IoT Fuel Control Terminal

Installation Guide

Ward
Telematics and Fuel Control

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Notes, Cautions, Warnings, and Danger Definitions

It is important that you read and thoroughly understand this installation guide before attempting service on any Ward product.

The following terms and symbols are used throughout this guide to call attention to the presence of hazards of various risk levels, or to other important information concerning this product.

NOTE: Indicates important information that helps you better understand your Ward device.

CAUTION: Indicates potential damage to hardware, loss of data, and how to avoid possible issues.

WARNING: Indicates the presence of a hazard which MAY cause death, severe personal injury, or property damage if ignored.

DANGER: Indicates the presence of a hazard which WILL cause death, severe personal injury, or property damage if ignored.

THIS SAFETY TERMINOLOGY IS IMPORTANT AND MUST BE TAKEN SERIOUSLY.
FAILURE TO FOLLOW THESE GUIDELINES CAN RESULT IN DEATH,
SEVERE PERSONAL INJURY, OR SUBSTANTIAL PROPERTY DAMAGE!

Safety Considerations

This manual presents the installation of a typical system. However, it is impractical to provide specific instructions for each installation due to the wide variation of dispensers, wiring schemes, and applications.

WARNING: Consult this manual before attempting any installation procedures on the FCT. ONLY individuals who are trained and qualified should install the FCT.

CAUTION: All peripheral control equipment used with the FCT should:

- Be UL listed.
- Have the appropriate communication protocol.
- Not be installed over or in a hazardous location.
- Be determined to be safe and acceptable by the authority having jurisdiction with regard to suitability, overall installation, and any alteration to other existing equipment required for the overall installation.

DANGER: THERE ARE HAZARDOUS VOLTAGES INSIDE THE FCT CABINET. Disconnect all power during installation or servicing of the FCT. Power may be supplied from more than one breaker source.

WARNING: Take all necessary precautions when working around hazardous materials and in hazardous areas. Follow applicable electrical codes. Do not use electrically powered tools or equipment when in a hazardous location. If you are unsure of the safety of any action, consult local code authorities for code specifications.

DANGER: Failure to comply with ALL safety requirements may result in death, severe personal injury, or substantial property damage.

NOTE: Specifications and/or installation instructions are subject to change without prior notice.

Regulatory Compliance

Declaration of Conformity

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and, (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the requirements for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment.

CAUTION: This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

CAUTION: Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

ISO 9001:2008 CERTIFICATION™

Intertek

INFORMATION TECHNOLOGY EQUIPMENT SAFETY PART 1: GENERAL REQUIREMENTS >VALID WITHOUT TECHNICAL REVISION: 01JAN2022< [UL 60950-1:2007 ED.2 +R:14OCT2014]

INFORMATION TECHNOLOGY EQUIPMENT SAFETY PART 1: GENERAL REQUIREMENTS (R2016) >VALID WITHOUT TECHNICAL REVISION: 01JAN2022< [CSA C22.2#60950-1:2007 ED.2+A1;A2]

CONTROL EQUIPMENT FOR USE WITH FLAMMABLE LIQUID DISPENSING DEVICES [UL 1238:2015 ED.6+R:07SEP2016]

CSA C22.2#22 ISSUED: 1986/02/28 (R2013) ELECTRICAL EQUIPMENT FOR FLAMMABLE AND COMBUSTIBLE FUEL DISPENSERS - GEN. INST. NO. 1 1986

INFORMATION TECHNOLOGY EQUIPMENT - SAFETY - PART 22: EQUIPMENT TO BE INSTALLED OUTDOORS [UL 60950-22:2017 ED.2]

INFORMATION TECHNOLOGY EQUIPMENT - SAFETY - PART 22: EQUIPMENT TO BE INSTALLED OUTDOORS [CSA C22.2#60950-22:2017 ED.2]

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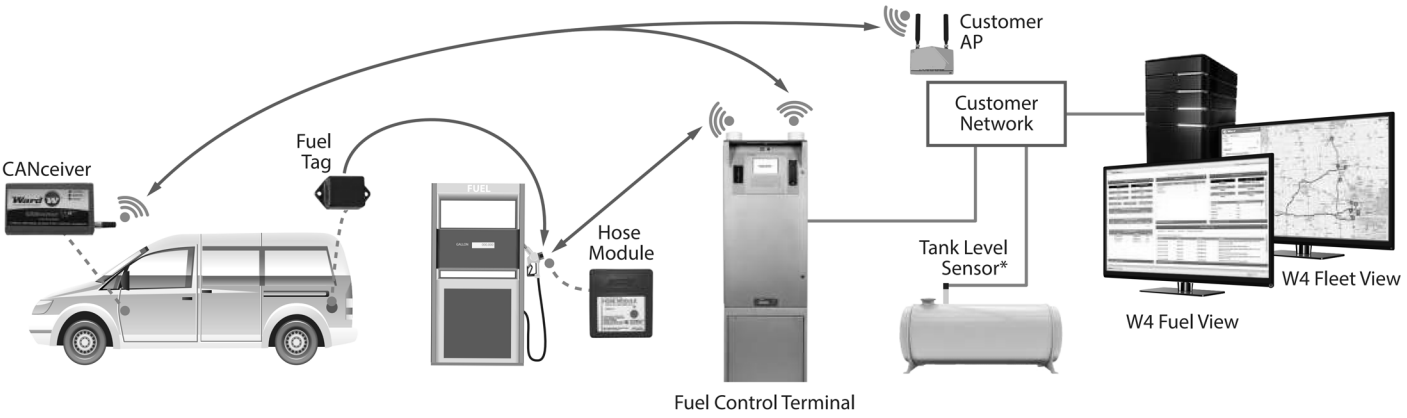
1. Overview



Fuel System Overview

Figure 1. Ward Fuel System Overview

A typical fueling system consists of the following components:

Ward Fuel Control Terminal (FCT)
Ward CANceiver™
Ward Fuel Tag
Ward Hose Module
Ward Fuel View™ Software with Authentication Scripts
Ward Fleet View software (for GPS and Geo-fenceing)
Fleet Vehicles
Fuel Dispensers
Fuel Storage Tanks
Automatic Tank Guage (ATG)
Database, Web/Communication Server
Data Communications Network

2. Installation Considerations and Requirements

NOTE: Ward typically ships all small items associated with the FCT with the base. Check carefully inside the base and its shipping container for any loose items such as Hose Modules, wire ties, RF antennas, fiber optic media converters, and other loose items before discarding the box.

WARNING: A readily accessible disconnect device shall be incorporated external to the equipment.

WARNING: Equipment must be installed per local electrical code requirements.

WARNING: Intended for installation on non-combustible surface.

WARNING: Seals to be installed on cord or conduit connections between equipment and dispensing unit per Canadian electrical code (Canada only).

WARNING: The ground should originate from the service ground at the breaker panel. A separate ground rod shall be installed near the FCT to enhance grounding characteristics. The AC wiring should be routed to the FCT through a separate explosion proof conduit not shared with low voltage or communication wiring.

WARNING: If the reset complete/in use signal of the dispenser is 220VAC, different dispenser interface boards are needed. Using a standard dispenser interface board to control a dispenser with a 220VAC hook signal will result in equipment damage.

NOTE: Be certain all necessary wiring is in place, correct, and operational before potting conduit seals.

Dispenser Considerations

1. Test all dispensers for proper operation before installing any hardware or rewiring any circuits!
2. Document and report any existing malfunction with fuel dispensing equipment to customer before installation begins!

TIP: Verifying dispenser functionality prior to the FCT startup should eliminate the dispenser as the cause of any discrepancies during testing.

- Dispensers should be equipped with a reset handle so the FCT can detect the 'in use' signal, commonly referred to as reset complete or after reset (ARS).
- Dispensers should be equipped with a pulser to detect, monitor, and record product flow.
- Most commercial dispensers have dry contact pulsers that will satisfy the above requirements and Ward supports a variety of electronic pulsers.
- Most commercial electronic pumps have an open collector type pulser.
- A solenoid valve is also desirable for controlling fuel flow. Alternatively, the FCT may control the pump motor directly in suction lift models.

Ward carries many pulser styles to upgrade almost any fuel dispenser that is not currently equipped with a pulser. Contact Ward for assistance with special applications.

WARNING: All electrical wiring, and conduit, etc., must comply with all governing local, state, National Electrical Codes (NEC), and NFPA Fire codes.

Field Wiring Requirements

- All wiring must have an NEC and UL approved gas and oil resistant insulation. Ward recommends using Teflon coated TFFN or equivalent wire.
- All low voltage wire must be stranded 18 AWG minimum.
- All AC control wiring must be adequately sized according to length of wire and amount of current it must carry (14 AWG minimum). Consult the NEC for correct wire gauge.
- Conductor size in relation to the size of the dispenser junction box (j-box) is also a consideration. Refer to the NEC for correct j-box sizes.
- While no special wiring techniques are required, all field wiring should be labeled, color- coded or numbered to facilitate proper termination.
- Low voltage wiring such as pulser and communication wiring should be in a separate conduit from high voltage pump control wiring. Pulser wiring should be shielded cable, and communication wire should be twisted pairs with a minimum rating of CAT-5.
- All conduit and wiring installation must be wired to local, state and federal codes. All conduit exiting grade must have threaded seal-offs installed per applicable codes.

NOTE: All conduit on the fuel island must have a seal off within the first 18 inches above grade and be the first fitting out of the ground.

NOTE: Seal-offs must not be poured until after final inspection approving the installation.

Installation Location

WARNING: To avoid personal injury, equipment damage, and property loss, this equipment must be installed in compliance with the National Electric Code and the Flammable and Combustible Liquids Code (NFPA 70 and NFPA 30). All applicable local safety codes must be followed.

- The FCT should be installed in a location near the equipment that it will control, such as on the fuel island with the dispensers, or at either end of the island protected by bollard guard posts.
- Whenever possible, the FCT should be installed so the front is facing in-line with the island, not toward the drive lanes. This orientation will allow the user safe access from either side of the island and minimize traffic hazards to pedestrians.
- If the FCT must be installed facing a drive lane, it should be installed as far back from the middle of the island (next to the edge) as safely possible. There should be a minimum of 30 inches in front of the FCT to the opposite edge of the fuel island for safe use.
- If safety considerations allow, position the FCT so that it will be facing away from morning and evening sun for best display legibility.
- In colder climates where you may experience snow or ice storms, face the FCT away from the direction winter storms typically approach.

FCT Enclosure

The FCT enclosure consists of two parts:

- FCT Cabinet
- Island Conduit Receptacle (base)

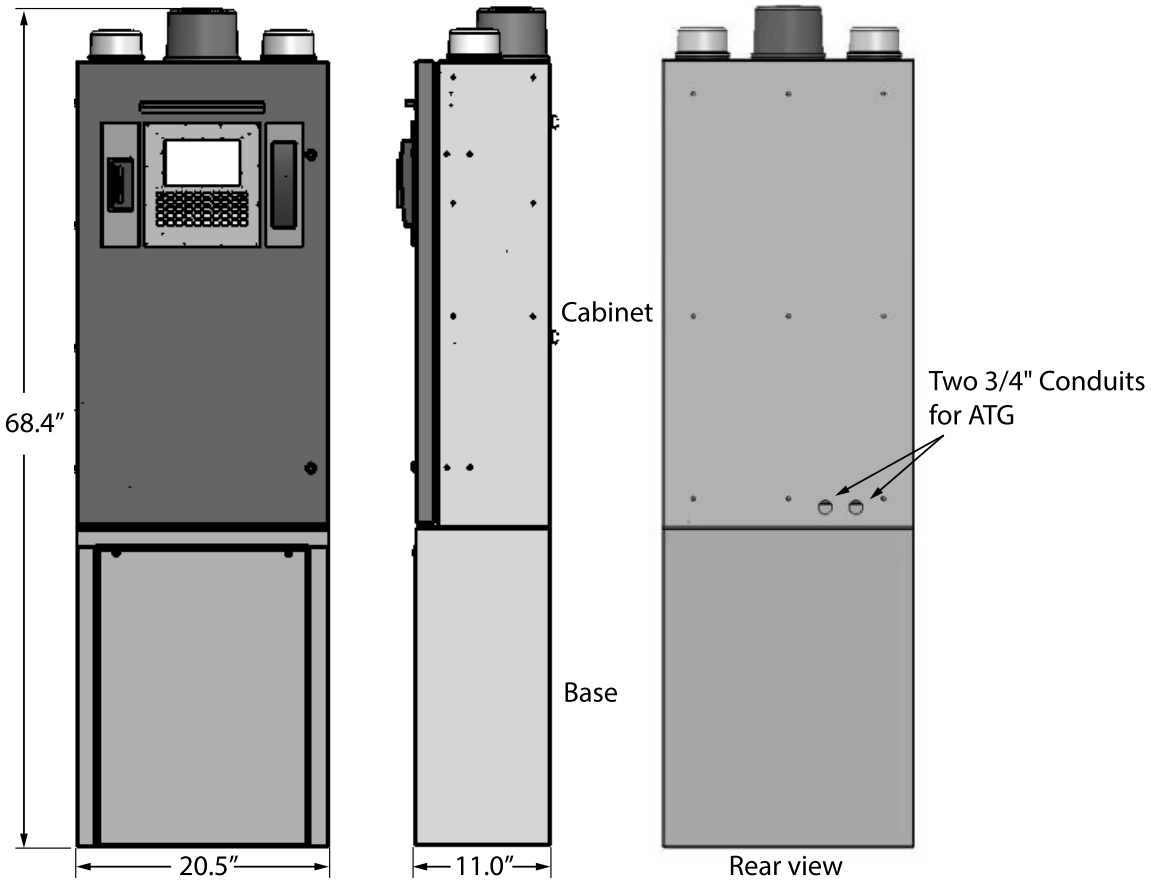


Figure 2. FCT Dimensions

FCT Island Base

The Island Conduit Receptacle serves as conduit termination point and the base for the FCT. Conduits are terminated on the base conduit termination plate, which is also the floor for the FCT cabinet. The base conduit termination plate contains 17 pre-stamped, ¾ inch knock-outs to facilitate conduit termination.

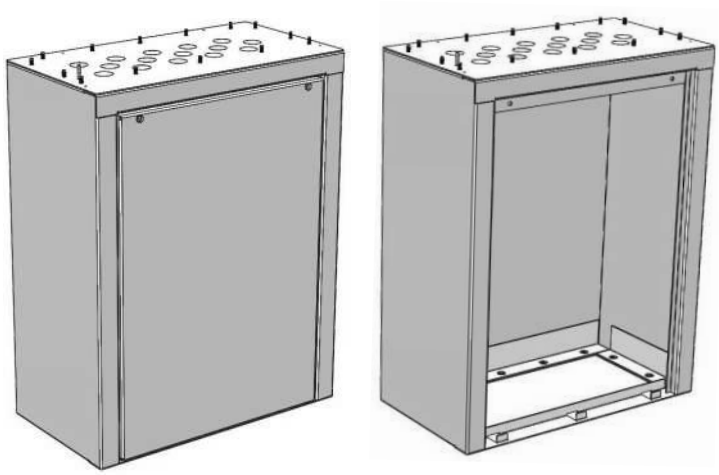


Figure 3. FCT Base - door and without door views

CAUTION: Per all applicable NEC installation codes, all conduit on the fuel island must have a seal-off within the first 18 inches above grade and be the first fitting out of the ground. The seal-off must also be installed below the conduit termination plate on the FCT base.

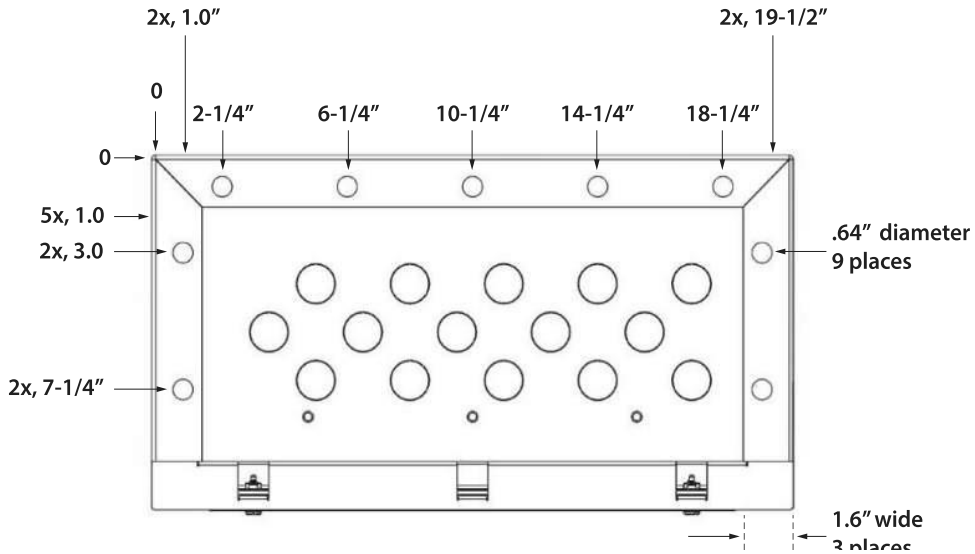


Figure 4. FCT Base - bottom view and dimensions

Conduits

- All wire should be installed in rigid ¾ inch (minimum) conduit buried in a trench.
- Install all wiring and conduit complying with all applicable wiring codes and using reliable installation practices.
- All conduits on the fuel island must have a seal off within the first 18 inches and be the first fitting out of the ground.
- Consult the NEC to determine conduit size based on wire count.
- Above ground conduit is allowed in retrofit applications IF installed in a manner which:
  - » Minimizes tripping hazards
  - » Is approved by the customer
  - » Is approved by applicable codes

Area Classifications for Dispensing Devices

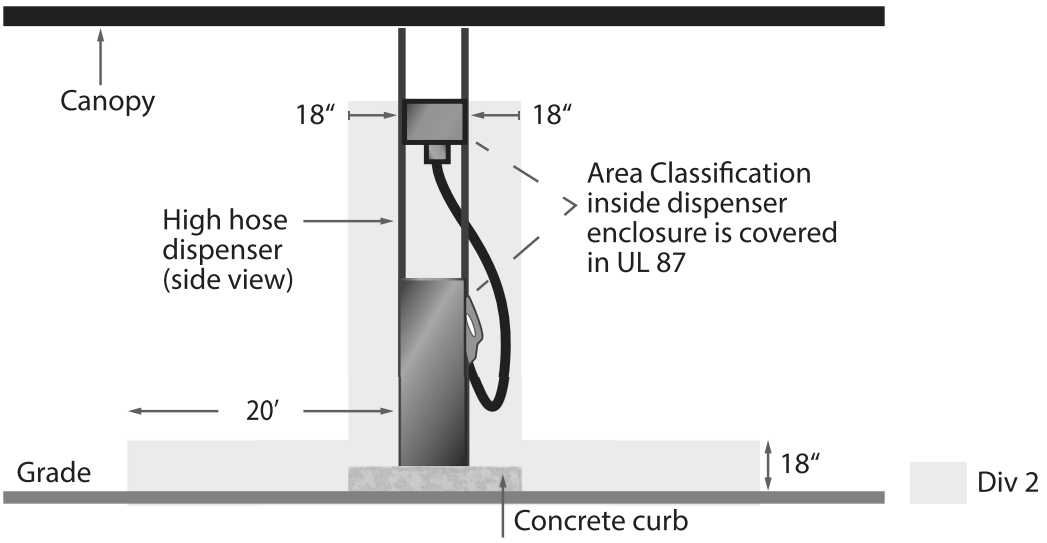


Figure 5. Class I Overhead Clearance Requirements

NOTE: Class I location around overhead motor fuel dispensing units is in accordance with NEC Table 514.3(B)(1).

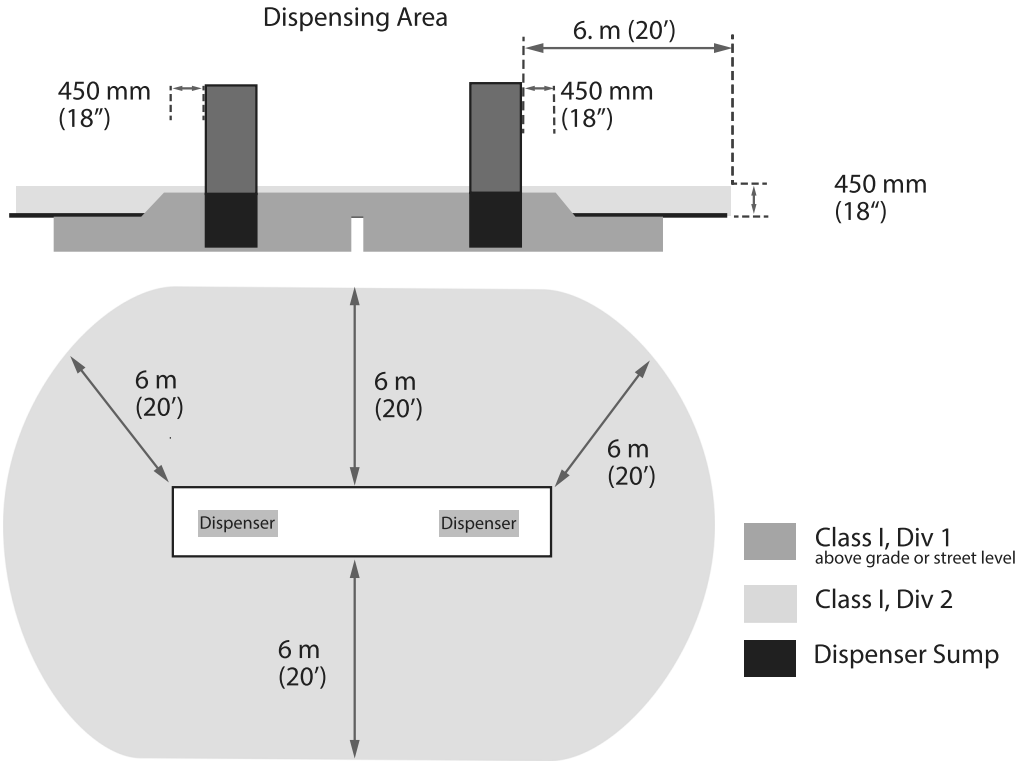


Figure 6. Class I Div 1 and Class I Div 2 Clearance Requirements

CAUTION: Area Classification information is provided for reference only. Ward recommends the installer reviews current National, State, and Local codes before proceeding with the FCT installation.

Area Classification Definitions

Class I, Division 1

A location in which ignitable concentrations of flammable gases, flammable liquid-produced vapors, or combustible liquid-produced vapors can exist under normal operating conditions.

Class I, Division 2

A location in which ignitable concentrations of such flammable gases, flammable liquid-produced vapors, or combustible liquids above their flash points may exist frequently because of repair or maintenance operations or because of leakage.

Location	Division (Group D)	Zone (Group IIA)	Extent of Classified Location
Dispensing Device (except) Overhead Type Under dispenser containment	1	1	Entire space within and under dispenser pit or containment.
Dispenser	2	2	Within 450 mm (18 in) of dispenser enclosure or that position of dispenser enclosure containing liquid handling components, extending horizontally in all directions and down to grade level.
Outdoor	2	2	Up to 450 mm (18 in) above grade level, extending 6 m (20 ft) Horizontally in all directions from dispenser enclosure.
Indoor			
Mechanical ventilation	2	2	Up to 450 mm (18 in) above floor level, extending 6 m (20 ft) horizontally in all directions from dispenser enclosure.
Gravity ventilation	2	2	Up to 450 mm (18 in) above floor level, extending 7.5 m (25 ft) horizontally in all directions from dispenser enclosure.

Dispensing Device	Class I, Division 1	Class I, Division 2
Compressed Natural Gas	Entire space within the dispenser enclosure.	15 m (50 ft) in all directions from dispenser enclosure.
Liquefied Natural Gas	Entire space within the dispenser enclosure and 1.5 m (5 ft) in all directions from the dispenser enclosure.	From 1.5 - 3.0 m (6 - 10 ft) in all directions from the dispenser enclosure.
Liquefied Petroleum Gas	Entire space within the dispenser enclosure; 450 mm (18 in) from the exterior surface of the dispenser enclosure to an elevation of 1.5 m (5 ft) above the base of the dispenser and within 6.0 m (20 ft) horizontally from any edge of the dispenser when the pit or trench is not mechanically ventilated.	Up to 450 mm (18 in) above ground and within 6.0 m (20 ft) horizontally from any edge of the dispenser enclosure, including pits or trenches within this area when provided with adequate mechanical ventilation.

Typical Conduit and Wiring Illustrations

Typical Island Overhead View Wiring Illustration

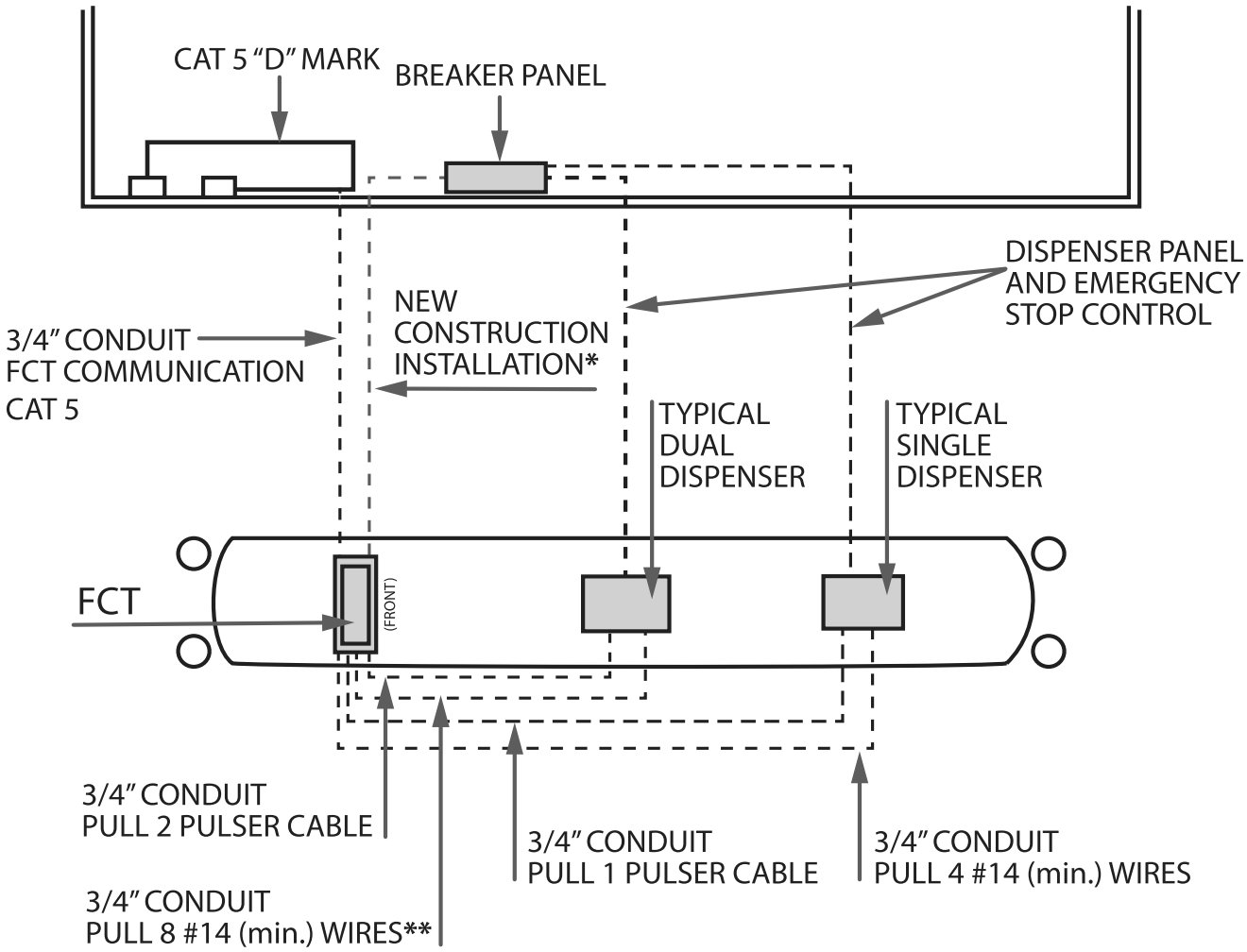


Figure 7. Typical Conduit and Wire Pull Layout - overhead view

* Recommended FCT Power for new construction installation, install a new 3/4 inch conduit from the breaker panel to the FCT base conduit termination plate (as noted with red line in Figure 7).

** Optional FCT Power: Pull three additional 14 AWG wires for Hot, Neutral & Ground only if FCT is sharing primary 120VAC power with nearby dispenser.

NOTE: The ground should originate from the service ground at the breaker panel. A separate ground rod shall be installed near the FCT to enhance grounding characteristics. The AC wiring should be routed to the FCT through a separate explosion proof conduit not shared with the pulser wire.

Typical FCT Single Dispenser Illustration

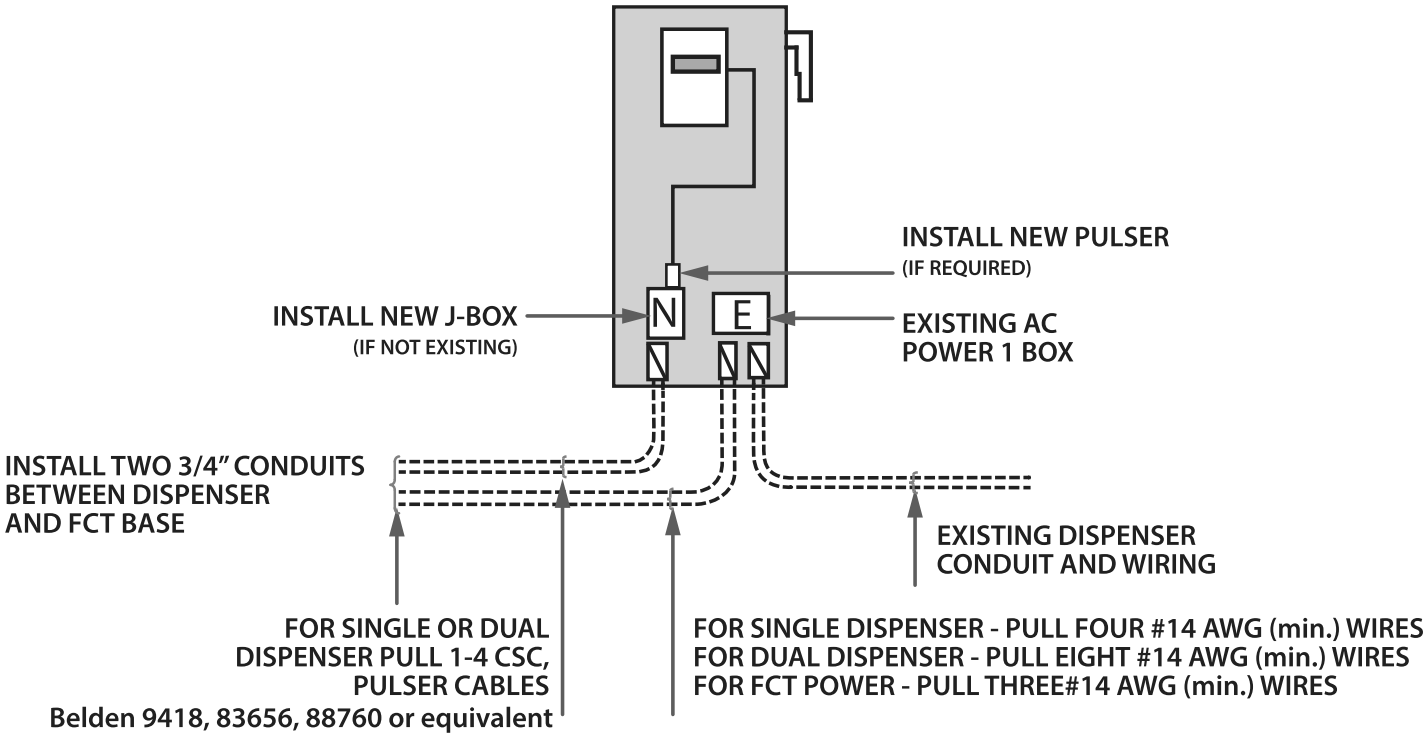


Figure 8. Typical FCT to Dispenser Conduit and Wire Pull - street level view

WARNING: Proper conduit access into the enclosure must be observed in order to maintain a safe operating environment. Failure to maintain proper conduit access could result in serious personal injury, death, property loss, and equipment damage through explosions, fire, or electrical shock.

WARNING: Low voltage cables and high voltage AC wires must not be run through the same conduit. Failure to follow proper wiring procedures may result in faulty operation in addition to possible explosion, fire, and electrical shock hazards.

CAUTION: All conduits must enter the FCT cabinet through the base conduit termination plate. Conduit entry into any of the FCT cabinet walls above the base conduit termination plate may induce rain or water intrusion into the FCT and cause damage to electronic hardware and electrical connections. It is the installers responsibility to ensure that all conduit entry points into the FCT cabinet are properly sealed and water/vapor tight.

NOTE: If there is not enough conduit capacity at the site, please contact Ward for assistance.

Typical Site Installation Illustration

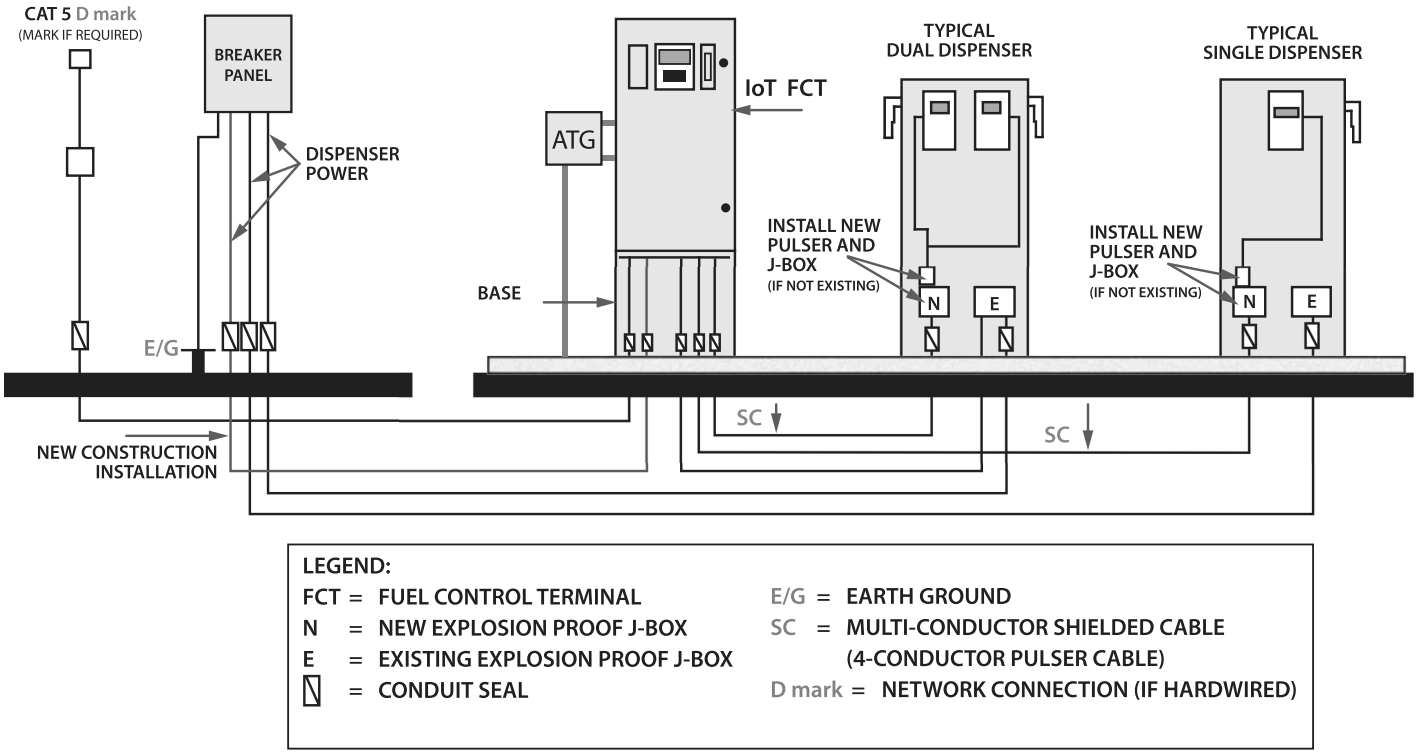


Figure 9. Typical Site Installation Showing J-boxes and Conduit Seals

Conduit Scheme and Wire Pulls

Conduit for Communication Line

1. Install a separate ¾ inch rigid conduit between the D-MARK and the FCT base conduit termination plate.
2. In this conduit, pull a communication cable that is specific for the application: an approved CAT 5, CAT 5E, or CAT 6 cable appropriate for 10/100 or 10/100/1000 data communications.

NOTE: Cellular and Wi-Fi applications provide wireless communication between the FCT and the customers network. FCTs using cellular or Wi-Fi communications will not need a conduit installed between the D-Mark and the FCT for communication cable.

NOTE: The maximum distance for CAT 5 network cable is 100 meters (300 feet) between the FCT and the network switch.

CAUTION: Do not run any high voltage wires in the communication or low voltage conduits.

CAUTION: In areas prone to lightning strikes, Ward recommends using fiber optic cables and media converters for networked applications. This method is less susceptible to damage from voltage surges and will help protect the network and equipment connected to it.

CAUTION: Media converters used in the FCT should have a temperature rating from -40°C to 80°C.

Conduit for Primary FCT Power

Recommended FCT Power

1. Install one ¾ inch conduit between the breaker panel and the FCT base conduit termination plate.

Ward requires the FCT's power source to be supplied from a dedicated 120VAC circuit controlled by a separate 15 Amp circuit breaker. The wires for this circuit shall consist of gas and oil resistant insulation, three conductor, 14 AWG stranded, denoted as HOT, NEUTRAL and GROUND wires. This installation needs to comply with NEC as it pertains to conduit size, type and wire gauge based on the length of circuit from the electrical panel.

2. Pull three UL/NEC approved gas and oil resistant (14 AWG minimum) stranded wires through ¾ inch conduit between breaker panel and FCT base conduit termination plate.

Black	14 AWG	120VAC	from breaker switch at breaker panel
White	14 AWG	Neutral	from breaker panel
Green	14 AWG	Ground	from breaker panel

Optional FCT Power

1. Install one ¾ inch conduit between the FCT base conduit termination plate and the explosion proof j-box located inside the base of the fuel dispenser.

If a dedicated circuit is not available, the FCT may share AC power from a dispenser located near the FCT. The AC power may be fed from the line side feed inside the fuel dispenser. This will ease the installation and may not have an impact to the FCT operation. If the fuel dispenser is electronic and/or has a dedicated light control circuit breaker, use this power feed source before resorting to using the feed to the dispensers pump motor.

WARNING: Fuel dispensers that control low current devices such as electric solenoid valves (ESV) and remote STP starter relays may produce minimal electrical interference on the ac power supply, however dispensers that control high current devices such as heavy duty suction lift motors (SLM) can produce significant electrical interference such as spikes, dips, transients, etc. Sharing the same AC power source between a pump motor and the FCT could have an impact to FCT operation and is not recommended.

Dispenser Conduit, Pulser, and Control Wiring

Single Nozzle Fuel Dispenser Conduit

1. Install two ¾ inch conduits between the explosion proof j-box located inside the base of each single nozzle dispenser and the FCT base conduit termination plate.
   - One ¾ inch conduit for pump control wiring
   - One ¾ inch conduit for pulser cable
2. Install explosion proof j-box to pulser conduit for pulser inside dispenser housing if a low voltage j-box is not already installed.

Single Nozzle Fuel Dispenser Pulser Wiring

3. Pull one UL/NEC approved gas and oil resistant, shielded pulser cable through ¾ inch pulser conduit between FCT base and single nozzle fuel dispenser.

NOTE: The pulser cable must be oil and gas resistant, Teflon coated outer jacket material: FEP (fluorinated ethylene propylene).

Mechanical/Dry-Contact Pulsers

Recommended pulser cable for a single nozzle dispenser (mechanical/dry-contact) pulser that requires two conductors: Beldon 88760: single-pair, (1 pr) 18 AWG (19x30) TC, FEP/FEP, Foil Shld, CMP

Red	18 AWG stranded	Pulse
Black	18 AWG stranded	DC COM

Electronic Pulsers

Recommended pulser cable for a single nozzle dispenser (electronic) pulser that requires four conductors: Beldon 9418: audio/control/instrumentation, 18 AWG (19x30) TC, SRPVC/PVC, Foil Shld, CMG.

Red	18 AWG stranded	+12VDC
Black	18 AWG stranded	DC COM
White	18 AWG stranded	DC COM
Green	18 AWG stranded	Pulse

Single Nozzle Fuel Dispenser Control Wiring

4. Pull four UL/NEC approved gas and oil resistant (14 AWG minimum) stranded wires through dedicated ¾ inch conduit for pump control wiring between FCT and each single nozzle fuel dispenser.

Brown	14 AWG stranded	PPO
Black	14 AWG stranded	PPI
Yellow	14 AWG stranded	ARS
White	14 AWG stranded	P/N

- *OPTIONAL FCT Power*: Pull three additional UL/NEC approved gas and oil resistant (14 AWG minimum) stranded wires through same ¾ inch pump control conduit for primary FCT power only if FCT will share the same power source from nearby dispenser.

Black	14 AWG	120VAC from dispenser breaker switch at breaker panel
White	14 AWG	Dispenser neutral from breaker panel
Green	14 AWG	Dispenser ground from breaker panel

Dual Nozzle Fuel Dispenser Conduit

1. Install two ¾ inch conduits between each dual dispenser and the FCT base conduit termination plate.
   - One ¾ inch conduit for pump control wiring
   - Once ¾ inch conduit for pulser cable
2. Install an explosion proof j-box to the pulser conduit for pulser inside dispenser housing.

Dual Nozzle Fuel Dispenser Pulser Wiring

3. Pull one UL/NEC approved gas and oil resistant, shielded pulser cable through ¾ inch pulser conduit between FCT base and dual nozzle fuel dispenser.
4. Ward recommends pulser cable for a dual nozzle fuel dispenser equipped with a dual electronic pulser that requires six conductors: Belden 83656: Audio/Control/Instrumentation, 18 AWG (19x30) TC, FEP/FEP, Foil+TC Braid Shld, CMP

White	DC COM (Pulse A)
Green	Pulse A
Orange	DC COM (Pulse B)
Blue	Pulse B

Dual Nozzle Dispenser Control Wiring

5. Ward recommends to pull eight UL/NEC approved gas and oil resistant (14 AWG minimum) stranded wires through ¾ inch pump control conduit.

Brown	14 AWG stranded	PPO	Hose A
Black	14 AWG stranded	PPI	Hose A
Yellow	14 AWG stranded	ARS	Hose A
White	14 AWG stranded	P/N	Hose A
Brown	14 AWG stranded	PPO	Hose B
Black	14 AWG stranded	PPI	Hose B
Yellow	14 AWG stranded	ARS	Hose B
White	14 AWG stranded	P/N	Hose B

- *OPTIONAL FCT Power:* Pull three additional UL/NEC approved gas and oil resistant (14 AWG minimum) stranded wires through same ¾ inch pump control conduit for primary FCT power only if FCT will share the same power source from nearby dispenser. .

Black	14 AWG	120VAC hot from dispenser breaker switch at breaker panel
White	14 AWG	Dispenser neutral from breaker panel
Green	14 AWG	Dispenser ground from breaker panel

Conduit Seals

The sealing of conduits must follow the procedures of an authorized City Inspector. Typically, a rough-in inspection by an authorized City Inspector is performed prior to the sealing of the conduits. Ward recommends contacting a locally authorized City Inspector for the required procedures.

1. Seal each conduit using conduit seal-offs and approved sealing compound.

NOTE: The conduit seal should always be the first fitting on the conduit as it exits the surface.

NOTE: Ward recommends using an approved sealing compound, according to NEC.

Power Recommendations

Ward highly recommends the FCT's power source to be supplied from a dedicated 120VAC circuit controlled by a separate 15 Amp circuit breaker. The wires for this circuit shall consist of gas and oil resistant insulation, three conductor, 14 AWG stranded, denoted as HOT, NEUTRAL and GROUND wires. This installation needs to comply with NEC as it pertains to conduit size, type and wire gauge based on the length of circuit from the electrical panel.

If a dedicated circuit is not available, the FCT may share AC power from a dispenser located near the FCT. The AC power may be fed from the line side feed inside the fuel dispenser. This will ease the installation and may not have an impact to the FCT operation. If the fuel dispenser is electronic and/or has a dedicated light control circuit breaker, use this power feed source before resorting to using the feed to the dispensers pump motor.

WARNING: Fuel dispensers that control low current devices such as ESVs and remote STP starter relays may produce minimal electrical interference on the AC power supply, however, dispensers that control high current devices such as heavy duty SLM can produce significant electrical interference such as spikes, dips, transients, etc. Sharing the same AC power source between a pump motor and the FCT could have an impact to FCT operation and is not recommended.

Recommended Wiring Colors for 120VAC

Black	Hot (L1)
White	Neutral
Green	Ground

Standard Interface

The standard FCT interface to a fuel dispenser uses mechanical relays with normally open contacts rated at 30 Amps to control dispenser operation.

This configuration is designed primarily to control three main functions of a fuel dispenser:

1. Control power to a dispensers ESV, STP starter relay, or SLM.
2. Detect if the dispenser is on hook or off hook.
3. Read pulses from a dispensers pulser to determine the amount of fuel that has been dispensed.

WARNING: If the hook signal of the dispenser is 220VAC, different dispenser interface boards are needed. Using a standard hose dispenser interface board to control a dispenser with a 220VAC hook signal will result in equipment damage.

3. FCT Island Installation

Required Tools

The following tools are required for installation and should be on hand:

- ⅜ Masonry drill bit
- Screw driver
- Key to dispenser
- Socket set
- Hammer drill
- 17/64 Drill bit
- 1⅛ inch hole saw
- 1½ inch knock out
- Stepper drill bit
- Wire cutters
- Wire stripper
- Zip ties
- Sharpie marker

Required Materials

- ¾ inch rigid conduit
- Four ⅜ inch concrete anchors (minimum per FCT base)

NOTE: Before installing the FCT, verify that all wiring is available and space requirements are met.

DANGER: Ensure all circuit breakers which provide power to the FCT and pumps are OFF before proceeding.

Install the FCT Base

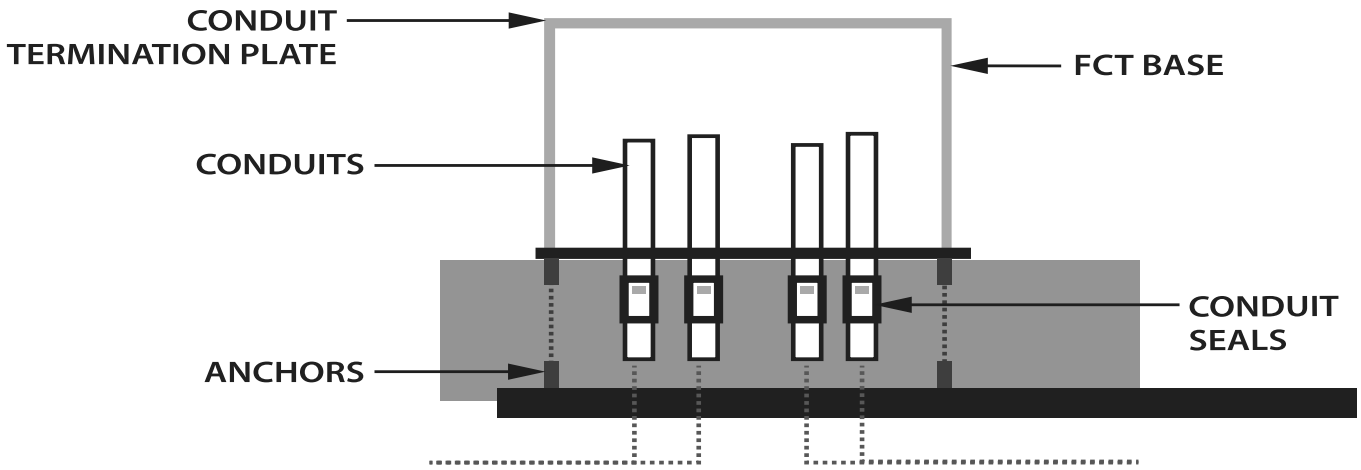


Figure 10. FCT Base - installation cross section

1. Select the location where the FCT base is to be installed on the fuel island, normally over the stubbed-up conduit.
2. Remove the two screws holding the FCT base door in place and remove the base door.
   - Ensure the two screws are saved.

3. Place the base over the stubbed–up conduit and mark four mounting holes on the concrete through the base plate holes labeled, 1, 2, 8, and 9.

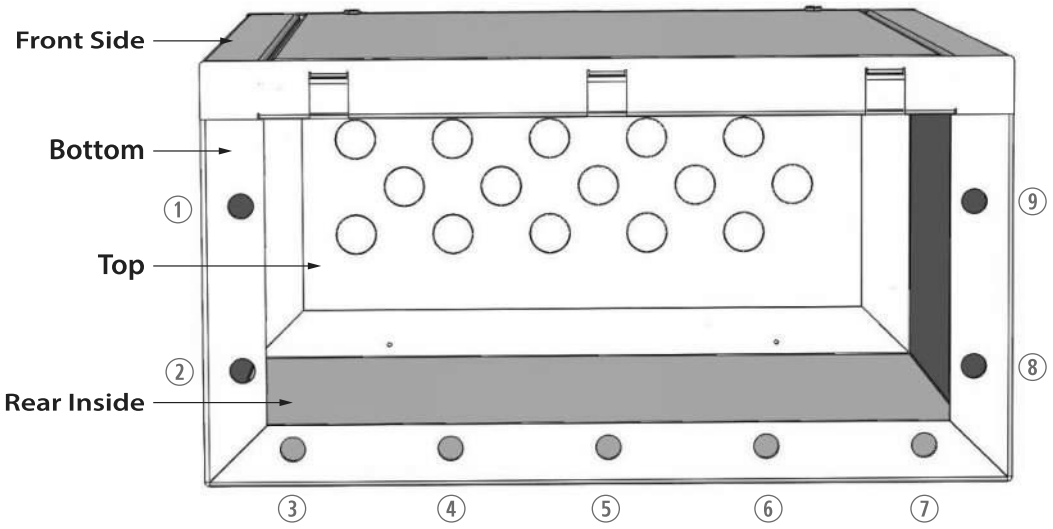


Figure 11. FCT Base and Labeled Mounting Holes - bottom view

4. Remove the base, and drill at least four holes in the concrete through the marked locations.
5. Install at least four ⅜ x 3 inch concrete anchors in the concrete.
6. Install at least four conduit seals and extend the conduit to allow for termination on the conduit termination plate (on top of the base).
7. Install the conduit termination hardware.
8. Position the base over the stubbed up conduit, align the base over the mounting bolts and lower in place.
9. Apply washers and nuts to each mounting bolt and tighten securely.
10. Install conduit fittings to secure the end of each conduit to the base termination plate.

This completes the installation of the FCT Base.

Install the FCT Cabinet

1. Position the cabinet on top of the base.

Figure 12. FCT Positioned Over the Base

2. Secure the FCT cabinet to the base using ten ¼ x 20 Keps nuts to each PEM stud on the base.

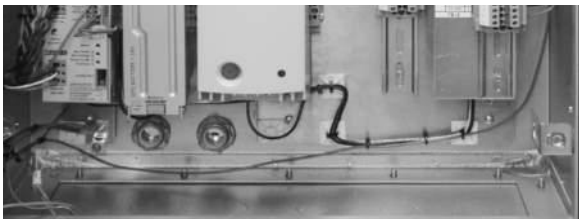


Figure 13. FCT Mounted on PEM Studs Over the Base

3. Ensure the primary power to the FCT power supply is off by pulling the handle of the fuse switch out and to the right.
   - Pull the handle towards you until the fuse holder is out.

Figure 14. Fuse Handle in the Out Position

4. Attach the ring terminal from the green ground wire to the ground PEM stud located at left inside corner of base and secure with a ¼ x 20 Kep nut.

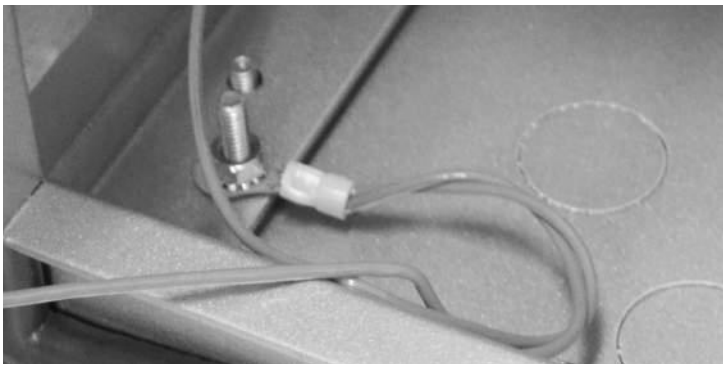


Figure 15. Ground PEM Stud

5. Strip the incoming safety ground wire(s) and insert them into the grounding lug located in the lower left corner of the FCT back panel.

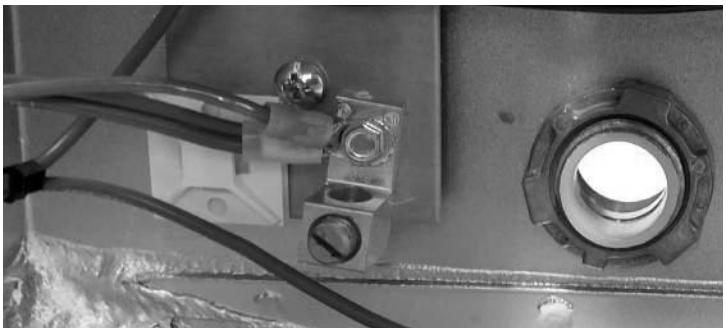


Figure 16. Ground Lug

6. Screw the lug clockwise, ensuring the ground wire is secure.

The safety ground from the breaker panel serves to prevent the cabinet from becoming an electrical shock hazard. If the power and ground originate from a sub-panel, a ground rod must be connected directly to sub-panel ground.

WARNING: Proper safety ground is essential to proper operation and safety.

7. Ensure that all the wires in the conduits coming from the pumps are properly identified and labeled.

DANGER: There may be hazardous voltage inside the FCT cabinet. Ensure the breaker switch at the breaker panel is off and all fuse switches located on TB-1 are in the open or off position before proceeding.

Connect Power

The FCT typically requires 120VAC supplied by Hot (L1), neutral and ground.

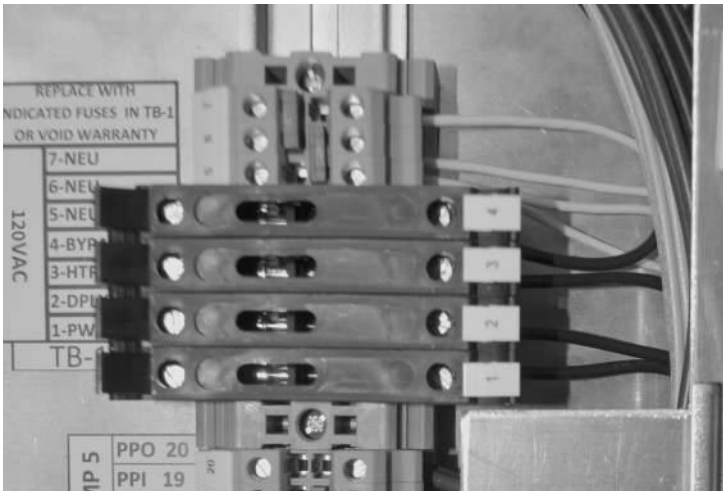


Figure 17. AC Power Distribution Fuse and TB-1

Connect the following wires to TB-1:

1. Locate the black (hot), white (neutral) and green (ground) wires from the conduit that is intended to supply 120VAC power to the FCT.
2. Connect the black 120VAC wire on the left side of the fuse switch labeled: 1-PWR-2A at TB-1.
3. Install three black 14 AWG jumper wires between the primary hot from position 1 at TB-1 to the left side of all additional fuse switches:
   - Install jumper from (1 to 2), (2 to 3), (3 to 4).
   - The left side of all fuse switches share the same 120VAC source.
4. Connect the white neutral wire to the left side of TB-1 labeled 5-NEU.

At the Breaker Panel

5. Locate the black, white and green wires that are intended for the FCT's power.
6. Connect the black wire to the 15 Amp breaker located inside breaker panel.
7. Connect the white wire to the neutral buss bar located inside breaker panel.
8. Connect the green wire preferably to a ground rod installed at the breaker panel; otherwise connect directly to the ground lug or neutral bus bar.
9. Ensure the breaker switch for the FCT's power remains in the off position.
10. Ensure all breaker switches for each dispenser are in the off position.

FCT Wiring and Pump Control Circuits

NOTE: The applications described in this section are examples of the many wiring configurations in which an FCT may be wired to control different dispenser models as listed in the Appendix. Contact Ward with questions concerning different applications and wiring configurations.

Connect FCT Pump Control Wires

The right side of TB-2 and TB-3 are pre-wired to each FCT 5-hose board. TB-2 is organized by pump number with four circuits or wires per pump. Every circuit for each pump on TB-2 is clearly labeled, starting with Pump 1 at the bottom of TB-2 up to PUMP 10 at the top of TB-2. All field wiring that is pulled through conduit from each pump to the FCT is connected to the left side of TB-2 for pump control wiring and on the left side of TB-3 for pulser wiring.

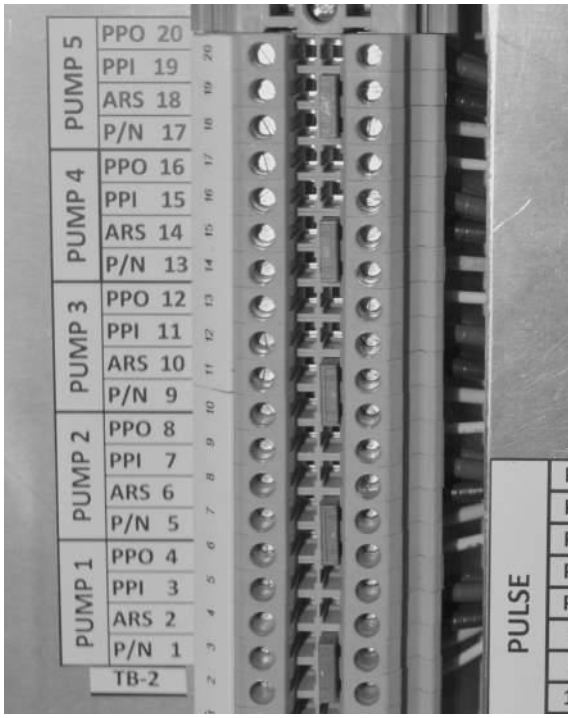


Figure 18. TB-2 FCT to Pump Control Interface

TB-2 Pump Connections

Label	Function	Wire Color
PPO	PUMP POWER OUT	Brown
PPI	PUMP POWER IN	Black
ARS	AFTER RESET	Yellow
P/N	PUMP NEUTRAL	White

NOTE: In reference to Figure 18 above, the red jumper is inserted into the terminal block which connects a 120VAC ARS to PPI. A red jumper is installed across ARS and PPI for each individual pump. However, in certain FCT to pump interface applications, the red jumper must be removed in order to support electronic dispensers that provide a 120VAC for ARS but require a 12VDC PPI and PPO for an ESV that operates at 12VDC.

FCT to Fuel Dispenser Wiring

The following example applies to a typical interface between a fuel dispenser and the FCT in which the dispensers hook switch provides 120VAC to ARS at the FCT when the hook lever is Off Hook or ARS Cycle completes. Refer to *Typical ESV Wiring Diagram* (Figure 28 on page 33).

Example for Pump 1:

1. Connect the white wire P/N from Pump 1 to TB-2 P/N position 1 at the FCT (as shown in Figure 18).
2. Connect the black wire PPI from Pump 1 to TB-2 PPI position 3 at the FCT.
   - Optional: Connect the yellow wire ARS from Pump 1 to TB-2 ARS position 2 at the FCT.
   - The remaining wire will be a spare.

NOTE: The red jumper installed between PPI and ARS on TB-2 at the FCT supports either the PPI or ARS wire from the pump.

3. Connect the brown pump power out wire from Pump 1 to TB-2 PPO position 4 at the FCT.

ARS Circuit at the Dispenser

The ARS circuit is a 120VAC signal from the pump that performs two functions at the FCT, such as ARS and PPI through the red jumper installed on TB-2.

Most of the common electro-mechanical pumps/dispensers contain a hook lever that activates an electric reset motor which turns a shaft that clears the last total gallons pumped on the pumps register head. This is known as a Reset Cycle.

Once the reset cycle completes, a CAM disengages power to the electric reset motor but engages a DPDT (double-pole-double-throw) switch that closes two separate sets of contacts.

One set of contacts that close usually supplies 120VAC to a SLM or starter relay for submersible turbine pump motors.

The other set of contacts that close usually supplies 120VAC to an ESV.

If FCT Controls Power to an ESV with ARS Wiring

1. Locate the junction or wire nut in the dispenser's J-box for the hot side of the ESV and disconnect this circuit.
   - There will now be one disconnected wire that leads to the electric reset and one disconnected wire that leads to the ESV.
2. Connect the PPO brown wire from the FCT to the wire that leads to the ESV.
   - Use a wire nut to secure the junction.
3. Connect the ARS yellow wire from the FCT to the wire (leads to the electric reset) that was originally connected to the ESV.
   - Use a wire nut to secure the junction.

If FCT Controls Power to a SLM with ARS Wiring

1. Locate the junction or wire nut in the dispensers J-box for the hot side of the SLM and disconnect this circuit.
   - There will now be one disconnected wire that leads to the electric reset and one disconnected wire that leads to the SLM.
2. Connect the PPO brown wire from the FCT to the wire that leads to the SLM.

3. Connect the ARS yellow wire from the FCT to the wire (leads to the electric reset) that was originally connected to the SLM
   - Use a wire nut to secure the junction .

Figure 19. Pump 1 Connections on TB-2 - close-up

4. Connect the white neutral wire from P/N on TB-1 at the FCT to the pumps neutral wire or junction in the dispensers j-box.
5. Repeat the same wiring for all remaining pumps as illustrated in this wiring example for Pump 1.
6. Sort out all pump control wires from remaining conduits and separate according to each pump number in order to connect to each corresponding pump number labeled on TB-2.

FCT to Pulser Wiring.

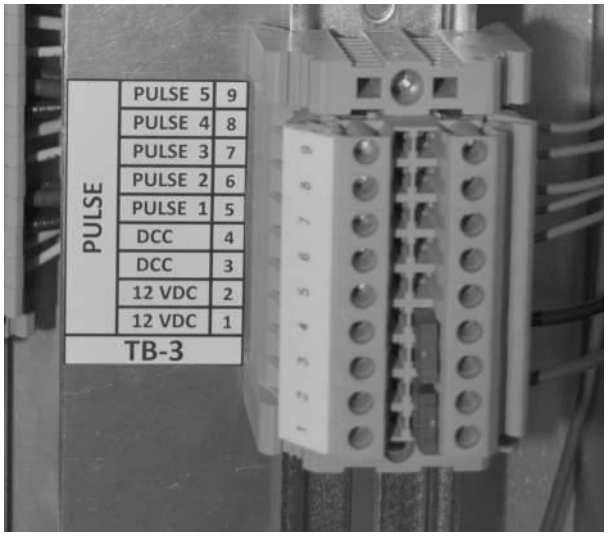


Figure 20. TB-3 12VDC Power and Pulser

Mechanical/Dry-Contact Pulsers

Recommended pulser cable for a single nozzle dispenser (mechanical/dry-contact) pulser that requires two conductors:

Beldon 88760: Single-Pair, (1 pr) 18 AWG (19x30) TC, FEP/FEP, Foil Shld, CMP

Red	18 AWG stranded	Pulse
Black	18 AWG stranded	DC COM

At the FCT

1. Connect the black wire from the shielded pulser cable coming from Pump 1 to position 4 on TB-3, labeled DCC (Figure 20).
2. Connect the red wire from the shielded pulser cable coming from Pump 1 to position 5 on TB-3, labeled PULSE 1.
3. Connect the uninsulated drain wire from the shielded pulser cable to position 3 on TB-3, labeled DCC.

CAUTION: The shield or drain wire at the end of the pulser cable must be grounded to the FCT end of the cable and floated at the dispenser end of the cable. Do not ground both ends of the cable.

At the Dispenser

The dry contact pulser will have two wires routed to the same J-box where one end of the shielded pulser cable is routed from the FCT.

4. Connect the black wire from the shielded pulser cable to one wire on the pulser.
5. Connect the red wire from the shielded pulser cable to the other wire from the pulser.
6. Cut off the uninsulated drain wire and any foil or braided shield at the end of the shielded pulser cable.
7. Float the shielded end of the cable at the dispenser by using electrical tape to wrap and insulate the end of the cable.
   - Ensure that all conductive material from the end of the cable such as foil, tip of drain wire, and braided shield, etc. are insulated.

The shielded pulser cable wiring between Pump 1 pulser and the FCT is now complete.

8. Repeat from Step 1 for each additional pump, pulser, and shielded pulser cable.

Electronic Pulsers

Ward recommends Beldon Cable 9418 for electronic pulsers that require 12VDC and have three polarized conductors.

1. Select three wire colors from the shielded cable and assign each color a specific function.

Example:	*Red*	*18 AWG stranded +12VDC*
	Black	*18 AWG stranded DC COM*
	Green	*18 AWG stranded Pulse*
	Drain/Shield	*18 AWG stranded DC COM*

2. Connect the black wire and the shield/drain wire together from the shielded cable to DCC, position 3 on TB-3 at the FCT.
3. Connect the red wire from the shielded cable to 12 VDC, position 1 on TB-3.
4. Connect the green wire from the shielded cable to Pulse 1, position 5 on TB-3 for Pump 1 .

At the Dispenser

5. Connect the opposite end of each wire from the shielded cable at the dispenser to each wire from the electronic pulser.
   - Refer to manufacturers pulser documentation for correct wire polarity.
6. Float the shielded end of the cable at the dispenser by using electrical tape to wrap the end of the cable in order to insulate all conductive material from the end of the cable such as foil, tip of drain wire, and braided shield, etc.
7. Repeat from Step 1 for each additional dispenser and electronic pulser.
8. Use zip ties to bundle the wires for a neat appearance.

Installation Checklist

Perform the following checks after installation of the FCT is completed and before the FCT's power is turned on.

1. All breaker switches to fuel island, fuel dispensers, FCT, and ATG are turned off.
2. Check each pulser cable connection to ensure the polarity for each wire between the FCT and each pulser is wired correctly.
3. Each pulser cable with a shield/drain wire must be connected to DCC on TB-3 at the FCT and floated at the pulser end.
4. Check each electronic pulser sensor is properly installed on the dispenser register head so that it will transmit a pulse.

5. Check each wire connection between the FCT and the power source at breaker panel or dispenser to ensure 120VAC power source is wired correctly.
6. Check each wire connection between the FCT and each dispenser to ensure each component such as ESV or SLM is wired correctly.
7. Check that all new electrical connections and junctions are properly secured with the proper size wire nut.
8. Add electrical tape to wire nut to insulate any exposed copper from wires that are not completely covered by wire nut.

This concludes the installation for the FCT.

Refer to the ***IoT FCT Startup and Testing Guide*** before turning on power to the FCT.

4. Antenna Mounting

The Fuel Control Terminal's antennas are commonly packed and shipped within the box containing the FCT base. The antennas are in individual boxes with all their mounting hardware included.

RF-FCTI Antenna	ANT-0940-2X-A2	(male connectors)
Moxa Antenna	ANT-0940-WH-2X	(female connectors)
Cradlepoint Antenna	ANT-0940-2x-B-S	

.

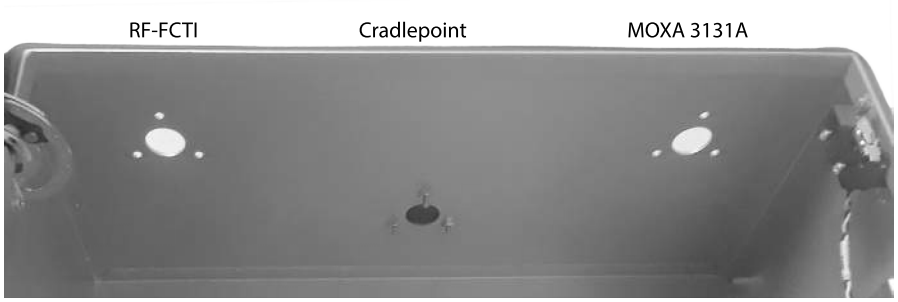


Figure 21. Internal FCT View of the Antenna Mounting Holes

WARNING: DO NOT install or replace any antennas while power is applied to the FCT. Antennas should be installed PRIOR to the FCT being powered on.

WARNING: Do not fold or bundle antenna cabling in any way during installation. Antenna cabling must have gentle bends.

NOTE: The Moxa antenna is utilized when the Cradlepoint IBR-600C is configured for both cellular and a Wi-Fi Access Point for Ward 4 CANceivers. If the Cradlepoint is not being used in this capacity, a blank off plate will need to be installed for the unused mounting location.

CAUTION: Antenna mounting and connections are hand tighten only. No tools are required. The use of hand tools may cause damage to the connectors or gasket material

Install the RF-FCTI Antenna

1. Remove the RF-FCTI Antenna from the box, ensuring you remove all necessary hardware (split washer and split nut) prior to disposing of the box.

Figure 22. RF-FCTI Antenna Connections Have Male Pins

2. Visually verify the antenna, cabling, and connector ends were not damaged during shipment.
3. With the nut and washer removed, insert the cable into the antenna mounting hole on the ***left*** side of the FCT cabinet (as you are facing the cabinet interior).
   - Ensure the antenna sits flush with the top of the FCT cabinet and the gasket is not obstructed by any debris.

CAUTION: Do not use silicone or any other liquid gasket material.

4. Install the split washer over the cabling, and slide the washer over the threaded mounting stud till the washer is flat against the underside of the FCT cabinet.
5. Install the split nut over the cabling and slide the nut up to the threaded mounting stud.
6. Tighten the nut.
   - Apply a small amount of down-force on the antenna itself, compressing the gasket material slightly, while tightening the nut.
7. Route the antenna cable to the RF-FCTI board location, without any tight bends or kinks in the line.
8. Hand-tighten the antenna connectors on the RF-FCTI board.

Install the Moxa Antenna

1. Remove the Moxa Antenna from the box, ensuring you remove all necessary hardware (split washer and split nut) prior to disposing of the box.

Figure 23. Moxa Antenna Connections Have Female Pins

2. Visually verify the antenna, cabling, and connector ends were not damaged during shipment.
3. With the nut and washer removed, insert the cable into the antenna mounting hole on the ***right*** side of the FCT cabinet (as you are facing the cabinet interior).
   - Ensure the antenna sits flush with the top of the cabinet and the gasket is not obstructed by any debris.

CAUTION: Do not use silicone or any other liquid gasket material.

4. Install the split washer over the cabling, and slide the washer over the threaded mounting stud till the washer is flat against the underside of the FCT cabinet.
5. Install the split nut over the cabling and slide the nut up to the threaded mounting stud.
6. Tighten the split nut.
   - Apply a small amount of down-force on the antenna itself, compressing the gasket material slightly, while tightening the nut.
7. Route the antenna cable to the Cradlepoint/Moxa 3131A mounting location without any tight bends or kinks in the line.

8. Hand tighten the antenna connectors on the Moxa 3131A or the Wi-Fi side of the Cradlepoint device.
   - The same side as the power and network ports.

Figure 24. Cradlepoint Wi-Fi Side

Install the Cradlepoint Antenna

1. Remove the Cradlepoint Antenna from the box, ensuring you remove all necessary hardware (split washer and split nut) prior to disposing of the box.

Figure 24. Cradlepoint Antenna Connector Pins

2. Visually verify the antenna, cabling, and connector ends were not damaged during shipment.
3. With the nut and washer removed, insert the cable into the antenna mounting hole in the center of the FCT cabinet (as you are facing the door).
   - Ensure the antenna sits flush with the top of the cabinet and the gasket is not obstructed by any debris.

CAUTION: Do not use silicone or any other liquid gasket material.

4. Install the split washer over the cabling, and slide the washer over the threaded mounting stud till the washer is flat against the underside of the FCT cabinet.
5. Install the split nut over the cabling and slide the nut up to the threaded mounting stud.
6. Tighten the split nut.
   - Apply a small amount of down-force on the antenna itself, compressing the gasket material slightly, while tightening the nut.
7. Route the antenna cable to the Cradlepoint mounting location without any tight bends or kinks in the line.

8. Hand tighten the antenna connectors on the 3G/4G (cellular) side of the Cradlepoint device.
    - The same side as the SIM card port.

Figure 25. Cradlepoint Cellular Side

The antenna Installation completed.

Figure 26. FCT With All Three Antennas Installed

Appendix

Typical Suction Lift Motor Wiring Diagram

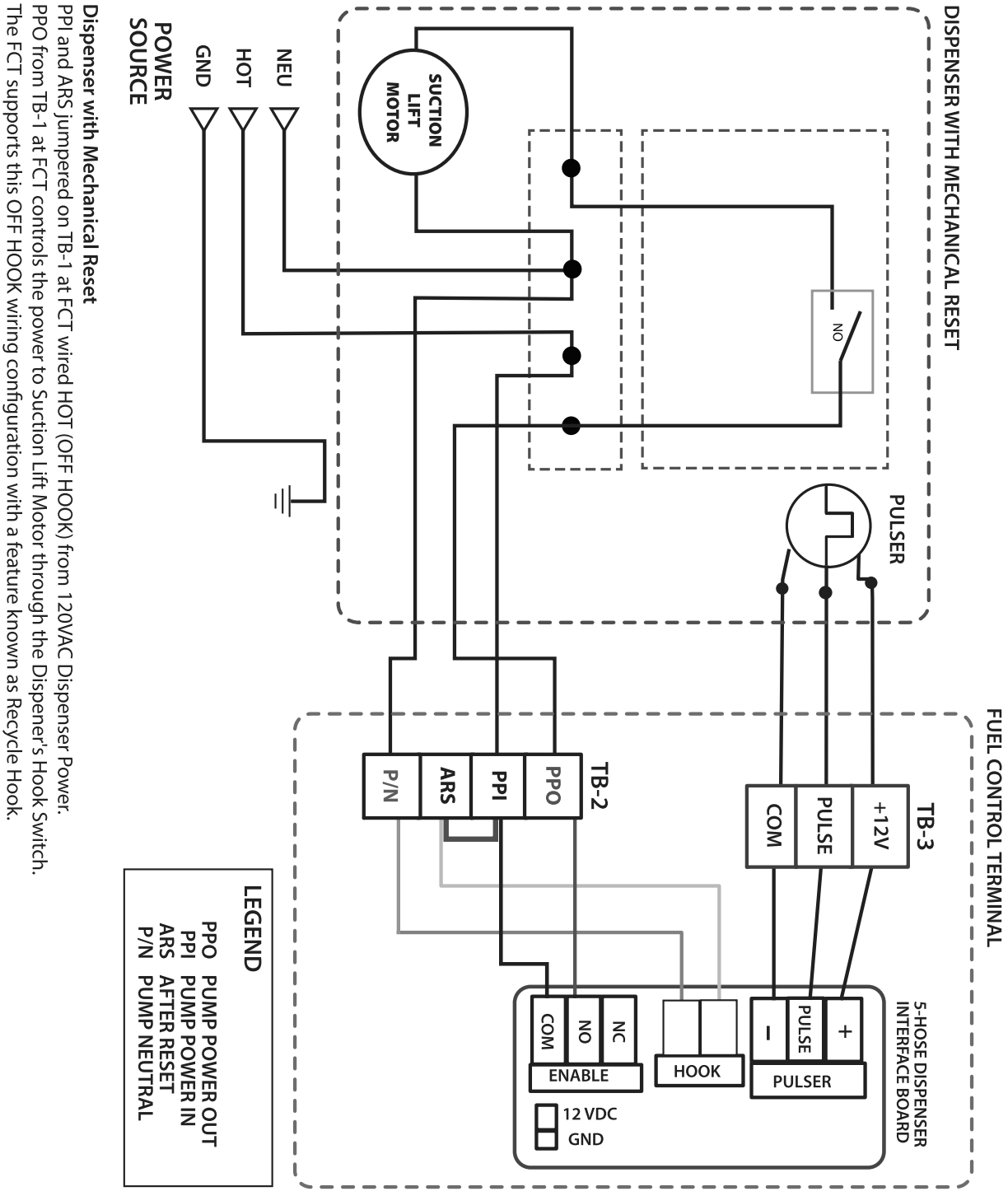
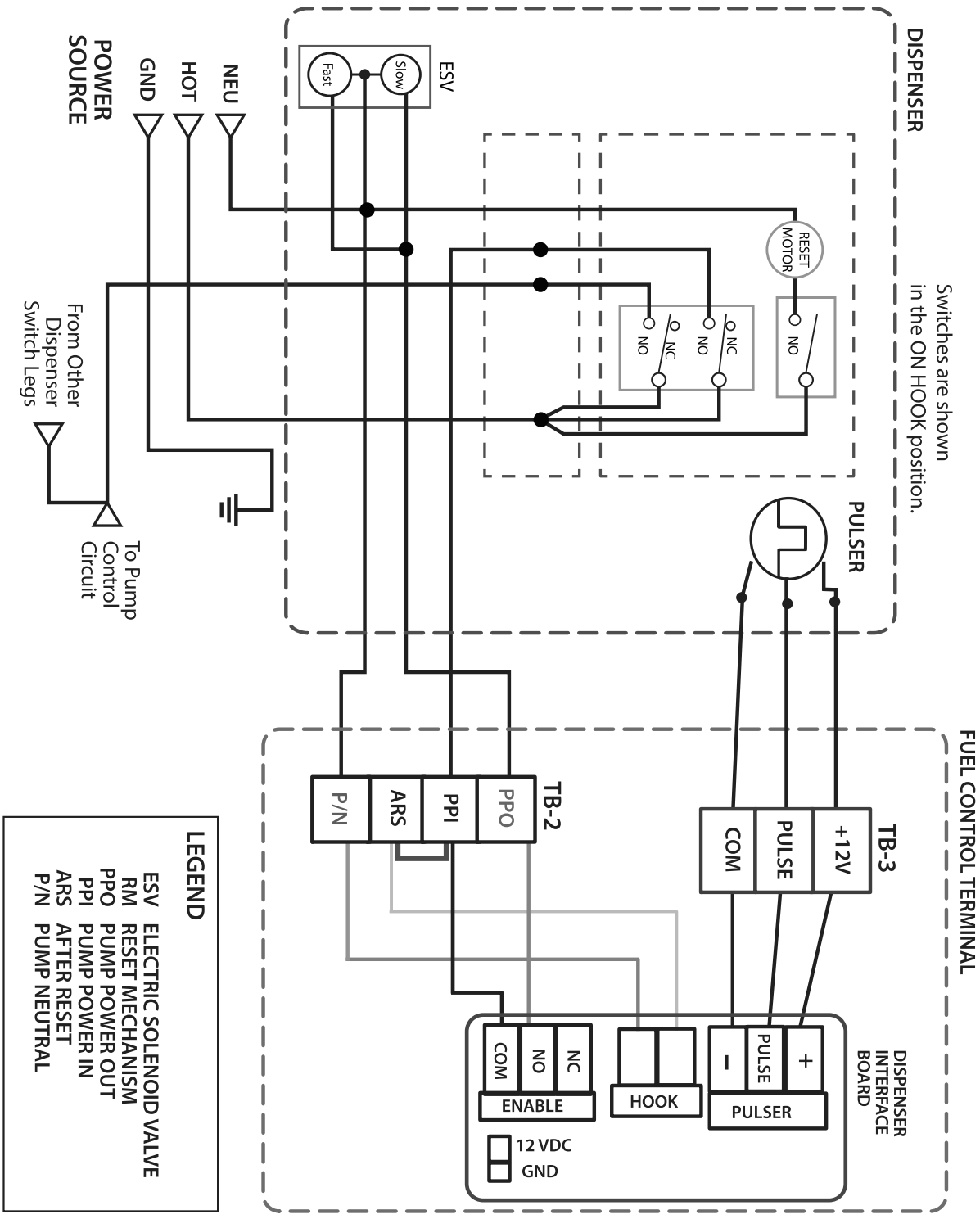


Figure 27. Typical Suction Lift Motor Wiring Control Configuration

NOTE: The Recycle Hook in Fuel View software must be checked for the FCT.

Typical ESV Wiring Diagram



Dispenser with Electric Reset

PPI and ARS jumpered on TB-1 at FCT switch to 120VAC by a set of contacts that close after the dispenser's reset cycle completes. PPO from TB-1 at FCT controls the HOT side of two ESVs connected in parrallel: Fast Flow ESVF and Slow Flow ESV.

Figure 28. Typical ESV Dispenser Control Wiring Configuration

NOTE: Refer to section titled: Gasboy Atlas Pump Settings for more information.

Typical Compressed Natural Gas Wiring Diagram

The following is a typical CNG dispenser interface wiring scheme wired in the ARS configuration.

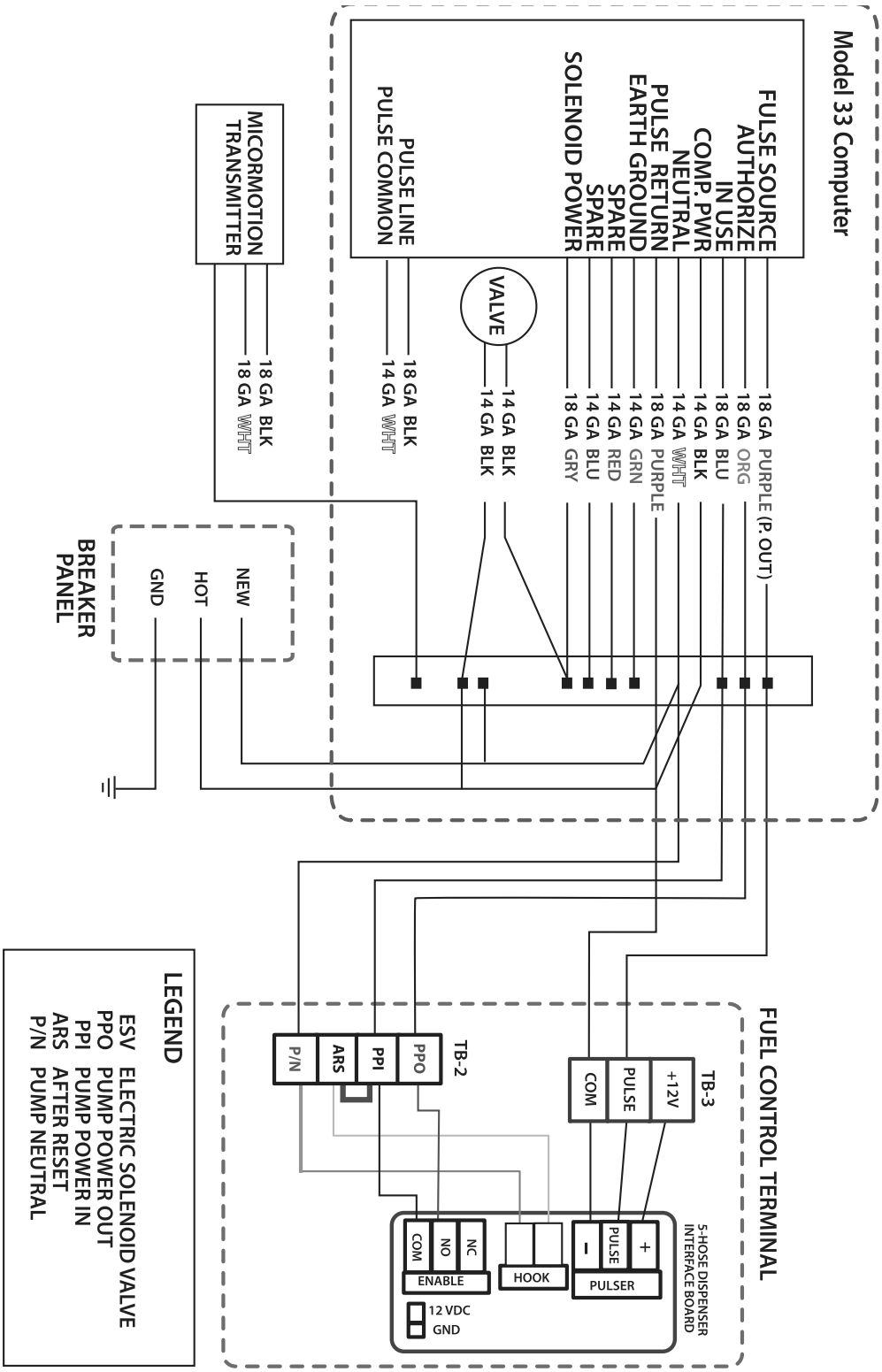
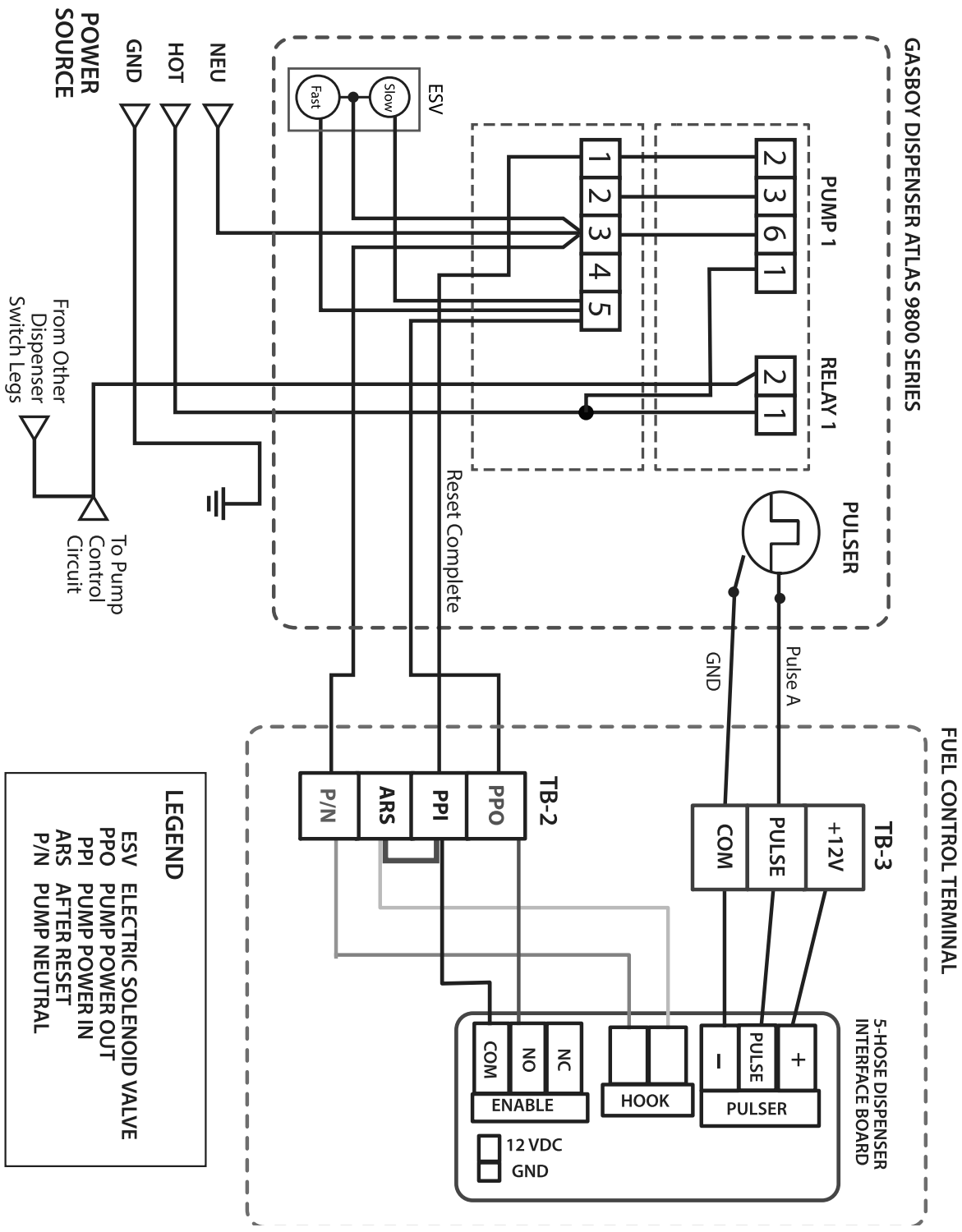


Figure 32. Typical Compressed Natural Gas Dispenser Control Wiring

NOTE: Dispenser must be set up to send an *In Use* signal before authorization is received. This is commonly referred to as Stand-Alone mode.

Gasboy 9800 Series Wiring Diagram



Electronic Dispenser Provides Reset Complete When Off Hook

PPI & ARS jumpered on TB-1 at the FCT switch to 120VAC from Reset Complete when Pump 1 is off hook

PPO from TB-1 at FCT controls the HOT side of two ESVs connected in parallel: Fast Flow ESV & Slow Flow ESV

Figure 29. Typical Gasboy Atlas 9800 Series Electronic Dispenser Control Wiring Configuration

Gasboy Atlas Pump Settings

The Gasboy Atlas CPU board has two items that must be set properly to be compatible with the FCT.

- Jumpers
- DIP switches

The jumpers have small black jumper blocks all in a row and are labeled JP(X). When setting a jumper, the block is slid over both jumper pins to short them, and a jumper set to Open has the block slid over just one pin so they are not shorted.

Jumper Settings

Jumper ID	Setting	Function
JP1	Jumped	RS-485 Baud Rate (not applicable)
JP2	Jumped	Standalone Mode
JP3 and JP4	Jumped	On Delay set to zero seconds (use for leak detection)
JP5	Jumped	Hose Pressurization set to ON
JP6	Jumped	Authorization Signal Enabled
JP7	Open	Totalizer set to Non Resettable
JP8	Jumped	Disable RS-485 Pump Disable Detect
JP9	Unused	Spare Jumper

SW2 DIP Switch Settings

Switch	On	Off	Setting
1		✓	Pulses = 10:1
2	✓		
3	✓		
4	✓		Pulse Time Out set to 4 minutes 15 seconds
5	✓		Units set to US Gallons
6	✓		
7	✓		Totalizer set to ON
8		✓	BDM Enable
9		✓	Flash Enable set to OFF
10	✓		Unused

NOTE: Cycle power on the CPU board by unplugging the micro power plug after setting jumpers and DIP switches for the settings to take effect (PWR Input P10).

For 10:1 pulse operation with the FCT, setting should be:

Off Switches 1, 8, 9

On All others

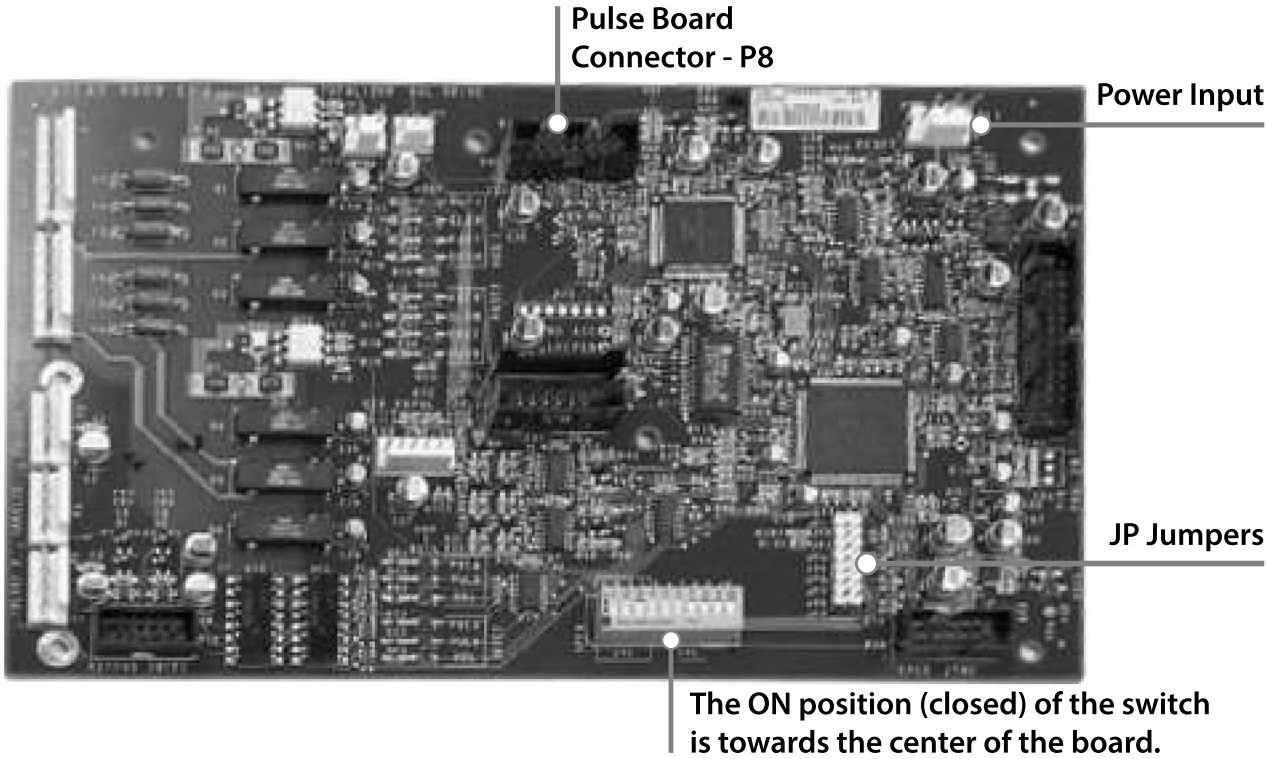


Figure 30. New Atlas 9800 CPU With 10-Position DIP Switch

NOTE: Older Atlas CPU boards have two DIP switches instead of the 10 position DIP switch as shown in Figure 30:

- **SW1 - eight-position DIP switch**
- **SW2 - four-position DIP switch**

If needed, contact Ward for the proper switch settings for an older board.

Pulser Board Installation

The dispenser must have a pulser board installed to supply pulses to the FCT. The pulser board is a piggy back board plugged in to connector P8. Gasboy also has an RS-485 communication board that plugs into the same port. The RS-485 board will not provide pulses.

TIP: Ward recommends verifying the board type during the installation.

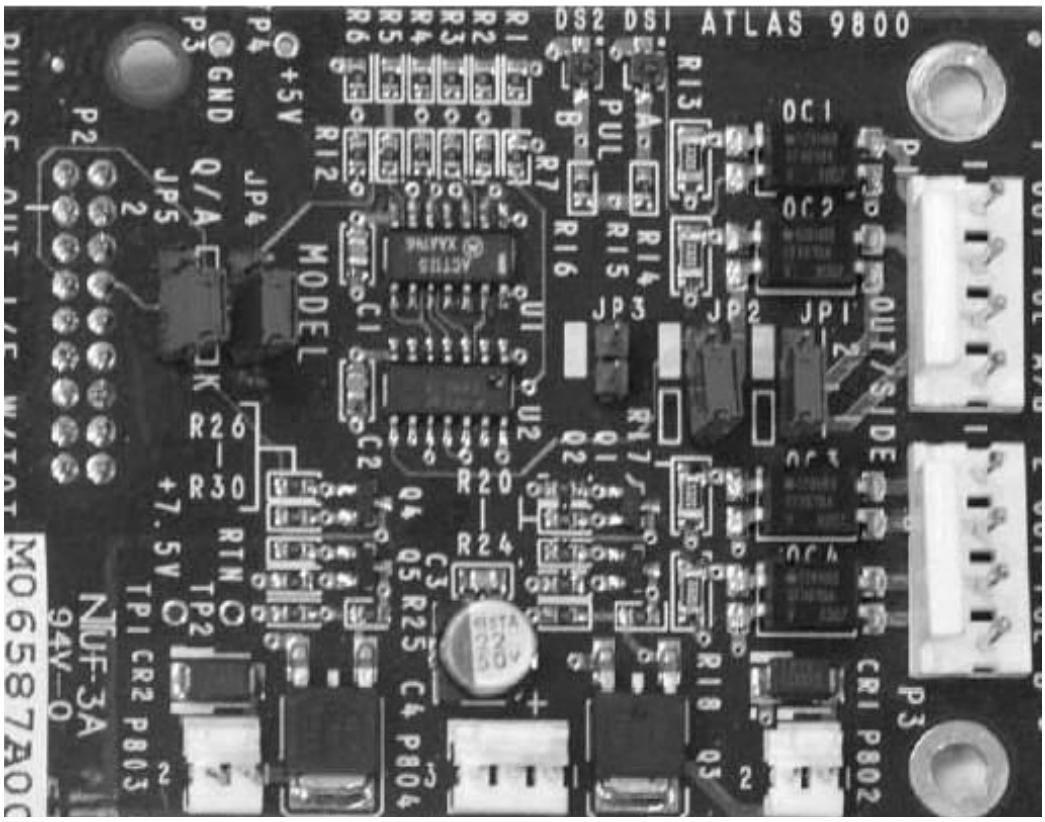


Figure 31. Gasboy Atlas Pulser Board

Pulse Wiring

Red	Pulse A
White	Pulse A GND
Green	Pulse B
Black	Pulse B GND

DIP Switch Settings

The M06333KXXXX CPU board can also be configured for various operating conditions using the switch positions SW2-1 through SW2-10. Check these switches and change if necessary. Switch settings must be changed with the power to the pump/dispenser Off. The CPU board only reads new switch settings during power-up.

NOTE: A switch in the closed position indicates that the switch is on (towards the center of the CPU board).

Pulse Output Rate Switches for Jumpered JP2

When the pump/dispenser is connected to an external controlling equipment that requires pulse output signals (for example, Gasboy Series 1000), the pulse signals are sent via the Pulse-out interface board. Setting switches SW2-1 through SW2-3 configures the Pulse-out rate required by the monitoring equipment. The Pulse-out rate represents the pulses per unit (gallon, liter, or imperial gallon).

Pulse Rate	SW2-1	SW2-2	SW2-3
1: 1	Closed	Closed	Closed
10: 1	Open	Closed	Closed
100: 1	Closed	Open	Closed
250: 1	Open	Open	Closed
500: 1	Closed	Closed	Open
None	Open	Closed	Open
None	Closed	Open	Open
None	Open	Open	Open

The maximum pulse output rate that can be achieved depends on the model of the dispenser/ pump and the unit of measure. Pulse output rate of 1000: 1 is not supported when using M06333KXXXX CPU board.

NOTE: 9800 refers to models 9852, 9853, 9822, and 9823.

NOTE: If a valid pulse-out rate is not selected, the CPU will not output pulses.

Leading zeros are always suppressed in the tens and hundreds place to the left of the decimal point. In Standalone mode, positions to the right of the decimal point are displayed based on the pulse output rate and unit of measure selected.

Pulse Rate	Gallons (US or Imperial)	Liters and/or 9850
1: 1	XXX.	XXXX.
10: 1	XXX.X	XXXX.X
100: 1	XXX.XX	XXXX.XX
250: 1	XXX.XXX	XXXX.XX
500: 1	XXX.XXX	XXXX.XX

Ward Product Warranty

Warranty coverage for E.J. Ward Inc. (Ward) products are described herein. Additional support coverage, on-site preventative maintenance and repair after the expiration of the initial one year warranty is available. Please consult your local Ward sales professional for annual support and services fees. The terms and conditions governing your warranty on Ward products are located below. Such terms and conditions supersede all other terms, unless otherwise agreed by Ward in writing.

Warranty Start Date

Start Date as used in this policy means the date this product is shipped from Ward manufacturing plus 30 days, or activation date, whichever comes first unless mutually agreed in writing.

Limited Hardware Warranty

Ward provides a one year limited product hardware warranty to purchasers of its products. Ward warrants that the products will be free from defects in materials and workmanship that result in a material deviation from the applicable published Ward technical specifications ("Hardware System Failure"). Upon a Hardware System Failure, Ward will repair or replace such products within three working days of its receipt of the failed hardware if, in advance of its receipt, such hardware has been:

1. Evaluated by a Ward Technician in person or Technical Support person via telephone.
2. Received a Technical Support RMA number from Ward.

Further, the product hardware must be shipped, shipment pre-paid, to Ward, and the RMA number must be clearly indicated on the shipping box and paperwork.

Limited Software Warranty

Ward provides a one year limited software warranty to licensees of Ward software accompanying Ward hardware. Ward warrants that the software delivered will be free of defects in material and workmanship for a period of one year following delivery to licensee. Ward warrants that the software, when used in accordance with the terms of the Ward "Software License" will operate substantially as set forth in the applicable Ward software documentation for a period of one year following delivery of the software to licensee.

Technical Support Access

During the warranty period, a toll free phone support number, 800.580.9273, is offered seven days per week, 24 hours per day. Access to Technical Support after warranty period is on a commercially reasonable basis with rates available upon request (unless an extended Support Contract is purchased for products sold by Ward and owned by the customer).

Software Updates

During the warranty period, software updates for the system and software products released by Ward are available by contacting Ward Project Manager or Technical Support team. System software updates include applicable minor releases (e.g. Release 2.0 to 2.1) to the customer's specific family of products as well as major feature releases (e.g. Release 2.x to 3.0). Customer must have access to the Internet for FTP downloads as directed by Ward Technical Support team member. Major Software updates released after the initial one year warranty period are available as an upgrade product (contact your local sales agent or Ward customer support team for pricing).

Hardware Repair Service

In the event of a hardware system failure past the first 30 days, but within the first year of ownership from the Warranty Start Date, the unit will be either repaired, or at Ward's option, replaced with a new or reconditioned unit of equal or greater value. This service requires an evaluation by a Ward Technician in person or a phone support evaluation of the failed system from Ward Technical Support team member, and the issuance of a RMA number. The returning product hardware must be shipped, shipment pre-paid, to Ward, and the RMA number

must be clearly indicated on the shipping box and paperwork; failure to do so will result in delays. A repaired or replacement unit will be shipped at Ward's expense within five (5) business days after receipt of the failed unit.

Warranty Limitations

Ward's warranties as set forth herein ("Warranty") are contingent on proper use of the Ward hardware and software ("Products") and do not apply if the Products have been modified without Ward's written approval, or if the Products' serial number label is removed, or if the Product has been damaged. The terms of the Warranty are limited to the remedies as set forth in this Warranty. THIS WARRANTY IS PROVIDED IN LIEU OF ALL OTHER RIGHTS, CONDITIONS AND WARRANTIES. WARD MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE SOFTWARE, HARDWARE, PRODUCTS, DOCUMENTATION OR WARD SUPPORT, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT OF THIRD PARTY RIGHTS. WARD DOES NOT WARRANT THAT ANY PRODUCTS WILL BE ERROR-FREE, OR THAT ANY DEFECTS THAT MAY EXIST IN ITS PRODUCTS CAN BE CORRECTED. IN NO EVENT SHALL WARD BE LIABLE FOR COST OF PROCUREMENT OF SUBSTITUTE GOODS, LOST PROFITS OR ANY OTHER SPECIAL, INDIRECT, CONSEQUENTIAL OR INCIDENTAL DAMAGES (INCLUDING BUT NOT LIMITED TO LOST DATA), HOWEVER CAUSED WHETHER OR NOT WARD HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Limitation of Liability

Once products are sold or provided under this agreement and are delivered to the "Buyer", the "Buyer" shall be solely responsible for the use of such products, including any and all results caused by the use or misuse of the products, and including using such products in compliance with all applicable local, state, federal, and international laws. In no event shall Ward, or its directors, officers, employees, agents, or affiliates, be liable to the "Buyer" or to any third party for (i) any lost profits, any data loss, any loss of business, or any indirect, consequential, exemplary, incidental or special losses or damages of any kind or nature whatsoever in connection with or arising out of the use or sale of products to the "Buyer" by Ward; or (ii) any losses or damages of any kind whatsoever, including personal injury or death, arising out of the "Buyer's" or a third party's installation, misuse, use, whether such use is proper or improper, or modifications of the products sold to the "Buyer" by Ward, not even in the case where Ward has been advised of the possibility of such loss or damage. The sole and exclusive remedy of the "Buyer" or any third party for any claim, loss, or damage not excluded under clauses (i) or (ii) of the preceding sentence and that in any way relates to, or arises out of, the products sold to the "Buyer" by Ward, shall be limited to repair or replacement of such products sold or provided under the terms of this agreement to the "Buyer" by Ward during the initial first calendar year placed into service.

Indemnification

The "Buyer" hereby agrees to indemnify and hold harmless Ward, its directors, officers, employees, agents, and affiliates, from any and all claims, demands, suits, actions, proceedings, losses, costs, and damages of any kind or nature whatsoever, including personal injury or death ("Actions"), including any action brought by a third party against Ward, and including attorneys' fees and litigation costs of Ward related to the "Actions", caused by, alleged to be caused by, related to, arising out of, or contributed to, in whole or in part, by any of the acts, omissions, errors, faults, mistakes, or negligence of the "Buyer", or the "Buyer's" directors, officers, employees, agents, or affiliates, in connection with the installation, misuse, use, whether such use is proper or improper, or modifications of the products sold to the "Buyer" by Ward. The foregoing indemnity will not be impaired or rendered inapplicable by the negligence of Ward, its directors, officers, employees, agents, or affiliates.

Contact Ward

Ward's mission is to provide industry leading technical support by ensuring all issues are promptly and wholly resolved. You can speak with a highly skilled Technical Support Specialist between 8am-5pm Central Time, Monday through Friday. If you contact Ward during non business hours, a Specialist will return your call the following business day.

Contact Ward for questions related to:

- Installation of new hardware or software
- Troubleshooting malfunctions
- Ordering new or replacement hardware

Phone..... 210.824.7383
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