FMS

ARCHITECT AND ENGINEER SPECIFICATIONS

RLE TECHNOLOGIES

1. GENERAL SPECIFICATION

1.1 The contractor shall provide a RLE Technologies Falcon Monitoring System (hereinafter referred to as the "FMS") as described in subsequent sections of this specification to perform the functions of sensor monitoring, data collection, alarm reporting, network management, and network communications.

1.2 The contractor shall supply the complete FMS with components that shall include but not be limited to: a Falcon FMS, optional Expansion Cards, and an optional Numeric Keypad.

1.3 The FMS components listed above shall be manufactured by RLE Technologies, 104 Racquette Drive, Fort Collins, CO 80524, U.S.A. Tel (970) 484-6510, Fax (970) 484-6650, URL: **www.rletech.com**

1.4 The manufacturer shall warrant the FMS against defects in materials and workmanship for a period of twelve (12) months from the date of shipment. This warranty shall be limited to parts and labor to repair or replace the system if it is found to be defective. To ensure warranty coverage, all installation and other instructions must be followed properly. All installation and setup work must be performed by qualified personnel who are knowledgeable of the equipment and aware of appropriate safety, wiring, and other applicable practices.

1.5 The contractor shall submit copies of all applicable drawings, specifications, datasheets and user guides.

1.6 All materials and equipment used for this project shall be new and unused.

2. CODES/STANDARDS COMPLIANCE

2.1 The FMS shall have the following listings and approvals for international standards specifying general safety requirements for electrical equipment intended for professional, industrial process, and educational use:

2.1.1 CE Certified; EMC – EN61326 Class A

2.1.2 UL STD 61010A-1; EN STD 61010-1; CAN/CSA C22.2 STD NO. 61010-1

2.1.3 CL2P/CMP (Seahawk Premium Water Leak Detection Cable)

3. SYSTEM DESCRIPTION

3.1 The Falcon Monitoring System shall consist of the FMS basic unit and optional Expansion Cards. The FMS shall monitor analog and dry contact outputs from devices such as temperature sensors, humidity sensors, gas detectors, smoke detectors, fire suppression systems, surveillance products (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.

3.2 The FMS shall analyze the outputs from these devices according to user instructions and take actions based on the outputs. Actions shall include: digital relay outputs; SNMP traps; email, pager or cell phone notification via SMTP/SMS; pager or cell phone notification via TAP; webpages; and front panel LED notification.

3.3 The FMS shall integrate with other RLE products with analog or digital dry contact outputs, such as the SeaHawk LD series Leak Detection Systems, other Falcon series systems, and the Raptor series, as a part of an enterprise's network management system (NMS) or building management system (BMS). The FMS shall be capable of being integrated simultaneously into an NMS and a separate BMS.

4. COMPONENT DESCRIPTION

4.1 PHYSICAL DESCRIPTION

4.1.1 The FMS shall be a stand alone system, running its own firmware and proprietary operating system.

4.1.2 The FMS shall be housed in a metal Type 1 enclosure suitable for rack mounting or optional wall mounting. The FMS shall be available in two different form factors: a 1 Rack Unit form factor (hereinafter referred to as "1U"); and a 2 Rack Unit form factor (hereinafter referred to as "2U").

4.1.3 The overall size of the FMS shall be 16.8"W x 7.9"D (427mmW x 201mmD). The height of the 1U FMS shall be 1.8" (46mm). The height of the 2U FMS shall be 3.5" (89mm).

4.1.4 The FMS 1U shall operate on 24VDC @1A max, or on 48VDC (36 to 72VDC) @ 0.5A max. The FMS 2U shall operate on 24VDC @2.5A max, or on 48VDC (36 to 72VDC) @ 1.25A max. The FMS shall include a barrel-type connector for a 24VDC wall adapter, and a terminal block for either 24VDC or 48VDC power.

4.1.5 The FMS shall be suitable for operating at ambient temperatures between 32°F and 158°F (0°C and 70°C), relative humidity between 5% and 95%, non-condensing, and a maximum altitude of 15,000 feet (4,572m). The FMS shall be suitable for storage at temperatures between -40°F and 185°F (-40°C and 85°C).

4.1.6 The FMS shall have the following front panel indicators and switches:

A.) One System Power toggle switch.

B.) One Power LED that illuminates green when the power is on.

C.) One System Status LED that flashes red while the FMS during initial boot, illuminates solid red when an alarm is present, and is dark when the FMS is running normally and no alarms are present.

