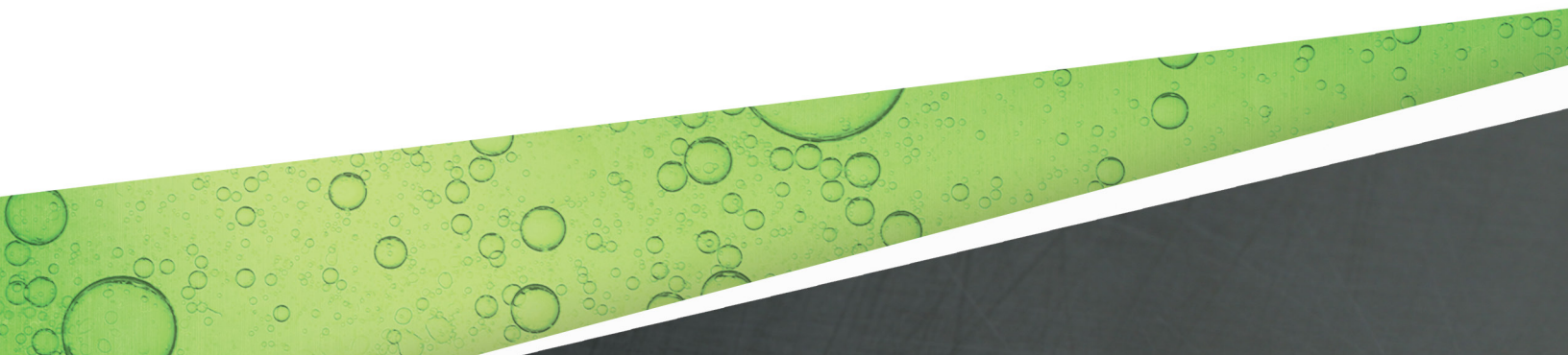
Franklin Fueling Systems

# EVO™ 200 AND EVO™ 400 AUTOMATIC TANK GAUGES

## INSTALLATION GUIDE



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# Contents

# Introduction

This manual contains installation instructions for the Franklin Fueling Systems (FFS) EVO™ 200 and EVO™ 400 Automatic Tank Gauges (ATGs). You must follow all safety information, warnings, instructions, and other information in this manual. Please read this entire manual carefully. If you do not follow the instructions in this manual, the result could be faulty operation, equipment damage, injury, or death.

## Questions and concerns

In case of emergency, follow the procedures established by your facility. If you have questions or concerns about safety or need assistance, use the information below to contact FFS:

Web: franklinfueling.com
Telephone:
USA and Canada: +1.608.838.8786, +1.800.225.9787
USA Technical Support: 1.800.984.6266
UK: +44 (0) 1473.243300
Mexico: 001.800.738.7610
China: +86.10.8565.4566

## Conventions used in this manual

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

**NOTE**: This provides helpful supplementary information.

**IMPORTANT**: This provides instructions to avoid damaging hardware or a potential hazard to the environment, for example: fuel leakage from equipment that could harm the environment.

⚠ **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

FFS 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 manual. Before you work with or install the equipment covered in this manual, or any related equipment, read this entire manual, 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 FFS parts. Substituting non-FFS parts could cause the device to fail, which could create a hazardous condition and/or harm the environment.

⚠ **WARNING**: Follow all codes that govern how you install and service 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 you are installing or servicing this product. Refer to this manual (and documentation for related equipment) for complete installation and safety information.

⚠ **WARNING**: Before you enter a containment sump, check for the presence of hydrocarbon vapors. Inhaling these vapors can make you dizzy or unconscious, and if ignited, they can explode and cause 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 you are working in it. If vapors reach unsafe levels, exit the sump and ventilate it with fresh air before you resume working. 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 manual 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 some other vehicle) to block access to the work area.

⚠ **WARNING**: All wiring must enter the console's enclosure through the designated knockouts. An explosion hazard may result if other openings are used. All wiring from probes to the console must be run in conduit separate from all other wiring. Failure to do so will create an explosion hazard.

⚠ **DANGER**: Make sure you check the installation location for potential ignition sources such as flames, sparks, radio waves, ionizing radiation, and ultrasound sonic waves. If you identify any potential ignition sources, you must make sure safety measure are implemented.

# Programming and operation documentation

The *EVO™ 200 and EVO™ 400 Automatic Tank Gauges Operation Guide* and the *EVO™ 200 and EVO™ 400 Automatic Tank Gauges Programming Guide* are useful manuals you may need. To download these manuals, go to: www.franklinfueling.com>Products>Fuel Management Systems>Automatic Tank Gauges>EVO™ 200 & EVO™400>Downloads>Manuals. Alternatively, you can click the following link, and go to the "Manuals" heading:

http://www.franklinfueling.com/americas/fms/featured/27308/en/evo-200-evo-400#Downloads

# Certified installer or service person

The equipment described in this manual should be serviced only by an FFS-certified technician, installer, or service person. Only an FFS-certified technician, installer, or service person is allowed to access both the user interface keypad and internal areas of an EVO™ 200 or EVO™ 400 ATG.

# Station owner or operator

Only the station owner or operator is allowed access to the user interface keypad. Access to internal areas of the EVO™ 200 or EVO™ 400 ATG console is strictly prohibited.

# Abbreviations and acronyms

AST - Aboveground Storage Tank

ATG - Automatic Tank Gauge

FMS - Fuel Management Systems

IS - Intrinsically Safe

PC - Personal Computer

RLY - Relay Module

TPI - Turbine Pump Interface

UST - Underground Storage Tank

# Product description

EVO™ 200 and EVO™ 400 ATGs are complete, automatic, continuous monitoring systems that:

- Perform inventory monitoring.
- Generate reports automatically in response to preset and programmed conditions and alarms.
- Provide audio-visual indications when an alarm or warning condition exists.

- Perform tank reconciliation and autocalibration.
- Print reports on an external USB printer.
- You can access remotely via Ethernet or RS-232 with a web browser.
- Perform leak detection and density monitoring.

