

Refrigerant Gas Detector (MRLDS-450) for Machinery Rooms, Cold Rooms and Freezers

Quick Start Guide

The MRLDS-450 refrigerant gas detector is designed for use in refrigeration applications and may be used as a stand-alone device, or connected to a facility's building management system (BMS). It enables compliance with refrigerant safety codes (ASHRAE 15 and EN378) and features audible and visual alarms to alert personnel in the event of a refrigerant leak.



Figure 1 - Refrigerant Gas Detector

1 Safety Instructions

⚠ DANGER	DANGER: The MRLDS-450 is NOT certified or approved for operation in oxygen-enriched atmospheres. Failure to comply may result in severe injury or death.
⚠ WARNING	WARNING: Use this product ONLY for the purposes and under the conditions listed in the user manual. Failure to comply may result in injury and/or damage to the product. The MRLDS-450 has not been designed to be intrinsically safe for use in areas classified as being hazardous locations. For your safety, DO NOT use in hazardous locations. Consult a qualified professional before connecting the MRLDS-450 to devices not mentioned in this manual. Failure to comply may result in injury and/or damage to the product.
⚠ WARNING	WARNING: The gas diffusion path can become occluded (moisture, dust, debris, frozen condensation) over time, resulting in reduced or complete lack of gas detection and alarming function. Routine visual inspection of the gas detector and bump testing are recommended to ensure proper gas detection and alarm function. For information on <u>calibrating the sensor</u> , refer to the <u>Care and Maintenance</u> section of the MRLDS-450 User Manual P/N 026-1316.
⚠ CAUTION	CAUTION: Except for the maintenance detailed in this manual, this product should ONLY be opened and/or serviced by authorized personnel. Failure to comply may void the warranty.
NOTICE	CODE COMPLIANCE: Comply with all local and national laws, rules and regulations associated with this equipment. Operators should be aware of the regulations and standards in their industry/locality for the operation of the MRLDS-450.

NOTICE

TECHNICIAN USE ONLY: The MRLDS-450 must be installed by a suitably qualified technician who will install this unit in accordance with these instructions and the standards in their particular industry/locality. This document is only intended as a guide and the manufacturer bears no responsibility for the installation or operation of this unit. Failure to install and operate the unit in accordance with these instructions and with industry guidelines may cause serious injury or death and the manufacturer will not be held responsible in this regard.

