

# Monitoring

## F110 User Guide



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**Note:** As necessary, blank pages are added to make the page count even.

## Product Registration

Product registration helps RLE Technologies inform owners of:

- Product upgrades
- Firmware enhancements
- New products and technologies
- Special offers available only to registered users

Access and submit Product Registration information from the F110 Configuration Menu.

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Personal assistance is available Monday through Friday, from 8:00 a.m. to 5:00 p.m. MST.

A request for assistance may be sent to [support@rletech.com](mailto:support@rletech.com).

Otherwise, please call us directly at: **(970) 484-6510**, and press “2” for technical support.

The following information is located on the bottom of each F110 unit. Please have this information available whenever a technical support call is placed:

Product Model Number \_\_\_\_\_  
Product Serial Number \_\_\_\_\_  
Product Manufacture Date \_\_\_\_\_

**Notes:**

# Contents

|          |  |           |
|----------|--|-----------|
| <b>1</b> | <b>System Overview</b> .....                         | <b>11</b> |
|          | Product Description .....                            | 11        |
|          | Front Panel Indicators and Controls .....            | 12        |
|          | Terminal Block Designations .....                    | 13        |
| <b>2</b> | <b>Getting Started</b> .....                         | <b>15</b> |
|          | Installation .....                                   | 15        |
|          | Communication .....                                  | 15        |
|          | Search .....   | 16        |
|          | Set IP .....   | 16        |
|          | IP Address Assignment for Static Only Networks ..... | 16        |
|          | Settings .....                                       | 16        |
|          | Web .....  | 16        |
|          | Update .....   | 17        |
|          | F110 Wiring .....                                    | 17        |
|          | Power Supply .....                                   | 17        |
|          | RJ45 Ethernet Connection .....                       | 18        |
| <b>3</b> | <b>F110 Web Interface</b> .....                      | <b>19</b> |
|          | F110 Web Interface Overview .....                    | 19        |
|          | Status Screen .....                                  | 19        |
|          | Settings Screen .....                                | 20        |
|          | Network .....  | 21        |
|          | Email .....  | 22        |
|          | SNMP .....   | 23        |
|          | Channel 2, Channel 3 and Channel 4 .....             | 24        |
|          | External Temperature/Humidity .....                  | 24        |
|          | Switched Sensor Alarm Configuration .....            | 25        |
|          | Security .....                                       | 25        |
|          | Advanced .....                                       | 26        |
|          | Reset Defaults .....                                 | 27        |
|          | Help Screen .....                                    | 28        |
|          | About Screen .....                                   | 28        |
| <b>A</b> | <b>Modbus Configuration Via Telnet</b> .....         | <b>29</b> |
|          | F110 Modbus Capabilities .....                       | 29        |
|          | Telnet Configuration .....                           | 29        |
| <b>B</b> | <b>Modbus Registers</b> .....                        | <b>31</b> |
| <b>C</b> | <b>Technical Specifications</b> .....                | <b>35</b> |

**Notes:**

# Figures

|          |   |           |
|----------|---|-----------|
| <b>1</b> | <b>System Overview</b> .....  | <b>11</b> |
|          | Figure 1.1 F110 Front Panel Indicators and Controls .....                 | 12        |
|          | Figure 1.2 F110 Terminal Block Designations .....                         | 13        |
| <b>2</b> | <b>Getting Started</b> .....  | <b>15</b> |
|          | Figure 2.1 Device Discovery Utility .....                                 | 15        |
|          | Figure 2.2 IP Pop-up Box .....  | 16        |
|          | Figure 2.3 5VDC Power Supply Connection .....                             | 17        |
|          | Figure 2.4 Physical Connection .....                                      | 18        |
|          | Figure 2.5 F110 Ethernet Connection to a PC on a Subnet .....             | 18        |
| <b>3</b> | <b>F110 Web Interface</b> .....   | <b>19</b> |
|          | Figure 3.1 F110 Status Screen .....                                       | 19        |
|          | Figure 3.2 Authentication Security Prompt (no Username or Password) ..... | 20        |
|          | Figure 3.3 Network Settings .....   | 21        |
|          | Figure 3.4 Email Settings .....   | 22        |
|          | Figure 3.5 SNMP Settings .....  | 23        |
|          | Figure 3.6 Sensor Settings .....  | 25        |
|          | Figure 3.7 Security Settings .....  | 26        |
|          | Figure 3.8 Advanced Settings .....  | 26        |
|          | Figure 3.9 Restore Defaults Prompt .....                                  | 27        |
|          | Figure 3.10 Help Screen .....   | 28        |
|          | Figure 3.11 About Screen .....  | 28        |
| <b>A</b> | <b>Modbus Configuration Via Telnet</b> .....                              | <b>29</b> |
|          | Figure A.1 Telnet Connection .....  | 29        |

**Notes:**



# Tables

|          |   |           |
|----------|---|-----------|
| <b>B</b> | <b>Modbus Registers</b> .....   | <b>31</b> |
|          | Table B.1 Read Output Registers .....                                 | 31        |
|          | Table B.2 Family Code (Register 40002, 40009, 40016, 40023: FC) ..... | 32        |
|          | Table B.3 Status Flags (Register 40003: SS) .....                     | 32        |
|          | Table B.4 Status Flags (Register 40004: SC) .....                     | 33        |
|          | Table B.5 Status Flags (Register 40005: AS) .....                     | 33        |
| <b>C</b> | <b>Technical Specifications</b> .....                                 | <b>35</b> |
|          | Table C.1 Technical Specifications .....                              | 35        |

**Notes:**

## SYSTEM OVERVIEW

### 1.1. Product Description

The F110 Monitoring System is a comprehensive system which provides equipment protection by monitoring critical operating parameters in enterprises, remote network facilities, communication rooms, and critical support systems. The F110 is a stand alone system. It operates via embedded “firmware” that handles all data collection, alarm reporting, and multiple concurrent communication mediums.

The F110 is designed specifically to monitor any combination of 3 digital temperature/humidity sensors or 3 digital temperature only sensors and up to 8 dry contact sensors (signal quality contacts) that can be distributed at locations spanning up to 100 feet (30m).

Additionally, the F110 allows alert notifications to be sent via email to devices like computers, phones, pagers and PDAs. Users can set up thresholds for temperatures and humidity as well as configure monitoring of Normally Open (N/O) or Normally Closed (N/C) inputs. Status of attached sensors for power, smoke/fire, motion, air flow and more is viewed in real-time. Because each F110 is SNMP enabled, it can easily be monitored by network management software. The F110 can easily be integrated with Building Management Systems (BMS) via the Modbus protocol.