## Specifications

The specifications for an EVO™ 200 or EVO™ 400 ATG are:

- Line voltage: 110-240  V~, 1.0 A.
- Frequency and power: 50/60 Hz, 100 W maximum.
- Storage temperature: -20 to 60° C (-4 to 140° F).
- Operating temperature: 0 to 40° C (32 to 104° F).
- Operating humidity: 0 to 95%, non-condensing.
- Exterior cleaning: Cloth or sponge slightly dampened in mild detergent.
- Splash resistance: Not to be exposed to direct spray, splash or drips.
- Location: Indoors in a non-hazardous, pollution degree 2 environment per IEC60664.
- Relay rating: 2A @ 240V~.

# Console Installation

## Console location

Install the console indoors in an area that has a pollution degree 2 rating and is classified as non-hazardous (per IEC60664). Place the console at eye level, for convenience, on a level, vertical surface 2–6' (0.6–1.9 m) high. Use appropriate fasteners.

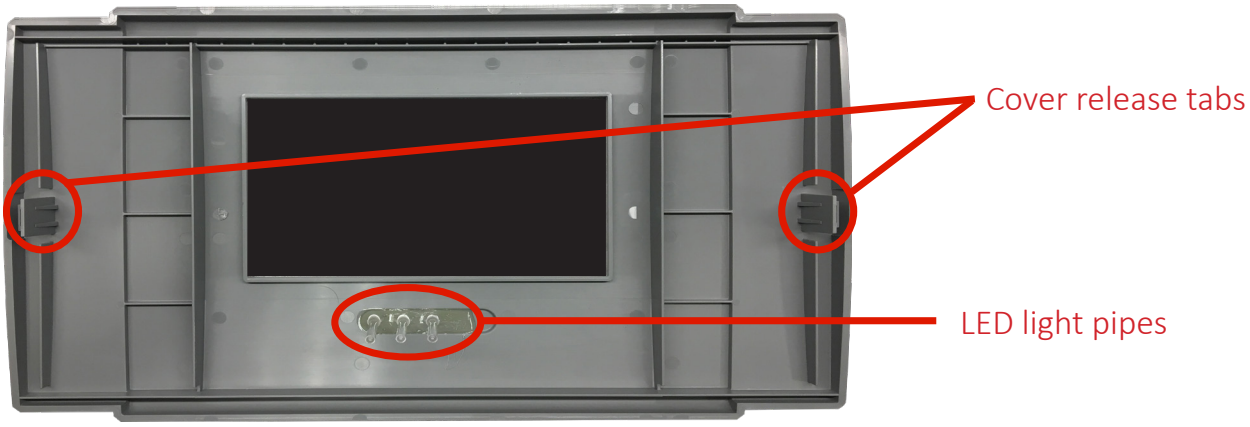
## Mounting the console

### Removing the cover

⚠ **WARNING**: Mount the console in a location where explosive or flammable vapors are not present. Otherwise, there is an explosion hazard that can result in property damage, environmental contamination, severe injury, and death.

**IMPORTANT**: Leave at least 2" (50 mm) of open space around the console to allow for ventilation, communication port connections, conduit, and wiring. Allow at least 7" (175 mm) at the top if the unit has an antenna.

To remove the cover, press the cover release tabs in and lift the cover straight away from the unit with two hands. To reinstall the cover, place it straight on the unit to help avoid damaging the LED light pipes.




Two mounting screw holes are located on each side of the console housing. Use fasteners that have sufficient load carrying capacity and are appropriate for wall construction. Make sure that there is enough room around the console for conduit, communication port connections, probe wiring, and access.

# Standard installation materials

Select and install standard installation materials according to local, state, and federal codes that govern the installation of this product and its associated systems. See the console, module wiring, or associated devices section of this manual for details.

## Circuit breaker

The console has a 20 Amp circuit breaker that provides power for only the console.

## Weatherproof junction boxes

There must be a weatherproof junction box (16 inch$^3$ (406.4 mm$^3$) minimum), cover, and cover gasket for liquid level probe manholes. Also use ½" (16 mm) bushings for probe compression fittings. Use a weatherproof metal pull box for combining multiple circuits that run into the console through one or more conduits. Use a separate weatherproof metal pull box to combine intrinsically safe (IS) liquid level probe wiring. Do not run other non-intrinsically safe wiring into the IS pull box. Run 0.5" (16 mm) IS probe conduit from the manholes to the IS pull box, and then run one or two 0.5" (16 mm) conduits to the console's IS conduit knockouts.

## Conduit

Entryways into the console are sized for 1" (27 mm) conduit. If you want to use smaller conduit, make sure you use the appropriate size reducing washers. Use conduit hardware that is appropriate for the installation and meets local, state, and federal requirements.

## Splice connector kit warranty requirement

**IMPORTANT**: According to the FFS warranty, you must use splice connector kits.

Use the FFS-approved, moisture-resistant, no-strip splice connectors for liquid level probes. (Part number TSP-KW30 contains 30 FFS-approved connectors.)

### Moisture-resistant splice connectors

Using moisture-resistant splice connectors will:

- Reduce or eliminate corrosion of the wire connections from repeated exposure to water condensation, which causes eventual signal loss and system failure.
- Reduce or eliminate equipment damage from water flooding around the connectors, which causes short-circuit damage.

## Thread sealant (UL classified)

Use a non-hardening, stay-soft, gasoline compatible, thread sealant to seal and waterproof all tank riser pipe threads. Also, the thread sealant (or pipe dope, as it is commonly known) should also be chemically non-reactive to the product in the tank(s). Apply thread sealant to seal and waterproof all outdoor electrical conduit fitting threads, including the hole plugs at the weatherproof junction boxes.

### Riser pipes

ANSI Schedule 40- (or chemically non-reactive) 2 or 4 inch (50.8 or 101.6 mm) (8 NPT) riser pipes for liquid level probes.

## Cables required for liquid level probes and 4-20 mA sensors

Use cables and wires compliant with national and local codes. FFS recommends using the types of cable shown below up to a recommended length of:

- Belden™ No. 87760 87760 (0.15" or 3.048 mm OD) to 260 feet (80 m)
- Belden™ No. 87761* (0.12" or 3.048 mm OD) to 400 feet (120 m)
- Belden™ No. 89182* (0.31" or 7.874 mm OD) to 1500 feet (450 m)

* You can order this cable from FFS.

**NOTE:** Conductors of different IS circuits that are run together in the same conduit should have at least .01" (.25 mm) of insulation.