2 Component Overview

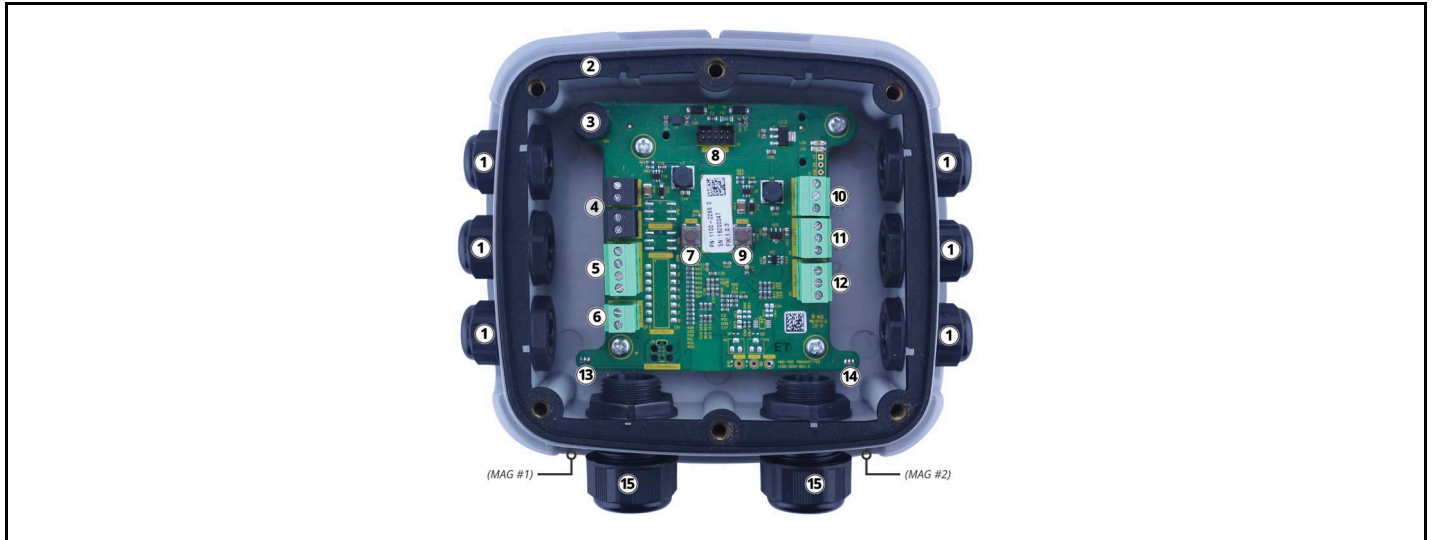


Figure 2 - Component Locations

#	Component Description
1	M16 Cable Glands (x6)
2	Rubber Gasket
3	Internal Alarm Buzzer
4	Power Connections (x2)
5	Digital Connection (<i>Modbus</i>)
6	Analog Connection
7	Tactile Switch #1
8	Ribbon Cable Connection (<i>To Sensor</i>)
9	Tactile Switch #2
10	Relay 3 Connection (<i>FAULT</i>)
11	Relay 2 Connection (<i>HIGH</i>)
12	Relay 1 Connection (<i>LOW</i>)
13	Magnetic (Mag) Switch #1
14	Magnetic (Mag) Switch #2
15	M20 Cable Glands (x2)

Table 1 - Component Descriptions

3 Product Specifications

Size (HxWxD)	6.5" x 6.5" x 3.4" (165 x 165x 87 mm)
Weight	1.05 lbs (480g)
Indicators	Multi-color Status LED Internal Alarm Buzzer: 72dB @ 3.9" (10 cm)
Alarm Delay	Configurable (0 to 15 minutes)
Inputs	Tactile Switches (x2), Magnetic Switches (x2)
Outputs	Analog Output: 1 to 5V (default), 0 to 5V, 0 to 10V, 2 to 10V or 4 to 20 mA
Bluetooth®	Bluetooth® Low Energy, BLE 4.2
Modbus	Connection: RS-485 terminal block Baud Rate: 9,600 or 19,200 (default) Data Bits: 8 Parity: None, Odd, or Even (default) Stop Bits: 1 (default) or 2 Retry Time: 500 ms (minimum)
Power Supply	19.5 to 28.5 VDC or 24 VAC ±20%; 4W
Wiring (Power)	2-core cable, 16 to 28 AWG
Wiring (Relays)	2-core cable, 16 to 28 AWG
Wiring (Modbus)	Recommended: Belden 3106A (or equivalent) 3-core, 2 twisted pair + ground, shielded cable with 120 Ω characteristic impedance, 16 to 28 AWG
Enclosure	Material: ABS Protection: IP66
Temperature	Semiconductor: -40°F to 122°F (-40°C to 50°C) Electrochemical: Ranges vary by gas type and / or concentration, see the MRLDS-450 user manual (P/N 026-1316) for a full list of temperature ranges. Infrared: -40°F to 122°F (-40°C to 50°C) Catalytic Bead: -40 to 122°F (-40°C to 50°C)
Humidity	5 to 90% RH, non-condensing
Pressure	23.6 to 32.5" Hg (800 to 1,100 mbar)
Elevation	0 to 6,560' (3,000 m) altitude


Table 2 - Product Specifications

4 Installation



NOTICE

NOTICE: The manufacturer of this product requires that a bump test or calibration be performed following installation to verify installation to verify instrument functionality.