## 1.2. Front Panel Indicators and Controls



Figure 1.1 F110 Front Panel Indicators and Controls

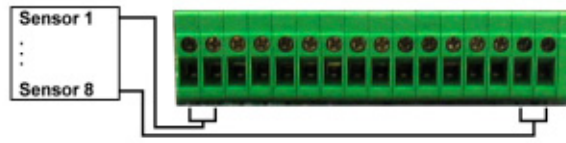
**Power LED** – Green (On) if power is on.

**Network Link** – Green (On) if a network connection is found.

**Network Activity LED** – Green (On) if network communication is occurring.

| Front Panel |  |
|-------------|--|
| Power       | 5VDC wall adapter input (center +)     |
| Network     | RJ45 1-/1--BaseT Ethernet connector    |
| 2           | RJ11 External Environment Sensor input |
| 3           | RJ11 External Environment Sensor input |
| 4           | RJ11 External Environment Sensor input |

## 1.3. Terminal Block Designations



**Figure 1.2** F110 Terminal Block Designations

| Rear Panel           |                 |
|----------------------|-----------------|
| Switch Sensor Port 1 | Digital Input 1 |
| Switch Sensor Port 2 | Digital Input 2 |
| Switch Sensor Port 3 | Digital Input 3 |
| Switch Sensor Port 4 | Digital Input 4 |
| Switch Sensor Port 5 | Digital Input 5 |
| Switch Sensor Port 6 | Digital Input 6 |
| Switch Sensor Port 7 | Digital Input 7 |
| Switch Sensor Port 8 | Digital Input 8 |

**Notes:**

## GETTING STARTED

### 2.1. Installation

The F110 comes in a 4.5”W x 1.25”H x 2.5”D desktop enclosure. Mount or place the unit in the desired location. A 19 inch (.48m) rack mount enclosure is available from RLE.

### 2.2. Communication

The F110 default is configured with a DHCP IP Address. The RLE Device Discovery Utility scans the network and locates all F110 devices connected to the network. This provides an efficient way to manage large numbers of F110 devices from a single host system.

**Note** The default DHCP name on the F110 is 'F110 -<5 digit number>'. This 5 digit number will be the serial number located on the bottom of the F110.

The Device Discovery Utility is available on your RLE Product User Guide CD, included with your F110. It is also available for download on the Documentation/Files section of the F110 webpage at [www.rletech.com](http://www.rletech.com). Install and run the Device Discovery Utility.

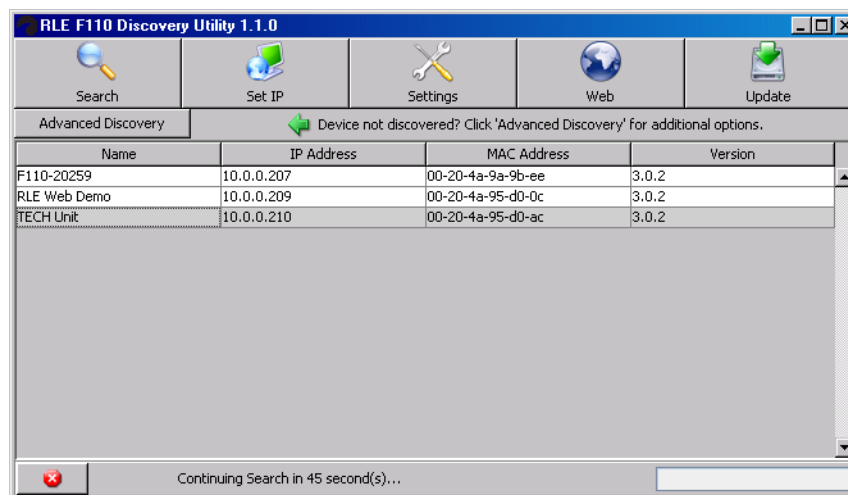


Figure 2.1 Device Discovery Utility

## 2.2.1 Search

Select the **Search** button to scan the network for the F110 hardware devices. If an F110 is physically attached to your network anywhere it will be located in this scan.

**Note** If the Device Discovery Utility can not find the F110, reset the unit by unplugging the power adapter and then plugging it back in. Also, make sure that UDP port “30718” is not restricted on your network by a router, switch, network firewall or software firewall.

## 2.2.2 Set IP

Select the **Set IP** button to enter a static IP address, gateway IP address and subnet mask for the selected F110. To configure a dynamic IP address, set the IP to **0.0.0.0**. When configured for a dynamic IP address, F110 will attempt to obtain an IP address automatically via DHCP.

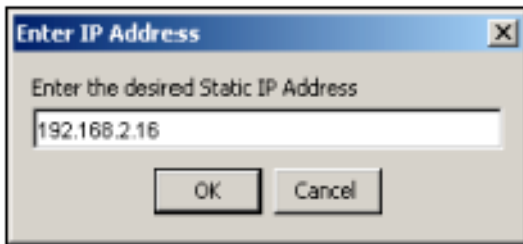


Figure 2.2 IP Pop-up Box

## 2.2.3 IP Address Assignment for Static Only Networks

If the network is not configured for DHCP, a static IP address will need to be set before the F110 can be accessed. After discovering the unit, it will be displayed with an IP address. Click the **Set IP** button to assign a static IP address only. After the F110 reboots (i.e., it takes about 4 seconds) with the new IP address, select the **Search** button on the Device Discovery Utility. Next, select the F110 that was just assigned a static IP and then select the **Set IP** button. Finally, fill in the gateway IP address and subnet mask for the selected ID Box.

## 2.2.4 Settings

Click the **Settings** button to open the Settings Applet on the web browser interface for the selected device. The Settings Applet can then be used to configure that specific F110.

## 2.2.5 Web

Click the **Web** button to open the web browser interface for the selected F110. This is useful for viewing the current sensor status.



## 2.2.6 Update

Click the **Update** button to update the firmware installed on the selected F110. Updated firmware files provided by RLE, add new features and enhance the web browser interface. These firmware updates are available from RLE if firmware replacement is necessary.

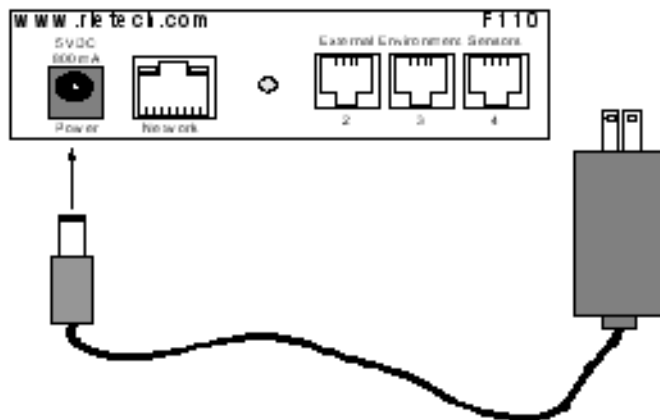
**Note** When obtaining the F110 Firmware Update file from the RLE Technologies website, be sure to save the file instead of opening it from a web browser. After receiving the file, right-click the F110 Firmware Update file and select “Properties.” If the F110 Firmware Update file has a “.zip” extension, replace “.zip” with “.upd” before uploading the file with the Device Discovery Utility.