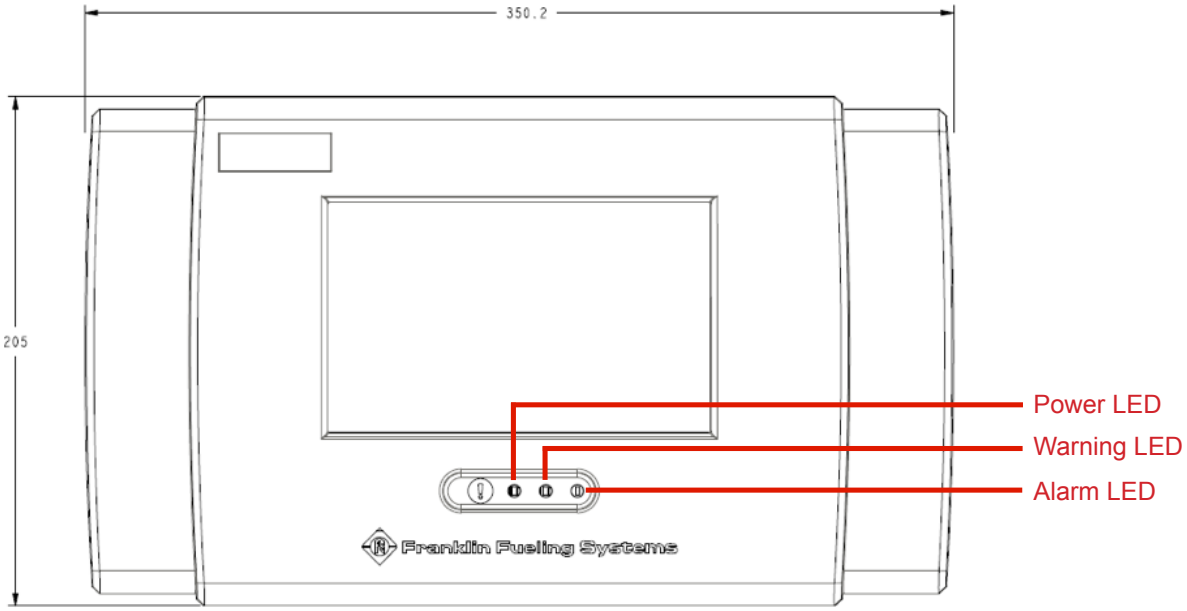
## Cable or wire for 2-wire sensors

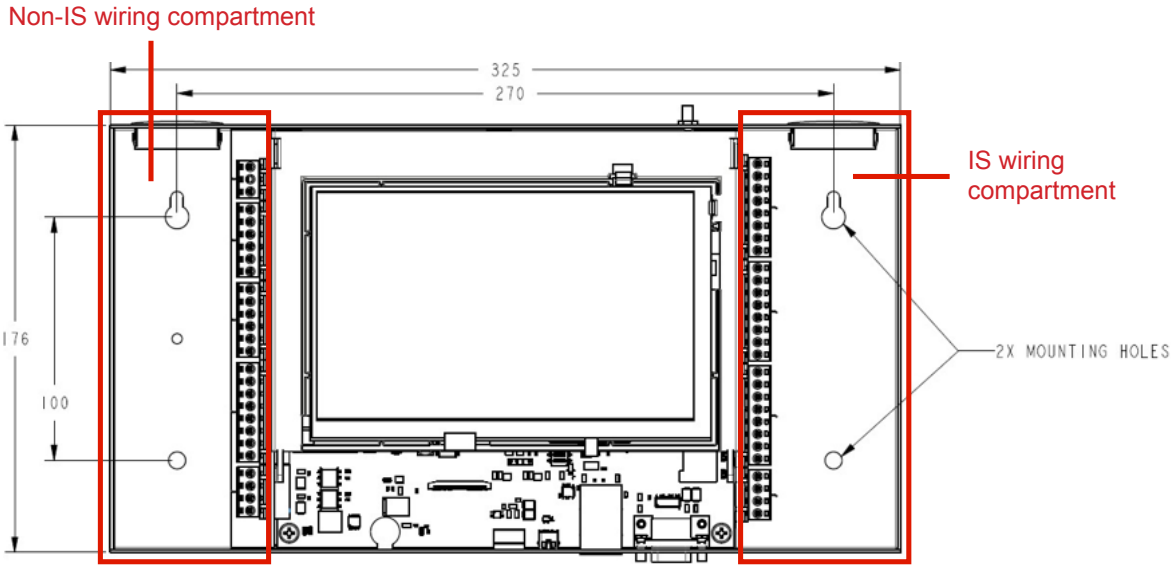
You can use 2-wire sensor wire (type THHN, TFFN, or THWN, gas and oil resistant, 18 AWG minimum, 1500 feet maximum wire run length) when it is enclosed in rigid metal conduit from the sensor to the console.

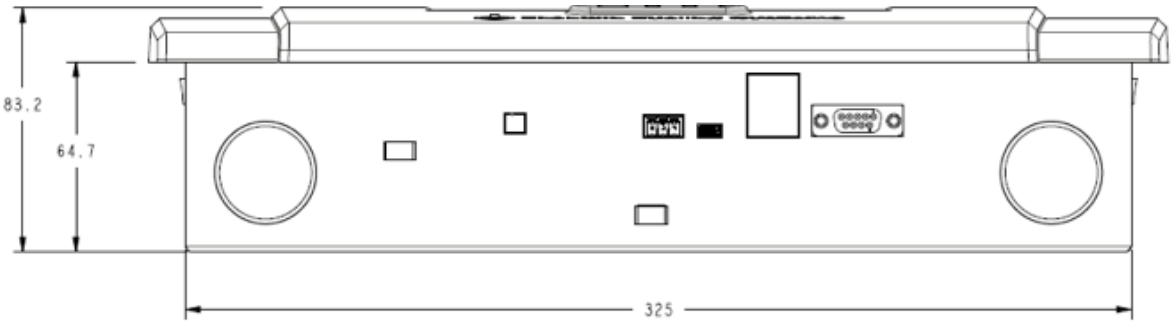
When cable is not run through rigid metal conduit, you must use leak detection sensor cable. (See the ***Direct Burial Cable Installation Manual*** (FFS part number 000-1041) for further information.) The following are cable types and descriptions:

- Alpha 58411 (FFS part number 600-0062):
    - 2-conductor cable for standard, 2-conductor, leak detection sensors (0.114 inch (2.9 mm) OD).
- Wire required for the EVO™ TS-550 or EVO™ 5000 console:
    - Power: 3 conductor–12 GA to 14 GA maximum; Black, white, and green.
    - Safety ground–1 conductor: 12 AWG green. (Two may be required in some locations.)
    - Accessories: As required–Type THHN, TFFN, or THWN; 18 AWG minimum.

