Network Operating System (NOS). This MIB is compiled through standard functions of the NOS. Consult with your Network Administrator for proper installation of the FMS MIB on the NOS. Once the MIB is loaded, the FMS can be discovered and configured over the

network. For proper operation, the IP addresses configured in the FMS communities must match the IP addresses on the receiving stations.

Only the administrator's username/password may be changed from this menu. All other Web users must be changed via the Web interface.

Table 6.3 IP Configuration Menu

Command	Description	Function
mac	Media Access Control	MAC will display the current MAC address for the FMS. The MAC address should never be changed on the FMS, if it needs to be changed, contact RLE Technologies.
ip	Internet Protocol	IP is the network address that is part of the TCP/IP protocol suite for the FMS to communicate over the network.
nm	Subnet Mask	nm allows users to configure the subnet mask address for the network.
dg	Default Gateway	dg allows the user to configure the default gateways/router address for the network.
ping	ICMP	ping allows users to send a communication request to other network device to check for network conductivity.
time	Time	time displays the FMS current time and date. To enter manually, type time one space then the current time in 24 hour format, including the seconds. example: hh:mm:ss.
date	Date	date displays the FMS current time and date. To enter manually, type date one space then the current time date. example: mm/dd/yy.
reset	Bootloader	reset allows the user to return to the bootloader menu
id	Firmware Identification	id displays the current firmware file name and file size.
blank	Firmware fileCheck	blank displays what firmware files are present in the FMS memory.
erase prgm	Erase Firmware	erase prgm allows users to erase the back up firmware file in the FMS.
Load prgm xmodem	Load firmware file via the EIA-232	Load prgm xmodem allows users to upload firmware files via the EIA-232 using a serial packet transfer with a terminal emulation program.
erase saX	Erase sectors of memory	erase saX allows users to erase the specific sections of memory from the FMS.
run	Start Application	run allows users to erase the back up firmware file in the FMS.
diag	Diagnostics	diag allows users to run the current firmware file for the FMS to run its application.

REMOTE ACCESS

7.1. Remote Access Configuration

The FMS can be remotely accessed with any terminal emulation software package. To establish a proper dial-out session, set the appropriate modem port as follows:

- ◆ 33.6K baud
- ◆ NO parity
- ◆ 8 bits
- ◆ 1 stop bit
- ◆ (2400/N/8/1)
- ◆ No software or hardware flow control

Once the proper settings are made, dial the phone number assigned to the FMS. Once communication is established, press **Enter**. A login prompt will appear on the screen. Type the login and press **Enter**; type the password and press **Enter**. The session will begin.

Note The factory default settings are: username: `falcon`, and password: `rletech`.

Type a question mark (?) to view the **System Menu**. To terminate the session, execute the command in the software package that disconnects the modem. The commands for accessing the system remotely are identical to the ones described in 2.3.1, “[Set the FMS IP Address](#)” on [page 33](#). There is, however, a limited command set for remote access. The available commands are:

- ◆ Current Alarms (**CA**)
- ◆ Kill All Alarms (**KA**)
- ◆ Display Date/Time (**TI**)
- ◆ ADC Input Values (**AD**)
- ◆ Modem Stats (**MS**)
- ◆ System Configuration (**SC**)

Pages can be acknowledged by phone number during a remote access session by entering aa followed by the alarm acknowledgement code for that phone number.

POINT-TO-POINT PROTOCOL

Point-To-Point Protocol (PPP) is an alternate method that may be used to communicate with the FMS. PPP can only be used through a modem, over a phone line. Both the FMS and the user's computer must be configured correctly in order for PPP to work.

8.1. Configuring the FMS

- 1 Access the FMS Web interface.
- 2 Click the **Configuration** link. Enter the correct user name and password (if necessary).
- 3 From the **Configuration Menu**, click on the **System** link.
- 4 On the **System Configuration** page, click on the **IP Configuration Menu** link.

The **IP Configuration** page lists the IP addresses configured on the FMS. Both the **PPP Server** and **PPP Assignment** fields need to be completed in order for PPP to work.

PPP Server: Assigns an IP address to the FMS for PPP communications. Any IP address may be used, as long as it is not in the same subnet as the FMS primary IP address. A good example of an IP address to use is: 192.168.1.2. Use this address to view the FMS Web interface through a browser when communicating with the FMS through PPP.

PPP Assignment: Tells the FMS what IP address to assign to the PC the user dials in from. Again, any IP address may be used, as long as it is in the same subnet as the PPP Server IP address. A good example of an IP address to use is: 192.168.1.3

8.2. Configuring the PC

Now the user is ready to configure the PC they will be dialing in from. These directions were written from a Windows XP machine. To configure the PC:

- 1 Click on **Start**, **Control Panel**, then **Network**. Select **New Connection**.
- 2 When the **Internet Properties** window appears, select the **Connections** tab at the top of the window and click on the **Setup** button to start the **New Connection Wizard**.
- 3 Click the **Next** button to begin the Wizard.
- 4 Select **Connect to the Internet** and click the **Next** button.
- 5 Select the **Set up my connection manually** button and click **Next**.
- 6 Select the **Connect using a dial-up modem** button and click **Next**.
- 7 Type "**Falcon**" as the name of the Internet Service Provider (ISP) in the space provided and click **Next**.
- 8 Enter the **phone number** of the phone line that connects to the FMS. Click the **Next** button.
- 9 Enter the FMS Modem **User name** and **Password** and click **Next**.
- 10 Add a shortcut to the desktop. Click the **Finish** button. Use this desktop shortcut to establish a PPP connection with the FMS.

LOADING FIRMWARE AND CONFIGURATION DATA

9.1. Loading FMS Firmware

You can download current and some past versions of firmware from RLE's website at www.rletech.com. It is important to confirm the correct version of firmware before downloading and installing it. The FMS MAC ID is printed on a sticker on the bottom of the unit. FMS units with MAC IDs **00.90.5B.02.00.00** and **above** accept different firmware than other Falcons.

- ◆ FMS8002, 8126, and 2006 Falcons support firmware version 5.x only
- ◆ FMS8, 20, 20U and FMS32 Falcons support firmware version 6.x only.
- ◆ FLS8 and FLS8-M (Falcon Lite), and F-Series support firmware version 2.x only.
- ◆ FMS-X/FMS-XXXX with bootloader 7.x.x support firmware version 7.x only.
- ◆ FMS-X/FMS-XXXX With Bootloader 2.x.x supports firmware version 8.3.x only.
- ◆ FMS-X/FMS-XXXX With Bootloader 3.x.x supports firmware version 8.4.x only.



WARNING

DO NOT ATTEMPT TO LOAD THE WRONG FIRMWARE ONTO THE FMS. If you have any questions regarding firmware compatibility, visit our FMS webpage at www.rletech.com or call us directly.

9.1.1 Loading Firmware Using MIME

To update the firmware for the FMS using the MIME (multipurpose Internet mail extensions) standard:

- 1 Go to the RLE website Resources page at <http://www.rletech.com/resources/>.
- 2 Scroll down to the Falcon section and locate the firmware (a .bin file) for the FMS. *Using the same filename*, save it to a local disk.

IMPORTANT Do not change the name of the firmware file when you save it. Otherwise, the FMS will not recognize the file.

- 3 On the FMS interface, go to Configuration>Flash Program.

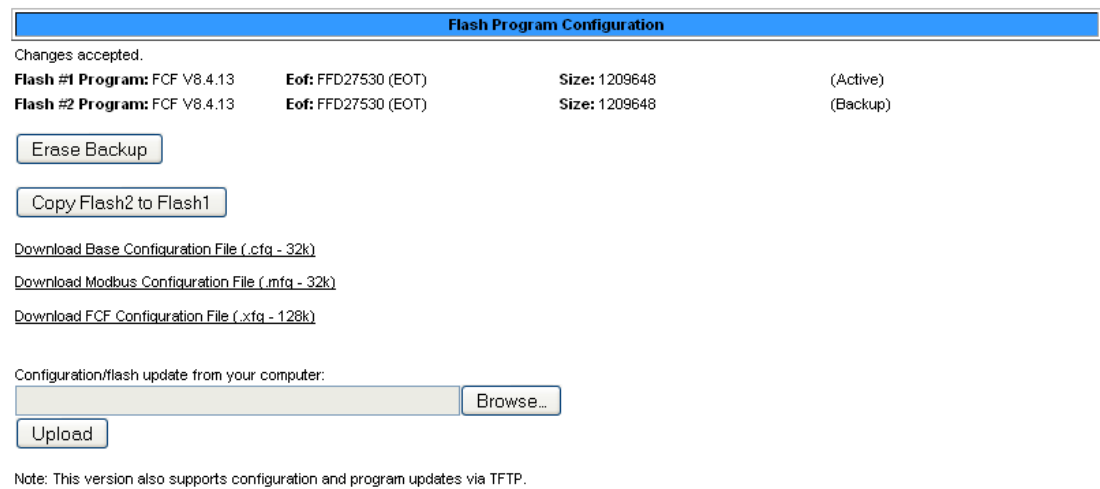


Figure 9.1 Flash Program Configuration Page

4 Click the Browse button.

5 Locate and choose the firmware file (.bin) that you saved from the RLE website.

The path and name of the firmware file (.bin) displays in the field to the left of the Browse button.

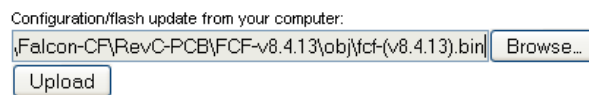
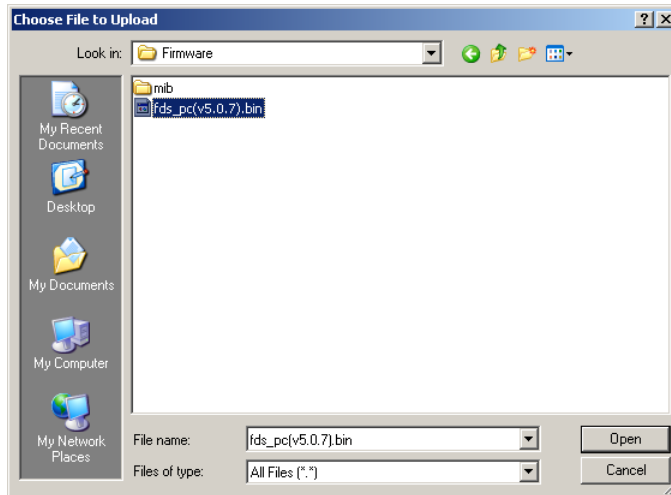


Figure 9.2 Choosing a Firmware File

6 Click the Upload button.

The firmware is loaded while the FMS displays a message confirming that it is loading the new file.

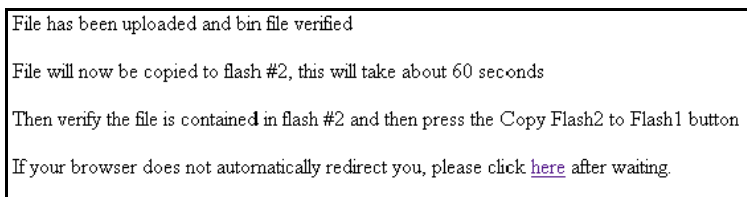
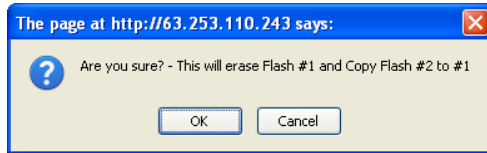


Figure 9.3 Firmware Load Messages

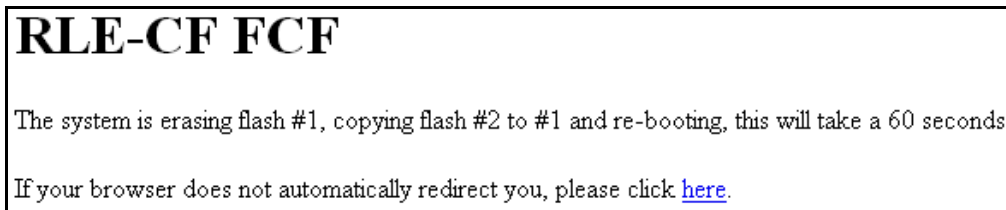
The file is loaded to the Flash #2 Program area, which is also called the Backup area. The Flash #1 Program area (also called the Active area) contains the current flash firmware that is in use.