D.) Four Modem Communications LEDs:
TX – illuminates green when data is being transmitted by the FMS.
RX – illuminates green when data is being received by the FMS.
OH – "Off Hook," illuminates green if the modem detects a dial tone.
CD – illuminates yellow if a carrier is detected.

E.) Two Network Communications LEDs:
Link – illuminates green if network link is established, red if no network is present.
Active – illuminates green when data is being transmitted or received by the FMS.

F.) Expansion Card relay status LEDs: illuminate green when a relay on an expansion card is energized.

4.1.7 The FMS shall have the following rear panel indicators and switches:

A.) K1, K2 relay status LEDs: illuminate green when relay 1 or relay 2 are energized.

B.) Communications LEDs:
COM1, COM2 TX – illuminate green when data is being transmitted by the FMS.
COM1, COM2 RX – illuminate green when data is being received by the FMS.
RS232 SELECT – illuminates green when COM1 is configured for RS232.
RS485 SELECT – illuminates green when COM1 is configured for RS485.

C.) Switch to connect an RS485 100-ohm termination resistor.

4.2 INPUT/OUTPUT

4.2.1 The FMS shall include 8 non-isolated universal inputs, configurable as either 4-20mA current loop inputs with 12-bit A/D conversion, or digital dry contact inputs.

4.2.2 The FMS shall optionally include an internal temperature sensor, accurate to ± 0.5 °F (0.28 °C) at 77 °F (25 °C), and to ± 4 °F (2.2 °C) over the range -40 to 185 °F (-40 to 85 °C).

4.2.3 The FMS shall optionally include an internal humidity sensor, accurate to ± 3%RH over the range from 20% to 80%RH.

4.2.4 The FMS shall also be capable of interfacing with an optional RLE Technologies model KPO 3x4 numeric keypad, storing and recognizing up to 20 user-defined access codes.

4.2.5 The FMS shall include 2 Form C relay outputs with contacts rated at 1A at 24VDC, 0.5A resistive at 120VAC. The relays shall be configurable as supervised (normally energized) or non-supervised (normally de-energized).

4.2.6 The FMS shall provide 24VDC @300mA max power for external sensors and other devices.

4.2.7 The FMS shall allow for additional input and output connections through the installation of expansion cards, up to a maximum of 32 inputs and 10 relay outputs in the 1U FMS, and 104 inputs and 26 relay outputs in the 2U FMS.

4.2.8 The 1U FMS shall accept one expansion card, and the 2U FMS shall accept up to four expansion cards.

4.2.9 Two types of expansion cards shall be optionally installed in the FMS. Expansion card type "A" shall provide 12 additional non-isolated universal inputs and 8 Form C relay outputs. Expansion card type "C" shall provide 24 digital dry contact inputs, optically isolated and protected to 3000VAC RMS.

4.2.10 The 48V FMS shall accept a maximum of one type "A" card.

4.2.11 Each FMS input shall have associated with it 2 high alarm levels and 2 low alarm levels. The alarm levels shall be user configurable. The actions taken when an alarm level is reached or exceeded shall also be user configurable, and shall include a combination of the following: illuminating a front panel LED; energizing or de-energizing a relay output, sending notifications via TAP (cell phone or pager), SMTP/SMS (email, cell phone or pager), SNMP traps, Modbus, or BACnet.

4.3 LOGGING

4.3.1 The FMS shall maintain the following Logs: an Alarm Log listing the last 256 alarms, an Event Log listing the last 100 events (or actions); a Web User Access Log listing the last 100 HTML accesses; a Digital Status Log listing the last 100 digital status entries; and a Trend Log listing the last 244 analog entries for each channel, and high/low/average values for each minute of the previous 65 minutes, each hour of the previous 25 hours, and each day of the previous 7 days. The FMS shall have the capability of transferring some or all of the Log data to other networked devices.

4.4 NETWORKING

4.4.1 The FMS shall be capable of integration into larger systems, such as network management systems (NMS) via Modbus or SMTP protocols, or building management systems (BMS) through BACnet protocols.

4.4.2 The FMS shall be capable of communication with other devices through an internal modem connected to an RJ11 connector. The modem shall be capable of V.34bis/33.6kbps max data rate, and shall support dial-in/dial-out, DTMF signaling, and PPP.

4.4.3 The FMS shall be capable of serial communications through two 9-pin DIN RS232 connectors. The COM1 connector shall support communication with other devices through PPP, Modbus/DTE, Modbus/DCE, BACnet, Telnet, and HTTP/HTML. The COM2 connector shall

support communication with a PC for local configuration, firmware downloads and troubleshooting.