## 2.3. F110 Wiring

RLE recommends an 18AWG stranded copper wire for connection from each monitored point to the terminal block (TB) connection on the F110 (8 Switched Sensors inputs only). RLE recommends no more than 200 feet (60.9m) of wire at this specification. If longer runs are needed, please contact RLE for application guidance.

### 2.3.1 Power Supply

Plug the wall adapter into the connection labeled **Power**. The wall adapter has a 6 foot (18.82m) power cord. RLE recommends powering the F110 from a UPS supply to allow the F110 to send alarm notification during a power outage.



**Figure 2.3** 5VDC Power Supply Connection



**WARNING**

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NEVER connect main power to the sensors or sensor cables.

---

## 2.3.2 RJ45 Ethernet Connection

The F110 has an internal 10/100BaseT Ethernet port used to configure and monitor the F110. The Ethernet port supports Web browser access, email (SMTP), Modbus, and SNMP. The following figures show the physical connection.

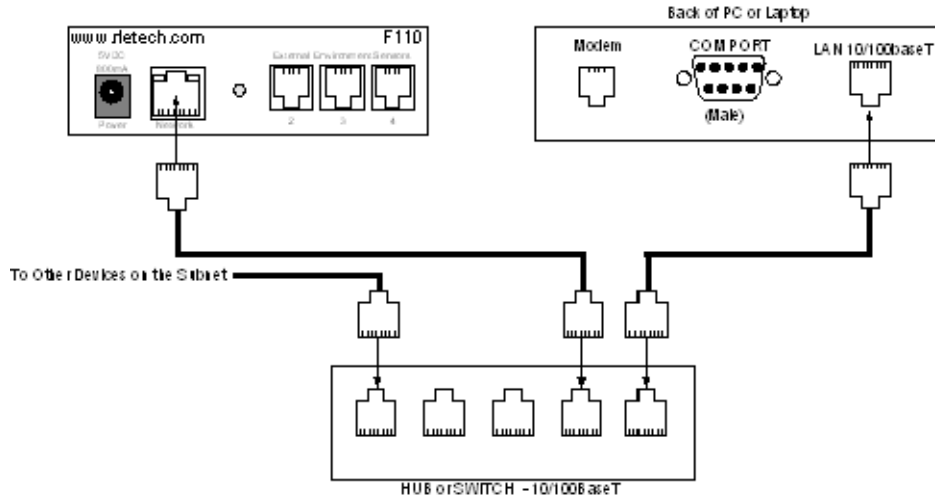


Figure 2.4 Physical Connection

Figure 2.5 shows a typical F110 connection on a subnet using a hub or switch and straight through Network Patch cables.

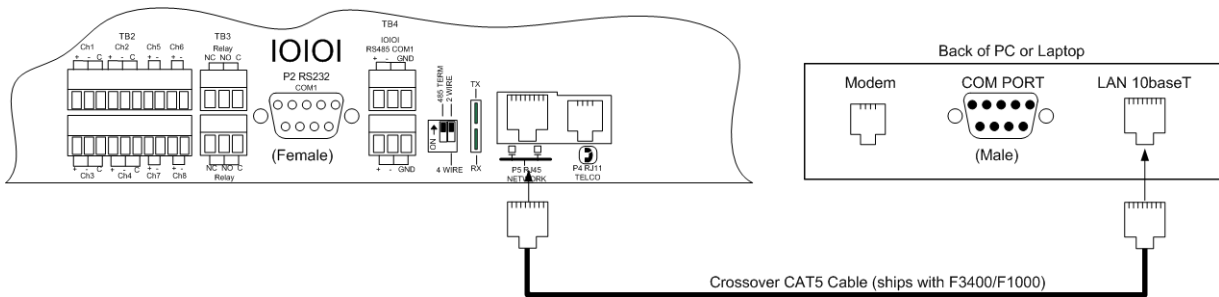


Figure 2.5 F110 Ethernet Connection to a PC on a Subnet

## F110 WEB INTERFACE

### 3.1. F110 Web Interface Overview

The F110's Web interface provides a convenient way to check the F110's status and reconfigure basic settings from any internet enabled computer. Enter the IP address of the F110 into your web browser's address bar. The F110 Main Page will appear.

### 3.2. Status Screen

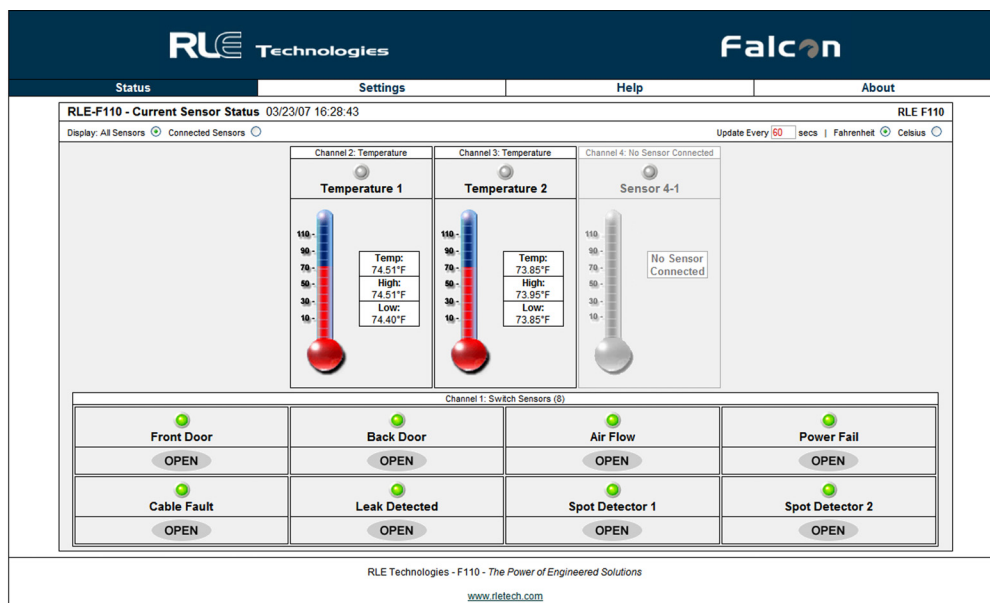


Figure 3.1 F110 Status Screen

The Falcon F110 Status Screen is available through the built-in web server and shows the current status of the attached sensors. If high and low alert thresholds are defined for the temperature or temperature/humidity sensors, the status icon above the sensor label changes

color based upon where the temperature or humidity is in relation to the established high and low thresholds.

