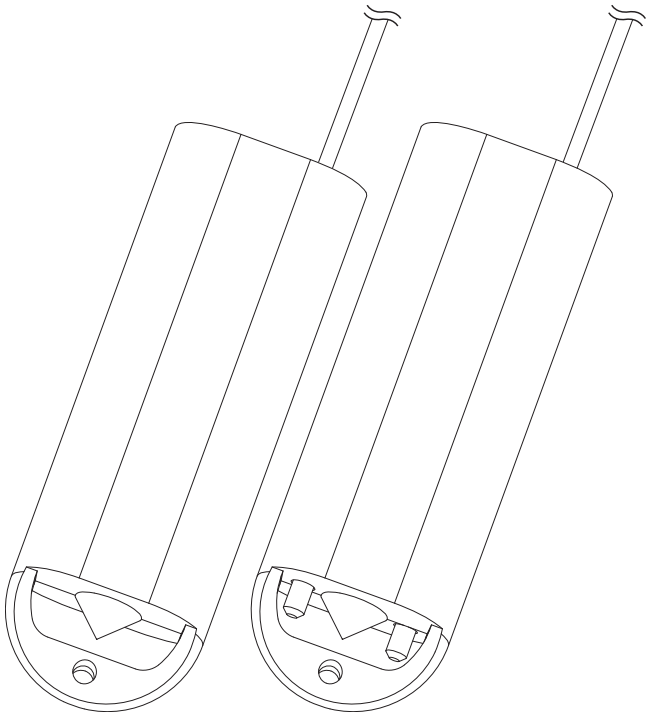
Franklin Electric
ENERGY SYSTEMS

DISCRIMINATING & ELECTRO-OPTIC INTERSTITIAL SENSOR

INSTALL GUIDE

000-2086 r4

SENSOR MODELS
FMP-DIS
FMP-DIS-U
FMP-EIS
FMP-EIS-U



The information in this publication is provided for reference only. While every effort has been made to ensure the reliability and accuracy of the information contained in this document at the time of printing, we recommend that you refer to "franklinfueling.com" for the most current version of this document. All product specifications, as well as the information contained in this publication, are subject to change without notice. Franklin Electric does not assume responsibility and expressly disclaims liability for loss, damage, or expense arising out of, or in any way connected with, installation, operation, use, or maintenance by using this document. Franklin Electric assumes no responsibility for any infringement of patents or other rights of third parties that may result from use of this document or the products. We make no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

Copyright © 2026 Franklin Electric Co., Inc., Madison, WI 53718. All world rights reserved. No part of this publication may be stored in a retrieval system, transmitted, or reproduced in any way, including, but not limited to, photocopy, photograph, magnetic, or other record, without the prior written permission of Franklin Electric.

For technical support, please contact:
Franklin Electric Technical Support
Web: franklinfueling.com/support-center
Tel: +1 800 984 6266

For additional questions and concerns, please contact:
Franklin Electric
3760 Marsh Rd
Madison, WI 53718 USA
Web: franklin-energy.com
Tel: USA & Canada +1 800 225 9787 • Tel: UK +44 (0) 1473 243300
Tel: Mex 001 800 738 7610 • Tel: DE +49 6571 105 380 • Tel: CN +86 10 8565 4566

FE Petro is a registered trademark of Franklin Electric Co., Inc.
Guardian Series is a trademark of Franklin Electric Co., Inc.
Veeder-Root is a trademark of Danaher Corporation.

000-2086 r4

CONVENTIONS USED IN THIS DOCUMENT

This document includes safety precautions and other important information presented in the following format:

NOTE: This provides helpful supplementary information.

IMPORTANT: This provides important supplementary information and instructions to avoid damaging hardware or a potential hazard.

⚠ **CAUTION**: This indicates a potentially hazardous situation that could result in minor or moderate injury if not avoided. This may also be used to alert against unsafe practices.

⚠ **WARNING**: This indicates a potentially hazardous situation that could result in severe injury or death if not avoided.

⚠ **DANGER**: This indicates an imminently hazardous situation that will result in death if not avoided.

OPERATING PRECAUTIONS

Franklin Electric equipment is designed to be installed in areas where volatile liquids such as gasoline and diesel fuel are present. Working in such a hazardous environment presents a risk of severe injury or death if you do not follow standard industry practices and the instructions in this document. Before working with or installing the equipment covered in this document, or any related equipment, read this entire document, particularly the following precautions:

IMPORTANT: To help prevent spillage from an underground storage tank, make sure the delivery equipment is well-maintained, that there is a proper connection, and that the fill adaptor is tight. Delivery personnel should inspect delivery elbows and hoses for damage and missing parts.

⚠ **CAUTION**: Use only original Franklin Electric parts. Substituting non-Franklin Electric parts could cause the device to fail, which could create a hazardous condition and/or harm the environment.

⚠ **WARNING**: Follow all codes that govern the installation and service of this product and the entire system. Always lock out and tag electrical circuit breakers while installing or servicing this equipment and related equipment. A potentially lethal electrical shock hazard and the possibility of an explosion or fire from a spark can result if the electrical circuit breakers are accidentally turned on while installing or servicing this product. Refer to this document (and documentation for related equipment) for complete installation and safety information.

⚠ **WARNING**: Before entering a containment sump, check for the presence of hydrocarbon vapors. Inhaling these vapors may cause dizziness/unconsciousness, and if ignited, can explode causing serious injury or death. Containment sumps are designed to trap hazardous liquid spills and prevent environmental contamination, so they can accumulate dangerous amounts of hydrocarbon vapors. Check the atmosphere in the sump regularly while work is in process. If vapors reach unsafe levels, exit the sump and ventilate it with fresh air before resuming work. Always have another person standing by for assistance.

⚠ **WARNING**: Follow all federal, state, and local laws governing the installation of this product and its associated systems. When no other regulations apply, follow NFPA codes 30, 30A, and 70 from the National Fire Protection Association. Failure to follow these codes could result in severe injury, death, serious property damage, and/or environmental contamination.

⚠ **WARNING**: Always secure the work area from moving vehicles. The equipment in this document is usually mounted underground, so reduced visibility puts service personnel working on it in danger from moving vehicles that enter the work area. To help prevent this safety hazard, secure the area by using a service truck or other vehicle to block access to the work area.

⚠ **DANGER**: Inspect the installation location for potential ignition sources such as flames, sparks, radio waves, ionizing radiation, and ultrasound sonic waves. If any potential ignition sources are identified, implement proper safety measures.

Contents

1 Introduction 1
1.1 Regulatory Compliance 1
1.2 Documentation 1
1.2.1 Symbol Legend 2
2 Safety/Security 3
2.1 General Safety Information 3
2.2 Documentation Availability 3
2.3 Installation & Service Access 3
2.4 Hazard Assessment 4
2.5 Required Personal Protective Equipment (PPEs) 4
2.6 Cyber Security 4
2.7 Qualifications and Responsibilities 5
2.7.1 Qualifications for Installation Certification 5
2.7.2 Qualifications for Programming Certification 5
2.7.3 Qualifications for Product Compliance Testing 6
2.7.4 Responsibilities 6
3 Pre-Installation Overview 7
3.1 Upon Receipt of Item(s) 7
3.1.1 Materials Included 7
3.2 Technical Overview 7
3.2.1 Communication Methods 8
3.2.2 Specifications 8
3.2.3 Dimensions 8
3.2.4 Required Tools & Materials 9
3.2.4.1 Approved Field Wiring for Sensors 9
4 Installation 10
4.1 Pre-Install Sensor Testing 11
4.2 Tank Interstitial Applications 12
4.2.1 Fiberglass Tank – Initial Sensor Install 12
4.2.2 Steel Tank – Initial Sensor Install 13
4.2.3 Fiberglass & Steel Tank – Completing the Sensor Install 14
4.3 Intrinsically Safe Wiring 15
4.4 Electrical Connections at the ATG Console 16
4.4.1 UDP & Probe Module or EVO™ ONE & EVO™ 200/400 UDP Input 16
4.4.2 Multiplexing Sensor Hub™ 17

4.4.3 3-Wire Sensor Module 18
5 Maintenance 19
5.1 Sensor Testing 19
5.2 Sensor Record 19
6 Appendix 20
6.1 Related Support Information 20
6.1.1 Related Documents 20
6.2 Certifications & Approvals 20
6.3 Control Drawings 21
6.4 Glossary 23

1 Introduction

The Electro-Optic Interstitial Sensor (EIS) uses electro-optical technology (LED and prism) to detect the presence of liquid. The Discriminating Interstitial Sensor (DIS), also with electro-optical technology, utilizes conductive sensing pins to determine whether a liquid is water or fuel.

- EIS sensors are used in locations where the presence of liquid indicates a leak.
- DIS sensors are used where liquid detection and identification of water or fuel is required.

1.1 Regulatory Compliance

IMPORTANT INFORMATION - FOLLOW ALL INSTRUCTIONS

- The products contained within in this guide shall only be assembled and installed by a qualified person (see §2.7). The *use of non-qualified personnel, or any deviations from these recommended procedures, could result in damage or malfunction.*
- For Required Tools & Materials, see §3.2.4
- For Maintenance, Inspection, & Testing see §5
- For Operating Parameters, see §6.3
- For Specific Conditions of Use, see §6.3
- For Certifications & Approvals, see §6.3

1.2 Documentation

- Instructions of this document are in English. All other language versions are translations of this original document.
- Information given in this document is provided as a guide only.
    - The Illustrations depict a typical setup and are for instruction and description purposes only.
    - It is the installer's responsibility to ensure that correct and safe procedures are followed at the worksite.
- This document and related documents are available from Franklin Electric at www.franklin-energy.com.