STEP 1: Mount Gas Detector & Remove Lid

	<p>CAUTION: DO NOT allow the lid/sensor to hang from the ribbon cable. Failure to comply may result in damage to the product.</p> <ol style="list-style-type: none"> Mount the MRLDS-450 according to the product dimensions, maximum wiring lengths, and following considerations: <ul style="list-style-type: none"> • Environment: the full range of environmental conditions when selecting a location. • Application: the specifics of the application (possible leaks, air movement/draft, etc.) when selecting a location. • Accessibility: the degree of accessibility required for maintenance purposes when selecting a location. • Target Gas: the specific gravity of the target gas when selecting the height of the instrument. Using a 5/32" (4mm) hex key/allen wrench (not included), remove the lid and disconnect the ribbon cable from the base. Set the lid and rubber gasket aside to be reinstalled later.
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STEP 2: Wire Connections

	<p>WARNING: Ensure that all wiring connections are made BEFORE applying power.</p>
	<p>WARNING: Relays are rated for 0 to 30V. DO NOT apply main power onto these relays.</p>
<p>NOTICE</p>	<p>NOTICE: Cable glands are meant to accommodate one cable. DO NOT use cable glands for more than one cable.</p>
<p>NOTICE</p>	<p>NOTICE: If analog output is 4 to 20 mA, connect or short the connection to ensure the gas detector does not go into fault.</p>

- Locate connections (Power, Analog, Modbus, Relays) and remove terminal blocks from the PCBA.

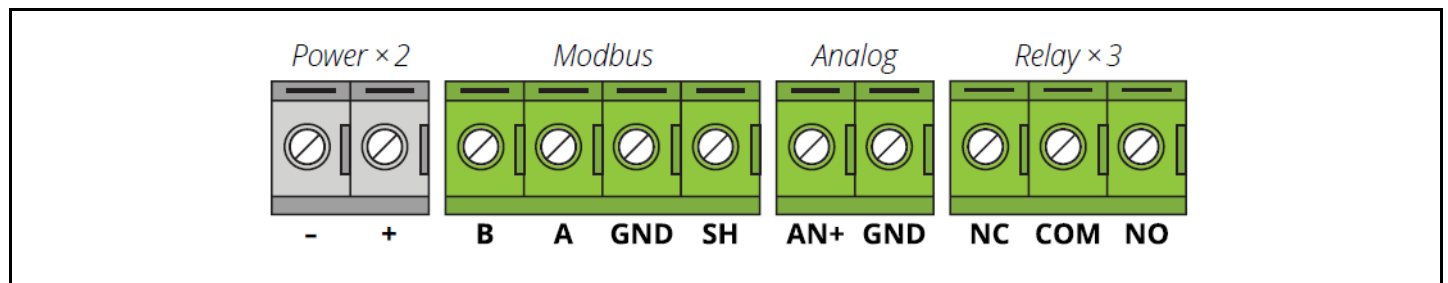


Figure 3 - Locate Connections

- Remove plugs from the corresponding M16 cable glands and pass the cable through the opening.
- Secure wires in each terminal block and, pressing firmly, reinstall the terminal block in the PCBA.
- Remove all excess cable from the housing before firmly securing the cable glands.

STEP 3: Reinstall Sensor and Connect Lid

⚠ CAUTION	CAUTION: DO NOT leave excess cable inside of the gas detector housing. Failure to comply may result in damage to the product.
NOTICE	NOTICE: To achieve proper seal in the IP66 enclosure, the lid screws should be torqued to 15 to 20 lbf in (1.5 to 2.0 Nm).

1. Reinstall the rubber gasket. Ensure that it is correctly seated by placing the side with two grooves face down and the edge with two bumps on the top.