If the temperature or humidity is between the high and low thresholds and more than five (5) degrees from either threshold, the status icon will be **green**. If it is within five (5) degrees of the high threshold, the status icon will be **yellow**. If it is within five (5) degrees of the low threshold, the status icon will be **blue**. If the high or low threshold is exceeded, the status icon will be **red**. If no thresholds are currently defined, the status icon will be **gray**.

The **Status** screen also displays the current status of any switch sensors connected to the F110. If the status icon above the switch sensor is **red**, then that switch sensor is currently in an alarm state. Below the status icon and switch sensor label, the current switch sensor state will be displayed. If you are unsure as to which state (i.e. open or closed) to set for the switch sensor alarm state and the switch sensor is not currently in an alarm state, set the alarm state to be the opposite of what is displayed here. Refer to the manual of each sensor for information on the normal state (open or closed) of the switch sensor in use.

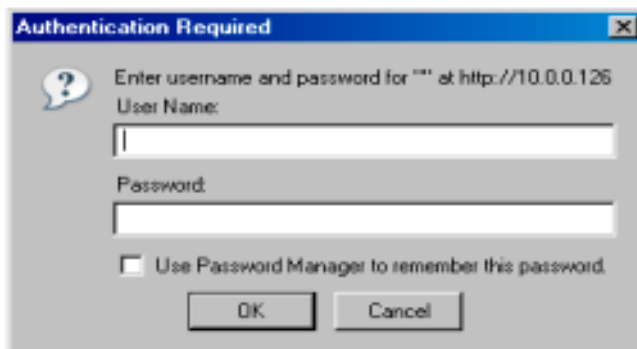
Below the DHCP Name and time display are a number of radio buttons and form fields that allow the display of the F110 web server interface to be modified. Changing the **Display** radio buttons will toggle how inactive sensors are displayed, modifying the **Update Every** form field will adjust the refresh time of the F110 web server interface and selecting the **Celsius** radio button instead of the **Fahrenheit** radio button will display sensor values in Celsius.

### 3.3. Settings Screen

The F110 Settings Screen is used to modify the F110 configuration. Here users can configure Network, Email, SNMP, Alert Threshold, Security, and Advanced settings. When settings are modified and saved, the F110 will automatically reset and start with the new configuration.

**Note** After you make a field change, click on Accept Changes at the bottom of the screen, then click on Save Settings on the left hand column.

You will see an authentication security prompt appear once accessing the Settings Menu. Default from RLE, there is no USER name and NO password assigned to the unit. A password can be assign to the unit later during the configuration. There is no USER name assigned to the unit, at this time.



**Figure 3.2** Authentication Security Prompt (no Username or Password)

**Note** There is no user name or no password from RLE. Password can be assigned to the unit later in the configuration menu. There is no user name that can be configured at this time.

### 3.3.1 Network

The Network tab stores settings to control how the F110 appears on the local network. Modifying the DHCP name will change how the F110 reports to the DHCP server when attempting to obtain a dynamic IP address. This label must be unique, so when assigning the DHCP Name ensure that duplicate labels do not appear on the network.

To set a static IP address, uncheck the **Use DHCP** checkbox and enter the Static IP, Gateway IP, and Subnet Mask.

If you wish to use a DNS name instead of an IP address for the **Mail Server Address** on the **Email** tab, enter the IP address of your DNS Server in the **DNS Server IP** field.

**Note** In most cases, the DNS Server IP address is the same as the IP address entered into the "Gateway IP" field. If this does not work, please contact your network administrator for assistance.

The screenshot displays the RLE Technologies F110 Web Interface. At the top, there is a header with the RLE Technologies logo and a navigation bar with 'Status' and 'Settings' tabs. Below the navigation bar, the MAC Address is '00-20-4A-93-59-EE' and the Version is 'V0.3.2.2'. The main content area is titled 'Network Settings' and contains the following configuration options:

- Device Name:** F110-20505
- IP Address Configuration:**
  - Obtain IP Address Automatically
  - Use The Following IP Configuration
- Auto Configuration Methods:**
  - BOOTP:  Enable  Disable
  - DHCP:  Enable  Disable
  - AutoIP:  Enable  Disable
- Use The Following IP Configuration:**
  - IP Address: 10.0.0.200
  - Subnet Mask: 255.255.255.0
  - Default Gateway: 10.0.0.1
  - DNS Server IP: 10.0.0.10
- Ethernet Configuration:**
  - MTU Size: 536
  - Auto Negotiate:
  - Speed:  100 Mbps  10 Mbps
  - Duplex:  Full  Half

An 'Accept Changes' button is located at the bottom of the configuration area.

**Figure 3.3** Network Settings

**Note** If using SNMP monitoring software to monitor the F110, it is recommended that a static IP address be assigned to the device to ensure that the software can find the unit. The IP address assigned must also be excluded from DHCP assignment to ensure that the IP address of the F110 is NOT given to another device on your network. Please contact your Network Administrator for assistance.

### 3.3.2 Email

The Email tab stores settings for the F110 to send Email Alert Notifications when alert thresholds are exceeded. In order to enable email alerting from the F110's web server interface, your mail server must have **SMTP Relay** enabled for either your network or the IP address of the F110. Contact your Email Administrator if you need assistance.

Enter the mail server address for the mail server you are using in the **Mail Server Address** field. The address can be entered as either the IP address or the DNS name of your mail server. If you wish to use a DNS name for the **Mail Server Address** field, you must assign a Static IP address, Gateway IP address, DNS Server IP address, and Subnet Mask on the **Network** tab.

In the **Email Recipients** fields, you can enter a single/regular email address, distribution list email address or mobile phone, pager or PDA email address (using Email-To-SMS) for email alert when alert thresholds are exceeded. **Only one address may be entered.**

The **Return Address (From)** field **MUST** contain an email address for an active account on the mail server specified in the **Mail Server Address** field. For example, if 'mail.rletech.com' is entered in the **Mail Server Address** field, the **Return Address (From)** field must contain an email address with the 'mail.rletech.com' domain. Contact your email administrator if you require additional assistance.

The F110 can also do authenticated SMTP (**ESMTP**). Enter your user name and password in the fields and select the check box for Enable Authentication. You **MUST** save your settings before sending a test email. Refer to xrefpg. X for Trace output, to view mail transfer information between the F110 and mail server for troubleshooting.

