



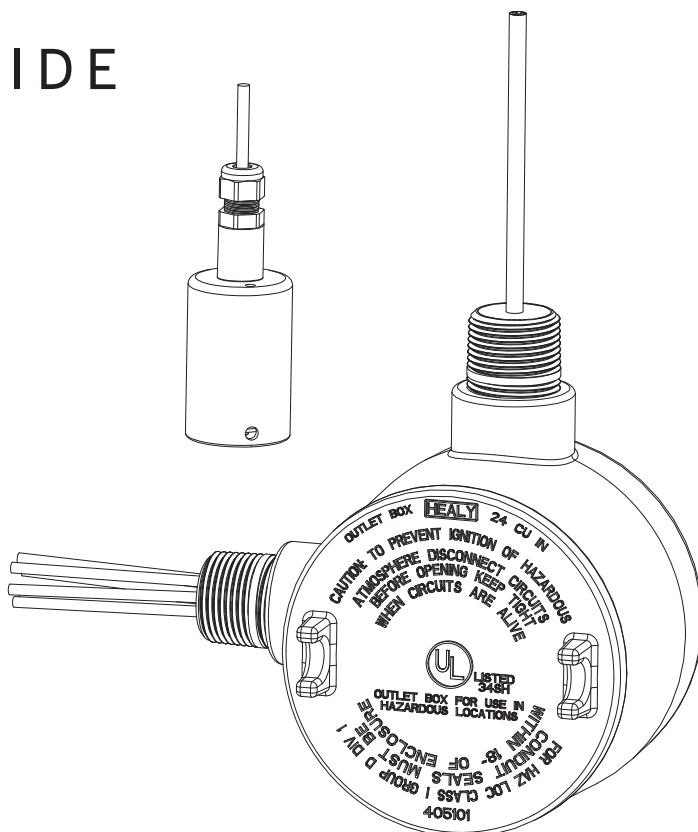
Franklin Electric
FUELING SYSTEMS

DC400 DISPENSING CUTOFF SYSTEM

INSTALL GUIDE

000-0316 r2

MODEL
DC404
DC404C



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000-0316 r2

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.

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1 Introduction

The DC400 Dispensing Cutoff System (DCS) is a standalone, two-part system comprised of a controller (404-4) and sensor (S404). The DC400 DCS is designed to automatically shut down product flow if liquid is detected inside containment spaces. Ideal for retrofit applications, the DC400 allows for easy compliance with new and evolving regulations without the added expense of shutting down a site to break concrete for new conduit and wiring installation. The DC400 can be mounted inside any turbine sump to provide complete pump shutdown or mounted directly into dispenser sumps, allowing only the affected dispenser to be shut down as liquid is detected.

1.1 Documentation

- This document is intended for qualified and certified installation persons.
- Instructions of this document are in English. All other language versions are translations of this original document.
- Illustrations in this document show a typical setup and are for instruction and description purposes only.
- Information given in this document is given as a guide only. It is the installer's responsibility to ensure that correct and safe procedures are followed at all times.
- This document and related documents are available from Franklin Electric at www.franklinfueling.com.

1.1.1 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: Industrial vehicles



Warning: Electricity



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.
- 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

2.2.1 Station Owner or Operator

Save this guide for future use, and make sure to provide it to anyone who services this equipment.

2.2.2 Miscellaneous

Always reference the guide(s) that came with the equipment for the most current and complete list of installation and safety precautions.

2.3 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 should:

- 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.

2.4 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

2.5 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 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.

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.

3.2 Specifications

NOTE:

- *Current* 404-4 controller version has a *round body*.
- *Obsolete* 404-4 controller version has a *rectangular body*.
 - Previous S406 and S404 sensors *are not compatible with the current DC400 Dispenser Cutoff System*. If either the controller (rectangular body) or sensor needs replacement, *both the controller and sensor must be replaced*.

TABLE 3.1 – 404-4 Controller

Feature	Description
Compatible Sensor(s)	S404 Liquid Sensor
Input Power	90–250 VAC, 50/60 HZ, 0.25 A
404-4 Power Consumption	2 W
Relay Switch Contact Rating	12 A (continuous), 2 HP @ 250 VAC (maximum) 12 A (continuous), 1.5 HP @ 120 VAC (maximum)
Dimensions (External)	4.5625" x 6.375" x 3.625" (115.9 x 161.9 x 92.1)MM
Operating Temperature	-4° to 140°F (-20° to 60°C)
Hazardous Location Category	Class I, Div 1, Group D

TABLE 3.2 – S404 Liquid Sensor

Feature	Description
Detection Time	<1 second
Minimum Detectable Water Limit	0.98" (25 mm)

3.3 Required Tools, Parts & Consumables

TABLE 3.3

Item	Part Number
Non-Sparking Tools (Industry Standard)	Locally Sourced
Allen Wrench – 19 MM	
QUICKON Wire Connectors	210-0083
Conduit and fittings as needed (<i>must be UL listed for use in Class I, Div 1 locations</i>)	Locally Sourced

4

Installation



NOTE: When the installation is complete, make sure this guide is left with the service station owner or operator.

The DC400 DCS consists of a controller (404-4) and a sensor (S404). Follow these instructions for installation of the DCS 404-4 controller. Franklin Electric (FE) sensor(s) approved for use with the DC400 DCS come with their own installation instructions.

4.1

Dispenser Cutoff Instructions

⚠ WARNING:

- Only qualified service technicians experienced with petroleum dispensing and pumping systems should install the DC400 DCS.
- *DO NOT* exceed the 12 A (continuous), 250 VAC relay contact rating of this controller. Relay contacts are not fused.

NOTE:

- Install the DC400 DCS *ONLY* in a UL listed dispenser.
- The DC400 DCS *CANNOT* be installed if there is no junction box or open port on the junction box.

Procedure

1. Remove all power to the dispenser.
2. Lockout and tag the corresponding dispenser circuit breaker.
3. Open / remove the dispenser lower panel for access to the dispenser hazardous area. Inspect the hazardous area to locate the dispenser explosion proof power entry junction box. The DCS (404-4) controller will be wired into the dispenser via a spare conduit hub located on the dispenser power entry junction box.
4. Determine where to best locate the DCS controller and how best to plumb conduit from the dispenser spare conduit hub to the controller. The controller must be located so that regular servicing of the dispenser (such as changing of fuel filters) will not be impeded. The controller can be located in the dispenser hazardous area or suspended down below the dispenser in the dispenser sump as room dictates (see Figure 1).

NOTE: Because each dispenser installation is unique it is impossible to provide a “one size fits all” conduit fitting kit. Necessary explosion-proof conduit and conduit fittings must be determined and supplied by the installer. The DCS controller conduit size is ¾" NPT. Simple fittings such as elbows, sweeps, unions, and nipples should be used and must be UL listed and suitable for use in Class I, Div 1, Group D locations.

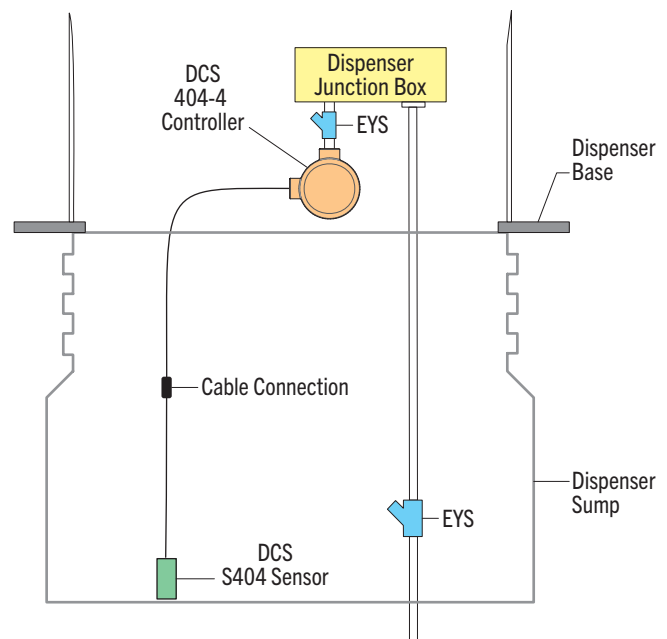


Figure 1 – Typical system installation in a dispenser sump.

5. Open the dispenser power entry junction box cover and retain hardware for later use.

Remove spare junction box plug and plumb explosion-proof conduit from the spare conduit entry hub to the DCS controller power port (the port with 6 wires protruding). Thread the 6 wires coming out of the power port of the controller through the conduit to the dispenser power entry junction box.

IMPORTANT:

- Be sure installation of conduit, fittings and wiring is in accordance with local, state and national electrical codes. A conduit seal must be installed between the dispenser J-box and the DCS controller. The conduit seal must be within 18" of the dispenser J-box and the DCS controller. Refer to NEC NFPA 70, article 501.15 (A) (3), 2011. Make sure the dispenser power entry junction box has enough spare room to accommodate the additional controller wires (see the Table 3.4).
- When tightening the conduit to the DCS controller, use a wrench on the conduit fittings and *NOT the controller body*.

6. Wire the DCS controller power wiring per the schematic that matches your dispenser (see § 5.1). *Contact the dispenser manufacturer for a wiring diagram if you are unsure of the dispenser input power wiring.*

▲ WARNING: Make sure to connect both ground wires and verify they are connected to earth ground. Failure to do so may result in a fire or explosion hazard in case of a fault condition.

7. Connect the sensor wire cable coming from the DCS controller to the appropriate Franklin Electric sensor. *Refer to the sensor's installation instructions for installation, wiring and testing of the sensor.*

IMPORTANT: The sensor must be installed in accordance with the sensor's control drawing and with Franklin Electric's control drawing 000-1737.

8. Double check all dispenser and controller power wiring to be sure it is correct, then replace the dispenser power entry junction box cover. Secure the cover with the fastening hardware retained in Step 5.

9. Turn the dispenser power back on. *The dispenser should operate normally.*
10. Replace and secure lower dispenser door(s).
11. Test the DC400 DCS by submerging the sensor in water. *The dispenser should shut off and remain off as long as the sensor is submerged.*

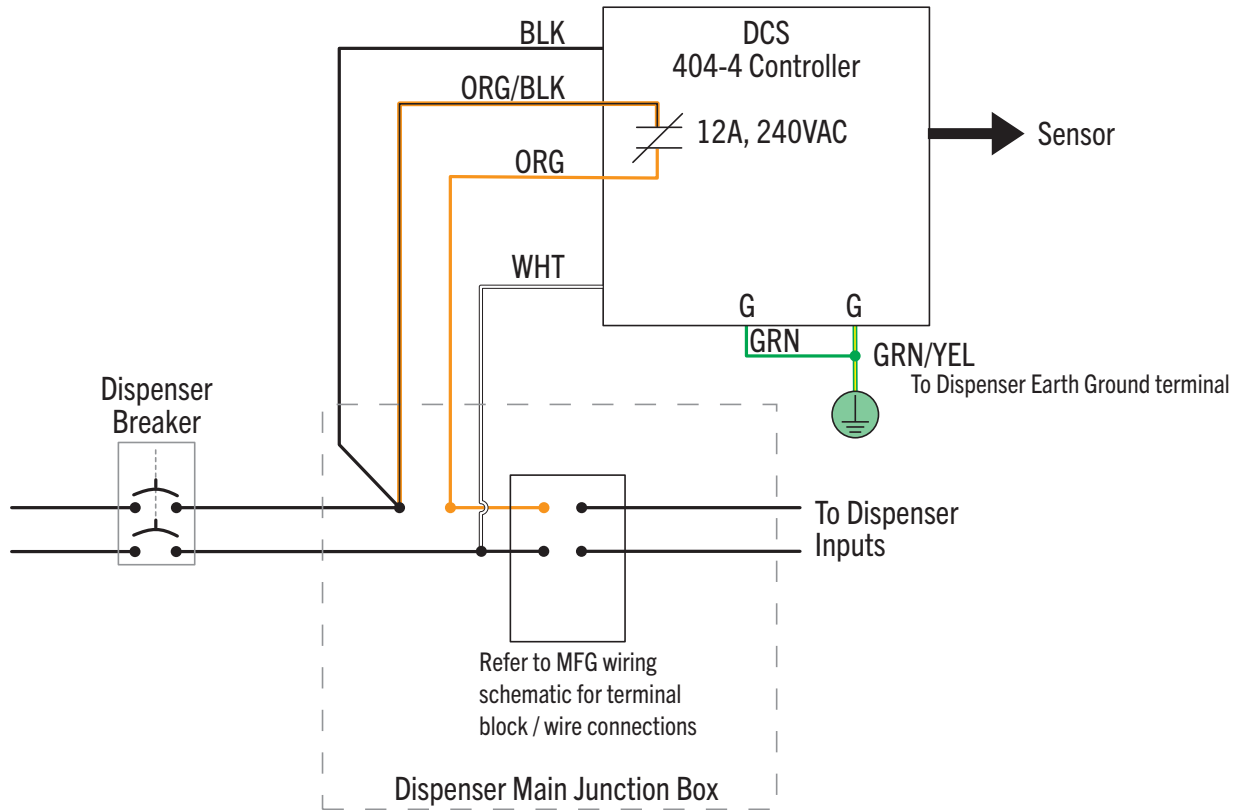


Figure 2 – Power wiring schematic for controller dispenser connection.

4.2 Submersible Pump Cutoff Instructions

⚠ WARNING:

- Only qualified service technicians experienced with petroleum dispensing and pumping systems should install the DC400 DCS.
- This controller is *NOT* for use with 3-Phase pumps or Variable Frequency Drive Pump installations.
- *DO NOT* exceed the 12 A (continuous), 250 VAC relay contact rating of this controller. Relay contacts are not fused. This controller is suitable for most submersible pumps rated up to 2 HP @ 250 VAC and 1½ HP @ 120 VAC, provided the maximum pump motor service factor amperage is 12 A or less. *Contact the submersible pump manufacturer if in doubt.*
- *Remove power to avoid possible electrocution or ignition of explosive vapors.*

NOTE:

- Install the DC400 DCS *ONLY* in a UL listed dispenser.
- The DC400 DCS *CANNOT* be installed if there is no junction box or open port on the junction box.

Procedure

1. Remove power to the STP.
2. Lockout and tag the corresponding STP circuit breaker.
3. Determine where best to place the DCS controller in the sump and then procure the necessary conduit and fittings (STP sump installations can vary). In pump cutoff installations, the DCS controller will be connected directly to the integral electrical junction box on the STP via rigid explosion proof conduit.
 - A typical means of connecting the controller to an STP via an explosion proof union is shown in Figure 3. All fittings must be UL listed and suitable for use in a Class I, Div 1, Group D environment.

NOTE: If the STP junction box does not have a removable plug or opening, installation adapters are available as listed in Table 4.1.

TABLE 4.1

Installed STP	Installation Adapter
FE PETRO®	TS-FE
Red Jacket®	TS-RJ
Red Jacket® Quantum	TS-RJQ

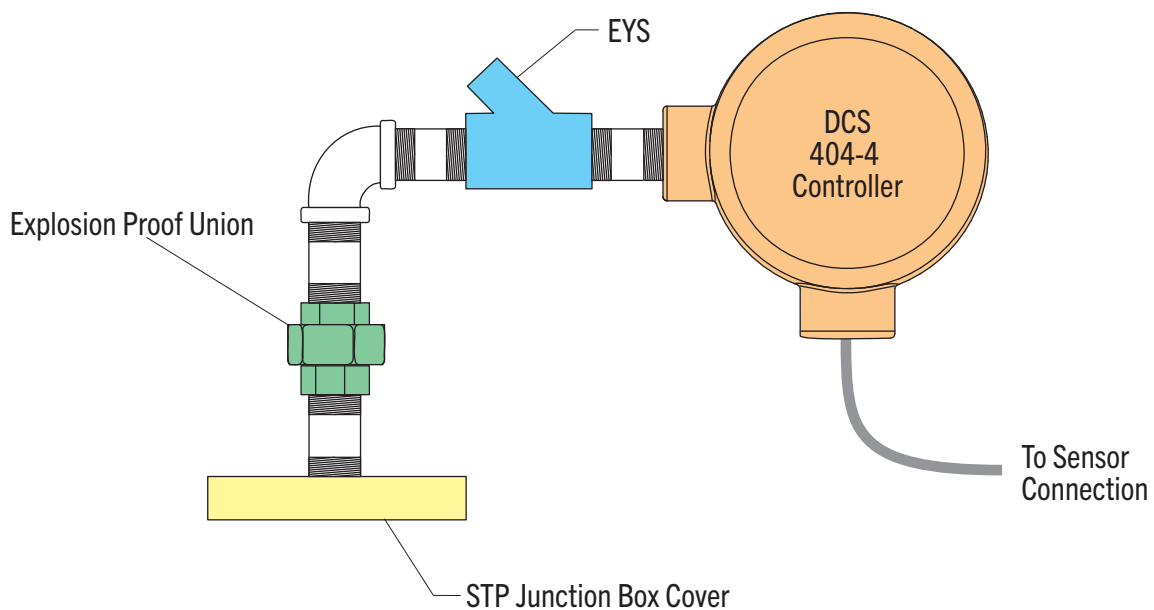


Figure 3 – Typical connection to STP.

4. Remove the STP junction box cover / plug. Make sure the STP junction box has enough room to accommodate the additional controller wires (see Table 3.4). Thread the six controller power wires from the power port through the conduit fittings and plumb the conduit fittings to the controller. Connect the controller power wires to the STP wiring as shown in Figure 4a (Figure 4b is for example only).

⚠ WARNING: Make sure to connect both ground wires and verify they are connected to earth ground. Failure to do so may result in a fire or explosion hazard in case of a fault condition.

5. Join the controller conduit to the STP junction box cover and replace the cover on the STP and securely tighten. A union will be required to do this (see Figure 3). A conduit seal must be installed between the dispenser J-box and the DCS controller. The conduit seal must be within 18" of the dispenser J-box and the DCS controller. Multiple conduit seals may be required for some installations, depending upon the distance between the dispenser J-Box and the DCS controller. Refer to NEC NFPA 70, article 501.15 (A) (3), 2011.

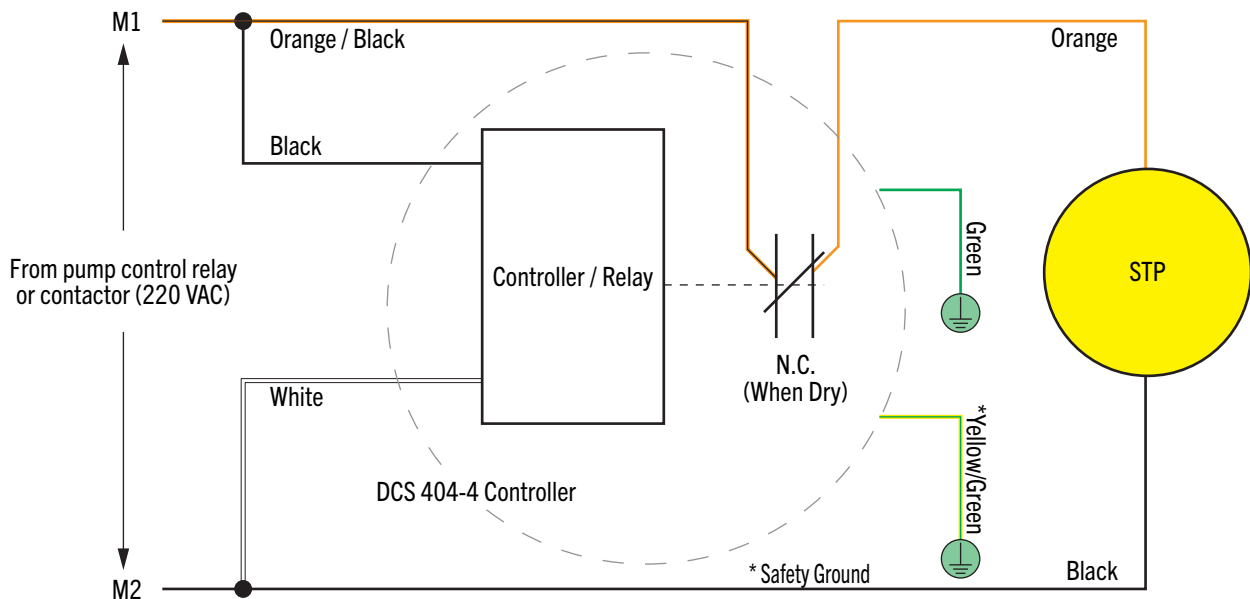


Figure 4a – Power wiring schematic for STP connection.

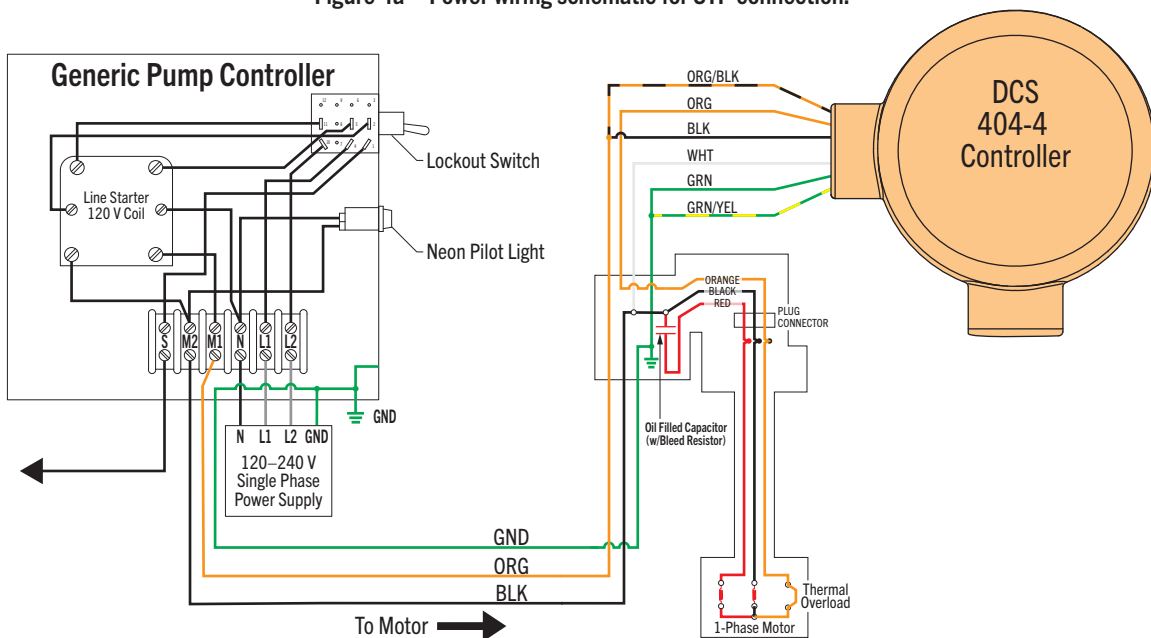


Figure 4b – Power wiring example for STP connection.

6. Connect the sensor wire cable coming from the DCS controller to the S404 sensor. Reference the S404 installation instructions for installation, wiring and testing of the sensor (see § 5.3).
 7. Turn the STP circuit breaker back on and test the DC400 DCS for proper operation. *With the sensor dry, the STP should operate normally.*
 8. Next, test the DC400 DCS pump cutoff by submerging the sensor in water. *The pump should shut off and remain off as long as the sensor is submerged.*
- NOTE:** If the pump is controlled and monitored by an external pump controller or tank gauge, this device may need to be reset when the sensor is removed from the water.

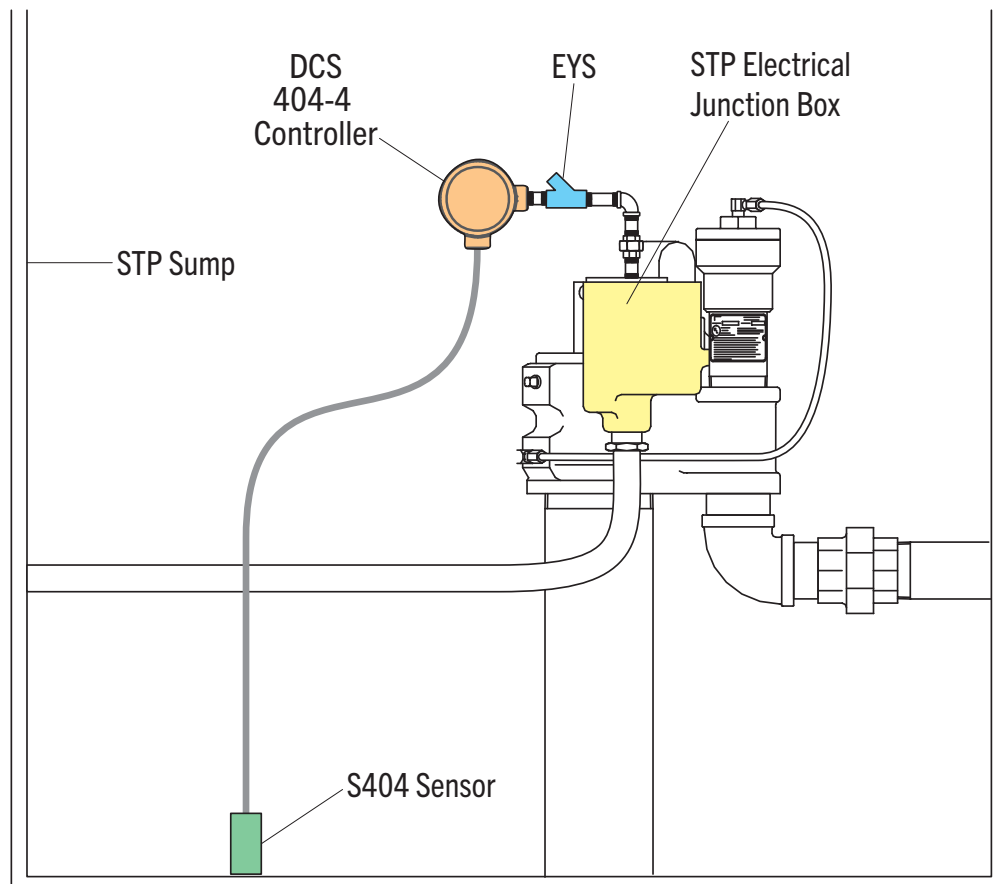


Figure 5 – Typical STP sump installation.

4.3 Alarm Wiring Instructions

IMPORTANT: For all applications, do not exceed the relay contact rating of 250 VAC, 12 A.

The relay contacts (ORANGE/BLACK and ORANGE wires) on the DCS controller are normally closed dry contacts (when power to the controller is applied) that will open when liquid is detected. This enables the DC400 DCS to be wired for various alarm notification and monitoring.

Figure 6 shows an example of alarm wiring for applications that do not require positive shutdown but simply some sort of visual and/or audible notification. In this example the alarm light illuminates when the DC400 DCS detects liquid.

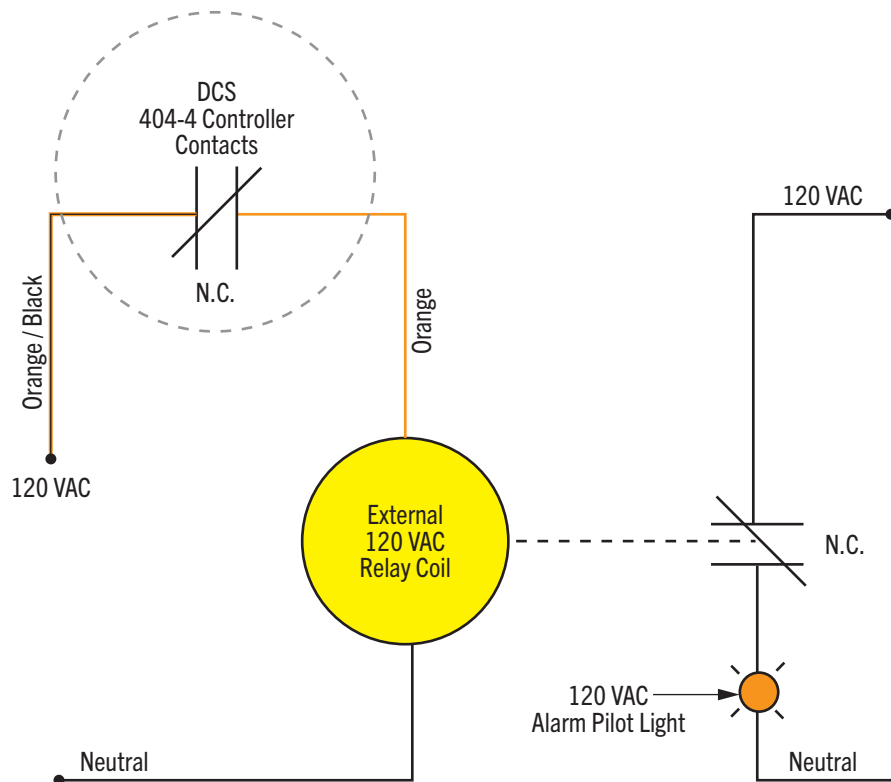


Figure 6 – Wiring example for Non-Positive Shutdown.

4.3.1 Testing

Test the function of the system according to applicable codes. *Test immediately after installation, and at least annually to verify proper system operation.*

4.3.2 Troubleshooting

If the DCS controller relay repeatedly cycles or oscillates when the sensor is tripped, it is likely that the controller is switching its own power. Check the wiring diagram and confirm that the controller is wired properly. Make sure that the ORANGE/BLACK, RED and BLACK wires are tied to power from the breaker and the ORANGE wire feeds the dispenser. If problems continue, contact FE Technical Support at 800-984-6266.

5 Appendix

5.1 Dispenser Specific Wiring Diagrams

5.1.1 Dresser-Wayne®

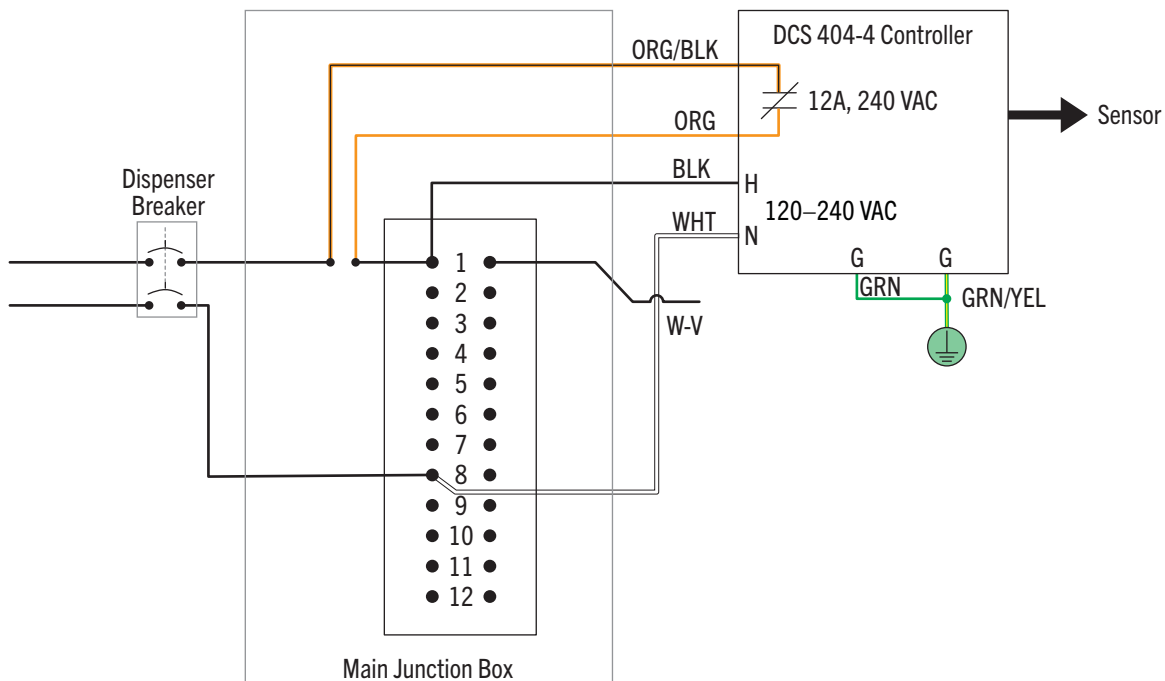


Figure 7 – DCS controller wired to a Vista 3 Series 120 V dispenser.

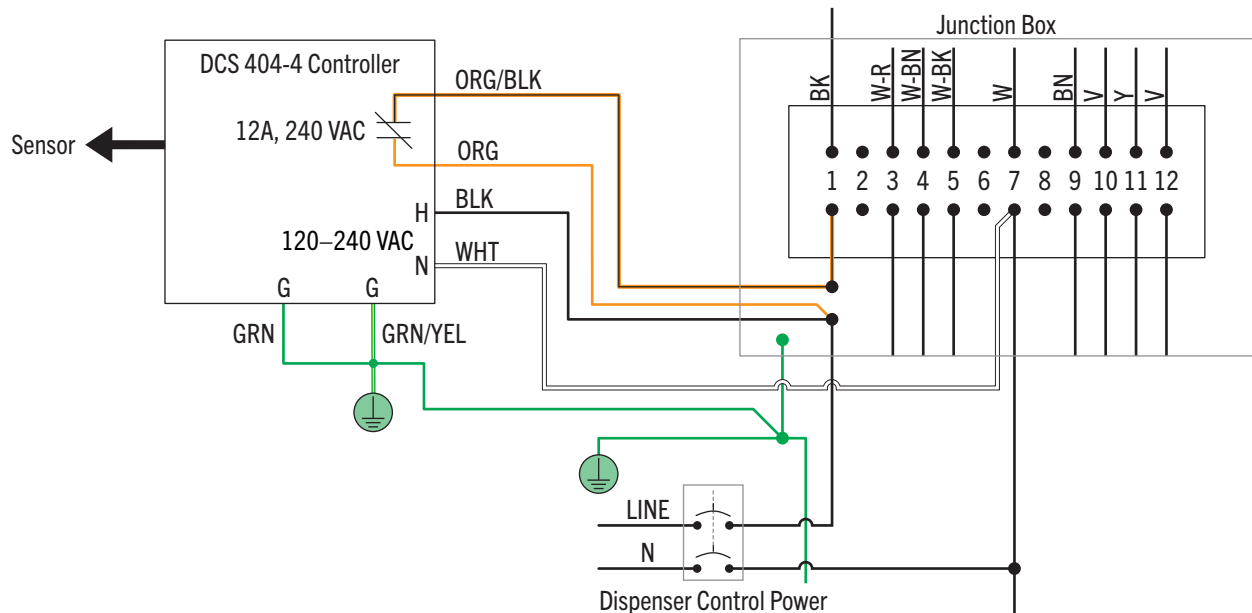


Figure 8 – DCS controller wired to an Ovation® 120 V dispenser.

5.1.2 Gilbarco®

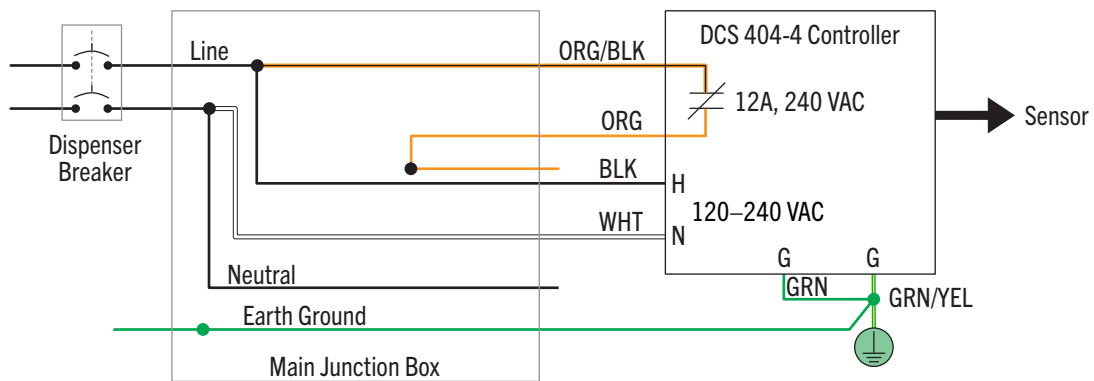


Figure 9 – DCS controller wired to an Eclipse dispenser.

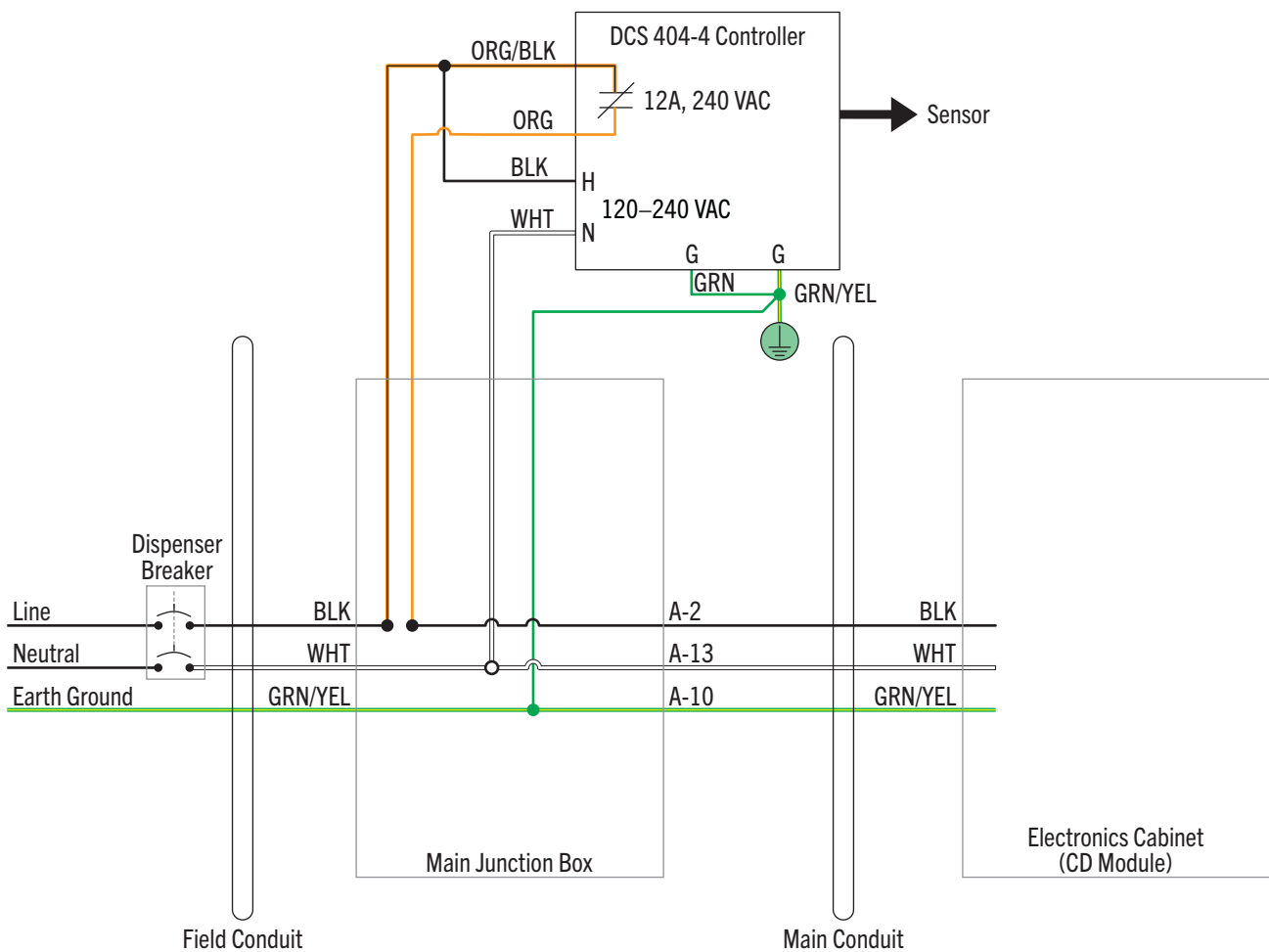


Figure 10 – DCS controller wired to an Encore™ 300 or 500 dispenser.

5.1.3 Tokheim™

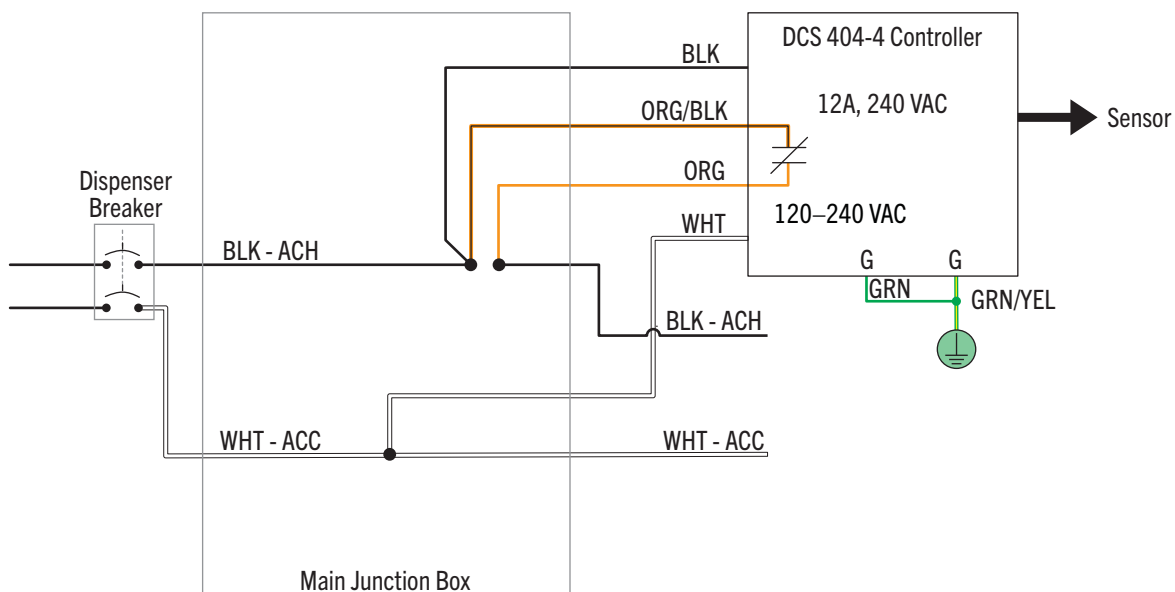


Figure 11 – DCS controller wired to a 262 or 262A dispenser.

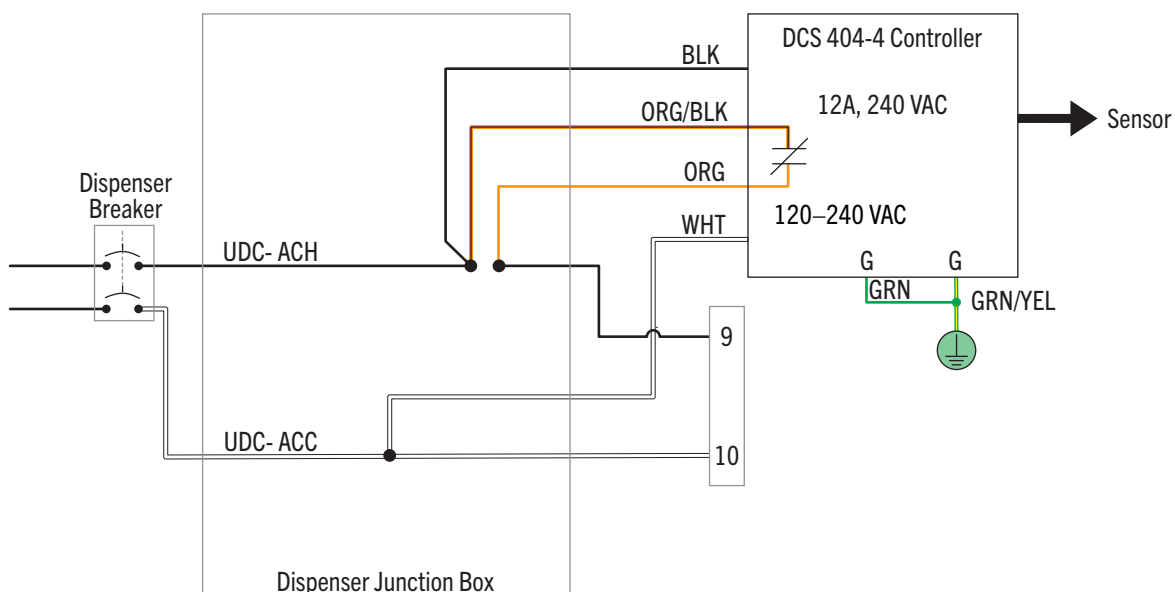


Figure 12 – DCS controller wired to a Premier™ dispenser.

5.2 Replacement Parts

TABLE 5.1 – Related Documents

Part Number	DC400 Dispensing Cutoff System Component
404-4	Controller
S404	Liquid Sensor

5.3 Related Documents

Documentation can be found online at www.franklinfueling.com.

TABLE 5.2 – Related Documents

Part Number	Description
000-0317	S404 Sensor Install Guide
TB0420-03	Field Wiring Cable Selection Guide

5.4 Certifications / Approvals

- UL
- Third party certification of leak detection capabilities

5.5 Glossary

DCS Dispensing Cutoff System
IS Intrinsically Safe
STP Submersible Turbine Pump
TPI Turbine Pump Interface



Franklin Electric

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