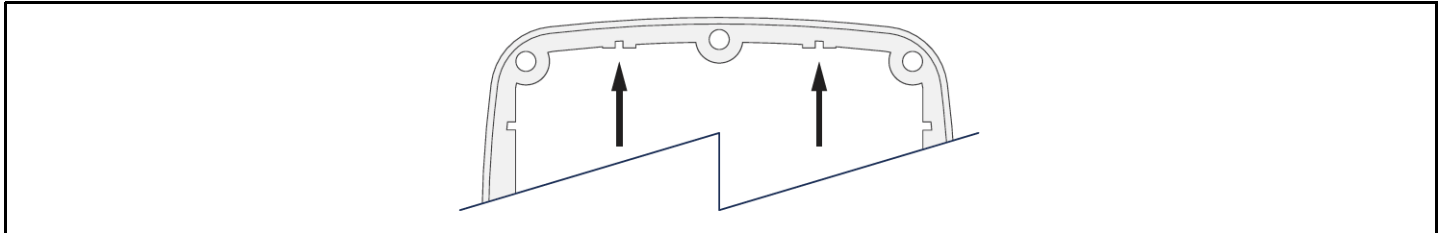


Figure 4 - Rubber Gasket Placement

2. Reconnect the ribbon cable from the sensor to the PCBA as shown:



Figure 5 - Ribbon Cable

3. Ensure no cables are interfering with the sensor module and close the lid.
4. Using a 5/32" (4 mm) hex key/allen wrench, tighten the lid screws in an X tightening pattern:



Figure 6 - Tightening Pattern

5 MRLDS-450 Network Setup for Site Supervisor and E2

For Modbus end-of-line termination, use 150Ω ohm resistor or termination block P/N 537-2711. Do not use MRLDS 120Ω ohm on-board termination with Site Supervisor or E2.

NOTICE	NOTICE: <ul style="list-style-type: none">• For 24 VAC installations sharing a transformer in a daisy-chain configuration, the neutral polarity must be maintained for all instruments.• 24 VAC power polarity must not be reversed.• For a more robust system, a dedicated transformer for <u>each</u> MRLDS is recommended to prevent damage caused by wiring errors.• Fasten terminal screws.
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5A. Site Supervisor Device and COMM Setup