# Console dimensions

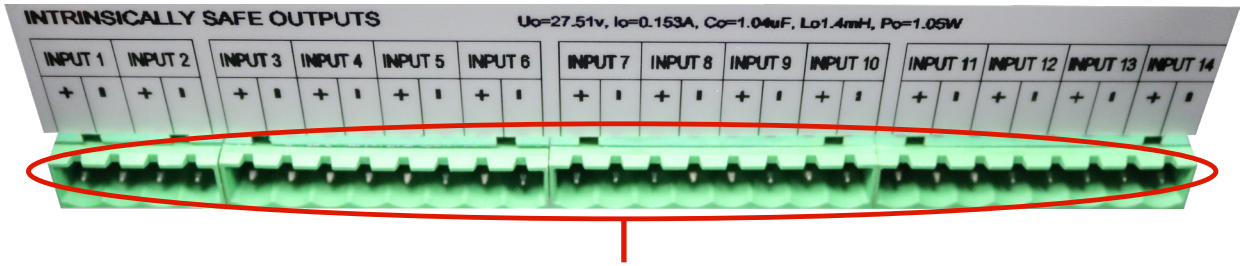


# Wiring the console

## Intrinsically safe wiring




Intrinsically safe outputs

**IMPORTANT**: Do not run IS and non-IS wiring in the same conduit.

**IMPORTANT**: If local codes do not require you to use conduit, you must use cable glands at all enclosure knock-outs. Gaps larger than 0.06" (1.5 mm) violate safety approvals. Make sure you provide adequate IS and non-IS wire separation.

**IMPORTANT**: To avoid violating safety approvals, make sure you install connectors in unused intrinsically safe output receptacles.

The IS inputs are certified as associated apparatuses by the Entity Concept. Under this concept, the IS apparatus (field device) has assigned parameters that, when matched to those of an associated apparatus, constitute an IS system. If none are available, use the following values:

- 60 pF/foot (200 pF/m) for capacitance for each wire pair.
- 0.2 uH/foot (0.7 uH/m) for inductance for each wire pair.

Refer to the apparatus's control drawing for cable run length calculations. Associated apparatus parameter types and comparisons to IS apparatus parameter values are in the following table:

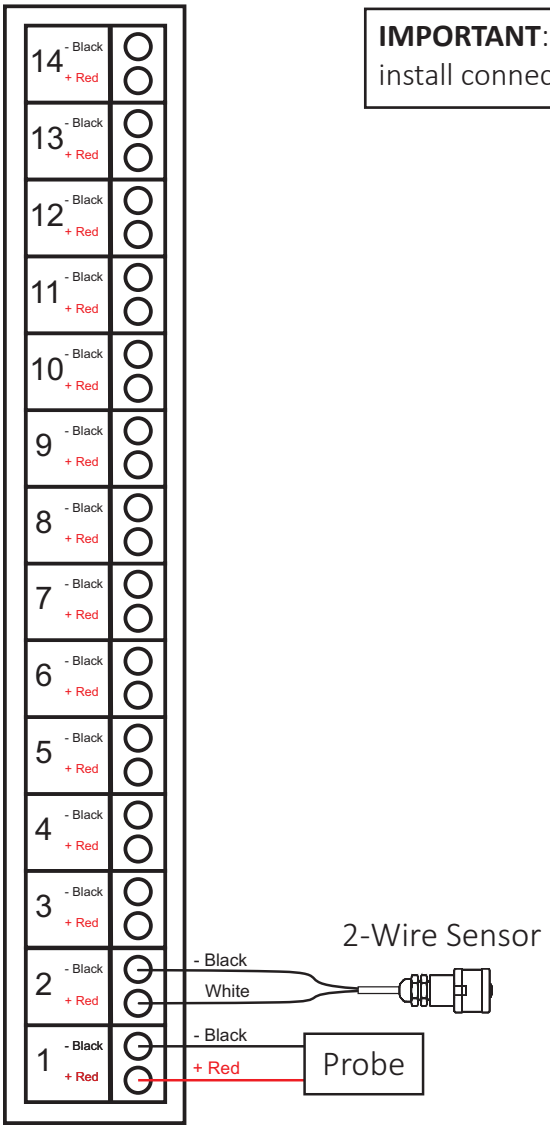
| Parameter | Associated Apparatus | Comparison | IS Device |
|---|---|---|---|
| Maximum Voltage | Uo | < | Ui |
| Maximum Current | Io | < | Ii |
| Maximum Power | Po | < | Pi |
| Total unprotected capacitance | Co | > | Ci+Cc |
| Total unprotected inductance | Lo | > | Li+Lc |

### Terms

| Term | Definition | Term | Definition |
|---|---|---|---|
| Uo | Maximum output voltage | Co | Maximum external capacitance |
| Ui | Maximum input voltage | Ci | Maximum internal capacitance |
| Io | Maximum output current | Cc | Cable capacitance |
| Ii | Maximum input current | Lo | Maximum external inductance |
| Po | Maximum output power | Li | Maximum internal inductance |
| Pi | Maximum input power | Lc | Cable inductance |

## UDP probe and sensor wiring

The probe and sensor wiring is IS and is kept separate from all other wiring. Conduit must enter the console enclosure through only the designated knockouts. The installation may require the conduit to enter on top or bottom. Do not lose the conduit plugs, and make sure any openings are covered by the plugs. Attach the probe wiring as shown below:




**IMPORTANT**: To avoid violating safety approvals, make sure you install connectors in unused intrinsically safe output receptacles.

| UDP 24 V Input Specifications (Motherboard A, B, C) | |
|---|---|
| Number of Channels: | 14, 6 |
| Safety rating: | Class I, Division 1, Group D, [Ex ia] IIA |
| Entity parameters: | Uo = 27.5 V<br>Io = 0.153 A<br>Co = 1.04 uF<br>Lo = 1.4 mH<br>Po = 1.05 W |

## Cables required for liquid level probes

Use cables and wires compliant with national and local codes to help provide reliable communication between the console and probes. FFS recommends using the types of cable shown in the table below. Cables must be oil and water resistant, 22 AWG (or greater), and must be shielded, twisted pairs.

| Distance feet (m) | Capacitance (pF) per foot | Inductance (µH) per foot | Belden™ Cable |
|---|---|---|---|
| 500 (152) | <100 | <0.2 | 87760<br>87761*<br>88760 |
| 1000 (305) | <60 | <0.2 | 8760<br>8770 |
| 1500 (457) | <20 | <0.3 | 89182* |

* You can order this cable from FFS.