4.4.4 The FMS shall be capable of Modbus/RTU communications via the optional RS485 serial port. With the Modbus option installed, the FMS shall be capable of being a Master or Slave on a Modbus RS485 network. The COM1 port must be configured for either the RS485 connection or the RS232 connection, but not both.

4.4.5 The FMS shall support three versions of the Modbus protocol: Modbus Standard; Modbus Extended; and Jbus.

4.4.6 The FMS RS485 network shall not exceed 4,000ft (1,219m) in cable length, and shall be terminated with a 100-ohm termination resistor. The FMS shall include a configuration switch for enabling an internal termination resistor when the FMS is the first or last device in the RS485 network.

4.4.7 Up to 32 FMS, F3400 or F1000 units may be connected in a Nest/Egg network, with one FMS acting simultaneously as the Master in the Nest/Egg network and as the Slave in a BMS or NMS network. Information about the FMS "Egg" units shall be made available in the FMS "Nest" unit webpages.

4.4.8 The FMS shall be capable of 10baseT/Ethernet communications via an RJ45 Ethernet connector. The FMS shall support the following protocols over the Ethernet connection: Modbus/IP (Slave only); BACnet/IP; SNMP V1 (Get/Set/Trap); TCP/IP; UDP/IP; ICMP/IP; IPv4; SMTP; HTTP/HTML.

4.4.9 An FMS with fewer than 104 digital or analog inputs shall have the capability of utilizing the missing inputs as user configurable "virtual inputs," with data provided through the RS232, optional RS45, Ethernet or RJ11 telephone/modem connections, for a total of up to 104 physical and virtual inputs.

4.4.10 The FMS shall be capable of simultaneous connections to two Modbus networks, two BACnet networks, or one Modbus and one BACnet network, through simultaneous use of the Ethernet and RS232/RS485 ports. The FMS shall be configurable as Master or Slave device on both ports, at once and independently, with the exception that the FMS shall not be both a BACnet Master and Modbus Master at once.

4.4.11 The FMS shall use a real-time clock for time and date stamping of trend and event log entries. The date and time shall be set through the FMS HTTP/HTML interface. If the FMS is connected to a network, the date and time shall be continuously maintained by connection to a Network Time Protocol (NTP) server.

4.4.12 The FMS shall be accessible and configurable from a standard Web browser on a PC connected to the FMS through Ethernet or RS232. The HTML-based webpages shall display the FMS device, input and alarm status and trends, and a link to the configuration menus. Configuration menus shall be password protected.

4.4.13 The FMS shall also be accessible and configurable from any VT100 terminal emulator connected to the FMS through Ethernet or RS232. The text-based output shall display the FMS device, input and alarm status, accessible through simple keyboard commands. Text-based configuration menus shall also be available, and shall be password protected.

4.5 INSTALLATION ACCESSORIES

4.5.1 The FMS shall be capable of interfacing with an RLE Technologies model KPO 3x4 numeric keypad, storing and recognizing up to 20 user-defined access codes. The actions to be taken upon entry of an access code shall be defined and configured by the FMS user. Actions shall include: digital relay outputs; SNMP traps; email, pager or cell phone notification via SMTP/SMS; pager or cell phone notification via TAP; webpages; and front panel LED notification.

4.5.2 The FMS shall be capable of acting as a Modbus/RTU Master and interfacing with up to 16 Veris Branch Circuit Monitors (BCM) on an RS485 network. If the FMS uses SNMP to communicate with other devices, then it shall be capable of interfacing with up to 4 BCMs.

5. SYSTEM COMMISSIONING AND MAINTENANCE

5.1 Upon completion of the system installation, the installer shall perform the following tests in the presence of the owner and shall provide the owner with a copy of the results:

5.1.1 System Turn-On

A.) Upon switching System Power to On, the System Status LED shall blink rapidly for up to 10 seconds during the bootup sequence. Upon completion of the bootup sequence, the System Status LED shall either be dark (if no alarms are present) or illuminated red (if alarms are present) and the Power LED shall be illuminated green. Other LEDs may also be illuminated.

5.1.2 Communications

A.) After the FMS IP address has been set according to instructions in the FMS User Guide, Section 2-3, “Set the FMS IP Address,” the IP address shall be entered in a Web browser window of a PC connected to the FMS through Ethernet or RS232. The FMS shall respond by displaying the Main Menu, according to instructions in the FMS User Guide, Section 3-2, “Main Menu.”

5.2 The RLE Technologies Falcon Monitoring System shall be maintained as recommended in the FMS User Guide.

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