1.2.1 Symbol Legend

Wear Protective Headwear

Wear Eye Protection

Wear Protective Clothing

Wear High-Visibility Clothing

Wear Protective Gloves

Wear Safety Footwear

Refer to instruction guide

Ventilate Before & During Entering

Ensure Continuous Ventilation

Connect an earth terminal to the ground

Lockout/Tagout Electrical Equipment

Disconnect main plug from electrical outlet

Disconnect before carrying out maintenance or repair

General Warning

Warning: Electricity

Warning: Industrial vehicles

Warning: Flammable Material

No open flame; Fire, open ignition source and smoking prohibited

2 Safety/Security

2.1 General Safety Information

- Procedures in this document are only to be performed by people qualified and certified to perform them (see §2.3 and §2.7).
- Personnel working on or with energized equipment must be authorized by relevant regulatory bodies to carry out such work and must have the appropriate training. Check with your employer and relevant regulatory body's rules for working with energized equipment.
- Obey all local laws, rules, regulations, and instructions in this document. In case of inconsistency or contradiction between information contained in this document and any laws, rules and regulations, obey the stricter of the two.
- Keep unqualified personnel at a safe distance during installation.
- If it is necessary to remove safety/security devices, immediately reinstall the safety/security devices after completing the work.

2.2 Documentation Availability

Upon installation completion, this document shall be transferred by the qualified person or manufacturer to the owner, operator, or other responsible person of the facility where the installation is done.

- Save this guide for future use, and make sure to provide it to anyone who services this equipment (see §2.3).
- Always reference the guide(s) that came with the equipment for a complete list of installation and safety precautions. The most current Franklin Electric documentation can be found online at www.franklin-energy.com.

2.3 Installation & Service Access

IMPORTANT: If the product is serviced by someone who is not a Franklin Electric certified installer, service (technician), or programmer, your warranty will be void.

Certified Installer, Service, or Programmer

- Only Franklin Electric certified installers, service (technician) and programmers are allowed to access both the console interface and areas internal to the console. *See §2.7 for information on certification training.*
- This product shall be:
  - Installed by a certified installer (see §2.7.1).
  - Serviced by a certified service technician (see §2.7.1).
  - Programmed by a certified programmer (see §2.7.2).

Site Owner or Operator

The site owner or operator of the console is only allowed to access the user interface. Access to areas internal to the console is prohibited.

2.4 Hazard Assessment

Prior to beginning work and prior to recommencing work after leaving and returning to the worksite, *a worksite pre-job hazard assessment* ***must be performed*** *to identify safety and environmental needs.* At a minimum, this hazard assessment shall:

- Identify possible hazards and risks.
- Identify the safety needs of the job.
- Identify the correct procedures, practices and equipment.
- Eliminate unsafe conditions and actions from the worksite.
- Identify the need for personal protective equipment.
- Inspect equipment before use.
- Confirm sheaths of all cables are secured and undamaged.
- Confirm plugs and connectors are properly connected and serviceable.
- Perform ongoing risk assessment during the project

2.5 Required Personal Protective Equipment (PPEs)

These PPEs are required during all phases of installation.

Wear Protective Clothing

Wear Eye Protection

Wear High-Visibility Clothing

Wear Protective Gloves

Wear Protective Headwear

Wear Safety Footwear

2.6 Cyber Security

This product is designed to be connected to and to communicate information and data via a network interface. It is solely the owner's responsibility to provide and continuously ensure a secure connection between the product and the Owner's network or any other network (as the case may be).

The Owner shall establish and maintain appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of anti-virus programs, etc.) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information. *The Owner shall also ensure that the device and/or any connecting devices have the latest firmware version available to ensure device security features are up to date.*

The manufacturer, Franklin Electric, and its affiliates are not liable for damages and/or losses related to such security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information.

2.7 Qualifications and Responsibilities

Completion of this course is required *before certification test access will be granted for any other course (online or live):*

- Fuel System Installation Safety

2.7.1 Qualifications for Installation Certification

To be considered "qualified" to install this product, individuals shall pass training from the following certification training courses (online or live):

FE Online or Live Certification Training

SCAN / CLICK

Controller Specialist

- EVO™ 600/6000 Installation & Wiring

  OR

- EVO™ 550/5000 Installation & Wiring

  OR

- EVO™ 200/400 Installation & Wiring

  AND

- LS500 Electronic Line Leak Detection*

  NOTE: *Only required if installing/programming the FMP-LS500 or FMP-LS500-U system.

2.7.2 Qualifications for Programming Certification

To be considered "qualified" to program this product, individuals shall pass training from the following certification training courses (online or live):

Site Startup Specialist

- EVO™ 600/6000 Programming

  OR

- EVO™ 550/5000 Programming

  OR

- EVO™ 200/400 Programming

  AND

- LS500 Electronic Line Leak Detection*

  NOTE: *Only required if installing/programming the FMP-LS500 or FMP-LS500-U system.

2.7.3 Qualifications for Product Compliance Testing

To be considered "qualified" to test this product for compliance, individuals shall pass training from the following certification training course (online or live):

Additional Training

- Compliance Testing

2.7.4 Responsibilities

The following responsibilities are for guidance only and are not limited to those listed here. It is the responsibility of:

- The owner of the install site(s) to ensure that all EIS and DIS sensor installers shall be certified (see §2.7.1), follow all local laws, rules and regulations, along with the instructions and the specifications listed in this document.
- The certified user(s) to know the EIS and DIS sensors and their safe use.
- The certified user(s) to have and maintain a valid Franklin Electric training certification (see §2.7.1).

3 Pre-Installation Overview

3.1 Upon Receipt of Item(s)

- Verify all items are in accordance with the order.
- Check all items for damage.
- If any item shows damage or is not in accordance with the order, inform Franklin Electric *immediately*.
- Remove the packaging material.
    - Follow all local laws, rules and regulations regarding disposal of discarded parts, packaging material or items and any subsequent components.

3.1.1 Materials Included

The following items are include with each sensor ordered:

- Model ID tags.
- No-strip electrical wire connectors.
- 25.0 ft. (7.62 m) attached cable.
- Cord grip fittings (for connection to a weatherproof electrical junction box)

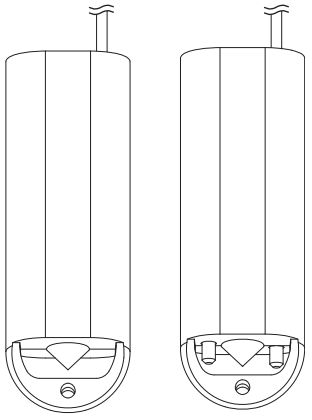
3.2 Technical Overview

Both EIS* and DIS** sensors detect the presence of liquids in the normally dry interstitial (annular) areas of double-wall fuel storage tanks (a Class 1, Division 1, Group D Hazardous Area).

- The FMP-EIS interstitial sensor detects the presence of liquid in interstitials.
- The FMP-DIS interstitial sensor detects the presence of liquid in interstitials and is capable of discriminating between hydrocarbon and non-hydrocarbon liquids.

NOTE:

- *When EIS/FMP-EIS is stated in this document, it is referencing the FMP-EIS and FMP-EIS-U unless otherwise noted.
- **When DIS/FMP-DIS is stated in this document, it is referencing the FMP-EIS and FMP-EIS-U unless otherwise noted



FMP-EIS or FMP-EIS-U | FMP-DIS or FMP-DIS-U

3.2.1 Communication Methods

EIS and DIS sensors are offered in two communication options:

Sensor	Communication Method	Compatible ATGs	Compatible Modules
FMP-EIS-U	Universal Device Protocol *(**UDP** new)*	» EVO™ ONE » EVO™ 200/400 » EVO™ 600/6000	» UDP Module » Probe Module » Multiplexing Sensor Hub™
FMP-DIS-U			
FMP-EIS*	BRITESENSOR® Protocol *(original)*	» EVO™ 600/6000 » EVO™ 550/5000 » T5 Series » T1 Series	3-Wire Sensor Module
FMP-DIS*			

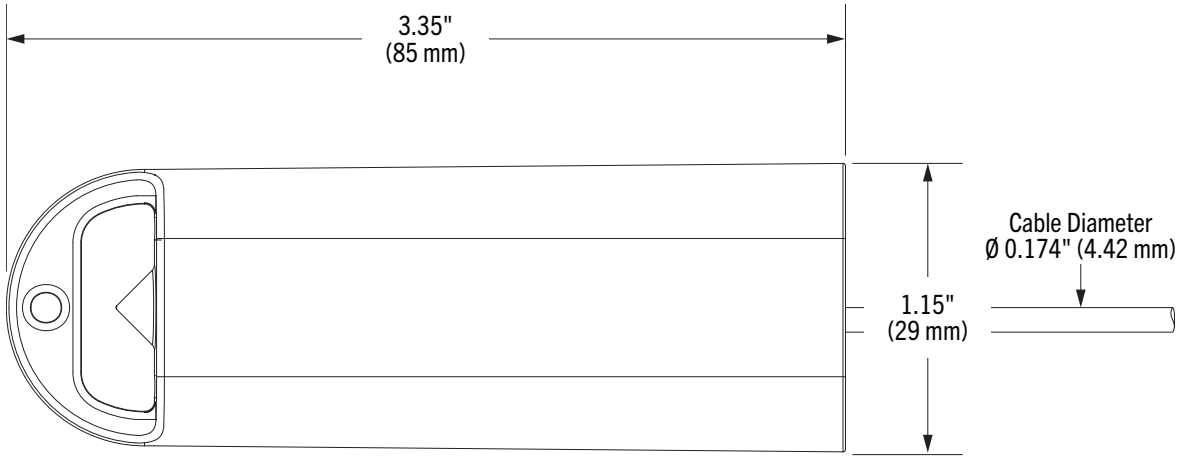
NOTE: *FMP-EIS and FMP-DIS stated in this table refer only to the FMP-EIS and FMP-DIS models.