- 7 To copy the firmware you just uploaded from Flash #2 Program to Flash #1 Program, click the Copy Flash2 to Flash1 button. The following prompt displays:



- 8 Click OK to start the erase and copy process.

During this process, the following messages display:



- 9 If the system does not reboot on its own, click the [here](#) link to display the FMS Home page.
- 10 You can verify which firmware version is loaded by going to Configuration>Flash Program and viewing the information under the blue bar.

Flash Program Configuration			
Flash #1 Program: FCF V8.4.13	Eof: FFD27530 (EOT)	Size: 1209648	(Active)
Flash #2 Program: FCF V8.4.13	Eof: FFD27530 (EOT)	Size: 1209648	(Backup)

Figure 9.4 Current Firmware Version As Shown in FMS Interface

9.1.2 Loading Firmware Using TFTP Client

This is the preferred method. However, it does not work with a PPP connection.

- 1 Uploading firmware via TFTP requires a TFTP Client. It may be possible to download a free license TFTP Client from the Internet. Consult your IT department to determine a compatible client program.
- 2 Verify that the PC and the FMS are on the same subnetwork (LAN).
- 3 Open the TFTP client. Configure the client as follows.
 - a **Host** = Falcon IP Address
 - b **Port** = 69
 - c **Block Size** = 64, 128, 256, 512, or 1024

Note The file must be sent in BINARY (not ASCII).

- 4 Send or PUT the firmware file to the FMS. It may take ~10 seconds for the firmware upload to begin. This will put the new firmware into effect. Once the transfer is complete, the FMS will reboot.
- 5 After one minute, refresh the FMS Flash program webpage. Notice that the active Flash now contains the latest firmware. Repeat the above steps to upgrade firmware in the second Flash chip.

9.1.3 Updating FMS Firmware via the EIA-232 COM2 Port (X-Modem)

- 1 Connect to the FMS using HyperTerminal. For instruction on how to do so, see our support document “Connect HyperTerminal” on the Documentation/Files section of the FMS webpage at www.rletech.com.
- 2 Start firmware updates by either:
 - ◆ Pressing any key after power-up when a 10 second window provides an opportunity to abort the Flash Main Program, or
 - ◆ Typing **RESET** to exit to Bootloader once the Main Menu appears.
- 3 From the FMS Boot prompt, type **?** and press Enter to see the list of available commands.
- 4 From the FMS Boot prompt, type **ID** and press Enter. Note which Flash has the lowest serial number. The Flash with the lowest serial number is the backup. The idea is to erase the backup, load the new version—which becomes the active Flash—then erase and load the other Flash.
- 5 From the FCF Boot Prompt, erase the back up Flash program (the one with the lowest serial number) by typing **ERASE PRGM** followed by Enter. After a few seconds, the screen will update with an ok and **FCFBoot>**.
- 6 From the FCF Boot prompt, type **LOAD PRGM1 XMODEM** or **LOAD PRGM2 XMODEM** followed by Enter. Select the same program that was erased.

- 7 From the HyperTerminal menu select **Transfer -> Send File**. Use the browse button to select the FMS firmware file from the computer's directory. The file must be binary and have a **.bin extension**. Select the file and upload it using the **1K X-Modem protocol**. Then click **Send**.
- 8 A transfer status screen will be displayed. The transfer takes about 10 minutes. Once the transfer is complete, the transfer status window will automatically close. The HyperTerminal window will indicate that the upload is complete.
- 9 From the FCF Boot prompt, type **RUN** or power down the FMS and restart it to verify that the new Flash program runs.
- 10 Press **Enter** to display the FCF Main Menu and repeat the steps above to erase and download to the other Flash program chip.

Once the firmware upgrade is complete, disconnect the serial cable and close HyperTerminal.

9.2. Loading and Saving FMS Configuration Data

This menu allows user configurations to be saved and reloaded onto other FMS units. In the unlikely event the FMS fails, a replacement FMS can be placed back in service faster by loading the saved configuration information onto it from the previous FMS. The configuration settings are saved to a binary file for backup purposes, which cannot currently be edited off line.

9.2.1 Saving Configuration Data via TFTP Client

- 1 Verify that the PC is connected to the FMS over the LAN and that port 69 is open between the PC and the FMS.
- 2 Open the TFTP client. Configure the client as follows.
 - a **Host** = Falcon IP Address
 - b **Port** = 69
 - c **Block Size** = 64, 128, 256, 512, or 1024

Note The file must be sent in BINARY (not ASCII).

- 3 The file name of the configuration being saved must contain the **.cfg** extension (e.g., config.cfg).
- 4 **Fetch** or **GET** the file. After a few seconds, the TFTP software should indicate when it is complete.
- 5 If the FMS Modbus is used and configured, the Modbus configuration file is saved in a separate file. Change the **.cfg** extension to **.mfg** and **Fetch** or **GET** the file (e.g., modbusconfig.cfg). The TFTP software should indicate when it is complete.
- 6 Use Windows Explorer to verify that the files exist on the PC's hard drive. Copy the files to the desired file backup location.

9.2.2 Loading Configuration Data via TFTP Client

- 1 Verify that the PC is connected to the FMS over the LAN and that port 69 is open between the PC and the FMS.
- 2 Open the TFTP client. Configure the client as follows.
 - a **Host** = Falcon IP Address
 - b **Port** = 69
 - c **Block Size** = 64, 128, 256, 512, or 1024

Note The file must be sent in BINARY (not ASCII).

- 3 The file name of the configuration being loaded must contain the **.cfg** extension.
- 4 **Send** or **PUT** the file. After a few seconds, the TFTP software should indicate when it is complete.
- 5 If the FMS Modbus is used and configured, the Modbus configuration file is loaded in a separate file. **Send** or **PUT** the **.mfg** configuration file. The TFTP software should indicate when it is complete.
- 6 Configurations are now loaded onto the replacement FMS. View the FMS webpages to verify that the configurations are as expected.



FMS EXPANSION CARDS

A.1. K-1 Expansion Card Descriptions

Four different expansion cards can populate the FMS expansion slots. Currently, Expansion Card A and Expansion Card C are available.

Note Expansion Card B and Expansion Card M are no longer available. Expansion Card M is known as the EXP-MBCS option that must be configured into an FMS unit at the factory.

The expansion cards are populated as follows:

Table A.1 Expansion Card Descriptions

Card	Features	RLE Product #
A	12 Analog Inputs (AI) Individually configurable, through jumpers, as 4-20mA, 0-5VDC, or 0-10VDC 8 Relay Outputs (RO)	EXP-A-24/48
C	24 Digital Inputs (DI)	EXP-C-24 (24VDC) EXP-C-48 (48VDC)

A.2. Expansion Card Installation

Expansion cards can be installed at the factory at the time of the initial product order, or they can be ordered at a later date and installed by the customer. If customers order an expansion card after they have possession of the FMS unit, they must install the expansion card themselves.

A.2.1 Installing an Expansion Card into a 2U FMS

The FMS expansion card is shipped with five screws. Remove the two screws that hold the expansion card plate from the slot on the FMS where the card will be installed. Place the screws back into the holes once the plate is removed.

- 1 Remove the four hex standoffs from the COM1 and COM2 connectors located on the back panel. Remove the bottom two screws located along the bottom edge of the back of the unit.

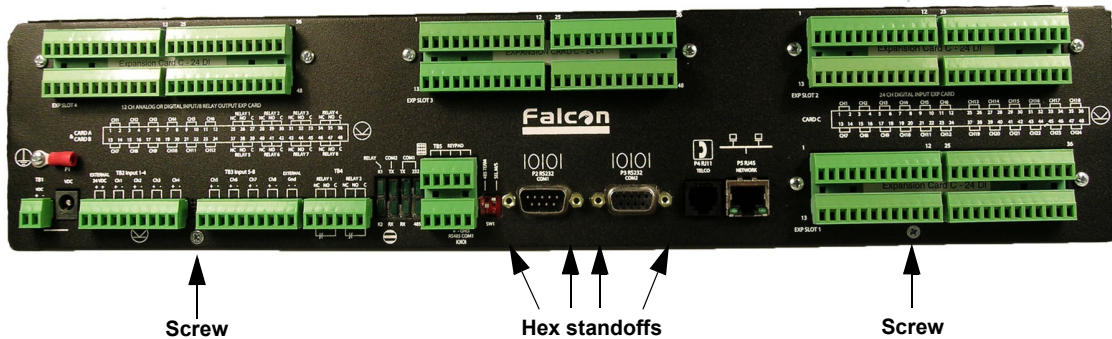


Figure A.1 Back of 2U FMS Showing Hex Standoffs and Screws to Remove

- 2 Remove the two top screws that attach the side plate (rack ears) to the unit from both sides.

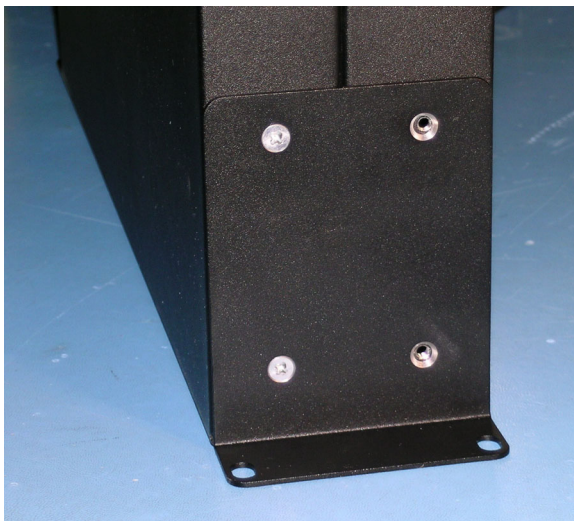


Figure A.2 Side Plate ("Ear") with Two Mounting Screws Removed

- 3 Slide the base and cover apart as shown.



Figure A.3 Sliding the Base and Cover Apart

- 1 Gently lift and hinge the top lid to the side and lay it next to the base (bottom chassis).

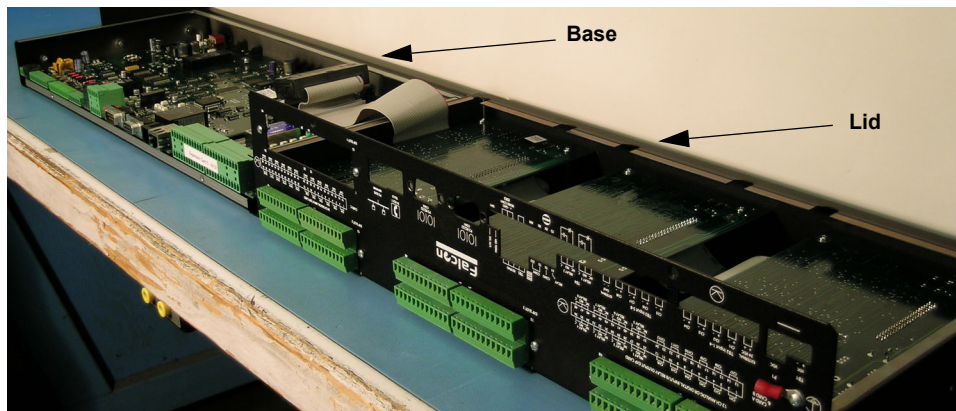


Figure A.4 Two-Rack Unit Opened

- 2 On the expansion card, set the card slot address (SW2 DIP switches) to the slot number where the card will reside (1 through 4). Table A.1 lists the position of the switches based on the slot number.

Table A.1 SW2 DIP Switch Settings for Expansion Card Slots

Slot	DIP Switch 1	DIP Switch 2	DIP Switch 3	DIP Switch 4
1	On	Off	Off	Off
2	Off	On	Off	Off
3	Off	Off	On	Off
4	Off	Off	Off	On

Figure A.5 shows the location of the DIP switches.