**Note** You must save your settings before sending a test email.

The screenshot shows the 'Email Settings' configuration page in the F110 web interface. The page is divided into a left-hand navigation menu and a main configuration area. The navigation menu includes options for Network, SMTP Email, Sensors, SNMP, Modbus, Security, and Advanced. The main configuration area is titled 'Email Settings' and contains the following fields and options:

- Email Enabled:**
- Email Footer Enabled:**
- Use SMS:**
- Mail Server Port:** 25
- Timeout:** 5
- Mail Server:** smtp.bizmail.yahoo.com (with a note: \* Domain Name or IP)
- Return Address (From):** tfletcher@rletech.com
- Display URL:** 10.0.0.200
- Authentication (optional):**
  - Enable Authentication:**
  - Username:** tfletcher@rletech.com
  - Password:** [masked with dots] (with a note: \* Max 11 Characters)
- Email Recipients (Separated By Comma):** tfletcher@rletech.com

At the bottom of the configuration area, there are two buttons: 'Send Test Email' and 'Accept Changes'.

Figure 3.4 Email Settings

**Note** Many email servers block SMTP email by default. To use SMTP email with the F110, be sure the F110 IP address is added to the list of allowed SMTP relay hosts on the email server you are using for email.

**Note** After you make a field change, click on Accept Changes at the bottom of the screen, after verifying the settings are ok, click on the Save Settings tab located on the left hand column.

### 3.3.3 SNMP

The SNMP tab stores settings allowing the F110 to respond to SNMP Query requests from network monitoring applications. Enter the 'Community Name' to use for accessing the SNMP data via SNMP Query for the F110 sensors. If the SNMP feature of the F110 is used, F110 MIB files are available for download on the Documentation/Files section of the F110 webpage at [www.rletech.com](http://www.rletech.com), or by contacting RLE via [support@rletech.com](mailto:support@rletech.com).

The F110 can also send SNMP Traps in response to alerts. Enter up to three (3) IP addresses on the SNMP tab and F110 will send SNMP Traps to these systems for processing by network monitoring applications.

**Figure 3.5** SNMP Settings

**Note** After you make a field change, click on Accept Changes at the bottom of the screen, after verifying the settings are ok, click on the Save Settings tab located on the left hand column.

### 3.3.4 Channel 2, Channel 3 and Channel 4

The Channel 2, Channel 3 and Channel 4 tabs are used to configure sensor labels and to set temperature thresholds, temperature/humidity thresholds and/or alarm states for the sensors connected to sensor channels 2, 3 and 4 on the front of the F110. Sensor labels can be up to 14 characters in length.

Depending on whether an external temperature / humidity sensor, external temperature sensor or any additional external sensor is plugged into the sensor channel, configuration of each specific channel may vary.

#### 3.3.4.1 External Temperature/Humidity

High and low thresholds can be defined for each temperature/humidity sensor. If the current temperature and/or humidity rises above the high threshold or falls below the low threshold, an alert will be generated. When the temperature and/or humidity returns to a normal state, the alert will clear and a follow-up notification will be sent.

The temperature/humidity sensors can be calibrated, if necessary, by entering correction values in the **Adjust** field for each temperature/humidity sensor. Temperature corrections entered here can only be entered in degrees **Celsius** (i.e.  $^{\circ}\text{Celsius} = [5/9]*[^{\circ}\text{Fahrenheit}-32]$ ). Humidity corrections are entered in percent (%) Relative Humidity. To adjust the temperature and/or humidity down, enter a minus (-) sign before the value (i.e. -5). All temperature alert thresholds **must** be entered in degrees Fahrenheit and all humidity alert thresholds must be entered in percent (%) Relative Humidity.

| Field  | Temperature Units |
|--------|-------------------|
| High   | Fahrenheit        |
| Low    | Fahrenheit        |
| Adjust | Celsius           |



**RLE Technologies**

**Status** | **Settings**

MAC Address: 00-20-4A-93-59-EE | Version: V0.3.2.2

**Sensor Settings**

**General Alarm Configuration**

Degrees Outside Of Threshold Before Alarm Is Triggered:  (between 0.0 and 25.5)

Degrees Within Threshold Before Alarm Is Cleared:  (between 0.1 and 25.5)

**Alarm Thresholds**

**Sensor 2 Alarm Configuration** | Sensor Type: Temperature (Fahrenheit)

| Sensor Label                          | Alarm On                                      | High                            | Low                             | Adjust                         |
|---------------------------------------|---|---------------------------------|---------------------------------|--------------------------------|
| <input type="text" value="Rack Top"/> | <input type="text" value="Temperature (°F)"/> | <input type="text" value="75"/> | <input type="text" value="50"/> | <input type="text" value="5"/> |

**Sensor 3 Alarm Configuration** | Sensor Type: Temp/Humidity (Fahrenheit)

| Sensor Label                                | Alarm On                                      | High                            | Low                             | Adjust                         |
|---|---|---------------------------------|---------------------------------|--------------------------------|
| <input type="text" value="Rack Middle"/>    | <input type="text" value="Temperature (°F)"/> | <input type="text" value="75"/> | <input type="text" value="50"/> | <input type="text" value="0"/> |
| <input type="checkbox"/> Monitor Heat Index | <input type="text" value="Humidity (%RH)"/>   | <input type="text" value="70"/> | <input type="text" value="10"/> | <input type="text" value="0"/> |

**Sensor 4 Alarm Configuration** | Sensor Type: Temperature (Fahrenheit)

| Sensor Label                             | Alarm On                                      | High                            | Low                             | Adjust                         |
|--|---|---------------------------------|---------------------------------|--------------------------------|
| <input type="text" value="Rack Botton"/> | <input type="text" value="Temperature (°F)"/> | <input type="text" value="75"/> | <input type="text" value="50"/> | <input type="text" value="0"/> |

**Switch Sensor Alarm Configuration** | Sensor Type: Switch

| Sensor Label                            | Alarm On                            | Sensor Label                             | Alarm On                            |
|---|-------------------------------------|--|-------------------------------------|
| <input type="text" value="UPS ALARM"/>  | <input type="text" value="Closed"/> | <input type="text" value="WATER ALARM"/> | <input type="text" value="Closed"/> |
| <input type="text" value="CRAC ALARM"/> | <input type="text" value="Closed"/> | <input type="text" value="CO2 ALARM"/>   | <input type="text" value="Closed"/> |

Figure 3.6 Sensor Settings

### 3.3.5 Switched Sensor Alarm Configuration

The Channel 1 tab is used to configure sensor labels and alarm states (normally open or closed) for the eight (8) switch sensor ports (dry contact inputs) on the back of the F110 unit. Sensor labels can be up to 15 characters in length.

Alert Thresholds for switch sensors connected to the eight (8) sensor ports on the back of the F110 are set by specifying either **CLOSED** or **OPEN**. Please refer to the documentation received with any sensor purchased to determine the 'normal' state (open or closed) for that specific sensor type. Next, select the opposite state (i.e. not normal) to configure the F110 for its alarm state, which will cause it to send an alert when the alarm condition exists.

### 3.3.6 Security

The **Security** tab is used to configure password security for access to the F110 Settings Screen. Passwords can **ONLY** contain the alphanumeric characters “0-9”, “a-z” and “A-Z”. Spaces, symbols, and punctuation are not supported. Be sure to record the password entered here in a secure location.

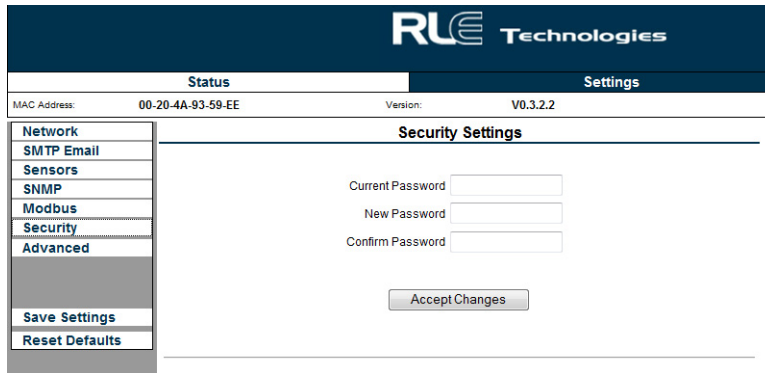


Figure 3.7 Security Settings

### 3.3.7 Advanced

The **Advanced** tab is used to configure the **Temperature Scale Configuration**, **Time & Date Configuration** by connecting to a NTP server and provides a **Trace Configuration** for diagnostics when communicating to other equipment. If you wish to modify the time display on the **Status** screen to the local time zone, use the drop down box to select your local time zone, check the **Daylight Savings Time** checkbox if applicable and click **Save Settings**. The **Time Server IP** field can be used to manually enter a specific time server to use for the time display if access to the Internet is restricted or not available and a time server is available for use on the local network.

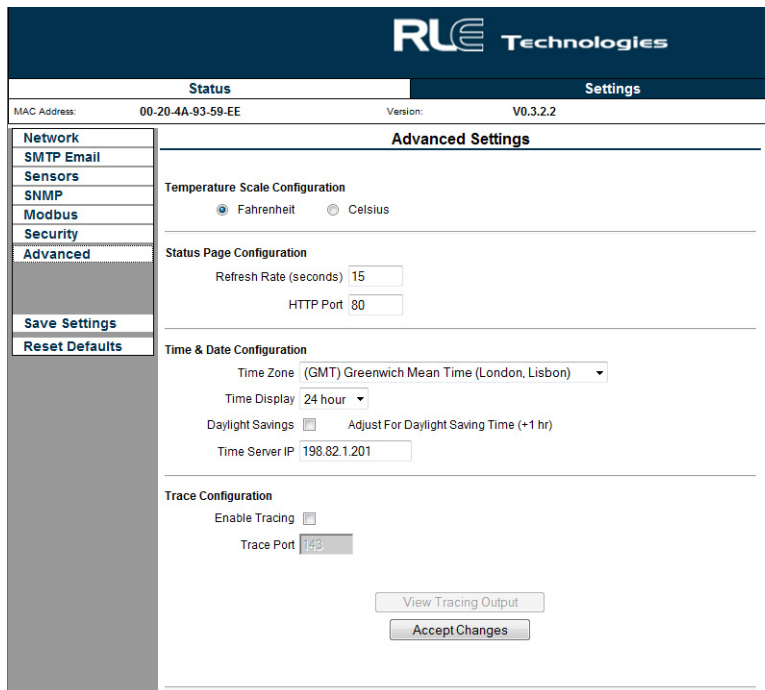


Figure 3.8 Advanced Settings

**Temperature Scale Conversion:** You can select how the F110 displays the Temperature output on the Status page, either being **Fahrenheit** or **Celsius**.

**Time & Date Configuration:** Enter an IP address of a NTP server for the F110 to synchronize with for displaying current date and time information.

**Trace Configuration:** This feature enable you to open a secondary window to view communication between the F110 and other devices, such as a Mail Server, Modus Master and SNMP manager. This feature aids in troubleshooting if communication is not being made. To use Tracing Output, click on the enable tracing box, save your settings. Go back to the Advanced screen after the changes have been made and left click the View Tracing Output button.

**Note** If Daylight Savings Time is used in your location, be sure to toggle the “Daylight Savings Time” checkbox when Daylight Savings Time is not being observed.

### 3.3.8 Reset Defaults

The Reset Factory Defaults button will reset the F110 to its default factory configuration, clearing any configuration changes made to the F110. Use this as a LAST resort if you are experiencing difficulties configuring the F110. You will have to rediscover the F110 once submitting. Write down the F110 MAC address before resetting to factory defaults.



**Figure 3.9** Restore Defaults Prompt

### 3.3.9 Help Screen

The Help screen displays the current firmware on the F110 unit. There are hyperlinks available for contacting RLE Technologies, RLE Technical Support, and Web Site link for viewing other RLE products and information.



Figure 3.10 Help Screen

### 3.3.10 About Screen

The About screen also displays current information and provides links and information for contacting RLE Technologies.

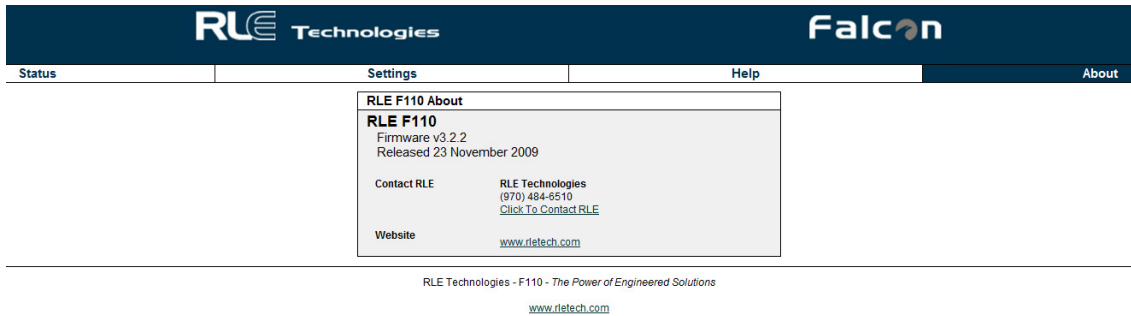


Figure 3.11 About Screen



## MODBUS CONFIGURATION VIA TELNET

### A.1. F110 Modbus Capabilities

By default, the F110 is enabled to listen on TCP port 502 for Modbus requests. The Modbus module can be enabled or disabled, the TCP port can be changed, and a list of IP addresses can be specified and used to either allow or deny Modbus requests.