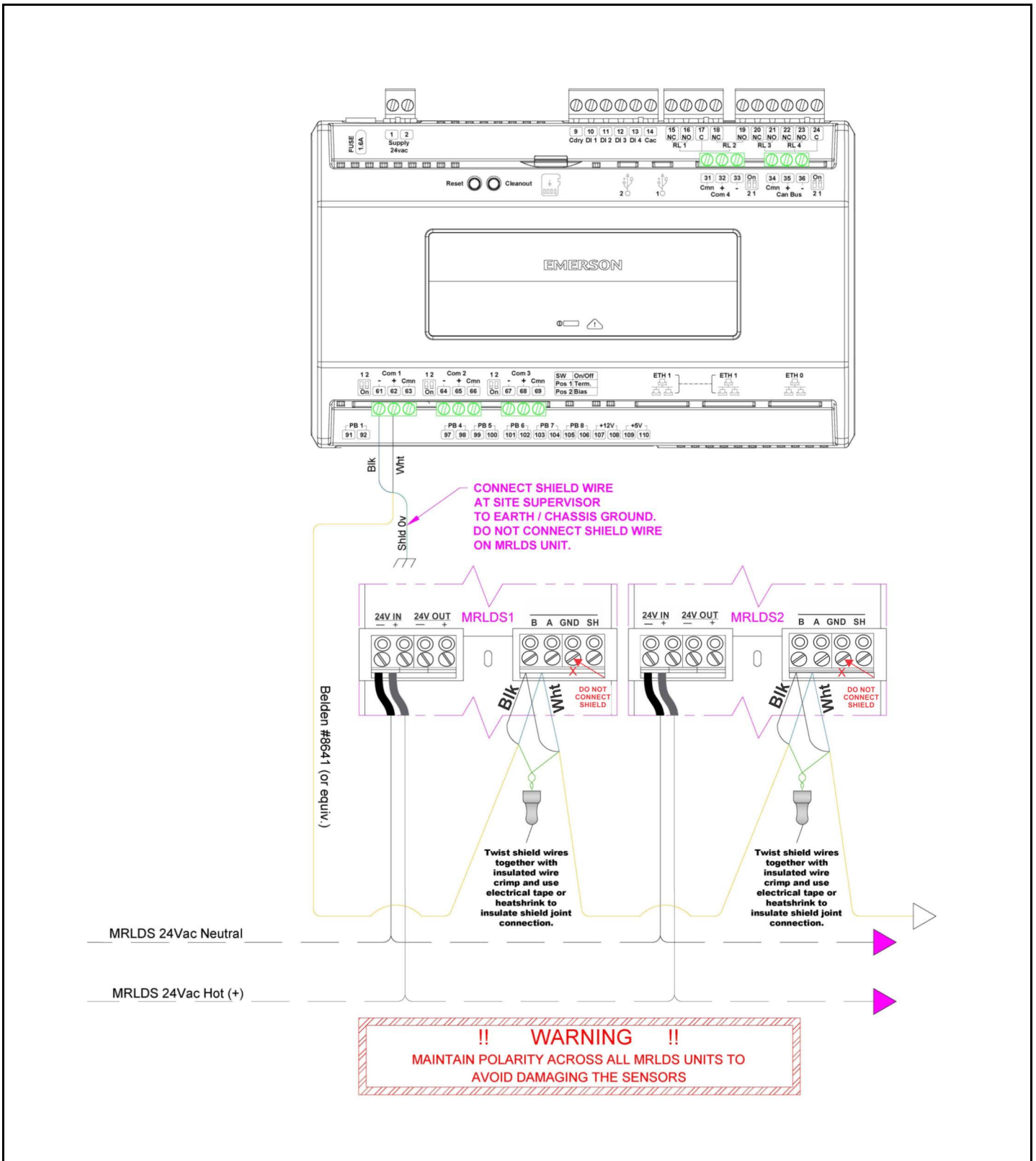


Figure 7 - Site Supervisor Setup

5B. E2 Device and COMM Setup

*For MODBUS setup of E2, please see the Quick Setup Guide P/N 026-4419

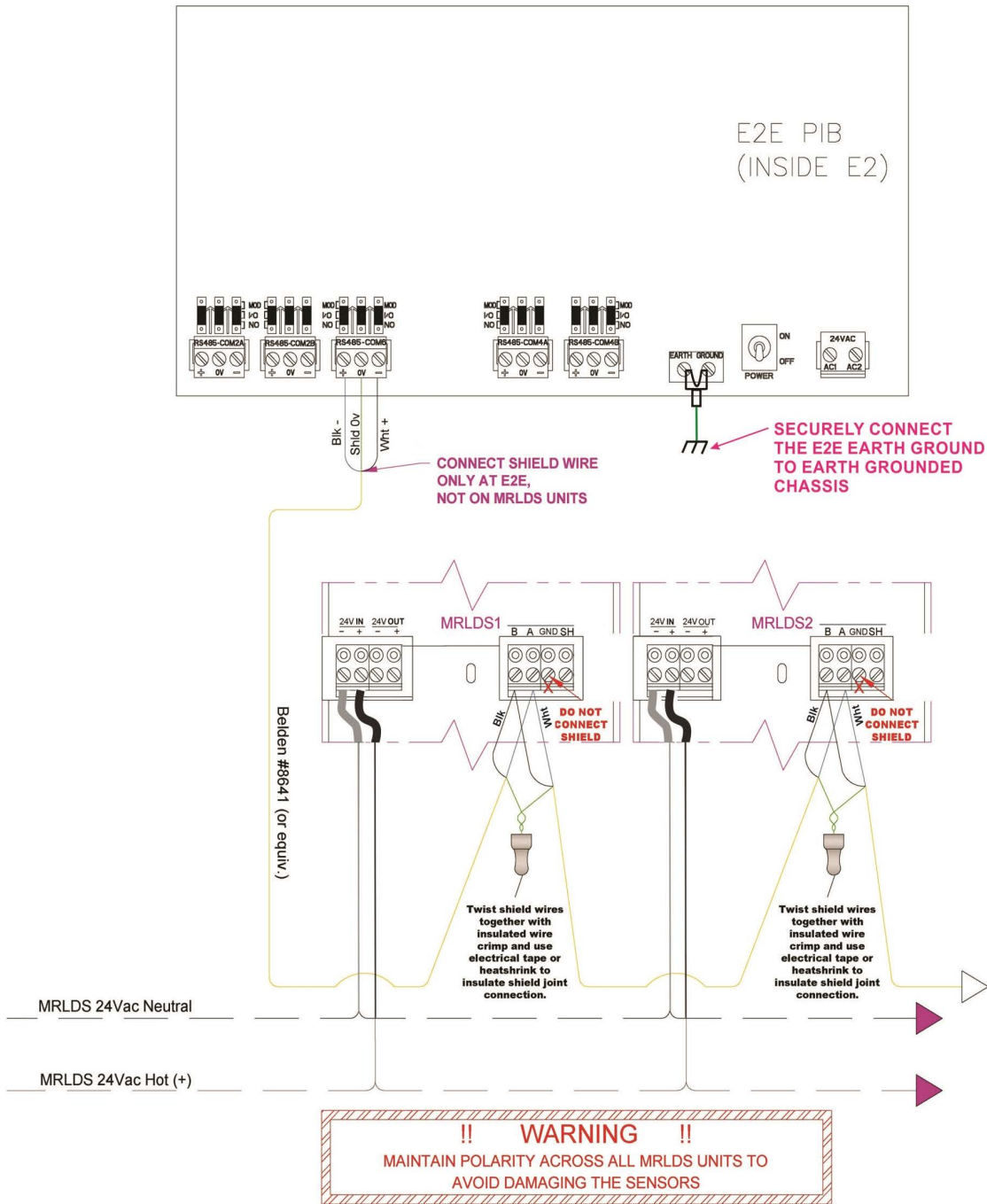


Figure 8 - E2 Setup

6 Connect MRLDS-450 to MRLDS-400 Series App (User Discretion)

The MRLDS-450 uses a smartphone application to allow users to interface with the gas detector.

NOTICE

NOTICE: Default alias, passkey, and unlock code can be changed via the MRLDS-400 Series App's configuration menu.

1. Enable Bluetooth® discovery by tapping **MAG#1** for 1 second. (After 10 seconds, the device will indicate that it is discoverable with audible heartbeat until it has been paired, discovery has timed-out or has been canceled.)