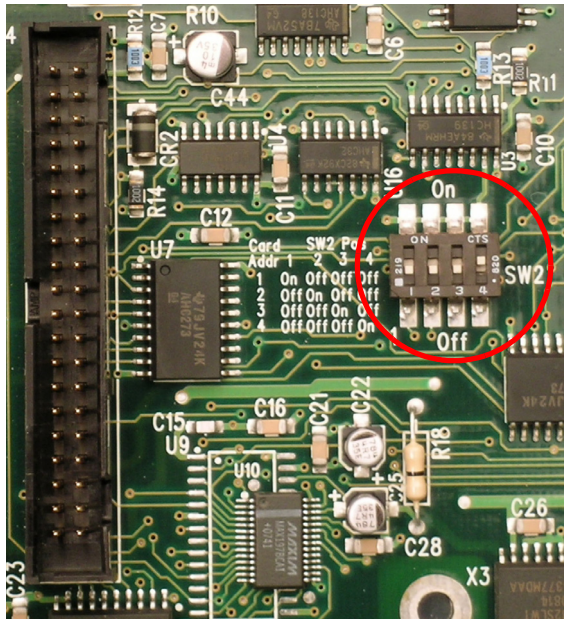


Figure A.5 SW2 DIP Switches

Mounting an Expansion Card in the Base (Slot 1)

If the expansion card is to be mounted in the base (Slot 1):

- 1 Attach the ribbon cable to the card.
- 2 Secure the provided screw into the remaining hole.

Note Do not overlook installation of the screw. This screw grounds the expansion card and is critical to the FMS performance.

If you are finished installing expansion cards:

- 3 Hinge the lid back in place over the base.
- 4 Reattach the side brackets using the two mounting screws on the back plate and the hex posts for COM1 and COM2.

If you have more cards to install, go to [“Mounting an Expansion Card in the Lid \(Slots 2 through 4\)” on page 153.](#)

Mounting an Expansion Card in the Lid (Slots 2 through 4)

If the expansion card is to be mounted in the lid (Slots 2, 3, and 4), mount the card as follows:

- 1 Attach the ribbon cable to the expansion card, making sure that the correct connector is attached.

Note

The ends of the ribbon cable are keyed, which means they will only fit onto the two double rows of pins in one direction. Align the keyed side of the ribbon cable with the notches in the plastic surrounding the rows of pins and push down securely. Always place and remove the ribbon cable with a straight up and down motion. Pulling the cable to one side or another will damage the pins in the connector and damage the board.

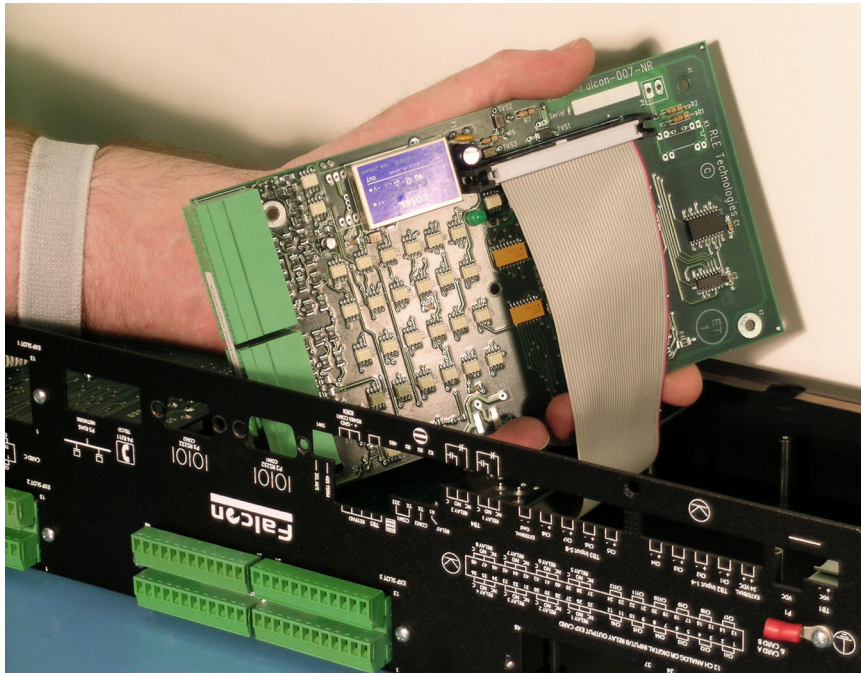


Figure A.6 Expansion Card with Ribbon Cable Attached

- 2 Angle the card toward the front of the FMS as you slide it into place with the bottom of the card facing out and the terminal blocks positioned in the rear opening. Align the screw holes on the card with the posts.

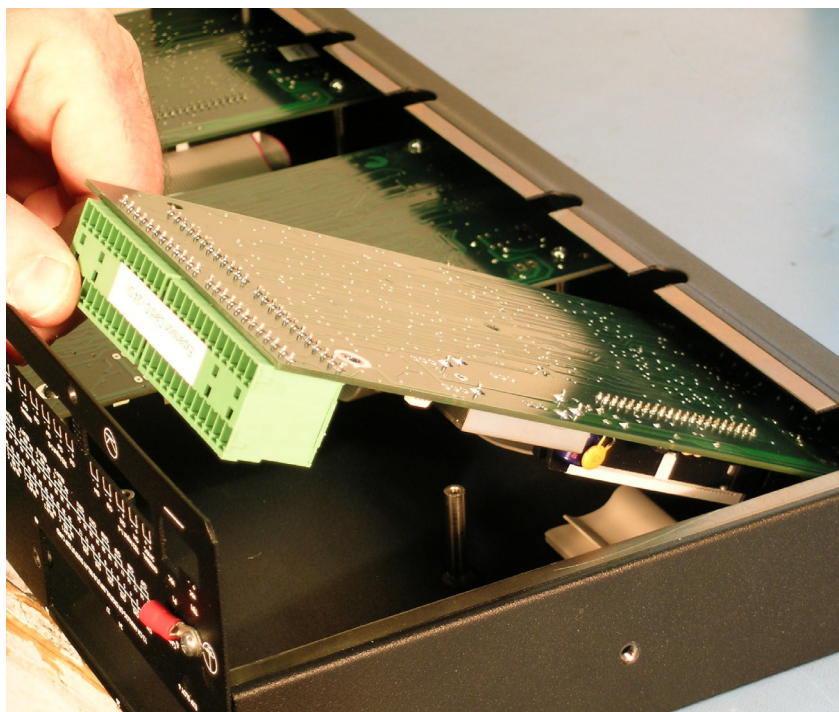


Figure A.7 Expansion Card Mounting in a Two-Rack Unit

- 3 Secure the card to the lid using the five mounting screws supplied.

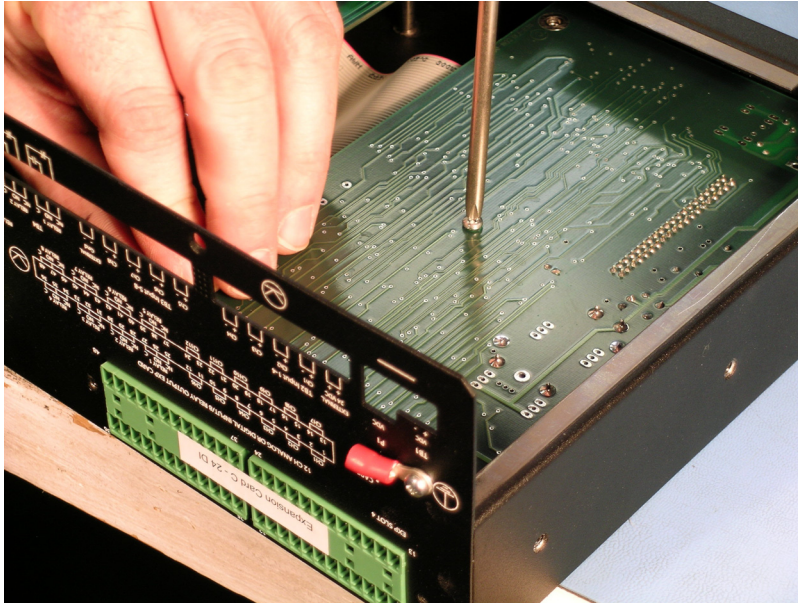


Figure A.8 Expansion Card Final Placement in a Two-Rack Unit

- 4 Hinge the lid back in place over the base and reattach the side brackets using the two mounting screws on the back plate and the hex posts for COM1 and COM2.

A.2.2 Installing an Expansion Card into a 1U FMS

Expansion cards are shipped with a ribbon cable and five screws, although only one screw will be used for the installation process. To install a FMS expansion card:

- 1 Remove the four screws that secure the lid to the FMS. Lift off the lid. Then, remove the four hex standoffs on the two COM1 ports (for the location of the hex standoffs, see [Figure A.1 on page 150](#)).
- 2 Remove the terminal blocks.
- 3 Remove the cover plate labeled Expansion Card from the back of the lid.
- 4 On the expansion card, set the card slot address (SW2 DIP switches) to address 1 (for a location of the DIP switches, see [Figure A.5 on page 152](#)). Switch 1 should be On, and switches 2 through 4 should be Off.

- 5 Align the holes in the card with the four posts and one screw setting on the main FMS unit. Make sure the two double rows of pins align next to each other, and the green inputs point toward the rear of the unit.
- 6 Snap the card onto the four posts and secure the provided screw into the remaining hole.

You will know the card is in place if it is very difficult to remove.

Do not overlook installation of the screw. This screw grounds the expansion card and is critical to the FMS performance.

- 1 Connect the ribbon cable between the main FMS board and the expansion card.

Note The ends of the ribbon cable are keyed, which means they will only fit onto the two double rows of pins—one on the main board, one on the expansion card—in one direction. Align the keyed sides of the ribbon cable with the notches in the plastic surrounding the rows of pins, and push down securely. Always place and remove the ribbon cable with a straight up and down motion. Pulling the cable to one side or another will bend the pins in the connectors and damage the boards

- 2 Installation is complete. Place the lid back on the FMS and secure it with the four screws in the lid and the four hex standoffs.

A.3. Converting Current Input Channels to Voltage Input Channels on Expansion Card A

When the FMS optional 12 channel analog input card is delivered, its channels are configured for current inputs (4-20mA). Some sensors, however, may require voltage input channels (0-5V or 0-10V). The customer may manually reconfigure any or all current input channels as voltage input channels if necessary.

The headers on the expansion card are labeled P1 through P12. Each number corresponds with a channel (e.g., P1 corresponds with channel 1, while P10 with channel 10.) Each header has two parallel columns of five pins. Some pins are connected with jumpers. Changing these header settings converts a current channel to a voltage channel, and vice versa.

To configure a header as a **current channel (4-20mA)**, connect pins 1 and 3 with one jumper. Connect pins 2 and 4 with another jumper. Connect pins 7 and 8 with a third jumper.

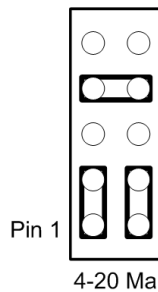


Figure A.9 Expansion Card Current Channel (4-20mA) Configuration

Note Expansion cards are shipped from the factory with all headers configured as current channels.

To configure a header as a **voltage channel (0-5V or 0-10V)**, connect pins 3 and 5 with one jumper. Connect pins 4 and 6 with another jumper. Connect pins 9 and 10 with a third jumper.

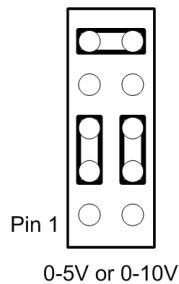


Figure A.10 Expansion Card Voltage Channel (0-5V or 0-10V) Configuration

Notes:

B

ANALOG AVERAGING

B.1. Analog Averaging Overview

Analog averaging allows the user to change the averaging method for analog inputs. Normally, the FMS samples analog points once a second while keeping track of high and low values for each analog point. After 60 seconds, the average of these readings and the high and low values for these points are recorded in the minute log.