### A.2. Telnet Configuration

Modbus can be configured through the F110 Telnet interface. To open the Telnet interface, type the following on the command line being sure to replace <IP Address> with the IP address of the F110:

```
telnet <IP Address> 9999
```

Press **Enter** when prompted to enter Setup Mode. If **Enter** is not pressed within three (3) seconds, the connection will be closed automatically.

```

Telnet 192.168.2.119
*** F110 Telnet Server ***
MAC address 00204A8717BD
Software version 00.1.0.0 <070212> F110
Press Enter for Setup Mode

Change Setup:
 1 Server configuration
 2 SNMP/MODBUS Configuration
 4 Reboot Unit
 6 Reset Web Password
 7 Reset Factory Defaults
 8 Discard Changes And Exit
 9 Save Changes And Exit
Your choice ? 2
 1 SNMP Configuration
 2 MODBUS Configuration
Your choice ? _

```

Figure A.1 Telnet Connection

Enter **2** and press **Enter** to select the **SNMP/MODBUS Configuration** option. At the next prompt, enter **2** and press **Enter** to select the **MODBUS Configuration** option. Follow the prompts below to configure Modbus on the F110.

### **Enable MODBUS? (N)?**

Enter **Y** to enable Modbus and **N** to disable it. When Modbus is disabled, the F110 will not actively listen on the Modbus TCP port for Modbus requests.

### **MODBUS Port: (502)**

By default, the F110 listens for Modbus requests on TCP port 502. This port can be changed to any valid TCP port number although it is recommended to leave it set for port 502 to ensure compatibility with other Modbus devices on the network.

### **Should IP List Allow or Deny Connections (0=Allow, 1=Deny):**

The F110 is configured by default to deny connections from any IP addresses listed in the Modbus IP list. When all IP addresses in this list are set to default (0.0.0.0) the F110 will deny connections from no devices. In other words, by default the F110 allows connections from all IP addresses. This can be modified if desired so that the F110 will only allow connections from IP addresses appearing in the IP list. Selecting “0=Allow” will only allow connections from the IP addresses provided in the list and deny connections from all other addresses. Selecting “1=Deny” will deny connections from all address in the list but accept from all other addresses.

### **Enter IP addresses for MODBUS Security:**

Up to three (3) IP addresses can be specified and added to the Modbus IP list. This list can be used to either allow or deny connections if the IP address that the request originated from matches an IP address in the list. To configure IP addresses, enter each IP address when prompted or enter **0.0.0.0** to leave blank.

### **Save Changes And Exit**

When configuration changes are complete, press **9** and **Enter** to save the changes and exit. The F110 will reboot and apply the new settings.

# B

## MODBUS REGISTERS

**Table B.1** Read Output Registers

| Register | Name | Description                              | Units               | Range   |
|----------|------|--|---------------------|---------|
| 40002    | FC   | Family Code (8 Switch Sensors)           | None                | 0-65535 |
| 40003    | SS   | Switch Status (8 Switch Sensors)         | None                | 0-65535 |
| 40004    | SC   | Current Alarm Setting (8 Switch Sensors) | None                | 0-65535 |
| 40005    | AS   | Current Alarm State (8 Switch Sensors)   | None                | 0-65535 |
| 40009    | FC   | Family Code (External Sensor 1)          | None                | 0-65535 |
| 40010    | TC   | Current Temperature (External Sensor 1)  | Celsius x100        | 0-65535 |
| 40011    | TH   | High Temperature (External Sensor 1)     | Celsius x100        | 0-65535 |
| 40012    | TL   | Low Temperature (External Sensor 1)      | Celsius x100        | 0-65535 |
| 40013    | HC   | Current Humidity (External Sensor 1)     | % Relative Humidity | 0-65535 |
| 40014    | HH   | High Humidity (External Sensor 1)        | % Relative Humidity | 0-65535 |
| 40015    | HL   | Low Humidity (External Sensor 1)         | % Relative Humidity | 0-65535 |
| 40016    | FC   | Family Code (External Sensor 2)          | None                | 0-65535 |
| 40017    | TC   | Current Temperature (External Sensor 2)  | Celsius x100        | 0-65535 |
| 40018    | TH   | High Temperature (External Sensor 2)     | Celsius x100        | 0-65535 |
| 40019    | TL   | Low Temperature (External Sensor 2)      | Celsius x100        | 0-65535 |
| 40020    | HC   | Current Humidity (External Sensor 2)     | % Relative Humidity | 0-65535 |
| 40021    | HH   | High Humidity (External Sensor 2)        | % Relative Humidity | 0-65535 |
| 40022    | HL   | Low Humidity (External Sensor 2)         | % Relative Humidity | 0-65535 |
| 40023    | FC   | Family Code (External Sensor 3)          | None                | 0-65535 |
| 40024    | TC   | Current Temperature (External Sensor 3)  | Celsius x100        | 0-65535 |
| 40025    | TH   | High Temperature (External Sensor 3)     | Celsius x100        | 0-65535 |

**Table B.1** Read Output Registers (continued)

| Register | Name | Description                             | Units               | Range   |
|----------|------|---|---------------------|---------|
| 40026    | TL   | Low Temperature (External Sensor 3)     | Celsius x100        | 0-65535 |
| 40027    | HC   | Current Humidity (External Sensor 3)    | % Relative Humidity | 0-65535 |
| 40028    | HH   | High Humidity (External Sensor 3)       | % Relative Humidity | 0-65535 |
| 40029    | HL   | Low Humidity (External Sensor 3)        | % Relative Humidity | 0-65535 |
| 40038    | TC   | Current Temperature (External Sensor 1) | Fahrenheit x100     | 0-65535 |
| 40039    | TH   | High Temperature (External Sensor 1)    | Fahrenheit x100     | 0-65535 |
| 40040    | TL   | Low Temperature (External Sensor 1)     | Fahrenheit x100     | 0-65535 |
| 40045    | TC   | Current Temperature (External Sensor 2) | Fahrenheit x100     | 0-65535 |
| 40046    | TH   | High Temperature (External Sensor 2)    | Fahrenheit x100     | 0-65535 |
| 40047    | TL   | Low Temperature (External Sensor 2)     | Fahrenheit x100     | 0-65535 |
| 40052    | TC   | Current Temperature (External Sensor 3) | Fahrenheit x100     | 0-65535 |
| 40053    | TH   | High Temperature (External Sensor 3)    | Fahrenheit x100     | 0-65535 |
| 40054    | TL   | Low Temperature (External Sensor 3)     | Fahrenheit x100     | 0-65535 |

**Table B.2** Family Code (Register 40002, 40009, 40016, 40023: FC)

| Hexadecimal Value | Decimal Value | Description                     |
|-------------------|---------------|---------------------------------|
| 0x29              | 41            | 8 Switch Sensor                 |
| 0x10              | 16            | Temperature Sensor              |
| 0x26              | 38            | Temperature and Humidity Sensor |
| 0x00              | 00            | No Sensor                       |

**Table B.3** Status Flags (Register 40003: SS)

| Bit | Status Flag                             |
|-----|---|
| 00  | Switch Sensor 1 Status; 1 = On, 0 = Off |
| 01  | Switch Sensor 2 Status; 1 = On, 0 = Off |
| 02  | Switch Sensor 3 Status; 1 = On, 0 = Off |
| 03  | Switch Sensor 4 Status; 1 = On, 0 = Off |
| 04  | Switch Sensor 5 Status; 1 = On, 0 = Off |
| 05  | Switch Sensor 6 Status; 1 = On, 0 = Off |
| 06  | Switch Sensor 7 Status; 1 = On, 0 = Off |



**Table B.3** Status Flags (Register 40003: SS) (continued)

| Bit   | Status Flag                             |
|-------|---|
| 07    | Switch Sensor 8 Status; 1 = On, 0 = Off |
| 08-15 | Spare                                   |

**Table B.4** Status Flags (Register 40004: SC)

| Bit   | Status Flag                                    |
|-------|--|
| 00    | Switch Sensor 1 Alarm On: 1 = Closed, 0 = Open |
| 01    | Switch Sensor 2 Alarm On: 1 = Closed, 0 = Open |
| 02    | Switch Sensor 3 Alarm On: 1 = Closed, 0 = Open |
| 03    | Switch Sensor 4 Alarm On: 1 = Closed, 0 = Open |
| 04    | Switch Sensor 5 Alarm On: 1 = Closed, 0 = Open |
| 05    | Switch Sensor 6 Alarm On: 1 = Closed, 0 = Open |
| 06    | Switch Sensor 7 Alarm On: 1 = Closed, 0 = Open |
| 07    | Switch Sensor 8 Alarm On: 1 = Closed, 0 = Open |
| 08-15 | Spare  |

**Table B.5** Status Flags (Register 40005: AS)

| Bit   | Status Flag  |
|-------|--|
| 00    | Switch Sensor 1 Alarm State; 1 = Alarm, 0 = Normal |
| 01    | Switch Sensor 2 Alarm State; 1 = Alarm, 0 = Normal |
| 02    | Switch Sensor 3 Alarm State; 1 = Alarm, 0 = Normal |
| 03    | Switch Sensor 4 Alarm State; 1 = Alarm, 0 = Normal |
| 04    | Switch Sensor 5 Alarm State; 1 = Alarm, 0 = Normal |
| 05    | Switch Sensor 6 Alarm State; 1 = Alarm, 0 = Normal |
| 06    | Switch Sensor 7 Alarm State; 1 = Alarm, 0 = Normal |
| 07    | Switch Sensor 8 Alarm State; 1 = Alarm, 0 = Normal |
| 08-15 | Spare  |

**Notes:**



## TECHNICAL SPECIFICATIONS

**Table C.1** Technical Specifications

|                              |                              |   |
|------------------------------|------------------------------|---|
| <b>Power</b>                 |                              | 5VDC @ 800mA max.; wall adaptor included  |
|                              | <b>Wall Adapter Input</b>    | 110/240VAC 50/60Hz  |
| <b>Inputs</b>                |                              |   |
|                              | <b>Temperature/Humidity</b>  | 3 Digital temperature or digital temperature/humidity sensor inputs; plug-and-play; configurable alarm points   |
|                              | <b>Digital (Dry Contact)</b> | 8 Digital alarm points (configurable) / Dry contacts (gold/Au clad)   |
|                              | <b>Input Cable Length</b>    | 25ft (7.62m) standard; maximum length up to 100ft (30.48m)  |
| <b>Communications Ports</b>  |                              |   |
|                              | <b>Ethernet</b>              | 10/100 BaseT, RJ45 connector; DHCP enabled (default); Static IP-addressable   |
| <b>Protocols</b>             |                              |   |
|                              | <b>TCP/IP; NTP</b>           | IPv4.0  |
|                              | <b>HTTP/HTML; Telnet</b>     | 1.1/4.0   |
|                              | <b>SNMP</b>                  | V1; NMS manageable with Get, and Traps; V2c- Traps or Informs   |
|                              | <b>SMTP (Email)</b>          | Slave; RTU Mode; Supports function codes 03, 04, 06 and 16  |
|                              | <b>Modbus (TCP/IP)</b>       | Modbus slave; TCP/IP transmission protocol  |
| <b>Alarm Notification</b>    |                              |   |
|                              | <b>Email</b>                 | 1 Email field (for one or multiple recipients); email sent on alarm; alarms notify email recipients; regular email, distribution list, or email-to-SMS accepted |
|                              | <b>SNMP Traps</b>            | 1 Community string with up to 3 manager IP addresses  |
| <b>Login Security</b>        |                              |   |
|                              | <b>Web Browser Access</b>    | 1 Universal web password for administrator access   |
| <b>Front Panel Interface</b> |                              |   |
|                              | <b>LED Indicators</b>        | Power: 1 green; Network Link: 1 green; Network Activity: 1 amber  |

**Table C.1** Technical Specifications (continued)

| <b>Operating Environment</b>                  |                              |  |
|---|------------------------------|--|
|   | <b>Temperature</b>           | -40°F to 185°F (-40°C to 85°C)   |
|   | <b>Humidity</b>              | 5% to 85% RH, non-condensing   |
|   | <b>Altitude</b>              | 15,000ft (4,572m) max.   |
| <b>Storage Environment</b>                    |                              | -40°F to 185°F (-40°C to 85°C)   |
| <b>Dimensions</b>                             |                              |  |
|   | <b>Box Enclosure</b>         | 4.56"W x 1.25"H x 2.25"D<br>(115.8mmW x 31.75mmH x 57.15mmD)   |
|   | <b>Rack Mount – Optional</b> | 19.0"W x 1.75"H x 3.75"D<br>(482.6mmW x 44.45mmH x 95.25mmD)   |
| <b>Weight</b>                                 |                              |  |
|   | <b>Box Enclosure</b>         | 10 oz. (283g)  |
|   | <b>Rack Mount – Optional</b> | 20 oz. (567g)  |
| <b>Mounting</b>                               |                              | Rack mount (brackets required): F110-RMB rack mount brackets (not included)  |
| <b>Temperature Sensor – Optional</b>          |                              | F110-TS (optional); includes 25ft (7.62m) leader cable with RJ-11 connector (100ft/30.48m distance max.)<br>Range: -67°F to 127°F (-55°C to 52°C)  |
| <b>Temperature/Humidity Sensor – Optional</b> |                              | F110-THS (optional); includes 25ft (7.62m) leader cable with RJ-11 connector (100ft/30.48m distance max.)<br>Range: -67°F to 127°F (-55°C to 52°C) |
| <b>Certifications</b>                         |                              | CE; UL STD 17DU E248122; EN STD 5502; ICES-003 Issue 4; FCC 47 CFR Part 15; VCCI; AS/NZS CISPR 22; EN 61326  |