2. Launch the MRLDS-400 App and click the Bluetooth® icon at the bottom of the screen to initiate a scan.
3. Select the instrument (*default is 18TMAE*) from the list of available gas detectors.
4. When prompted, enter the passkey (*default is 123456*).
5. Go to **Configure** tab to set up the device. When prompted, enter unlock code to access device configuration (*default is 1234*).

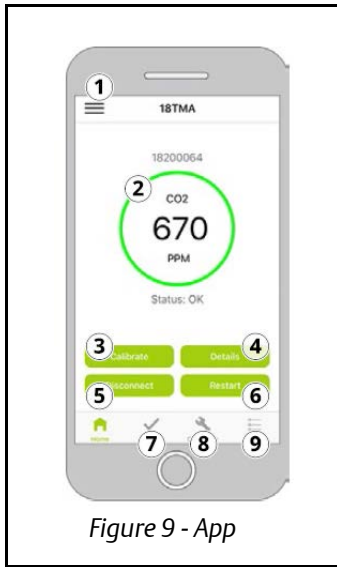


Figure 9 - App

#	APP DESCRIPTION
1	Main Menu (<i>App Settings</i>)
2	Status (<i>Gas Concentration</i>)
3	Calibrate (<i>Calibration/Bump Test</i>)
4	Details (<i>Instrument Information</i>)
5	Disconnect Bluetooth®
6	Restart Connected Device
7	Test Mode (<i>LED/Buzzer/Relays/Analog Output</i>)
8	Device Configuration
9	Logs

Table 3 - App Description

7 Operation Overview

STATE	OUTPUT				
	LED	RELAY 1	RELAY 2	RELAY 3	Buzzer
Warm-up		OFF	OFF	OFF	
Normal		OFF	OFF	OFF	
Low Alarm		ON	OFF	OFF	
High Alarm		ON	ON	OFF	
Offline		OFF	OFF	OFF	
Fault		OFF	OFF	ON	
Negative Gas Fault		OFF	OFF	ON	
Zero Cal. Fault		OFF	OFF	OFF	
Special Cal. Fault		OFF	OFF	OFF	

Table 4 - Outputs

8 Part Number and Ordering Information

Emerson P/N	IP66, 3 x Relays, Analog Output, Modbus Output, Audible & Visual Alarms		Emerson P/N	Replacement Sensor		Sensor Type
	Gas Type and Detection Range			Pre-calibrated Sensor Modules		
809-1040	CO2	0-5,000ppm	809-1140	CO2	0-5,000ppm	IR
809-1041	CO2	0-10,000ppm	809-1141	CO2	0-10,000ppm	IR
809-1046	R134A	0-1,000ppm	809-1146	R134A	0-1,000ppm	SC
809-1047	R404A	0-1,000ppm	809-1147	R404A	0-1,000ppm	SC
809-1048	R407A	0-1,000ppm	809-1148	R407A	0-1,000ppm	SC
809-1049	R410A	0-1,000ppm	809-1149	R410A	0-1,000ppm	SC
809-1050	R22	0-1,000ppm	809-1150	R22	0-1,000ppm	SC
809-1051	R507A	0-1,000ppm	809-1151	R507A	0-1,000ppm	SC
809-1053	R407F	0-1,000ppm	809-1153	R407F	0-1,000ppm	SC
809-1054	R1234ZE	0-1,000ppm	-	R1234ZE	0-1,000ppm	SC
809-1056	R448A	0-1,000ppm	809-1156	R448A	0-1,000ppm	SC
809-1057	R452A	0-1,000ppm	809-1157	R452A	0-1,000ppm	SC
809-1058	R513A	0-1,000ppm	809-1158	R513A	0-1,000ppm	SC
809-1059	R434A	0-1,000ppm	-	R434A	0-1,000ppm	SC
809-1061	R1234YF	0-1,000ppm	-	R1234YF	0-1,000ppm	SC
809-1063	R452B	0-1,000ppm	809-1163	R452B	0-1,000ppm	SC
809-1064	R454A	0-1,000ppm	-	R454A	0-1,000ppm	SC
809-1065	R422A	0-1,000ppm	-	R422A	0-1,000ppm	SC
809-1066	R422D	0-1,000ppm	809-1166	R422D	0-1,000ppm	SC
809-1067	R427A	0-1,000ppm	-	R427A	0-1,000ppm	SC
809-1068	R449A	0-1,000ppm	809-1168	R449A	0-1,000ppm	SC
809-1069	R454C	0-1,000ppm	-	R454C	0-1,000ppm	SC
809-1080	R450A	0-1,000ppm	-	R450A	0-1,000ppm	SC
809-1081	R454B	0-1,000ppm	-	R454B	0-1,000ppm	SC
809-1082	R455A	0-1,000ppm	-	R455A	0-1,000ppm	SC
809-1083	R407C	0-1,000ppm	809-1183	R407C	0-1,000ppm	SC
809-1084	R290	0-5,000ppm	809-1184	R290	0-5,000ppm	IR
809-1085	R32	0-1,000ppm	809-1185	R32	0-1,000ppm	SC
809-1086	R600	0-100% LEL	-	R600	0-100% LEL	IR
809-1088	R290	0-100% LEL	-	R290	0-100% LEL	IR
MRLDS-450 Accessories						
809-1190	Calibration Adapter Kit					

Table 5 - Product Ordering Information

Scan the QR code to download the full user manual P/N 026-1316.



For MODBUS setup of E2, please see the Quick Setup Guide P/N 026-4419.



For Technical Support call 833-409-7505 or email ColdChain.TechnicalServices@Emerson.com

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