B.2. How Analog Averaging Affects Values

Analog averaging can be changed through either the Web interface or the EIA-232 interface. An example of how averaging is altered and how it impacts high and low recordings is shown here.

- ◆ Analog averaging value is set to 5.
- ◆ The analog point is a temperature sensor.
- ◆ Temperature readings are displayed for an eleven-second period.

70, 70, 70, 71, 71, 72, 72, 73, 73, 74, 74

Average = 70, High Value = 70, Low Value = 70

70, 70, 70, 71, 71, 72, 72, 73, 73, 74, 74

Average = 70, High Value = 70, Low Value = 70

70, 70, 70, 71, 71, 72, 72, 73, 73, 74, 74

Average = 71, High Value = 71, Low Value = 70

70, 70, 70, 71, 71, 72, 72, 73, 73, 74, 74

Average = 71, High Value = 71, Low Value = 70

70, 70, 70, 71, 71, 72, 72, 73, 73, 74, 74

Average = 72, High Value = 72, Low Value = 70

70, 70, 70, 71, 71, 72, 72, 73, 73, 74, 74

Average = 72, High Value = 72, Low Value = 70

70, 70, 70, 71, 71, 72, 72, 73, 73, 74, 74

Average = 73, High Value = 73, Low Value = 70

Under normal conditions, the average reading would equal 71, the high value would equal 74, and the low value would equal 70. By changing the averaging method, the average reading is 73, the high value at 73, and the low value for this example remains the same. In a sense, averaging slows down the sensor response and the rate of change.



ANALOG INPUT 4-20MA REFERENCE CHART

Analog 4-20Ma Gain/Offset Conversion Formula:

Gain = Sensor Range (High Value - Low Value) / 4

Offset = Sensor Low Value - Gain

Example: TH140 Humidity

Gain = (High Value (100) - Low Value (0)) / 4 = 25

Offset = (Sensor Low Value (0) - Gain (25)) = -25

Table C.1 Analog Input 4-20mA Reference Chart

RLE Product #	Transducer Type	Range	Gain	Offset
TEMPERATURE				
TH140	Temperature (Display in Deg F)	32°F - 120°F	22	10
	Temperature (Display in Deg C)	0°C - 48.8°C	12.2	-12.2
	Humidity	0% - 100% RH	25	-25
T120	Temperature (Display in Deg F)	32°F - 122°F	22	10
	Temperature (Display in Deg C)	0°C - 48.8°F	12.2	-12.2
CURRENT				
CT55	Current	0 - 5 Amps	1	-1
		0 - 55 Amps	13	-13
CT20	Current	0 - 30 Amps	7	-7
		0 - 60 Amps	15	-15
		0 - 120 Amps	30	-30
CT200	Current	0 - 20 Amps	5	-5
		0 - 200 Amps	50	-50

Table C.1 Analog Input 4-20mA Reference Chart (continued)

RLE Product #	Transducer Type	Range	Gain	Offset
CT300	Current	0 - 100 Amps	25	-25
		0 - 300 Amps	75	-75
VOLTAGE				
PT300	Voltage – Single Phase	0 - 300 VAC	75	-75
3PT300	Voltage – Three Phase	0 - 300 VAC	75	-75
PT600	Voltage – Single Phase	0 - 600 VAC	150	-150
3PT600	Voltage – Three Phase	0 - 600 VAC	150	-150
DISTANCE READ LEAK DETECTION				
LD5000	Leak Detection 4-20mA Output (Calc. in ft/m)	0 - 500 ft / 152m	143	-179
		0 - 1000 ft / 305m	286	-357
		0 - 1500 ft / 457m	429	-536
		0 - 2000 ft / 610m	571	-714
		0 - 2500 ft / 762m	714	-893
		0 - 3000 ft / 914m	857	-1071
		0 - 3500 ft / 1067m	1000	-1250
		0 - 4000 ft / 1219m	1143	-1429
		0 - 4500 ft / 1372m	1286	-1607
		0 - 5000 ft / 1524m	1429	-1786
LD5100	Leak Detection 4-20mA Output (Calculated in ft/m)	0 - 1000 ft / 305m	250	-250
		0 - 2500 ft / 762m	625	-625
		0 - 5000 ft / 1524m	1250	-1250

D

FMS ACCESSORIES WIRING

The following figures show the typical wiring between the FMS monitoring system and other products offered by RLE Technologies.