# Line power wiring

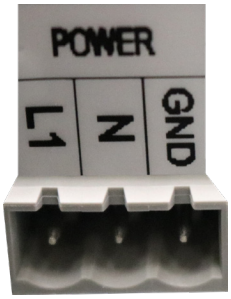
## Non-intrinsically safe wiring

⚠ **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.

### Console power supply

Power to the console must be 110-240 VAC, 50/60 Hz. At the electrical power panel, use a 20 amp circuit breaker that supplies power to only the console.

**IMPORTANT**: Do not connect other equipment to this circuit.




⚠ **WARNING**: The ground bus in the electrical panel must be connected to an earth ground as required by the National Electrical Code (or Canadian Electrical Code) when applicable. If the ground bus is not properly connected to an earth ground, or if the IS safety ground is not properly connected at the console, a dangerous condition will be created that could result in an explosion.

### Check electrical resistance to earth ground

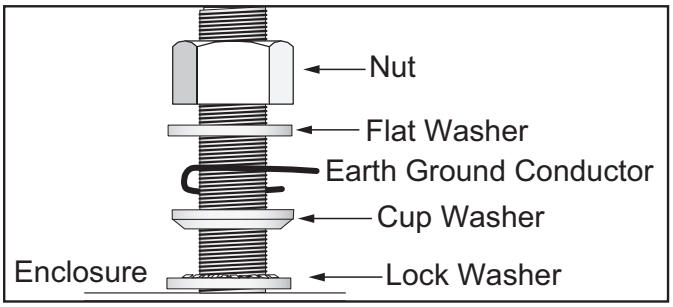
After wiring the IS safety grounds, check the resistance between the IS safety ground terminals at the console and the earth ground. This resistance must be less than 1 ohm.

### 110/240 VAC line power wire connections

| Electrical Panel | No. Conductors, Color (Gauge) | Circuit |
|---|---|---|
| 20 Amp Circuit Breaker | 1 Black wire, 14 AWG (1.6 mm) min. | 110/240 VAC Power |
| Neutral | 1 White Wire, 14 AWG (1.6 mm) min. | Neutral |
| Ground Bus | 1 Green wire, 14 AWG (1.6 mm) min. | Ground |
| Ground Bus | 1 Green wire, 12 AWG (2.1 mm) min. | Safety Ground |

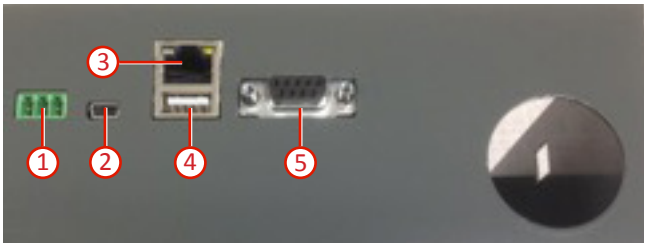
### Console Ground Connection

Attach the ground wire to the grounding stud in the left compartment of the console.




## Communication ports

The console has several communication ports that can be used to communicate with devices or connect to a local area network, point-of-sale device, external printer, or modem.

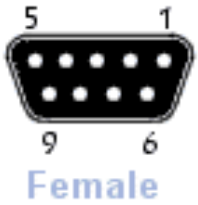


| # | Port | Connector Type | Devices |
|---|---|---|---|
| 1 | RS-485 | Pluggable terminal block | TPI/FE Petro Smart Controllers |
| 2 | Micro-USB | Female micro-USB | Local network or computer |
| 3 | Ethernet | RJ-45 | Local network or computer |
| 4 | USB | Type A | External printer, modem, or USB flash drive* |
| 5 | RS-232 Comm 1 | DB9 female | Modem, POS, or local PC |

* A USB flash drive can be used to collect data or load upgraded files.

## RS-232 communication connectors

A connector for RS-232 interface is on the bottom of the console. The following are the pin designations for this connector:



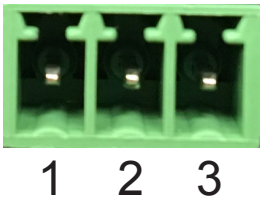

Console RS-232 Comm Port 1
DB9 Connector, Female, DCE

| Pin No. | Function | Input/Output |
|---|---|---|
| 2 | TD | O → |
| 3 | RD | I ← |
| 5 | GND | |

**NOTE**: Pins 1, 4, and 6-9 are not connected.

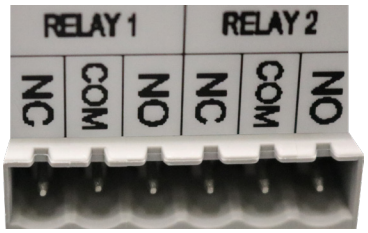
## RS-485 communication connectors

One connector for RS-485 interface is provided on the bottom of the console. The pin designations for the RS-485 connectors are as follows:




| Pin No. | Function |
|---|---|
| 1 | A |
| 2 | B |
| 3 | GND |

## Relay wiring

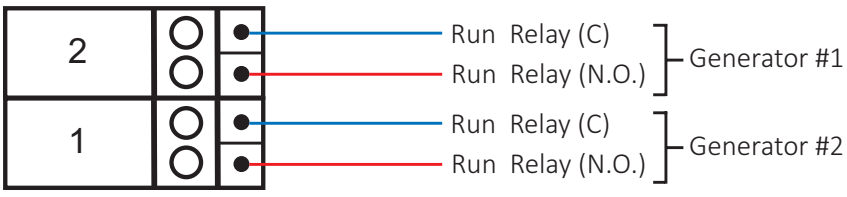



| Relay | Terminal | Description |
|---|---|---|
| 1 | 1. | Normally Closed |
| | 2. | Common |
| | 3. | Normally Open |
| 2 | 4. | Normally Closed |
| | 5. | Common |
| | 6. | Normally Open |
| 3 | 1. | Normally Closed |
| | 2. | Common |
| | 3. | Normally Open |
| 4 | 4. | Normally Closed |
| | 5. | Common |
| | 6. | Normally Open |

**NOTE**: There can be 0, 2, or 4 relays.

## Dry contact wiring


### Dry contacts




**NOTE**: Dry contacts are internally wetted with 5 VDC, 15 mA DC. External relays should have contacts suitable for low current.

NOTES:

1.
THE MODEL UDP(A-C) SHALL NOT BE CONNECTED TO ANY EQUIPMENT WHICH USES OR GENERATES GREATER THAN 250V.

2.
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.

3.
THE MODEL UDP(A-C) WIRING SHALL BE INSTALLED IN ACCORDANCE WITH THE NEC AND APPLICABLE NATIONAL OR LOCAL CODES. CONDUCTORS OF DIFFERENT INTRINSICALLY SAFE CIRCUITS RUN IN THE SAME CABLE/CONDUIT MUST HAVE AT LEAST 0.25mm OF INSULATION.

4.
CAPACITANCE AND INDUCTANCE OF THE FIELD WIRING FROM THE INTRINSICALLY SAFE EQUIPMENT TO THE BARRIER SHALL BE CALCULATED AND MUST BE INCLUDED IN THE SYSTEM CALCULATIONS AS SHOWN IN THE DIAGRAM TO THE RIGHT. CABLE CAPACITANCE (Ccable) PLUS INTRINSICALLY SAFE EQUIPMENT CAPACITANCE (Ci) MUST BE LESS THAN THE MARKED CAPACITANCE(Co) SHOWN ON ANY BARRIER USED. THE SAME APPLIES FOR INDUCTANCE (Li, Lcable AND Lo, RESPECTIVELY). WHERE THE CABLE CAPACITANCE AND INDUCTANCE PER FOOT ARE NOT KNOWN, THE FOLLOWING VALUES SHALL BE USED: Ccable=60pF/ft,(200pF/m), Lcable=0.2uH/ft (0.7uH/m).

5.
WIRING, CABLING AND SEALS MUST BE INSTALLED IN ACCORDANCE WITH THE NEC, CEC OR OTHER APPLICABLE NATIONAL OR LOCAL CODES.

6.
USE ONLY CABLE THAT IS SPECIFIED IN THE USER INSTALLATION MANUAL OR LISTED EQUIVALENT FOR THE INSTALLATION OF LIQUID LEVEL PROBES.

7.
USE THE FOLLOWING WIRE TYPES ONLY, 18 AWG MINIMUM, TO CONNECT SENSORS TO THE UDP(A-C) ASSOCIATED APPARATUS, OIL AND GASOLINE RESISTANT TYPES.

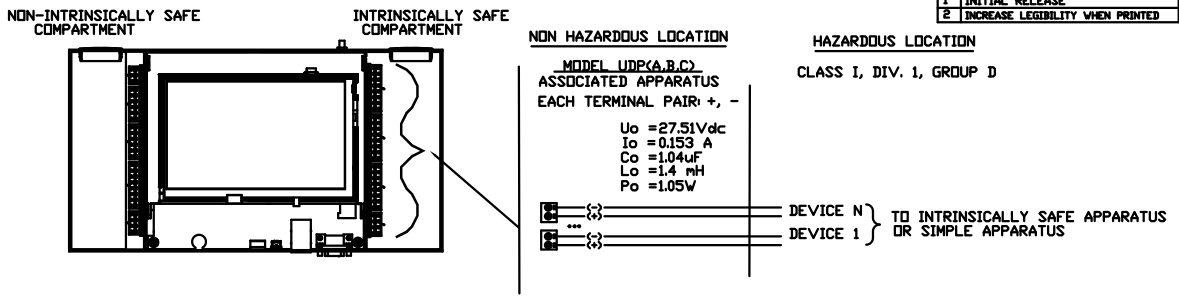
8.
USE ONLY CRIMP OR INSULATION DISPLACEMENT TYPE CONNECTORS FOR ELECTRICAL CONNECTIONS (DO NOT USE WIRE NUTS OR OTHER TYPE CONNECTORS).

9.
SEAL ALL FIELD WIRING CONNECTIONS FROM MOISTURE.

10.
SEE INSTALLATION MANUAL FOR MORE DETAIL.

11.
THE GENERAL CONTRACTOR MUST SUPPLY THE SPECIFIED WIRE, CONDUITS AND ELECTRICAL ACCESSORIES.

12.
THE ENTITY CONCEPT ALLOWS THE USER TO IDENTIFY ACCEPTABLE COMBINATIONS OF INTRINSICALLY SAFE APPARATUS AND ASSOCIATED APPARATUS THAT HAVE NOT BEEN EXAMINED AS A SYSTEM. EACH APPARATUS IS EXAMINED SEPARATELY BY A NATIONALLY RECOGNIZED TEST LABORATORY (NRTL) AND ASSIGNED A SET OF PARAMETERS CALLED ENTITY PARAMETERS. THE ENTITY PARAMETERS FOR UDP(A-C) (ASSOCIATED APPARATUS) CAN BE FOUND IN THE DIAGRAM TO THE RIGHT. TO DETERMINE THE Vmax (Ui), Imax (Ii), Ci, Li AND Pi VALUES THE CONTROL DRAWING FOR THE INTRINSICALLY SAFE APPARATUS SHALL BE USED. THE COMBINATION OF THE INTRINSICALLY SAFE APPARATUS AND ASSOCIATED APPARATUS MUST COMPLY WITH THE FOLLOWING:
Uo (Voc) ≤ Ui (Vmax)
Io (Isc) ≤ Ii (Imax)
Po ≤ Pi (Pmax)
Co (Ca) ≥ Ci + Ccable (SEE NOTE 4)
Lo (La) ≥ Li + Lcable (SEE NOTE 4)




13.
THE OUTPUT CURRENT OF THIS ASSOCIATED APPARATUS 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.

14.
ASSOCIATED APPARATUS MUST BE INSTALLED IN AN ENCLOSURE SUITABLE FOR THE APPLICATION IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (ANSI/NFPA 70) FOR INSTALLATION IN THE UNITED STATES, THE CANADIAN ELECTRICAL CODE FOR INSTALLATIONS IN CANADA, OR OTHER LOCAL CODES, AS APPLICABLE.

15.
INTRINSICALLY SAFE CIRCUITS MUST BE WIRED AND SEPARATED IN ACCORDANCE WITH ARTICLE 504.20 OF THE NATIONAL ELECTRICAL CODE (ANSI/NFPA 70) OR OTHER LOCAL CODES, AS APPLICABLE.

16.
THIS ASSOCIATED APPARATUS HAS NOT BEEN EVALUATED FOR USE IN COMBINATION WITH ANOTHER ASSOCIATED APPARATUS.

17.
EQUIPMENT COMPLIES WITH THE FOLLOWING STANDARDS: UL1238, SIXTH EDITION AND UL 913, EIGHTH EDITION, CAN/CSA-C22.2 NO. 60079-0:15, 3RD ED., CAN/CSA-C22.2 NO. 60079-11:14, 2ND EDITION, AND CAN/CSA C22.2 NO.142-M1987(REAFFIRMED 2014).

18.
UL LOGO DISPLAYED:

[Exia]
c UL us LISTED 6L79

19.
CONTROL DRAWING 228180006 SHIPPED WITH PRODUCT WILL HAVE DEDICATED PAGE REPRODUCING ALL ABOVE INFORMATION AND THE NOTE:

ONLY THIS PAGE REPRESENTS UL CONTROL DRAWING FOR THE UNITED STATES AND CANADA. ADDITIONAL PAGES OF THIS DOCUMENT REPRESENT SIMILAR INFORMATION FOR ALTERNATE COUNTRIES OR CERTIFICATIONS.

20. WARNING:
ASSOCIATED APPARATUS NON HAZARDOUS LOCATION PROVIDES INTRINSICALLY SAFE CIRCUITS FOR SENSORS LOCATED IN CLASS I, DIV. 1, GROUP D HAZARDOUS LOCATIONS WHEN INSTALLED PER CONTROL DRAWING 228180006, SEE INSTALLATION INSTRUCTIONS.

APPAREILLAGE ASSOCIÉ ZONE NON DANGEREUSE FOURNIR DES CIRCUITS À SÉCURITÉ INTRINSÈQUE POUR LES CAPTEURS SITUÉS DANS LA CLASSE I, DIV.1 GROUPE D, ENDROITS DANGEREUX, LORSQU' INSTALLÉ SELON LE SCHÉMA N ° 228180006. VOIR LES INSTRUCTIONS D'INSTALLATION.

21. WARNING:
THIS UNIT HAS MORE THAN ONE POWER SUPPLY CONNECTION POINT. DISCONNECT ALL POWER SUPPLIES BEFORE SERVICING.

CETTE UNITÉ A PLUS D'UN POINT DE D'ALIMENTATION. DÉBRANCHEZ TOUTES LES ALIMENTATIONS ÉLECTRIQUES AVANT L'ENTRETIEN.

22. WARNING:
SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY. TO PREVENT IGNITION OF FLAMMABLE OR COMBUSTIBLE ATMOSPHERES, DISCONNECT POWER BEFORE SERVICING.

AVERTISSEMENT: LA SUBSTITUTION DES COMPOSANTS PEUT NUIRE À LA SÉCURITÉ INTRINSÉQUE". POUR ÉVITER L'IGNITION DE MATIÈRES INFLAMMABLES OU COMBUSTIBLES, DÉBRANCHER L'ALIMENTATION AVANT L'ENTRETIEN.

23.
THE ASSOCIATED APPARATUS MAY ALSO BE CONNECTED TO SIMPLE APPARATUS AS DEFINED IN ARTICLE 504.2 AND INSTALLED AND TEMPERATURE CLASSIFIED IN ACCORDANCE WITH ARTICLE 504.10(B) OF THE NATIONAL ELECTRICAL CODE (ANSI/NFPA 70), OR OTHER LOCAL CODES, AS APPLICABLE.

| REVISIONS | | | |
|---|---|---|---|
| REV | DESCRIPTION | DATE | ECN |
| 1 | INITIAL RELEASE | 10/10/17 | 719335 |
| 2 | INCREASE LEGIBILITY WHEN PRINTED | 12/15/17 | 720653 |

EX CERTIFIED PRODUCT

~RELATED DOCUMENT~

NO MODIFICATIONS PERMITTED WITHOUT APPROVAL FROM THE ATHORIZED PERSON



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES
DECIMALS: .XX ± .01, .XXX ± .005
ANGULAR: ± 0°30'
FRACTIONAL: ± 1/64
THIRD ANGLE
DRAWN: Kelley DATE: 10/10/17
CHECKED
APPR.
APPR.

Franklin Fueling Systems

TITLE: CONTROL DRAWING EVO (UL)

SIZE: D | DO NOT SCALE DRAWING | DWG NO.: 228180006 | REV: 2

SCALE: NONE | SHEET 1 OF 2

Control drawing 1

NOTES:

1.
THE MODEL UDP(A-F), ANA(A,B,C), 485(D,E,F) SHALL NOT BE CONNECTED TO ANY EQUIPMENT WHICH USES OR GENERATES GREATER THAN 250V.

2.
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.

3.
CAPACITANCE AND INDUCTANCE OF THE FIELD WIRING FROM THE INTRINSICALLY SAFE EQUIPMENT TO THE BARRIER SHALL BE CALCULATED AND MUST BE INCLUDED IN THE SYSTEM CALCULATIONS AS SHOWN IN THE DIAGRAM TO THE RIGHT. CABLE CAPACITANCE (Ccable) PLUS INTRINSICALLY SAFE EQUIPMENT CAPACITANCE (Ci) MUST BE LESS THAN THE MARKED CAPACITANCE(Co) SHOWN ON ANY BARRIER USED. THE SAME APPLIES FOR INDUCTANCE (Li, Lcable AND Lo, RESPECTIVELY). WHERE THE CABLE CAPACITANCE AND INDUCTANCE PER FOOT ARE NOT KNOWN, THE FOLLOWING VALUES SHALL BE USED: Cc=60pF/ft,(200pF/m), Lc=0.2uH/ft (0.7uH/m).