3.2.2 Specifications

Feature	Description
Dimensions	See §3.2.3
Operating Temperature	-40 to 140° F (-40 to 60° C)

3.2.3 Dimensions

NOTE: Dimensions shown are for all sensor EIS and DIS sensor models.



3.2.4 Required Tools & Materials

⚠ **WARNING**: Ensure that all tools used are properly insulated and rated for the task being performed to prevent the risk of electrical damage or harm.

Item	P/N	Description	
Splice Connectors	TSP-KW30	3M™ Scotchlok™ 314 splice connectors (provided) or other connectors approved by UL for wire size and location must be used to connect the field wiring to the device wiring within the junction box	
Conduit	–	CableTight™ or other code-approved conduit must be used to connect the weatherproof junction box to the ¾" or 1" conduit knockouts on the ATG.	
EYS Seal	–	EYS seal fittings must be installed in conduit between the weatherproof junction box and the ATG.	
Junction Box (Weatherproof)	–	Weatherproof junction boxes, along with gaskets, covers, grounding screws†, and required reducing bushings, must be used to connect the intrinsically safe device wiring to the field wiring.	
Pipe Thread Sealant	–	UL-classified petro-resistant.	
Riser Cap*	TSP-KI2	For 2" riser pipes.	Includes a pre-installed ½" NPT compression gland (cord grip) fitting. **Needed for installation in UST interstitial areas (see § 4.2).*
Riser Pipe	–	2" diameter, threaded at one end (NPT-14) with all rough edges removed/deburred from the inner edges. The OD of a 2" pipe is 2.38". The thread is 11-1/2.	
2" Pipe Wrench	–	–	
Slip-Joint Pliers	–	–	

IMPORTANT: †All junction box ground screws shall be connected to earth ground.

3.2.4.1 Approved Field Wiring for Sensors

IMPORTANT: Field wiring, connected from the ATG to the junction box of intrinsically safe devices, *must be approved for use by Franklin Electric.*

Cable Type Equipment	Description
Belden® 89182	2-Wire, twisted pair, 1500' (457 m) maximum cable length.
Belden® 8760	2-Wire, twisted pair, 1000' (304 m) maximum cable length.
Belden® 87761 and 88761	2-Wire, twisted pair, 400' (121 m) maximum cable length.
Belden® 87760 and 88760	2-Wire, twisted pair, 260' (79 m) maximum cable length.

4 Installation

⚠ WARNING:

- Ensure power to the electrical circuit breakers is *turned off, tagged, and locked-out at the power panel* ***before performing any installation or service work to this and any related equipment.***
- The installation process shall be completed in accordance with the National Electrical Code, ANSI/NFPA 70, NEC, and any other applicable national or local codes. *Follow all necessary safety steps as required by federal, state and local regulations in relation to working with electrical equipment.*

⚠ CAUTION:

- Do not run intrinsically safe (IS) wiring and non-intrinsically safe (non-IS) wiring in the same conduit.
- Install field wiring, junction boxes, CableTight™ (or other code-approved conduit), and EYS seal fittings per the National Electrical Code (NEC) and all other codes governing the installation of these products.
- Ensure all conduits, conduit fittings, junction box fittings and hole plug threads are *sealed with pipe thread sealant (UL-classified petro-resistant) and produce a weather proof seal.*

IMPORTANT:

- A weatherproof, electrical junction box shall be installed inside each accessway, *high on the accessway wall to prevent it from being submerged during heavy rains.*
- Always use safe electrostatic discharge practices when connecting/removing power and any work associated with making electrical connections to the console and related connected components.
- Sensitive instrument. When installing this sensor, carefully lower it into position and *do not drop* it into position.
- Test the sensor before installing it (see §4.1).

NOTE:

- Conduit may enter the accessway from either the bottom or the side.
- Fill the bottom of the accessway with crushed stone to facilitate drainage *when the sensor is installed in the interstitial space of a steel tank.* ***Do not cover the top of the riser cap with fill material–it must remain accessible for sensor installation and service.***
- Only one knockout is needed when, inside the building, there is a junction box that can be used as a pull box to combine multiple sensor cables.
- Plan conduit routing. Dig trenches as necessary to install conduit from each junction box to the Intrinsically Safe (IS) knockouts at the ATG console.
- When the installation is complete, ensure this guide is left with the service station owner or operator.

4.1 Pre-Install Sensor Testing

IMPORTANT: Test the sensor before installing it.

NOTE: See also §5.1 for post-install testing.

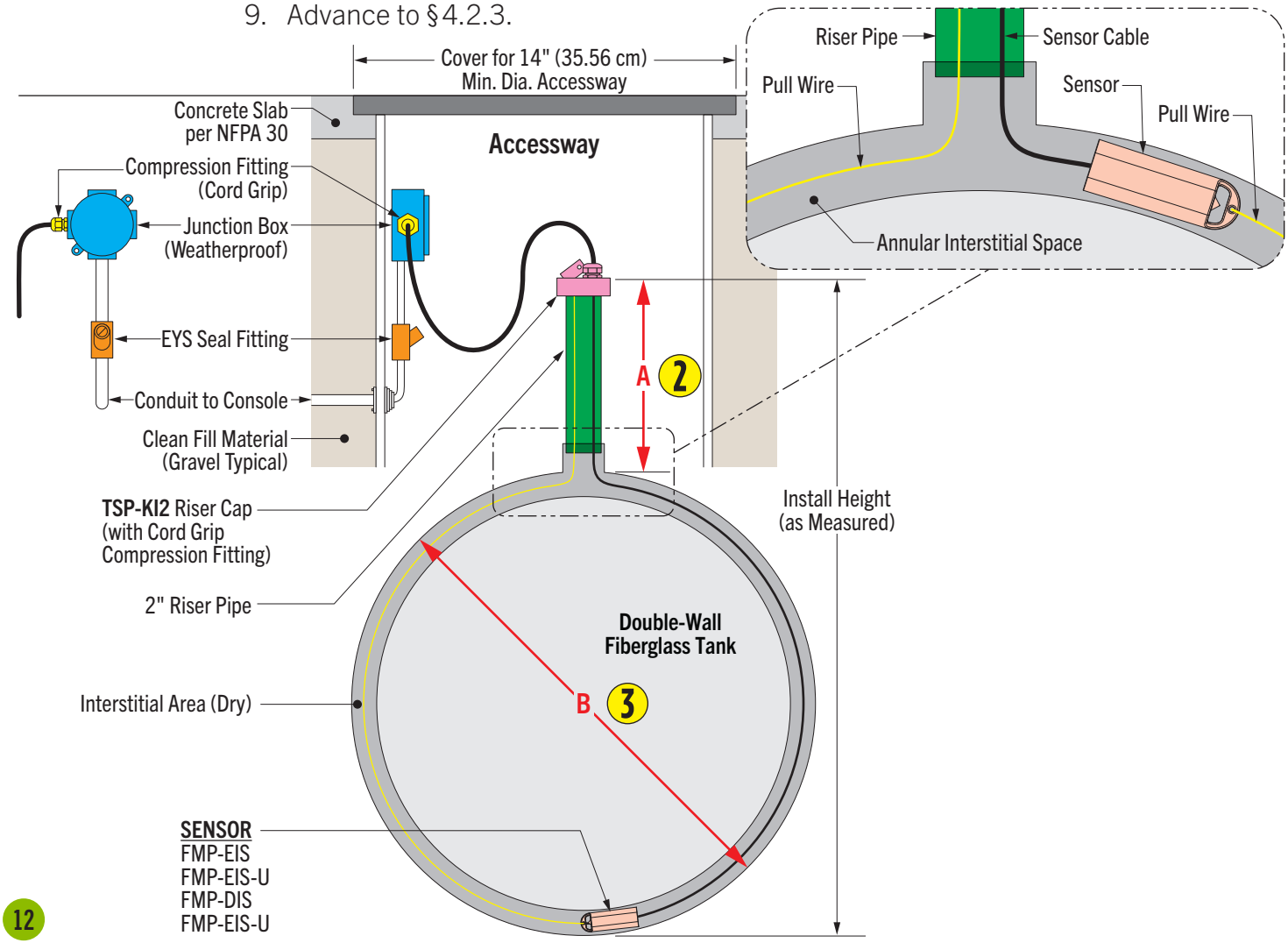
1. Wire the sensor directly to the EVO™.
    a. Connect the BLACK wire to the "–" (BLK) terminal.
    b. Connect the RED wire to the "+" (RED) terminal.
    c. Connect the WHITE wire to the NEUTRAL (WHITE) terminal (if applicable).
1. Place the sensor in a containment that limits exposure to light.
2. Submerge the sensor in 3–6 in. (76–152 mm) of clean water
3. Verify an alarm posts for the sensor:
    - EIS Sensor – An *Active Alarm* is generated.
    - DIS Sensor – A *Water Present Alarm* is generated.

4.2 Tank Interstitial Applications

4.2.1 Fiberglass Tank – Initial Sensor Install

1. Perform a facility/worksite approved Lockout/Tagout procedure for the circuit breakers connected to the ATG console (de-energize).
2. Measure the height of the riser (**A**).

   NOTE: Measure from the top opening to the tank and record this length.
3. Measure the outside diameter of the tank (**B**).
4. *Calculate the Sensor Cable Mark position using this formula:*
   Riser Length (**A**) + Tank Diameter (**B**) multiplied by 1.5 = ***Sensor Cable Mark**** *(this is the total length the cable should be).*
5. *Mark the sensor cable at the length calculated in Step 4.
6. Pull the sensor cable through the FMP-KI2 riser cap cord grip until the Sensor Cable Mark is 12" (30.5 cm) above the cord grip.
7. Securely attach one end of the pull wire to the sensor pull cap, *and pull the wire until the sensor cable moves just above the cord grip.*
8. Leave the pull wire in place, loop the wire around the sensor cable, and then tighten the cord grip.
9. Advance to § 4.2.3.

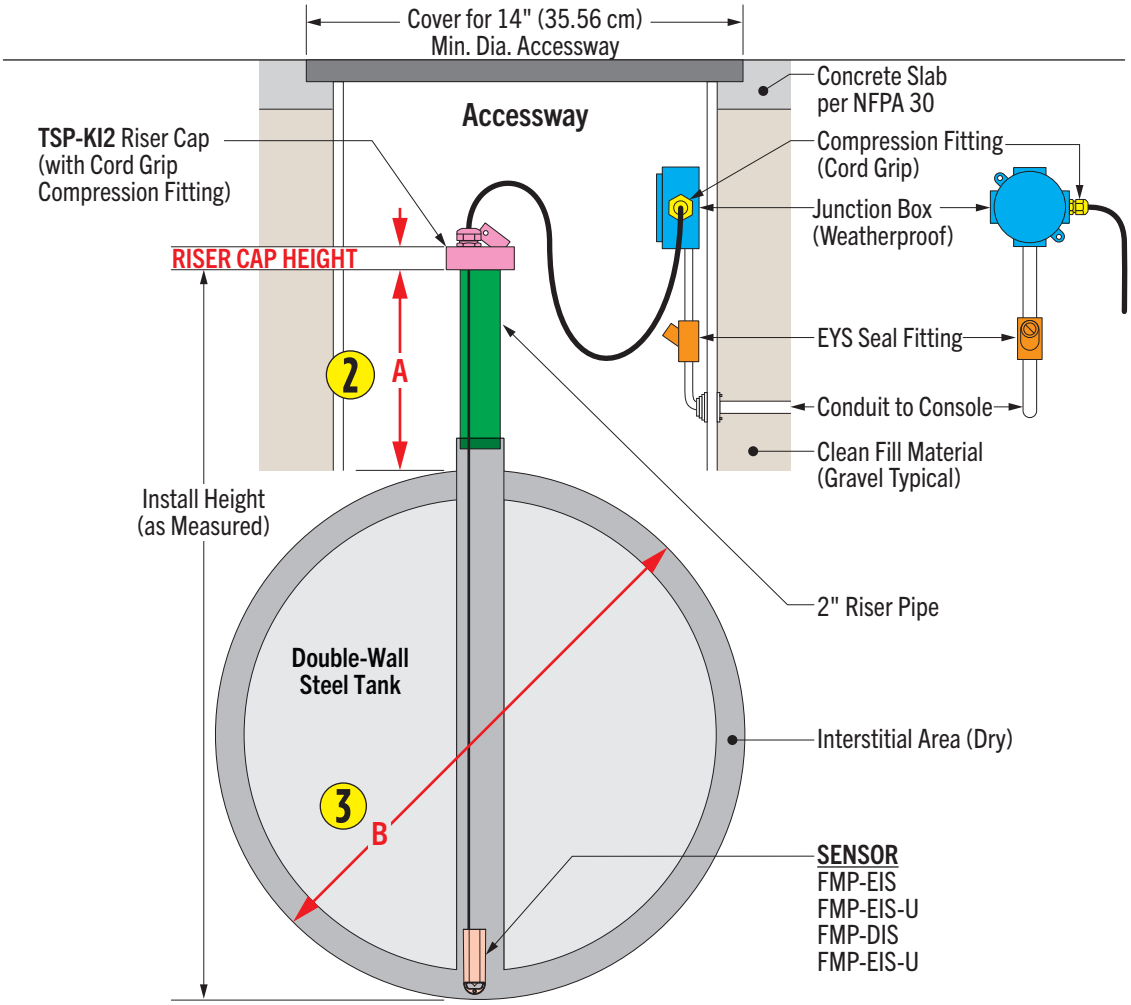


4.2.2 Steel Tank – Initial Sensor Install

IMPORTANT: When working with steel double-wall tanks, codes may require the installation of a nonconductive isolation-bushing between the tank and riser pipe.

1. Perform a facility/worksite approved Lockout/Tagout procedure for the circuit breakers connected to the ATG console (de-energize).
2. Measure the height of the riser (A).

   NOTE: Measure from the top opening to the tank and record this length.
3. Measure the outside diameter of the tank (B).
4. *Calculate the Sensor Cable Mark position using this formula:*
   Riser Length (A) + Tank Diameter (B) + Riser Cap Height (1.5") = *Sensor Cable Mark**
5. *Mark the sensor cable at the length calculated in Step 4.
6. Pull the sensor cable through the FMP-KI2 riser cap cord grip until the Sensor Cable Mark shows at the top of the cord grip.
7. Tighten the cord grip and lower the sensor into the interstitial area of the tank.
8. Slowly lower the sensor down the shaft until the Sensor Cable Mark is near or at the opening of the interstitial shaft. *The marked point should stop at the top of the riser entrance* ***confirming the sensor is at the bottom of the interstitial space.***
9. Advance to §4.2.3.



4.2.3 Fiberglass & Steel Tank – Completing the Sensor Install

1. Install the conduit, EYS fittings, and the weatherproof junction box.
2. Install the sensor cable through the supplied compression fitting.
3. Install the compression fitting at the waterproof junction box, and tighten the cord grip fitting.
4. Trim the wires and cables at the junction box to 6–8" (15–20 cm), or service-loop, and splice the wire according to the diagram for the appropriate connection (see §4.4).
5. Connect the wires for the appropriate connections at the ATG console as shown in §4.4.
6. Reverse the Lockout/Tagout procedure performed in Step 1 for the ATG console (re-energize).
7. Test the sensor, and verify the sensor passes testing (see §5.1).
8. Seal junction boxes and EYS fittings.
9. Re-install the accessway cover.
10. Record the location where the sensor was installed in the "Sensor Location Record" (see §5.2).

4.3 Intrinsically Safe Wiring

IMPORTANT: See § 4 precautions and notes.

⚠ WARNING:

- Always lock out and tag electrical circuit breakers while installing or servicing this equipment and any related equipment. A potentially lethal electrical shock hazard and the possibility of an explosion or fire from a spark can result if the electrical circuit breakers are accidentally turned on during installation or servicing.
- Only one sensor may be connected per channel **unless otherwise specified**. *Connecting multiple sensors to a single channel in the console may cause damage to the unit and may create an explosion hazard, and will result in improper system operation.*

⚠ CAUTION: Ensure the sensor cable is wired correctly. *Reversing the plus and minus terminals may damage the Intrinsically Safe circuits.*

IMPORTANT:

- Intrinsically safe wiring cannot be run in the same conduit as non-intrinsically safe wiring. Conduit knockouts for IS and non-IS module wiring are shown in the illustration below. IS modules can be identified by their blue faceplates and should always be installed to the right of the moveable isolation barrier. IS conduits require a ground to each box.
- If local codes do not require the use of conduit, cable glands must be used at all enclosure knock-outs. Gaps larger than 0.06 in. (1.5 mm) will violate safety approvals. Be certain to provide adequate IS and non-IS wire separation.
- Do not use wire nuts to make sensor connections. *Use the no-strip electrical connectors supplied in the installation kit (or equivalent only) to make all connections.* ***Failure to use the appropriate crimp-splice connectors will result in faulty operation and will void the warranty.***

NOTE:

- Always start at the first available channel, *do not skip channels.*
  - For example, if channels one through three are already being used for another application, *channel four must be used.*
- Be sure to connect the wires to the appropriate polarity (+/–). *If the transducer is wired inversely, it will not function.* Wires that are cut back *shall be taped off* so they are isolated from moisture and will not cause any interference.
- Avoid wiring errors by using consistent color codes when making sensor cable connections.
  - Always use the RED (or other NON-BLACK color) wire for the + **signal**.
  - Always use the BLACK wire for the – **signal ground**.
- When making console cable connections:
  - Remove 1½" (38 mm) of jacket from each cable.
  - Strip 3⁄16" (5 mm) of insulation from the end of each conductor

4.4 Electrical Connections at the ATG Console

4.4.1 UDP & Probe Module or EVO™ ONE & EVO™ 200/400 UDP Input

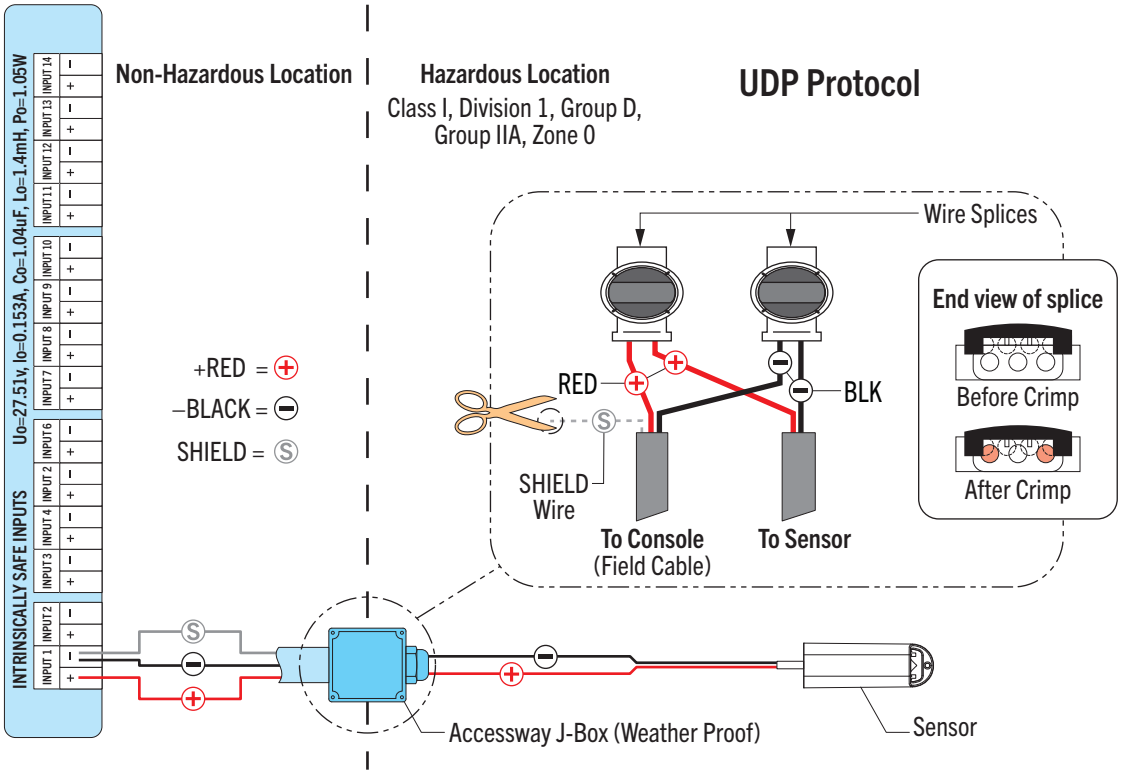
NOTE: The FMP-DIS-U and FMP-EIS-U are compatible with EVO™ ONE, EVO™ 200/400 and EVO™ 600/6000 Series consoles.

Sensor Connections – Junction Box

1. Splice the sensor and field cables together *with approved splice connectors only (see § 3.2.4),* at the weatherproof junction box (see below).
   a. BLACK wires from sensor and field cable are spliced together.
   b. RED wires from sensor and field cable are spliced together.
   c. Cut back the SHIELD wire of the field cable and tape off.

Sensor Connections – Console

1. Wire the two wires of the cable to the UDP input channel as described below:
   a. Connect the BLACK and SHIELD wires to the minus – (BLK) terminal.
   b. Connect the RED wire to the plus + (RED) terminal.

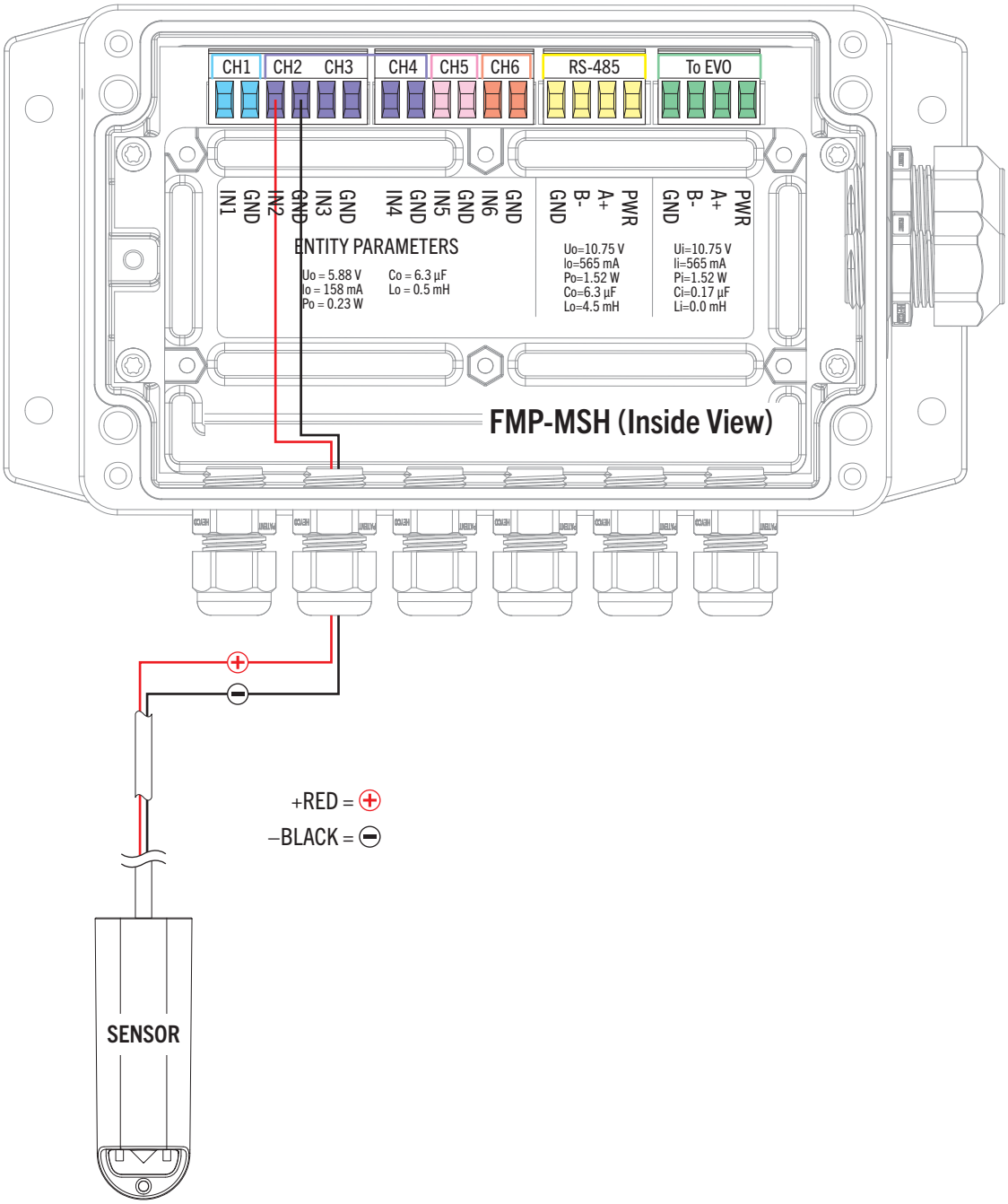


4.4.2 Multiplexing Sensor Hub™

NOTE: The FMP-DIS-U and FMP-EIS-U sensors are compatible with the Mutliplexing Sensor Hub™.

Sensor Connections - MSH

1. Connect the BLACK wire to the GND terminal.
2. Connect the RED wire to the plus +(IN) terminal.



4.4.3 3-Wire Sensor Module

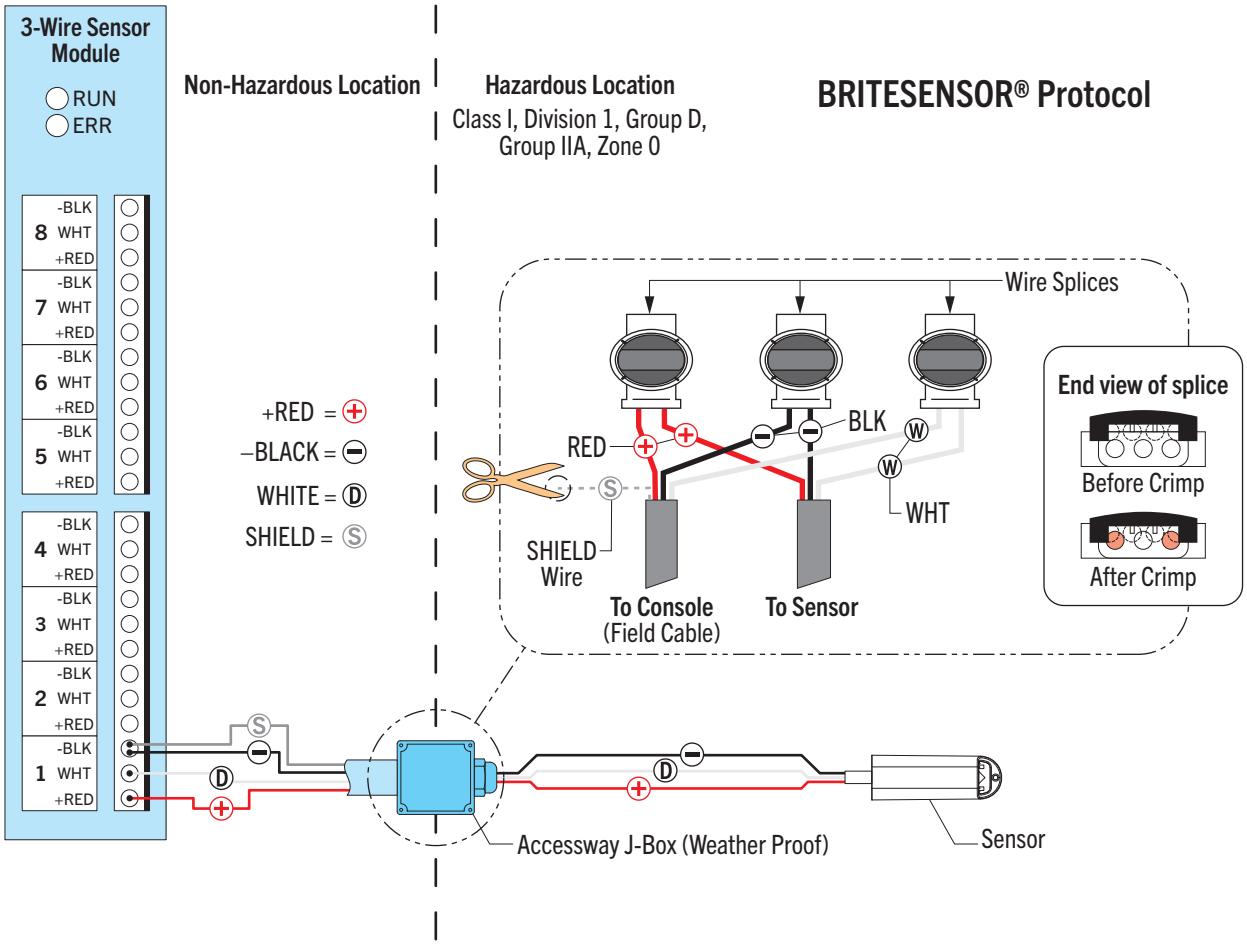
NOTE: The FMP-DIS and FMP-EIS are compatible with T1 Series, T5 Series, EVO™ 550/5000 Series, and EVO™ 600/6000 Series consoles.

Sensor Connections – Junction Box

1. Splice the sensor and field cables together *with approved splice connectors only (see §3.2.4),* at the weatherproof junction box (see below).
   a. BLACK wires from sensor and field cable are spliced together.
   b. RED wires from sensor and field cable are spliced together.
   c. WHITE wires from sensor and field cable are spliced together.
   d. Cut back the SHIELD wire of the field cable and tape off.

Sensor Connections – Console

1. Wire the three wires of the cable to the input channel as described below:
   a. Connect the BLACK and SHIELD wires to the minus – (BLK) terminal.
   b. Connect the RED wire to the plus + (RED) terminal.
   c. Connect the WHITE wire to the (WHITE) terminal.



5 Maintenance

5.1 Sensor Testing

Test the sensor for proper operation on a yearly basis, or more frequently according to local code. When performing service and operation tests, inspect the sensor and clean it if it is soiled.

NOTE: See §4.1 for pre-installation testing.

1. Place the sensor in a containment that limits exposure to light.
2. Submerge the sensor in 3–6 in. (76–152 mm) of clean water.
3. Verify an alarm posts for the sensor:
    - EIS Sensor – An *Active Alarm* is generated.
    - DIS Sensor – A *Water Present Alarm* is generated.

5.2 Sensor Record

Sensor	Channel Number	Notes

6 Appendix

6.1 Related Support Information

6.1.1 Related Documents

Documentation can be found online at www.franklin-energy.com.

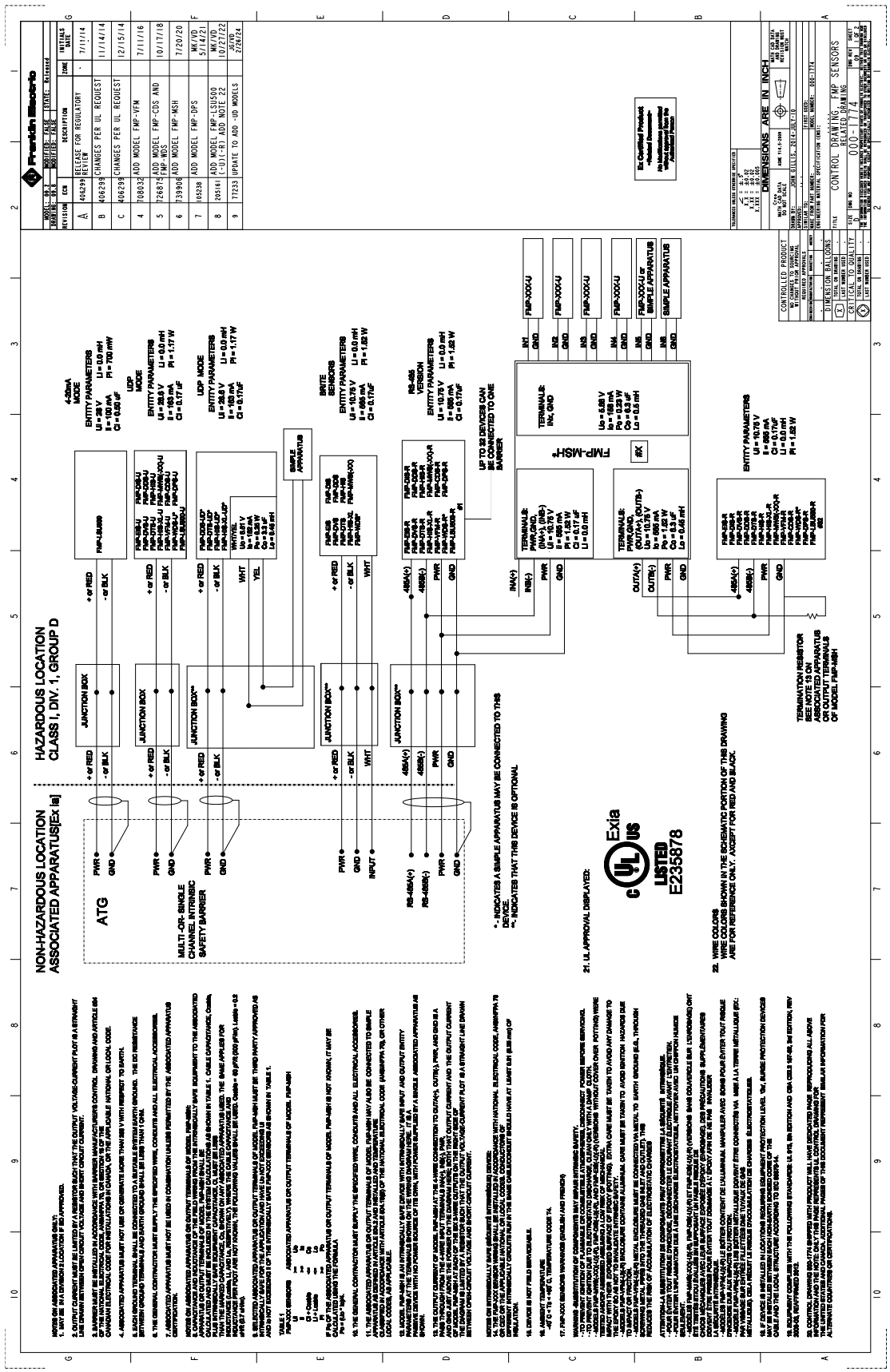
Part Number	Description
000-2142	Fuel Management System Programming Guide
000-2150	Fuel Management System Installation Guide
000-2173	EVO™ 550 Programming Guide
000-2170	EVO™ 550 Installation Guide
000-2153	Colibri® Automatic Tank Gauge Installation Guide
000-2155	Colibri® Set-Up and Operation Guide
228180015	EVO™ 200 and 400 Series Console Programming Guide
228180033	EVO™ 600 and 6000 Series Console Install Guide
228180061	EVO™ 600 and 6000 Series Console Programming Guide
10000023230	EVO™ ONE, EVO™ LLD, EVO™ 200/400 Install Guide

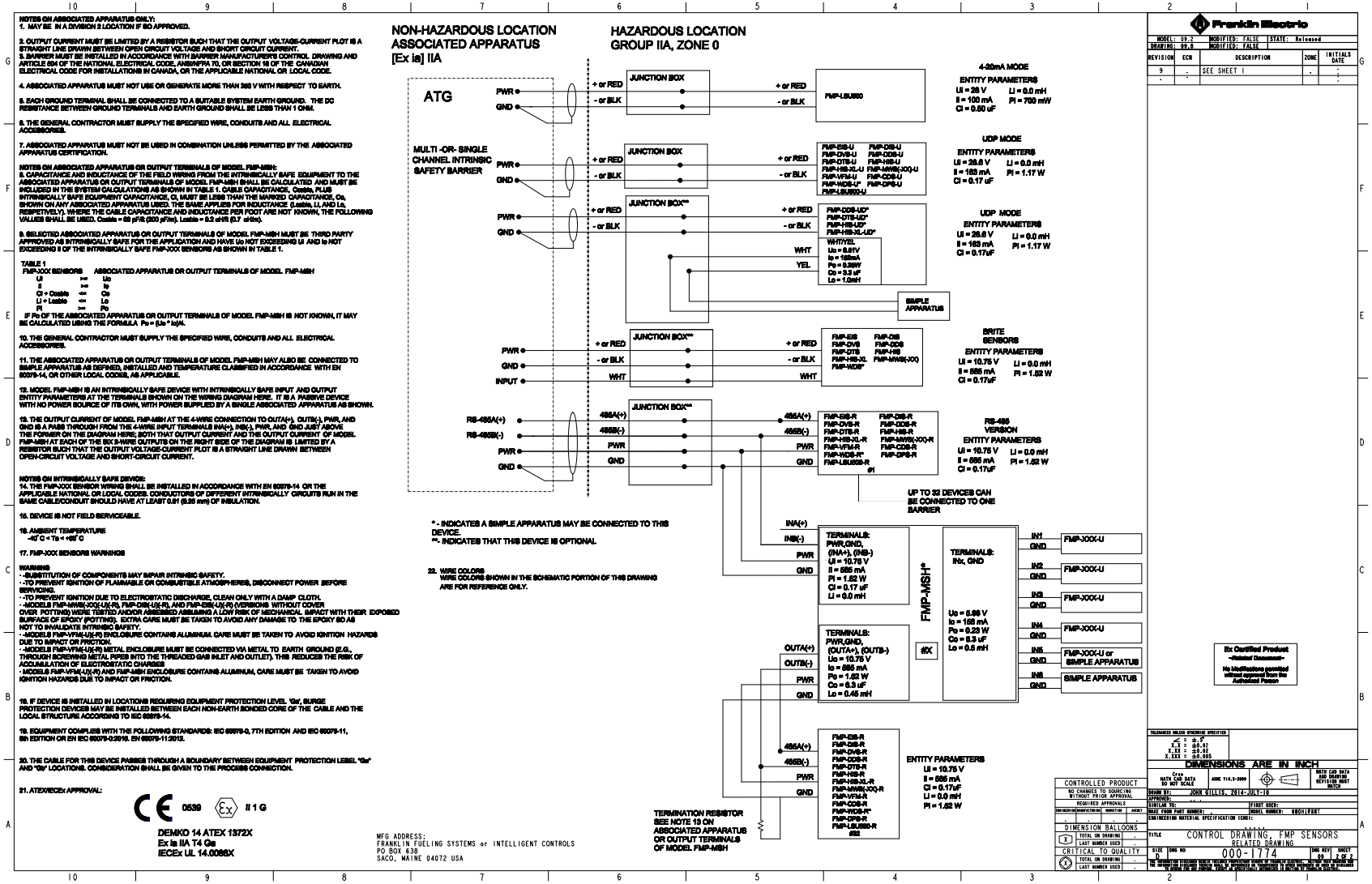
6.2 Certifications & Approvals

NOTE: See §6.3 for "Specific Conditions Of Use".

Agency	Certificate	Standards	Issue Date
UL/ULC	**E235878** UL 913 CAN/CSA C22.2	UL 913 CAN/CSA C22.2	December 24, 2024
ATEX	**DEMKO 14 ATEX 1372X**	EN IEC 60079-0:2018 EN 60079-11:2012	December 29, 2014
IECEx	**IECEx UL 14.0086X**	IEC 60079-0:2011 IEC 60079-11:2011	December 29, 2014

6.3 Control Drawings




NOTES ON ASSOCIATED APPARATUS ONLY:
1. MAY BE IN A DIVISION 2 LOCATION IF SO APPROVED.
2. OUTPUT CURRENT MUST BE LIMITED BY A RESISTOR SUCH THAT THE OUTPUT VOLTAGE-CURRENT PLOT IS A STRAIGHT LINE DRAWN BETWEEN OPEN CIRCUIT VOLTAGE AND SHORT CIRCUIT CURRENT.
3. BARRIER MUST BE INSTALLED IN ACCORDANCE WITH BARRIER MANUFACTURER'S CONTROL DRAWING AND ARTICLE 504 OF THE NATIONAL ELECTRICAL CODE, ANSI/NFPA 70, OR SECTION 18 OF THE CANADIAN ELECTRICAL CODE FOR INSTALLATIONS IN CANADA, OR THE APPLICABLE NATIONAL OR LOCAL CODE.
4. ASSOCIATED APPARATUS MUST NOT USE OR GENERATE MORE THAN 360 V WITH RESPECT TO EARTH.
5. EACH GROUND TERMINAL SHALL BE CONNECTED TO A SUITABLE SYSTEM EARTH GROUND. THE DC RESISTANCE BETWEEN GROUND TERMINALS AND EARTH GROUND SHALL BE LESS THAN 1 OHM.
6. THE GENERAL CONTRACTOR MUST SUPPLY THE SPECIFIED WIRE, CONDUITS AND ALL ELECTRICAL ACCESSORIES.
7. ASSOCIATED APPARATUS MUST NOT BE USED IN COMBINATION UNLESS PERMITTED BY THE ASSOCIATED APPARATUS CERTIFICATION.
NOTES ON ASSOCIATED APPARATUS OR OUTPUT TERMINALS OF MODEL FMP-MSH:
8. CAPACITANCE AND INDUCTANCE OF THE FIELD WIRING FROM THE INTRINSICALLY SAFE EQUIPMENT TO THE ASSOCIATED APPARATUS OR OUTPUT TERMINALS OF MODEL FMP-MSH SHALL BE CALCULATED AND MUST BE INCLUDED IN THE SYSTEM CALCULATIONS AS SHOWN IN TABLE 1. CABLE CAPACITANCE, Ccable, PLUS INTRINSICALLY SAFE EQUIPMENT CAPACITANCE, Ci, MUST BE LESS THAN THE MARKED CAPACITANCE, Co, SHOWN ON ANY ASSOCIATED APPARATUS USED. THE SAME APPLIES FOR INDUCTANCE (Lcable, Li, AND Lo, RESPECTIVELY). WHERE THE CABLE CAPACITANCE AND INDUCTANCE PER FOOT ARE NOT KNOWN, THE FOLLOWING VALUES SHALL BE USED. Ccable = 60 pF/ft (200 pF/m). Lcable = 0.2 uH/ft (0.7 uH/m).
9. SELECTED ASSOCIATED APPARATUS OR OUTPUT TERMINALS OF MODEL FMP-MSH MUST BE THIRD PARTY APPROVED AS INTRINSICALLY SAFE FOR THE APPLICATION AND HAVE Uo NOT EXCEEDING Ui AND Io NOT EXCEEDING Ii OF THE INTRINSICALLY SAFE FMP-XXX SENSORS AS SHOWN IN TABLE 1.
TABLE 1
FMP-XXX SENSORS — ASSOCIATED APPARATUS OR OUTPUT TERMINALS OF MODEL FMP-MSH
Ui >= Uo
Ii >= Io
Ci + Ccable <= Co
Li + Lcable <= Lo
Pi >= Po
IF Po OF THE ASSOCIATED APPARATUS OR OUTPUT TERMINALS OF MODEL FMP-MSH IS NOT KNOWN, IT MAY BE CALCULATED USING THE FORMULA Po = (Uo * Io)/4.
10. THE GENERAL CONTRACTOR MUST SUPPLY THE SPECIFIED WIRE, CONDUITS AND ALL ELECTRICAL ACCESSORIES.
11. THE ASSOCIATED APPARATUS OR OUTPUT TERMINALS OF MODEL FMP-MSH MAY ALSO BE CONNECTED TO SIMPLE APPARATUS AS DEFINED, INSTALLED AND TEMPERATURE CLASSIFIED IN ACCORDANCE WITH EN 60079-14, OR OTHER LOCAL CODES, AS APPLICABLE.
12. MODEL FMP-MSH IS AN INTRINSICALLY SAFE DEVICE WITH INTRINSICALLY SAFE INPUT AND OUTPUT ENTITY PARAMETERS AT THE TERMINALS SHOWN ON THE WIRING DIAGRAM HERE. IT IS A PASSIVE DEVICE WITH NO POWER SOURCE OF ITS OWN, WITH POWER SUPPLIED BY A SINGLE ASSOCIATED APPARATUS AS SHOWN.
13. THE OUTPUT CURRENT OF MODEL FMP-MSH AT THE 4-WIRE CONNECTION TO OUTA(+), OUTB(-), PWR, AND GND IS A SUM THROUGH FROM THE 4-WIRE INPUT TERMINALS INA(+), INB(-), PWR, AND GND JUST ABOVE THE FORMER ON THE DIAGRAM HERE; BOTH THAT OUTPUT CURRENT AND THE OUTPUT CURRENT OF MODEL FMP-MSH AT EACH OF THE SIX 5-WIRE OUTPUTS ON THE RIGHT SIDE OF THE DIAGRAM IS LIMITED BY A RESISTOR SUCH THAT THE OUTPUT VOLTAGE-CURRENT PLOT IS A STRAIGHT LINE DRAWN BETWEEN OPEN-CIRCUIT VOLTAGE AND SHORT-CIRCUIT CURRENT.
NOTES ON INTRINSICALLY SAFE DEVICE:
14. THE FMP-XXX SENSOR WIRING SHALL BE INSTALLED IN ACCORDANCE WITH EN 60079-14 OR THE APPLICABLE NATIONAL OR LOCAL CODES. CONDUCTORS OF DIFFERENT INTRINSICALLY CIRCUITS RUN IN THE SAME CABLE/CONDUIT SHOULD HAVE AT LEAST 0.01 (0.25 mm) OF INSULATION.
15. DEVICE IS NOT FIELD SERVICEABLE.
16. AMBIENT TEMPERATURE
-40° C < Ta < +60° C
17. FMP-XXX SENSORS WARNINGS
WARNING
- SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
- TO PREVENT IGNITION OF FLAMMABLE OR COMBUSTIBLE ATMOSPHERES, DISCONNECT POWER BEFORE SERVICING.
- TO PREVENT IGNITION DUE TO ELECTROSTATIC DISCHARGE, CLEAN ONLY WITH A DAMP CLOTH.
- MODELS FMP-MWS(-XXX)-UX(-R), FMP-DIS(-U)(-R), AND FMP-ES8(-U)(-R) (VERSIONS WITHOUT COVER OVER POTTING) WERE TESTED AND/OR ASSESSED ASSUMING A LOW RISK OF MECHANICAL IMPACT WITH THEIR EXPOSED SURFACE OF EPOXY (POTTING). EXTRA CARE MUST BE TAKEN TO AVOID ANY DAMAGE TO THE EPOXY SO AS NOT TO INVALIDATE INTRINSIC SAFETY.
- MODELS FMP-VFM-U(-R) ENCLOSURE CONTAINS ALUMINUM. CARE MUST BE TAKEN TO AVOID IGNITION HAZARDS DUE TO IMPACT OR FRICTION.
- MODELS FMP-VFM-UX(-R) METAL ENCLOSURE MUST BE CONNECTED VIA METAL TO EARTH GROUND (E.G., THROUGH SCREWING METAL PIPES INTO THE THREADED GAS INLET AND OUTLET). THIS REDUCES THE RISK OF ACCUMULATION OF ELECTROSTATIC CHARGES.
- MODELS FMP-VFM-(UX-R) AND FMP-MSH ENCLOSURE CONTAINS ALUMINUM, CARE MUST BE TAKEN TO AVOID IGNITION HAZARDS DUE TO IMPACT OR FRICTION.
18. IF DEVICE IS INSTALLED IN LOCATIONS REQUIRING EQUIPMENT PROTECTION LEVEL "Gb", SURGE PROTECTION DEVICES MAY BE INSTALLED BETWEEN EACH NON-EARTH BONDED CORE OF THE CABLE AND THE LOCAL STRUCTURE ACCORDING TO IEC 60079-14.
19. EQUIPMENT COMPLIES WITH THE FOLLOWING STANDARDS: IEC 60079-0, 7TH EDITION AND IEC 60079-11, 6th EDITION OR EN IEC 60079-0:2018, EN 60079-11:2012.
20. THE CABLE FOR THIS DEVICE PASSES THROUGH A BOUNDARY BETWEEN EQUIPMENT PROTECTION LEBEL "Ga" AND "Gb" LOCATIONS. CONSIDERATION SHALL BE GIVEN TO THE PROCESS CONNECTION.
21. ATEX/IECEx APPROVAL:
CE 0539 Ex II 1 G
DEMKO 14 ATEX 1372X
Ex ia IIA T4 Ga
IECEx UL 14.0066X
NON-HAZARDOUS LOCATION
ASSOCIATED APPARATUS
[Ex ia] IIA
HAZARDOUS LOCATION
GROUP IIA, ZONE 0
ATG
MULTI -OR- SINGLE CHANNEL INTRINSIC SAFETY BARRIER
PWR
GND
INPUT
RS-485A(+)
RS-485B(-)
+ or RED
- or BLK
WHT
YEL
JUNCTION BOX
JUNCTION BOX*
JUNCTION BOX**
FMP-LSU600
FMP-ES8-U FMP-DIS-U FMP-DVS-U FMP-DDS-U FMP-DTS-U FMP-HS-U FMP-HS-XL-U FMP-MWS(-XXX)-U FMP-VFM-U FMP-CDS-U FMP-WDS-U* FMP-DPS-U FMP-LSU600-U
FMP-DDS-UD* FMP-DTS-UD* FMP-HS-UD* FMP-HS-XL-UD*
WHT/YEL Uo = 9.61V Io = 183mA Po = 0.39W Co = 3.3 uF Lo = 1.0mH
SIMPLE APPARATUS
FMP-ES8 FMP-DVS FMP-DTS FMP-HS-XL FMP-WDS* FMP-DDS FMP-HS FMP-MWS(-XX)
FMP-ES8-R FMP-DVS-R FMP-DTS-R FMP-HS-XL-R FMP-VFM-R FMP-WDS-R* FMP-LSU600-R #1 FMP-DDS-R FMP-HS-R FMP-MWS(-XX)-R FMP-CDS-R FMP-DPS-R
4-20mA MODE
ENTITY PARAMETERS
Ui = 28 V Li = 0.0 mH
Ii = 100 mA Pi = 700 mW
Ci = 0.60 uF
UDP MODE
ENTITY PARAMETERS
Ui = 28.6 V Li = 0.0 mH
Ii = 183 mA Pi = 1.17 W
Ci = 0.17 uF
UDP MODE
ENTITY PARAMETERS
Ui = 28.6 V Li = 0.0 mH
Ii = 183 mA Pi = 1.17 W
Ci = 0.17uF
BRITE SENSORS
ENTITY PARAMETERS
Ui = 10.75 V Li = 0.0 mH
Ii = 585 mA Pi = 1.52 W
Ci = 0.17uF
RS-485 VERSION
ENTITY PARAMETERS
Ui = 10.75 V Li = 0.0 mH
Ii = 585 mA Pi = 1.52 W
Ci = 0.17uF
UP TO 32 DEVICES CAN BE CONNECTED TO ONE BARRIER
* - INDICATES A SIMPLE APPARATUS MAY BE CONNECTED TO THIS DEVICE.
** - INDICATES THAT THIS DEVICE IS OPTIONAL
22. WIRE COLORS
WIRE COLORS SHOWN IN THE SCHEMATIC PORTION OF THIS DRAWING ARE FOR REFERENCE ONLY.
INA(+)
INB(-)
OUTA(+)
OUTB(-)
TERMINALS: PWR,GND, (INA+), (INB-) Ui = 10.75 V Ii = 585 mA Pi = 1.52 W Ci = 0.17 uF Li = 0.0 mH
TERMINALS: PWR,GND, (OUTA+), (OUTB-) Uo = 10.75 V Io = 585 mA Po = 1.52 W Co = 6.9 uF Lo = 0.46 mH
FMP-MSH*
#X
TERMINALS: IN#, GND
Uo = 5.66 V Io = 168 mA Po = 0.29 W Co = 6.3 uF Lo = 0.5 mH
IN1 GND FMP-JOX-U
IN2 GND FMP-JOX-U
IN3 GND FMP-JOX-U
IN4 GND FMP-JOX-U
IN5 GND FMP-JOX-U or SIMPLE APPARATUS
IN6 GND SIMPLE APPARATUS
FMP-ES8-R FMP-DIS-R FMP-DVS-R FMP-DDS-R FMP-DTS-R FMP-HS-R FMP-HS-XL-R FMP-MWS(-XX)-R FMP-VFM-R FMP-CDS-R FMP-DPS-R FMP-LSU600-R #X2
ENTITY PARAMETERS
Ui = 10.75 V
Ii = 585 mA
Ci = 0.17uF
Li = 0.0 mH
Pi = 1.52 W
TERMINATION RESISTOR SEE NOTE 13 ON ASSOCIATED APPARATUS OR OUTPUT TERMINALS OF MODEL FMP-MSH
MFG ADDRESS:
FRANKLIN FUELING SYSTEMS or INTELLIGENT CONTROLS
PO BOX 638
SACO, MAINE 04072 USA
Franklin Electric
MODEL: 09.2 MODIFIED: FALSE STATE: Released
DRAWING: 09.0 MODIFIED: FALSE
REVISION ECN DESCRIPTION ZONE INITIALS DATE
9 . SEE SHEET 1 . .
Ex Certified Product
-Related Documents-
No modifications permitted without approval from the Authorized Person
DIMENSIONS ARE IN INCH
CONTROLLED PRODUCT
NO CHANGES TO SOURCING WITHOUT PRIOR APPROVAL
REQUIRED APPROVALS
DRAWN BY: JOHN GILLIS, 28TH JULY-16
SIMILAR TO:
MAKE FROM PART NUMBER:
ENGINEERING MATERIAL SPECIFICATION (EMS):
DIMENSION BALLOONS
CRITICAL TO QUALITY
TITLE CONTROL DRAWING, FMP SENSORS RELATED DRAWING
SIZE D DWG NO 000-1774 REV 09 SHEET 1 OF 2

6.4 Glossary

ATG ..... Automatic Tank Gauge
DIS ..... Discriminating Interstitial Sensor (FMP-DIS/FMP-DIS-U)
DW/DWT ..... Double Wall/Double Wall Tank.
EIS..... Electro-Optic Interstitial Sensor (FMP-EIS/FMP-EIS-U)
EYS..... Explosionproof Sealing
FMS..... Fuel Management System
IS..... Intrinsically Safe
LED ..... Light Emitting Diode
NPT ..... National Pipe Thread
UST ..... Underground Storage Tank

000-2086 r4

October 20, 2026