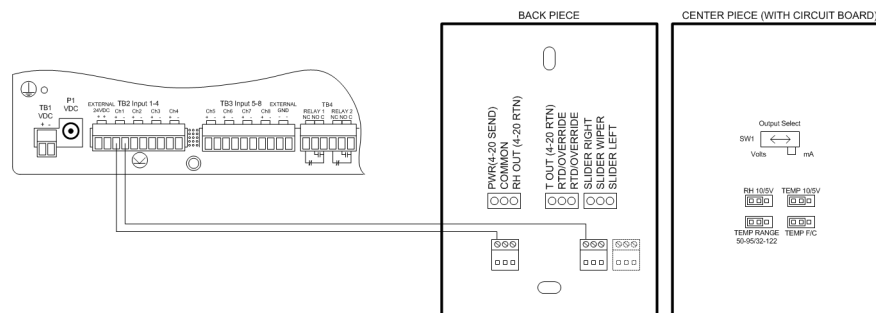


Figure D.1 T120 and T120D Temperature Sensors

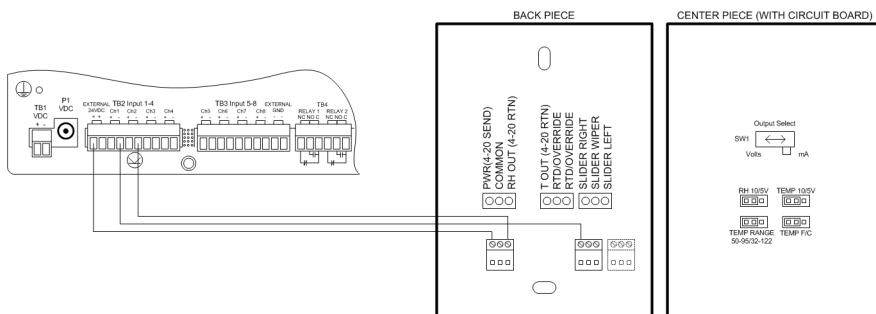


Figure D.2 TH140 and TH140D Temperature/Humidity Sensors

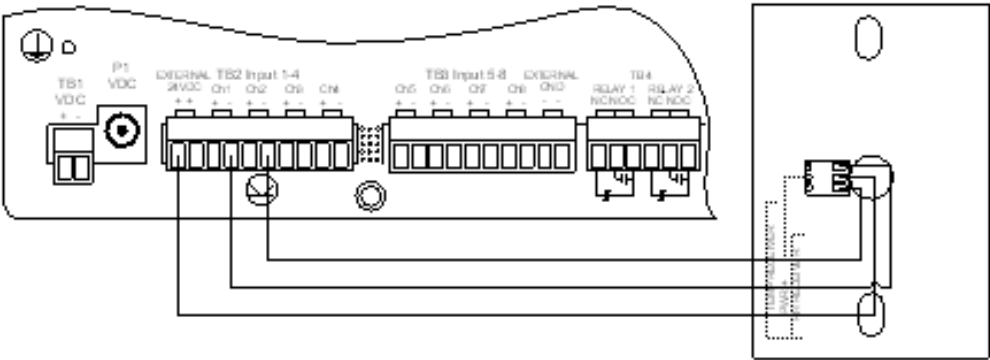


Figure D.3 Dwyer Temperature/Humidity Sensor

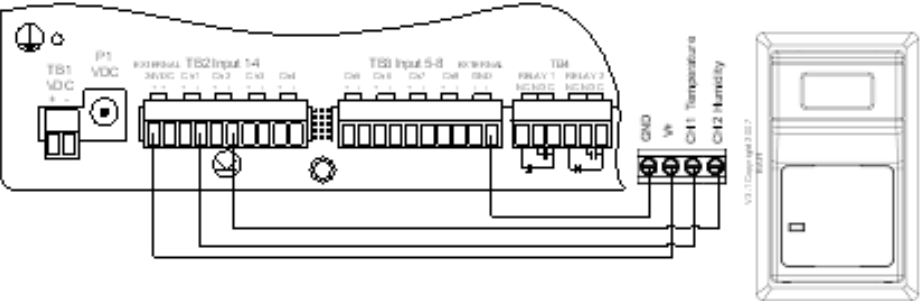


Figure D.4 BAPI Temperature/Humidity Sensor

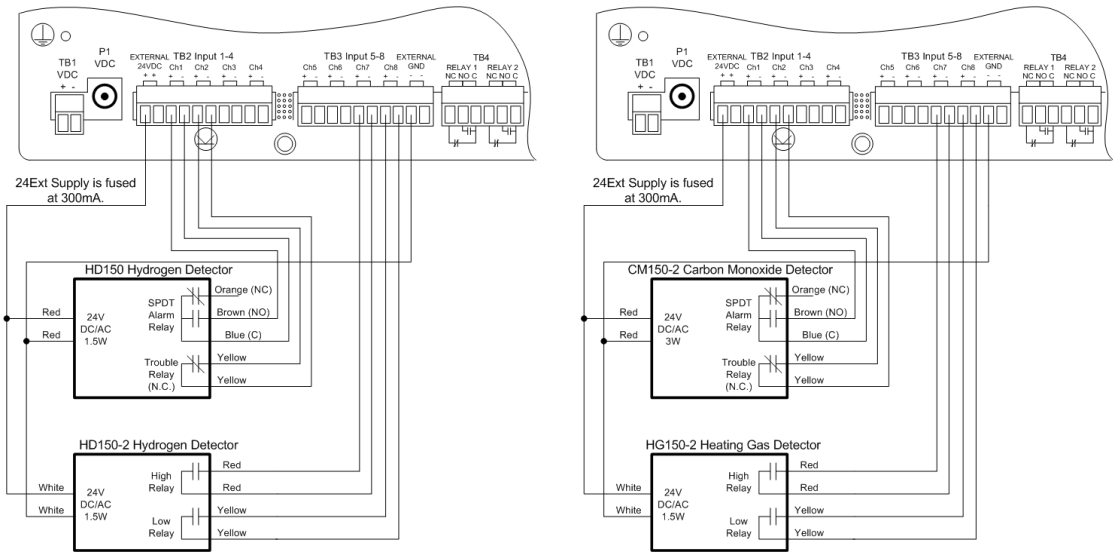


Figure D.5 HD150, HD150-2, CM150-2, and HG150-2 Gas Sensors

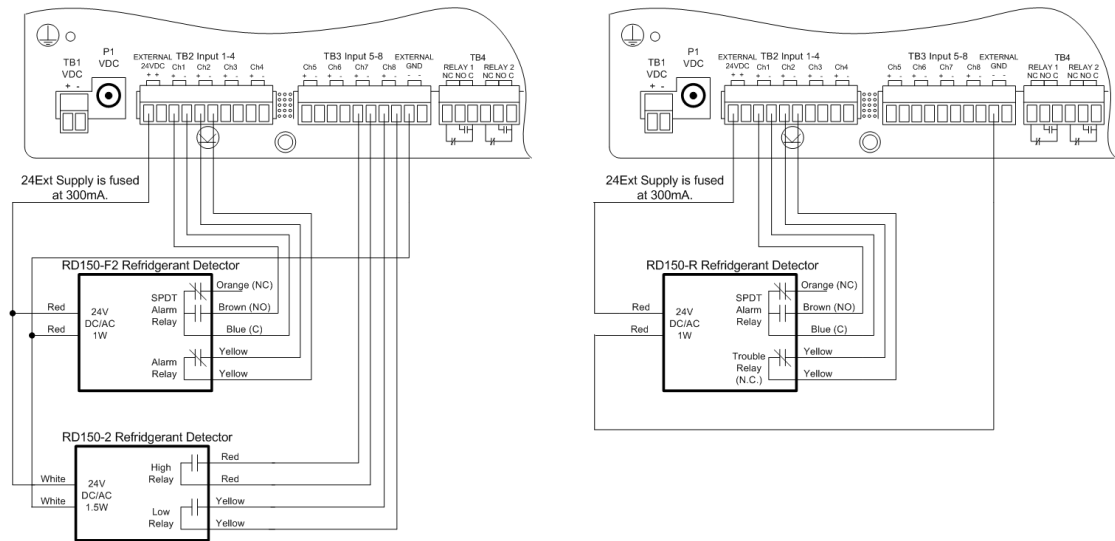


Figure D.6 RD150-F2, RD150-2 & RD150-R Refrigerant Detectors

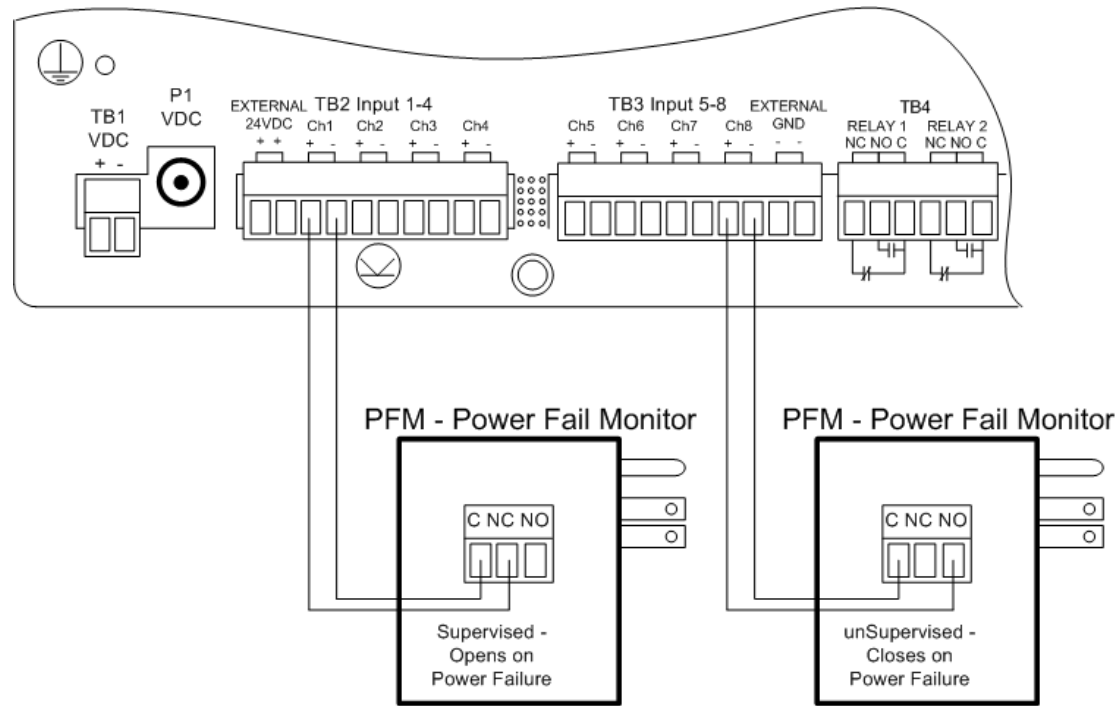


Figure D.7 PFM Power Fail Monitor

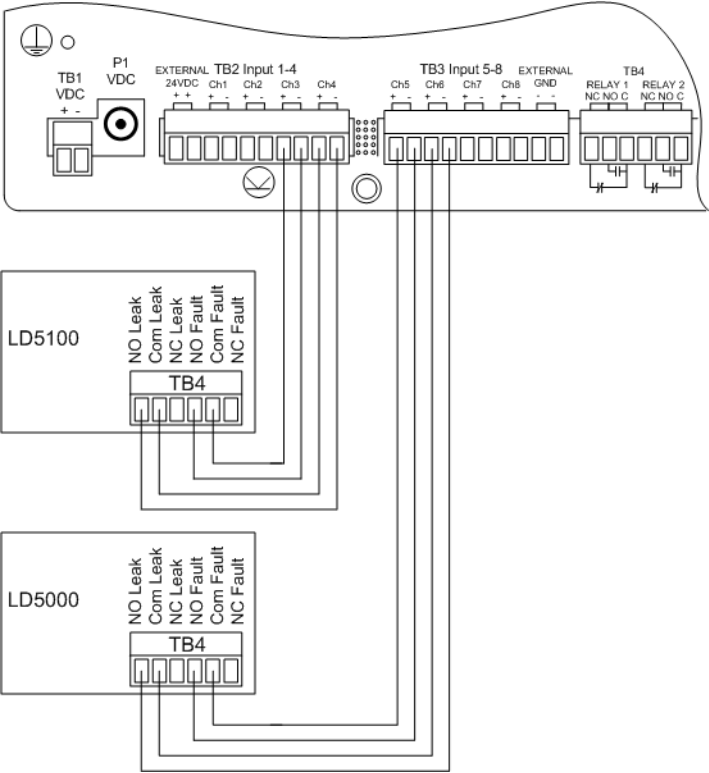


Figure D.8 SeaHawk LD5100 Distance Read Leak Detection System (Dry Contact)

D.1. Configuring the SeaHawk LD5100 as an Analog Input

The FMS averages/filters the analog inputs. Therefore, the alarm delay for RLE's SeaHawk LD5100 input must be set to a value equal to or greater than the averaging time set in the FMS. The LD5100 will output 4mA when there is no leak. The LD5100 will output a value between 4mA and 20mA when there is a water leak. The low range (4mA) will always correspond to zero feet. The high range (20mA) will always correspond to the LD5100's set 4-20mA Max Range (1000, 2500, or 5000 feet).

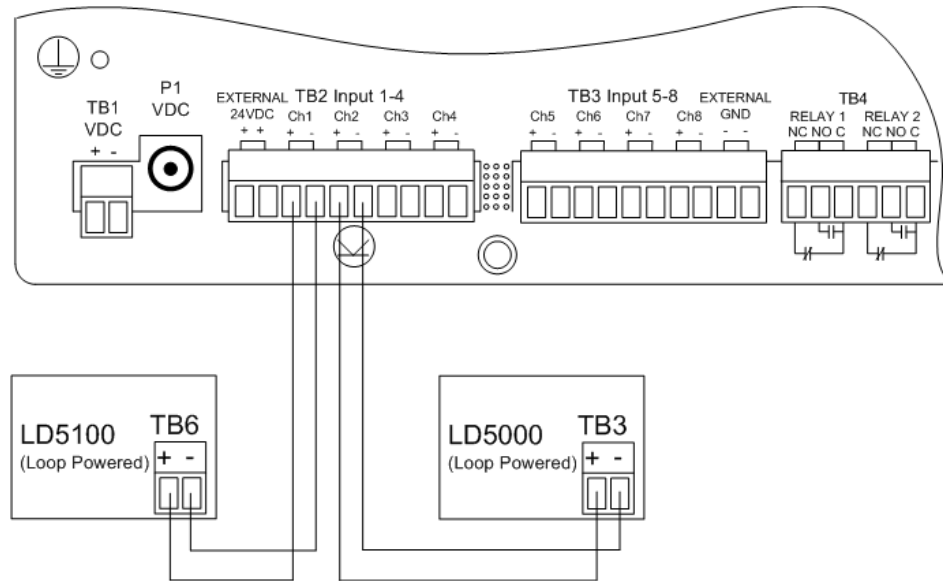


Figure D.9 SeaHawk LD5100 Distance Read Leak Detection System (4-20mA)

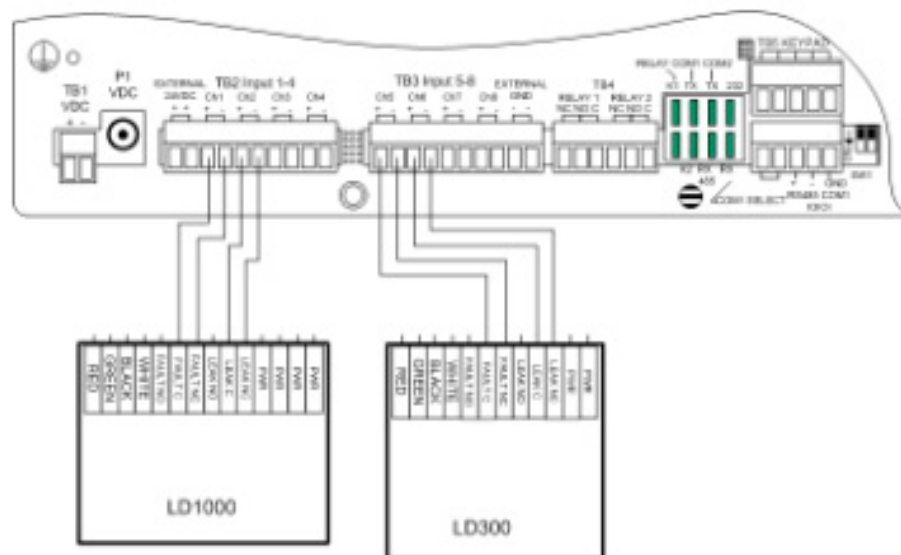


Figure D.10 SeaHawk LD1000, LD300 Leak Detection Systems

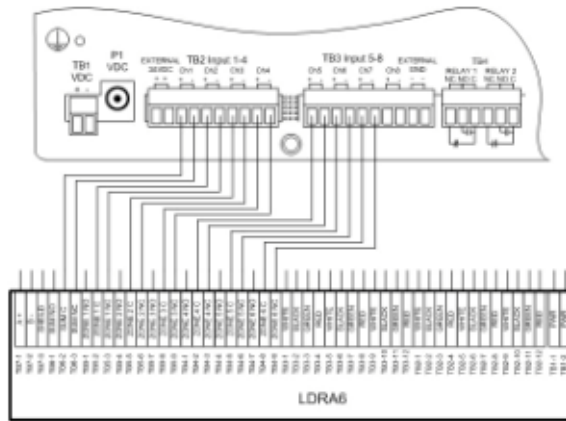


Figure D.11 SeaHawk LD1000, LD300, and LDRA6 Zone Leak Detection Systems

D.2. Wiring for Other Falcon FMS Accessories

For assistance wiring the following Falcon FMS Accessories also offered by RLE, contact Technical Support at (970) 484-6510:

- ◆ CT55 and CT200 Single Phase Current Sensor
- ◆ CT300 and CT800 Single Phase Current Sensor
- ◆ PT150 Single Phase Voltage Sensor
- ◆ PT300 Three Phase Voltage Sensor
- ◆ PT600 Three Phase Voltage Sensor
- ◆ MD3 Motion Sensor
- ◆ MDS Magnetic Door Sensor
- ◆ SMK Photoelectric Smoke Detector
- ◆ SeaHawk SD & SD-RO1 Spot Detectors
- ◆ PS-RC Relay Controlled Two Outlet Receptacle

E

ALARM ID REFERENCE TABLES

E.1. Analog Tables

Table E.1 Analog Alarm ID Reference Table – Inputs 1 through 8

Analog Inputs 1 through 8					
Channel	Condition	ID	Channel	Condition	ID
1	High Limit 1	0011	5	High Limit 1	0051
1	Low Limit 1	0012	5	Low Limit 1	0052
1	High Limit 2	0013	5	High Limit 2	0053
1	Low Limit 2	0014	5	Low Limit 2	0054
2	High Limit 1	0021	6	High Limit 1	0061
2	Low Limit 1	0022	6	Low Limit 1	0062
2	High Limit 2	0023	6	High Limit 2	0063
2	Low Limit 2	0024	6	Low Limit 2	0064
3	High Limit 1	0031	7	High Limit 1	0071
3	Low Limit 1	0032	7	Low Limit 1	0072
3	High Limit 2	0033	7	High Limit 2	0073
3	Low Limit 2	0034	7	Low Limit 2	0074
4	High Limit 1	0041	8	High Limit 1	0081
4	Low Limit 1	0042	8	Low Limit 1	0082
4	High Limit 2	0043	8	High Limit 2	0083
4	Low Limit 2	0044	8	Low Limit 2	0084