4.
WIRING, CABLING AND SEALS MUST BE INSTALLED IN ACCORDANCE WITH THE APPLICABLE NATIONAL OR LOCAL CODES.

5.
SEE INSTALLATION MANUAL FOR MORE DETAIL.

6.
THE ENTITY CONCEPT ALLOWS THE USER TO IDENTIFY ACCEPTABLE COMBINATIONS OF INTRINSICALLY SAFE APPARATUS AND ASSOCIATED APPARATUS THAT HAVE NOT BEEN EXAMINED AS A SYSTEM. EACH APPARATUS IS EXAMINED SEPARATELY BY AN ATEX NOTIFIED BODY AND ASSIGNED A SET OF PARAMETERS CALLED ENTITY PARAMETERS. THE ENTITY PARAMETERS FOR UDP(A-F), ANA(A,B,C), 485(D,E,F) (ASSOCIATED APPARATUS) CAN BE FOUND IN THE DIAGRAM TO THE RIGHT. TO DETERMINE THE Ui, Ii, Ci, Li, AND Pi VALUES THE CONTROL DRAWING FOR THE INTRINSICALLY SAFE APPARATUS SHALL BE USED. THE COMBINATION OF THE INTRINSICALLY SAFE APPARATUS AND ASSOCIATED APPARATUS MUST COMPLY WITH THE FOLLOWING:
Uo ≤ Ui
Io ≤ Ii
Po ≤ Pi
Co ≥ Ci + Ccable (SEE NOTE 3)
Lo ≥ Li + Lcable (SEE NOTE 3)

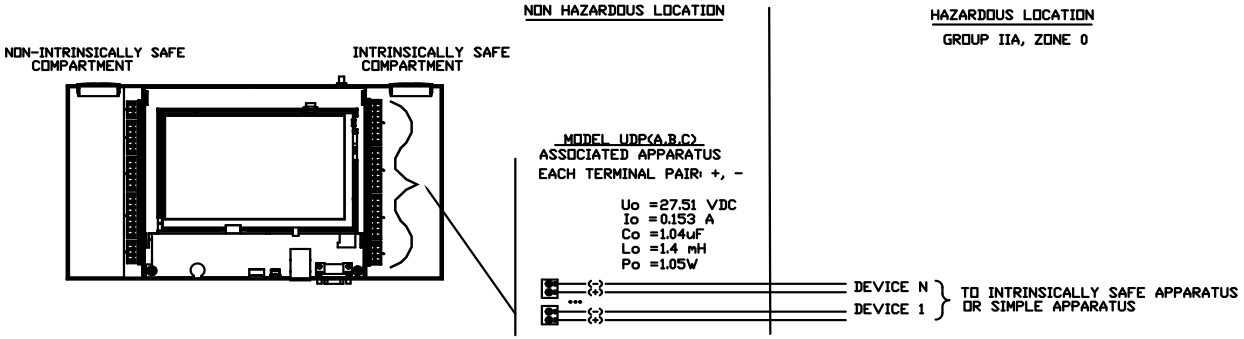
7.
THE OUTPUT CURRENT OF THIS ASSOCIATED APPARATUS IS LIMITED BY A RESISTOR SUCH THAT THE OUTPUT VOLTAGE-CURRENT PLOT IS A STRAIGHT LINE DRAWN BETWEEN OPEN-CIRCUIT VOLTAGE AND SHORT-CIRCUIT CURRENT.

8.
ASSOCIATED APPARATUS MUST BE INSTALLED IN AN ENCLOSURE SUITABLE FOR THE APPLICATION IN ACCORDANCE WITH THE NATIONAL AND LOCAL CODES, AS APPLICABLE.

9.
INTRINSICALLY SAFE CIRCUITS MUST BE WIRED AND SEPARATED IN ACCORDANCE WITH NATIONAL AND LOCAL CODES, AS APPLICABLE.

10.
THIS ASSOCIATED APPARATUS HAS NOT BEEN EVALUATED FOR USE IN COMBINATION WITH ANOTHER ASSOCIATED APPARATUS.

| REVISIONS | | | |
|---|---|---|---|
| REV | DESCRIPTION | DATE | APPROVED |
| 2 | SEE PAGE 1 | - | - |




11.
ATEX/IECEx APPROVAL DISPLAYED:

CE 0539 Ex II (1) G

IECEx UL 17.0059
[Ex ia Ga] IIA
DEMKO 17 ATEX 1902

12.
ALL OF THE ABOVE INFORMATION CAN BE COMBINED INTO A CONTROL DRAWING WITH OTHER CERTIFICATIONS OR IN THE INSTALLATION INSTRUCTIONS. IN ANY CASE, ALL INFORMATION ON THIS DRAWING MUST BE SHIPPED WITH EACH PRODUCT.

13.
THE ASSOCIATED APPARATUS MAY ALSO BE CONNECTED TO SIMPLE APPARATUS AS DEFINED IN ARTICLE 504.2 AND INSTALLED AND TEMPERATURE CLASSIFIED IN ACCORDANCE WITH ARTICLE 504.10(B) OF THE NATIONAL ELECTRICAL CODE (ANSI/NFPA 70), OR OTHER LOCAL CODES, AS APPLICABLE.

EX CERTIFIED PRODUCT

~RELATED DOCUMENT~

NO MODIFICATIONS PERMITTED WITHOUT APPROVAL FROM THE ATHORIZED PERSON



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES
DECIMALS: .XX ± .01, .XXX ± .005
ANGULAR: ± 0°30'
FRACTIONAL: ± 1/64
THIRD ANGLE
DRAWN: Jim Kirby 10/10/17
CHECKED
APPR
APPR

Franklin Fueling Systems

TITLE: CONTROL DRAWING EVO (ATEX/IECEx)

SIZE: D | DO NOT SCALE DRAWING | DWG NO. 228180006 | REV 2

SCALE: NONE | SHEET 2 OF 2

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228180003 r2