Table E.2 Analog Alarm Reference Table – Input Slots 1 and 2

Analog Input Slot 1				Analog Input Slot 2			
Slot Chan	Number	Condition	ID	Slot Chan	Number	Condition	ID
1	9	High Limit 1	1011	1	33	High Limit 1	2011
1	9	Low Limit 1	1012	1	33	Low Limit 1	2012
1	9	High Limit 2	1013	1	33	High Limit 2	2013
1	9	Low Limit 2	1014	1	33	Low Limit 2	2014
2	10	High Limit 1	1021	2	34	High Limit 1	2021
2	10	Low Limit 1	1022	2	34	Low Limit 1	2022
2	10	High Limit 2	1023	2	34	High Limit 2	2023
2	10	Low Limit 2	1024	2	34	Low Limit 2	2024
3	11	High Limit 1	1031	3	35	High Limit 1	2031
3	11	Low Limit 1	1032	3	35	Low Limit 1	2032
3	11	High Limit 2	1033	3	35	High Limit 2	2033
3	11	Low Limit 2	1034	3	35	Low Limit 2	2034
4	12	High Limit 1	1041	4	36	High Limit 1	2041
4	12	Low Limit 1	1042	4	36	Low Limit 1	2042
4	12	High Limit 2	1043	4	36	High Limit 2	2043
4	12	Low Limit 2	1044	4	36	Low Limit 2	2044
5	13	High Limit 1	1051	5	37	High Limit 1	2051
5	13	Low Limit 1	1052	5	37	Low Limit 1	2052
5	13	High Limit 2	1053	5	37	High Limit 2	2053
5	13	Low Limit 2	1054	5	37	Low Limit 2	2054
6	14	High Limit 1	1061	6	38	High Limit 1	2061
6	14	Low Limit 1	1062	6	38	Low Limit 1	2062
6	14	High Limit 2	1063	6	38	High Limit 2	2063
6	14	Low Limit 2	1064	6	38	Low Limit 2	2064
7	15	High Limit 1	1071	7	39	High Limit 1	2071
7	15	Low Limit 1	1072	7	39	Low Limit 1	2072
7	15	High Limit 2	1073	7	39	High Limit 2	2073
7	15	Low Limit 2	1074	7	39	Low Limit 2	2074
8	16	High Limit 1	1081	8	40	High Limit 1	2081
8	16	Low Limit 1	1082	8	40	Low Limit 1	2082
8	16	High Limit 2	1083	8	40	High Limit 2	2083
8	16	Low Limit 2	1084	8	40	Low Limit 2	2084

Table E.2 Analog Alarm Reference Table – Input Slots 1 and 2

Analog Input Slot 1				Analog Input Slot 2			
Slot Chan	Number	Condition	ID	Slot Chan	Number	Condition	ID
9	17	High Limit 1	1091	9	41	High Limit 1	2091
9	17	Low Limit 1	1092	9	41	Low Limit 1	2092
9	17	High Limit 2	1093	9	41	High Limit 2	2093
9	17	Low Limit 2	1094	9	41	Low Limit 2	2094
10	18	High Limit 1	1101	10	42	High Limit 1	2101
10	18	Low Limit 1	1102	10	42	Low Limit 1	2102
10	18	High Limit 2	1103	10	42	High Limit 2	2103
10	18	Low Limit 2	1104	10	42	Low Limit 2	2104
11	19	High Limit 1	1111	11	43	High Limit 1	2111
11	19	Low Limit 1	1112	11	43	Low Limit 1	2112
11	19	High Limit 2	1113	11	43	High Limit 2	2113
11	19	Low Limit 2	1114	11	43	Low Limit 2	2114
12	20	High Limit 1	1121	12	44	High Limit 1	2121
12	20	Low Limit 1	1122	12	44	Low Limit 1	2122
12	20	High Limit 2	1123	12	44	High Limit 2	2123
12	20	Low Limit 2	1124	12	44	Low Limit 2	2124

Table E.3 Analog Alarm Reference Table – Input Slots 3 and 4

Analog Input Slot 3				Analog Input Slot 4			
Slot Chan	Number	Condition	ID	Slot Chan	Number	Condition	ID
1	57	High Limit 1	3011	1	81	High Limit 1	4011
1	57	Low Limit 1	3012	1	81	Low Limit 1	4012
1	57	High Limit 2	3013	1	81	High Limit 2	4013
1	57	Low Limit 2	3014	1	81	Low Limit 2	4014
2	58	High Limit 1	3021	2	82	High Limit 1	4021
2	58	Low Limit 1	3022	2	82	Low Limit 1	4022
2	58	High Limit 2	3023	2	82	High Limit 2	4023
2	58	Low Limit 2	3024	2	82	Low Limit 2	4024
3	59	High Limit 1	3031	3	83	High Limit 1	4031
3	59	Low Limit 1	3032	3	83	Low Limit 1	4032
3	59	High Limit 2	3033	3	83	High Limit 2	4033
3	59	Low Limit 2	3034	3	83	Low Limit 2	4034

Table E.3 Analog Alarm Reference Table – Input Slots 3 and 4

Analog Input Slot 3				Analog Input Slot 4			
Slot Chan	Number	Condition	ID	Slot Chan	Number	Condition	ID
4	60	High Limit 1	3041	4	84	High Limit 1	4041
4	60	Low Limit 1	3042	4	84	Low Limit 1	4042
4	60	High Limit 2	3043	4	84	High Limit 2	4043
4	60	Low Limit 2	3044	4	84	Low Limit 2	4044
5	61	High Limit 1	3051	5	85	High Limit 1	4051
5	61	Low Limit 1	3052	5	85	Low Limit 1	4052
5	61	High Limit 2	3053	5	85	High Limit 2	4053
5	61	Low Limit 2	3054	5	85	Low Limit 2	4054
6	62	High Limit 1	3061	6	86	High Limit 1	4061
6	62	Low Limit 1	3062	6	86	Low Limit 1	4062
6	62	High Limit 2	3063	6	86	High Limit 2	4063
6	62	Low Limit 2	3064	6	86	Low Limit 2	4064
7	63	High Limit 1	3071	7	87	High Limit 1	4071
7	63	Low Limit 1	3072	7	87	Low Limit 1	4072
7	63	High Limit 2	3073	7	87	High Limit 2	4073
7	63	Low Limit 2	3074	7	87	Low Limit 2	4074
8	64	High Limit 1	3081	8	88	High Limit 1	4081
8	64	Low Limit 1	3082	8	88	Low Limit 1	4082
8	64	High Limit 2	3083	8	88	High Limit 2	4083
8	64	Low Limit 2	3084	8	88	Low Limit 2	4084
9	65	High Limit 1	3091	9	89	High Limit 1	4091
9	65	Low Limit 1	3092	9	89	Low Limit 1	4092
9	65	High Limit 2	3093	9	89	High Limit 2	4093
9	65	Low Limit 2	3094	9	89	Low Limit 2	4094
10	66	High Limit 1	3101	10	90	High Limit 1	4101
10	66	Low Limit 1	3102	10	90	Low Limit 1	4102
10	66	High Limit 2	3103	10	90	High Limit 2	4103
10	66	Low Limit 2	3104	10	90	Low Limit 2	4104
11	67	High Limit 1	3111	11	91	High Limit 1	4111
11	67	Low Limit 1	3112	11	91	Low Limit 1	4112
11	67	High Limit 2	3113	11	91	High Limit 2	4113
11	67	Low Limit 2	3114	11	91	Low Limit 2	4114
12	68	High Limit 1	3121	12	92	High Limit 1	4121

Table E.3 Analog Alarm Reference Table – Input Slots 3 and 4

Analog Input Slot 3				Analog Input Slot 4			
Slot Chan	Number	Condition	ID	Slot Chan	Number	Condition	ID
12	68	Low Limit 1	3122	12	92	Low Limit 1	4122
12	68	High Limit 2	3123	12	92	High Limit 2	4123
12	68	Low Limit 2	3124	12	92	Low Limit 2	4124

E.2. Digital Tables

Table E.4 Digital Alarm ID Reference Table – Digital Inputs 1 through 8

Channel	Condition	ID
1	On/Off	0010
2	On/Off	0020
3	On/Off	0030
4	On/Off	0040
5	On/Off	0050
6	On/Off	0060
7	On/Off	0070
8	On/Off	0080

Table E.5 Digital Alarm ID Reference Table – Digital Input Slots 1 and 2

Digital Input Slot 1				Digital Input Slot 2			
Slot Chan	Number	Condition	ID	Slot Chan	Number	Condition	ID
1	9	On/Off	1010	1	33	On/Off	2010
2	10	On/Off	1020	2	34	On/Off	2020
3	11	On/Off	1030	3	35	On/Off	2030
4	12	On/Off	1040	4	36	On/Off	2040
5	13	On/Off	1050	5	37	On/Off	2050
6	14	On/Off	1060	6	38	On/Off	2060
7	15	On/Off	1070	7	39	On/Off	2070
8	16	On/Off	1080	8	40	On/Off	2080
9	17	On/Off	1090	9	41	On/Off	2090
10	18	On/Off	1100	10	42	On/Off	2100
11	19	On/Off	1110	11	43	On/Off	2110
12	20	On/Off	1120	12	44	On/Off	2120
13	21	On/Off	1130	13	45	On/Off	2130
14	22	On/Off	1140	14	46	On/Off	2140
15	23	On/Off	1150	15	47	On/Off	2150
16	24	On/Off	1160	16	48	On/Off	2160
17	25	On/Off	1170	17	49	On/Off	2170
18	26	On/Off	1180	18	50	On/Off	2180
19	27	On/Off	1190	19	51	On/Off	2190
20	28	On/Off	1200	20	52	On/Off	2200
21	29	On/Off	1210	21	53	On/Off	2210
22	30	On/Off	1220	22	54	On/Off	2220
23	31	On/Off	1230	23	55	On/Off	2230
24	32	On/Off	1240	24	56	On/Off	2240

Table E.6 Digital Alarm ID Reference Table – Digital Input Slots 3 and 4

Digital Input Slot 3				Digital Input Slot 4			
Slot Chan	Number	Condition	ID	Slot Chan	Number	Condition	ID
1	57	On/Off	3010	1	81	On/Off	4010
2	58	On/Off	3020	2	82	On/Off	4020
3	59	On/Off	3030	3	83	On/Off	4030
4	60	On/Off	3040	4	84	On/Off	4040
5	61	On/Off	3050	5	85	On/Off	4050
6	62	On/Off	3060	6	86	On/Off	4060
7	3	On/Off	3070	7	87	On/Off	4070
8	64	On/Off	3080	8	88	On/Off	4080
9	65	On/Off	3090	9	89	On/Off	4090
10	66	On/Off	3100	10	90	On/Off	4100
11	67	On/Off	3110	11	91	On/Off	4110
12	68	On/Off	3120	12	92	On/Off	4120
13	69	On/Off	3130	13	93	On/Off	4130
14	70	On/Off	3140	14	94	On/Off	4140
15	71	On/Off	3150	15	95	On/Off	4150
16	72	On/Off	3160	16	96	On/Off	4160
17	73	On/Off	3170	17	97	On/Off	4170
18	74	On/Off	3180	18	98	On/Off	4180
19	75	On/Off	3190	19	99	On/Off	4190
20	76	On/Off	3200	20	100	On/Off	4200
21	77	On/Off	3210	21	101	On/Off	4210
22	78	On/Off	3220	22	102	On/Off	4220
23	79	On/Off	3230	23	103	On/Off	4230
24	80	On/Off	3240	24	104	On/Off	4240

Notess:



FMS SLOT DESIGNATIONS

F.1. Input Slot Designation Table

Alarm ID format:

- ◆ XYYZ - X is the Slot # 0-4
- ◆ YY is the CH # 1-24
- ◆ Z is the type: 0=digital, 1=HighLevel1, 2=LowLevel1, 3=HighLevel2, 4=LowLevel2

Table F.1 Input Slot Designation Table – Slot 0

Slot0	#	Port/CH	CH ID	Analog Alarm ID	Digital Alarm ID
FMS-Cxxx	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-CCxx	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-CCCx	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-CCCC	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-CAxx	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-CAAx	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-CAAA	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-CCAx	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-CCAA	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-CCCA	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-Axxx	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-AAxx	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-AAAx	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-AAAA	8	1-8	0.1-0.8	0011-0084	0010-0080

Table F.1 Input Slot Designation Table – Slot 0

Slot0	#	Port/CH	CH ID	Analog Alarm ID	Digital Alarm ID
IntTempSensor	5.1			5011-5014	
IntHumidSensor	5.2			5021-5024	
LowBatteryAlarm				6010	
PagerAlarm				6020	

Table F.2 Input Slot Designation Table – Slot 1

Slot1	#	Port/CH	CH ID	Analog Alarm ID	Digital Alarm ID
FMS-Cxxx	24	9-32	1.1-1.24		1010-1240
FMS-CCxx	24	9-32	1.1-1.24		1010-1240
FMS-CCCx	24	9-32	1.1-1.24		1010-1240
FMS-CCCC	24	9-32	1.1-1.24		1010-1240
FMS-CAxx	24	9-32	1.1-1.24		1010-1240
FMS-CAAx	24	9-32	1.1-1.24		1010-1240
FMS-CAAA	24	9-32	1.1-1.24		1010-1240
FMS-CCAx	24	9-32	1.1-1.24		1010-1240
FMS-CCAA	24	9-32	1.1-1.24		1010-1240
FMS-CCCA	24	9-32	1.1-1.24		1010-1240
FMS-Axxx	12	9-20	1.1-1.12	1011-1124	1010-1120
FMS-AAxx	12	9-20	1.1-1.12	1011-1124	1010-1120
FMS-AAAx	12	9-20	1.1-1.12	1011-1124	1010-1120
FMS-AAAA	12	9-20	1.1-1.12	1011-1124	1010-1120

Table F.3 Input Slot Designation Table – Slot 2

Slot2	#	Port/CH	CH ID	Analog Alarm ID	Digital Alarm ID
FMS-Cxxx	0				
FMS-CCxx	24	33-56	2.1-2.24		2010-2240
FMS-CCCx	24	33-56	2.1-2.24		2010-2240
FMS-CCCC	24	33-56	2.1-2.24		2010-2240
FMS-CAxx	12	33-44	2.1-2.12	2011-2124	2010-2120
FMS-CAAx	12	33-44	2.1-2.12	2011-2124	2010-2120
FMS-CAAA	12	33-44	2.1-2.12	2011-2124	2010-2120
FMS-CCAx	24	33-56	2.1-2.24		2010-2240
FMS-CCAA	24	33-56	2.1-2.24		2010-2240
FMS-CCCA	24	33-56	2.1-2.24		2010-2240
FMS-Axxx	0				
FMS-AAxx	12	33-44	2.1-2.12	2011-2124	2010-2120
FMS-AAAx	12	33-44	2.1-2.12	2011-2124	2010-2120
FMS-AAAA	12	33-44	2.1-2.12	2011-2124	2010-2120

Table F.4 Input Slot Designation Table – Slot 3

Slot3	#	Port/CH	CH ID	Analog Alarm ID	Digital Alarm ID
FMS-Cxxx	0				
FMS-CCxx	0				
FMS-CCCx	24	57-80	3.1-3.24		3010-3240
FMS-CCCC	24	57-80	3.1-3.24		3010-3240
FMS-CAxx	0				
FMS-CAAx	12	57-68	3.1-3.12	3011-3124	3010-3120
FMS-CAAA	12	57-68	3.1-3.12	3011-3124	3010-3120
FMS-CCAx	12	57-68	3.1-3.12	3011-3124	3010-3120
FMS-CCAA	12	57-68	3.1-3.12	3011-3124	3010-3120
FMS-CCCA	24	57-80	3.1-3.24		3010-3240
FMS-Axxx	0				
FMS-AAxx	0				
FMS-AAAx	12	57-68	3.1-3.12	3011-3124	3010-3120
FMS-AAAA	12	57-68	3.1-3.12	3011-3124	3010-3120

Table F.5 Input Slot Designation Table – Slot 4

Slot4	#	Port/CH	CH ID	Analog Alarm ID	Digital Alarm ID
FMS-Cxxx	0				
FMS-CCxx	0				
FMS-CCCx	0				
FMS-CCCC	24	81-104	4.1-4.24		4010-4240
FMS-CAxx	0				
FMS-CAAx	0				
FMS-CAAA	12	81-92	4.1-4.12	4011-4124	4010-4120
FMS-CCAx	0				
FMS-CCAA	12	81-92	4.1-4.12	4011-4124	4010-4120
FMS-CCCA	12	81-92	4.1-4.12	4011-4124	4010-4120
FMS-Axxx	0				
FMS-AAxx	0				
FMS-AAAx	0				
FMS-AAAA	12	81-92	4.1-4.12	4011-4124	4010-4120

F.2. Output Slot Designation Table

Table F.6 Output (Relays) Slot Designation Table – Slots 0 and 1

#	Rly	Rly ID	#	Rly	Rly ID	#
FMS-Cxxx	2	1-2	0.1-0.2	0		
FMS-CCxx	2	1-2	0.1-0.2	0		
FMS-CCCx	2	1-2	0.1-0.2	0		
FMS-CCCC	2	1-2	0.1-0.2	0		
FMS-CAxx	2	1-2	0.1-0.2	0		
FMS-CAAx	2	1-2	0.1-0.2	0		
FMS-CAAA	2	1-2	0.1-0.2	0		
FMS-CCAx	2	1-2	0.1-0.2	0		
FMS-CCAA	2	1-2	0.1-0.2	0		
FMS-CCCA	2	1-2	0.1-0.2	0		
FMS-Axxx	2	1-2	0.1-0.2	8	2-10	1.1-1.8
FMS-AAxx	2	1-2	0.1-0.2	8	2-10	1.1-1.8
FMS-AAAx	2	1-2	0.1-0.2	8	2-10	1.1-1.8
FMS-AAAA	2	1-2	0.1-0.2	8	2-10	1.1-1.8

Table F.7 Output (Relays) Slot Designation Table – Slots 2 and 3

#	Rly	Rly ID	#	Rly	Rly ID	#
FMS-Cxxx	0			0		
FMS-CCxx	0			0		
FMS-CCCx	0			0		
FMS-CCCC	0			0		
FMS-CAxx	8	11-18	2.1-2.8	0		
FMS-CAAx	8	11-18	2.1-2.8	8	19-26	3.1-3.8
FMS-CAAA	8	11-18	2.1-2.8	8	19-26	3.1-3.8
FMS-CCAx	0			8	19-26	3.1-3.8
FMS-CCAA	0			8	19-26	3.1-3.8
FMS-CCCA	0			0		
FMS-Axxx	0			0		
FMS-AAxx	8	11-18	2.1-2.8	0		
FMS-AAAx	8	11-18	2.1-2.8	8	19-26	3.1-3.8
FMS-AAAA	8	11-18	2.1-2.8	8	19-26	3.1-3.8

Table F.8 Output (Relays) Slot Designation Table – Slot 4

#	Rly	Rly ID	#
FMS-Cxxx	0		
FMS-CCxx	0		
FMS-CCCx	0		
FMS-CCCC	0		
FMS-CAxx	0		
FMS-CAAx	0		
FMS-CAAA	8	27-34	4.1-4.8
FMS-CCAx	0		
FMS-CCAA	8	27-34	4.1-4.8
FMS-CCCA	8	27-34	4.1-4.8
FMS-Axxx	0		
FMS-AAxx	0		
FMS-AAAx	0		
FMS-AAAA	8	27-34	4.1-4.8



RELAY CONTROL LOGIC

G.1. Falcon-EM Relay Logic

[Figure G.1 on page 185](#) contains the FMS relay control logic diagram described in the following sections.

OR Gate 144 Input

The OR Gate can accept any of the High Level 2, Low Level 2 or digital alarms. This option is configured on each input configuration page.

AND Gate 4 Input

The AND Gate can accept up to 4 alarms. These 4 inputs can be any of the analog level 1 or 2 alarms or any digital alarm. This option is configured on each relay configuration page.

OR/AND Gate3

This gate uses the OR Gate and the AND Gate as the inputs. This gate may be either an OR or an AND gate and is configured on each relay configuration page.

On-Delay

This gate will delay the relay operation until the programmed time has expired. The time is configured on each relay configuration page.

On-Duration/Latch

This gate controls how long the relay will stay activated after a valid alarm combination. A positive number will allow the relay to stay on for a fixed number of seconds. A negative number will keep the relay activated for that time after the alarm condition has returned to normal. Zero will force the relay to stay active until the alarm returns to normal. The time is configured on each relay configuration page. This gate can also be set for latching-the relay will stay active until it is manually reset by a user.

Inverter Gate

This gate can invert the relay activation. This allows the relay to be used in a “supervised” mode. In this mode, if the FMS loses power, the relay will close. The gate is configured on each relay configuration page.

Schedule

Each relay can be activated by either of the two schedules in the FMS. During the scheduled time-of-day the relay is activated. The schedule option is configured on each relay configuration page.

Keypad

Each relay can be controlled by a 3x4 keypad instead of the alarm inputs. The keypad option is configured on each relay configuration page.

DTMF

Each relay that can be programmed to be controlled by the keypad can also be controlled from a DTMF signal received on the phone line.

Force On/Off

Each relay can be forced to ON or OFF. This will override any alarm or keypad control of that relay until the relay operation has been restored.

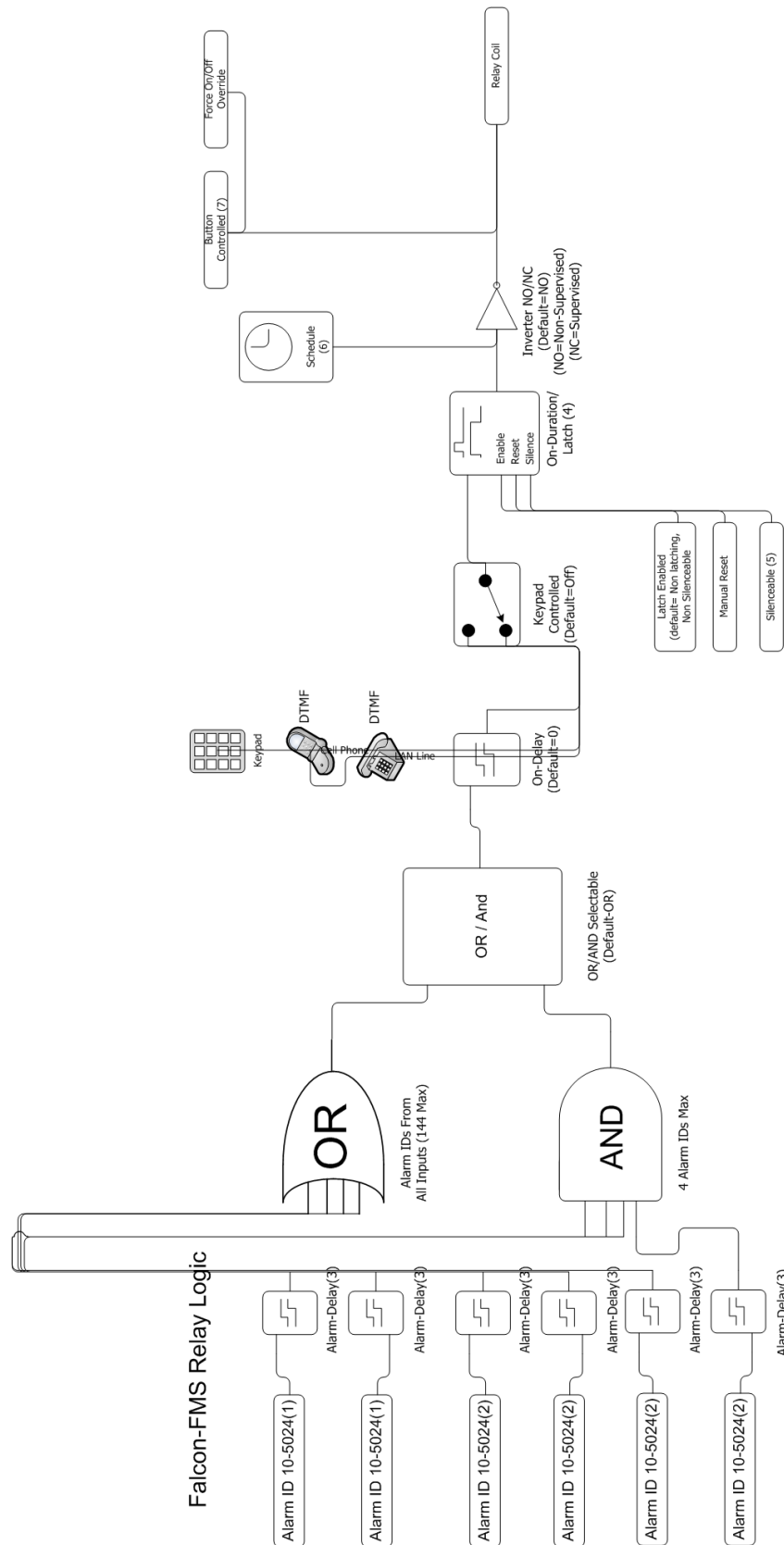


Figure G.1 FMS Relay Control Logic Diagram

Notes:



TECHNICAL SPECIFICATIONS

Table H.1 Technical Specifications

Power		
	1U FMS	24VDC Model: 24VDC ($\pm 10\%$), 1A max. (power supply included); 48VDC Model: 36-72VDC, 0.5A max
	2U FMS	24VDC Model: 24VDC ($\pm 10\%$), 2.5A max. (power supply included); 48VDC Model: 36-72VDC, 1.25A max.
Inputs		
	Analog/Digital	8 Configurable as 4-20mA (12-bit A/D conversion) or Dry Contact NO/NC ($< 15\text{mA}$)
	Optional Internal Temperature/Humidity	$\pm 0.5^\circ\text{F}$ (@ 25°C), $\pm 4^\circ\text{F}$ (@ -40° to 185°F); $\pm 3\%\text{RH}$ (@ 20% to $80\%\text{RH}$)
	Keypad	Standard 3x4; 3000VAC RMS optically isolated; 20 User Access Codes (also accessible via phone/DTMF through modem)
Outputs		
	Relay	2 Dry Contact, Form C, 1A @ 24VDC, 0.5A resistive @ 120VAC (controllable via user programmable logic)
	Sensor/Accessory Power	24VDC ($\pm 10\%$) @ 300mA max. (power for external sensors and/or devices)
Expansion Cards		
	EXP-A-24 or EXP-A-48	1U accommodates 1 expansion card; 2U accommodates up to 4 expansion cards 24V Falcon requires EXP-x-24 option cards; 48V Falcon requires EXP-x-48 option cards 12 analog inputs (jumper selectable for 4-20mA, 0-5VDC or 0-10VDC) and digital inputs (non-isolated, individual ground only); 8 Form C Relay Outputs, 1A @ 24VDC, 0.5A resistive @ 120VAC
	EXP-C-24 or EXP-C-48	24 Digital Inputs, 3000VAC RMS optically isolated (common ground or individual ground)

Table H.1 Technical Specifications (continued)

Communications Ports		
	Ethernet	10/100BaseT, RJ45 connector; 500VAC RMS isolation
	EIA-232	DB9 female connector; 9600 baud; 3000VAC RMS optically isolated; 15kV ESD protection
	EIA-485 (selectable as EIA-232)	Two-wire half duplex; terminal block (selecting EIA-232 switches to DB9 male connector); 1200, 2400, or 9600 baud configurable; 3000VAC RMS optically isolated
	Modem (RJ11 Telco) – Optional	V.34bis/33.6 kbps; DTMF capable; PPP-Enabled; FCC Part 68 approved; 1500VAC RMS isolation barrier; 2100V peak surge protection
Protocols		
	TCP/IP, UDP/IP, ICMP/IP, FTP, NTP	IPv4
	HTTP/HTML, SNPP, Telnet	1.1/4.0; up to 10 URL links to other IP addressable cameras/devices; webpages comply with Rehabilitation Act of 1973, sections 504 and 508, US Dept of Education (website accessibility for computer users with disabilities)
	SNMP	V1: MIB-2 compliant; NMS Manageable with Get, Set, and Traps; V2c: Traps or Informs
	SMTP (Email)	Supports Client Authentication (plain and login); compatible with ESMTP Servers
	Modbus	RTU transmission protocol; function codes: Slave - 03; Master - 01,02,03,04
	Modbus/IP	Modbus Slave; TCP/IP transmission protocol
	BACnet/IP	Reads up to 106 instances and converts to SNMP and Modbus
	Terminal Emulation	VT100 compatible
	TAP (Pager)	Telocator Alphanumeric Protocol Ver1.8
Alarm Notification		
	Pager (Modem)	15 Text, numeric, or alphanumeric pager numbers; each digital and analog alarm (HighLimit and LowLimit) can notify any 5 of the 15 pagers
	Email (Ethernet, Modem PPP)	8 Email recipients; email sent on Alarm and Return To Normal; each Alarm can notify any or all of the 8 email recipients
	SNMP Traps (Ethernet)	V1, V2c: 8 Community Strings; V3 (optional): 4 users, 4 Trap Destinations
	Escalation	Additional notification to 1 of the 15 pager numbers when the initial page results in a Failure To Acknowledge status
	Health Check/Self Monitoring	Self resetting; captured in Event Log
Internal Hardware		
	Real Time Clock	Battery backed; ± 1.53 min/month accuracy
	Memory	16 MB RAM; 128K NVRAM; 16MB Flash

Table H.1 Technical Specifications (continued)

Logging Capabilities		
	Alarm Log	Last 256 Alarms
	Event Log	Last 100 Events (e.g., Acknowledgement By Code, System Boot, Page Successful, etc.)
	Web User Access Log	Last 100 HTML Accesses (User, Date, and Time)
	Digital Status Log	Last 100 Digital Status entries
	Trending of Analog Inputs	244 Entries per time frame, per channel
	Minute	Every minute, high/low/avg for the last 65 minutes
	Hour	Every hour, high/low/avg for the last 25 hours
	Day	Every day, high/low/avg for the last 7 days
	Extended Trending of Analog Inputs	3,840 entries over 32 inputs either physical or Modbus; logging every 1 minute, 5 minute, 15 minute, 1 hour, 2 hour, 4 hour, 6 hour and 8 hour intervals.
Login Security		
	Web Browser Access (Ethernet, Modem PPP)	1 Administrator plus 7 Users individually selectable for Read Only, Read/Write or Administrator
	Terminal Emulation Access (Modem)	1 Administrator (password for Modem access)
Front Panel Interface		
	Switches	Power: 1 (on/off)
	LED Indicators	Power: 1 green (on/off); Status: 1 red (flashing = boot up, on = alarm, off = normal); Network Link: 1 bi-color (green = active, red = not active); Network Activity: 1 green; Modem: 3 green (transmit, receive, and off hook), 1 amber (carrier detect)
Operating Environment		
	Temperature	32° to 158°F (0° to 70°C)
	Humidity	5% to 95% RH, non-condensing
	Altitude	15,000ft (4,572m) max.
Storage Environment		-40° to 185°F (-40° to 85°C)
Dimensions		
	1U FMS	16.8"W x 1.8"H x 7.9"D (427mmW x 46mmH x 201mmD)
	2U FMS	16.8"W x 3.5"H x 7.9"D (427mmW x 89mmH x 201mmD)
Weight		
	1U FMS	6 lbs. (2.72kg)
	2U FMS	10 lbs. (4.54kg)

Table H.1 Technical Specifications (continued)

Mounting		
	1U FMS	Rack mount, or wall mount (brackets required): WMB wall mount brackets (not included)
	2U FMS	Rack mount, or wall mount (brackets required): WMB2U wall mount brackets (not included)
Certifications		CE; ETL listed: conforms to UL STD 61010A-1, EN STD 61010; certified to CAN/CSA C22.2 STD NO. 1010.1; RoHS compliant



SNMP v3

When the Falcon FMS has the optional SNMP v3 software installed, it can communicate with SNMP servers running version 3. To configure the FMS for SNMP v3, follow the steps in this appendix.

- 1 From the top bar of the FMS Web interface, select the Configuration Menu, then select the SNMP/Syslog link from the menu.

The following page displays:

SNMP/Syslog Configuration			
Submit Changes			
MIB-2 System			
System Name:	FMS-CCCC-N-24 (FCF)		
System Contact:	Technical Support		
System Location:	Technical Support Office		
V1/V2C Community Names			
Get/Read:	public		
Set/Write:	public		
Trap:	public		
Traps			
Select Snmp Trap Type:	V1-Trap		
Max Inform Retries:	0 (0-999) (0=unlimited)		
Persistent Trap/Inform Interval:	0 (1-999) Minutes (0=Send Once)		
Analog Trap varbinds:	☒ Value/UOM/Label ☐ Label Only		
Trap Type:	☒ AlarmEntryAdded ☐ falconPortTraps		
Configuration Changed Trap Community:	0 (1-4, 0=Disabled)		
Input Trap Delivery:	☒ LAN ☐ ppp		
Trap Destinations			
#	IP Address	TrapEnable	Syslog Message
1	0.0.0.0	☐	☐
2	10.0.0.69	☒	☐

Figure I.1 SNMP/Syslog Configuration Page

- 2 In the MIB-2 section, enter the basic system information, such as System Name, System Contact, and System Location.
- 3 In the Traps section, specify the SNMP trap settings as described in [Table I.1](#).

Table I.1 SNMP v3 Trap Settings

Field	Description
Select SNMP Trap Type	Select from the following: V1-Trap V2C-Trap V2C-Informs. V3-Traps V3-Informs
Max Inform Retries	Set from 0-999 (minutes). The default is 0, which allows the retries to be unlimited.
Persistent Trap/Inform Intervals	Set from 1-999 (minutes). The default is 0, which allows the FMS to send traps and informs once.
Analog Trap Varbinds	Select either a trap containing the Value, Unit of Measure and Label (default), or just the Label.
Trap Type	Select the method by which the trap is sent from the FMS. Choices are either Alarm Entry Added (default) or Falcon Port Traps.
Configuration Changed Trap Community	Select which trap destination to notify that the FMS has had a configuration change.
Input Trap Delivery	Select if trap notification is to be sent by LAN or PPP connection.

- 4 In the Trap Destinations section, enter up to four profiles for SNMPv3 communication. The selections are described in [Table I.2](#).

Table I.2 Trap Destination Settings

Field	Description
IP Address	The IP address of the server to the trap information to.
TrapEnable	Check this box to indicate that trap information should be sent to the specified server.
Syslog Message	Check this box to indicate that syslog messages should be sent to the specified server.

- 5 In the SNMPv3 section, create up to four profiles for SNMPv3 communication. The settings for this section are described in [Table I.3](#).

Table I.3 SNMP v3 Profile Settings

Field	Description
Engine ID	
Context Name	(Optional.) An alphanumeric name used for the SNMP v3 interface. //length limit?//
V3 Trap User (1-4)	Enter the number of the user you are creating or modifying.
User Name	Enter an alphanumeric string of up to //how many?// characters.
Access Mode	Choose from the following: No Authentication Authentication - MD5 Privacy Authentication - MD5 A user name is need for No Authentication, and a user name and password are required for Authentication and Privacy Authentication access.
Auth-Password	An alphanumeric string of 8 to 24 characters in length.
Priv-Password	An alphanumeric string of 8 to 24 characters in length.

Notes: