INSTALLATION & MAINTENANCE MANUAL

FH-510 • FH-515 SERIES REMOTE DISPENSERS W/ HOSE REELS

V2.13

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READ THIS FIRST

Equipment Inspection

When the dispenser(s) arrive at the installation site, unpack the units and inspect for possible shipping damage. Make all claims concerning damage to the freight carrier. Pump Measure Control (PMC) as shipper, is not liable for the hazards of transportation.

After unpacking and prior to installation, inspect all equipment to verify all required materials are on hand, and the dispensers have all the ordered options and markings. Compare the model number on the dispenser model / serial plate to the model number notation information in section 1 of this manual. If discrepancies in dispenser options and markings are determined, contact Pump Measure Control at (770) 667-0667.

Read all instructions and tags carefully prior to performing any work on the dispenser. An improperly installed or maintained dispenser can be dangerous and will likely be a source of ongoing problems.

1– IMPORTANT SAFETY INFORMATION

INSTRUCTIONS PERTAINING TO A RISK OF FIRE, ELECTRIC SHOCK, OR INJURY

The following procedures are mandatory and shall be followed when installing, maintaining, operating or servicing this equipment. Fire, explosion and electrical shock can occur and result in death or serious injury if the safe service practices outlined in this manual are not followed. The hazards and safety precautions associated with installing, maintaining or servicing the dispenser are detailed in the corresponding sections of this manual. Read all safety information and applicable sections in this manual before performing any work. Only trained or authorized individuals should install, inspect, maintain or service this equipment.

Emergency Shut-Off

Before performing any work at a location, identify the switch or circuit breakers that disconnects power to all fueling equipment, dispensing devices, and submerged turbine pumps (STPs).

Explosive / Flammable Environment

The fuel and associated vapors present in and around a dispenser are very flammable. In addition, the vapors can become explosive in the right concentrations. Clean up all spilled or leaking fuel immediately using an absorbent. Dispose of all contaminated material as required by regulatory agencies.

If the work being performed requires access to the dispenser's lower cabinet, allow it to 'air out' by opening it up before you begin. Open flames and sparks can ignite any fuel or vapors that may be present and therefore must be prevented. Never permit smoking or use of lighters and / or matches in the dispensing area. Other sources of ignition include welding torches and sparks generated by various sources including power tools, automobile starters and static electricity.

Read the Manual

Safety is of utmost importance! It is imperative that you understand the procedures necessary to complete a task before beginning any work. Read, understand and follow this manual and all applicable materials / labeling supplied with this dispenser. If you have questions or do not understand a procedure, call PMC - Tech Support at 770-667-0667.

Codes and Regulations

This equipment must be installed, operated and maintained in accordance with all federal, state and local codes and regulations. This includes, but is not limited to NFPA 30 *Flammable and Combustible Liquids Code*, NFPA 30A *Code for Motor Fuel Dispensing Facilities and Repair Garages,* NFPA 70 *The (NEC) National Electric Code*. Failure to do so may lead to violations and/or prevent safe operation of the equipment.

Replacement Parts

Use only genuine PMC repair parts and retrofit kits when making repairs or servicing this dispenser. Using non-PMC replacement parts may create a safety hazard and violate local regulations.

Safety Symbols and Signal Words

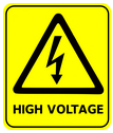
This safety alert triangle is used throughout this manual to alert you to a precaution or procedure that must be followed to avoid potential safety hazards.

The signal words DANGER, WARNING and CAUTION are used in this manual and on warning labels to alert you to the seriousness of the hazard. All safety procedures following these signal words must be followed to prevent serious injury or death.

DANGER - indicates a hazard or unsafe practice that **will** result in death or serious injury.

WARNING - indicates a hazard or unsafe practice that **may** result in death or serious injury.

CAUTION - indicates a hazard or unsafe practice that may result in minor injury or equipment damage.



Electrical Safety

Use safe and established practices in working with electrical devices. Be sure grounding connections are properly made. Refer to GROUND in Section 3 of this manual for specific information. Failure to do so may result in injury, damaged equipment or improper/erratic operation. All conduit sealing devices and compounds must be in place. Follow all OSHA Lock-Out and Tag-Out requirements / procedures. Make sure all station employees and service contractors on site understand these procedures to ensure safety while the equipment is being serviced or repaired.

SAVE THESE INSTRUCTIONS IN A READILY ACCESSIBLE AREA

2 - INTRODUCTION

Scope

This manual contains the information necessary to install, operate, service and maintain the PMC ***Fuelhouse*** series of dispensers. Please read, understand, and follow this manual and all applicable CODES and NFPA requirements before installing the equipment. Improper installations are a major source of dispenser failures and ongoing problems. The equipment must be installed and operated as directed by this manual to ensure proper and reliable operation.

Failure to install the dispenser per PMC specifications may void the warranty.

The manual covers both retail and commercial versions of the dispenser. Any references to *price* settings or *penny pulse outputs* apply only to the RETAIL versions. Differences are noted where necessary. All procedures described should only be performed by trained / authorized personnel.

WARNING

Per UL87A requirements, dispensers must not be changed from its original application by changing fuel types once installed. For instance, if installed for a gasoline/ ethanol blend such as E25 or E85, the dispenser can not be changed to traditional gasoline at a later date.

Leaks and potential environmental hazards can result or components may fail prematurely.

To avoid these issues, follow the instructions in this manual and do not change fuel types once installed.

Description

Shipping Weight:

approx. 500 lbs

Power Requirement:

AC Power Supply:	(Standard)	120VAC / 60Hz / 1Ø
	(Optional)	240VAC / 50Hz / 1Ø
Power Consumption (max):		1000Watts

Operating Environment:

Ambient Temperature:	-30°C ≤ Ta ≤ +60°C
Relative Humidity(non-condensing):	0% to 95%

Standard Features:

- Dimensions: 30”W x 31”D x 46-3/8”H
- Powder coated, heavy gauge stainless steel frame
- Brush Finish, 316L stainless steel door panels
- Single Product / Single Hose configurations
- Meter: Liquid Controls M-5 Rotary, positive displacement
- Filtration:
  - FH-510 Series: Single element, Hydrosorb Spin-on filter
  - FH-515 Series: Dual element, Hydrosorb Spin-on filter
- Hose Reel:
  - FH-510- 1” Swivel and Internals
  - FH-515- 1-1/2” Swivel and internals
- Solenoid Valve:
  - Marine and General Service
    - FH-510 - 1-1/2” Single Stage
    - FH-515 - 2” Single Stage
  - Aviation
    - FH-510 - 1” Two-Stage
    - FH-515 - 1-1/2” Two-Stage
- Registration Limits:

TOTAL SALE:	0 - $9999.99
GALLONS:	0 - 9999.99
PPG	0 - $9.999

- Non-resettable / electro-mechanical totalizer: 0 - 999999 gallons
- Standard Units of Measure: US GALLONS
- Single sided RETAIL displays
- Lane-oriented nozzle boot
- Hard wire interface (looks like mechanical dispenser to controller)
- Pulse output: (open collector): programmable for volume (10 or 100 pulses / unit) or penny pulse
- 120VAC / 60Hz operation

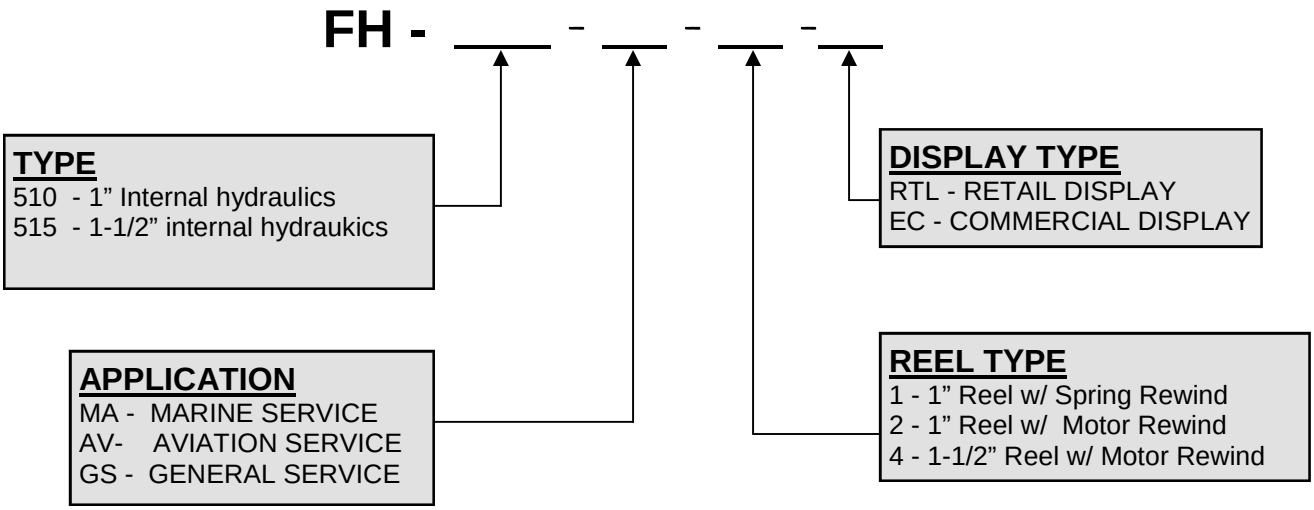
Options:

- All stainless steel construction w/ 316L Stainless Steel Panels (MA)
- RS-485 “two-wire” communication
- Single product inlet manifold
- COMMERCIAL (volume only) Displays
- Liters or Imperial Gallons Registration
- 240VAC / 50Hz operation

Model Codes

The serial plate on the ***Fuelhouse*** dispenser is located on the upper left corner of the dispenser's rear panel. The plate contains both the model number and serial number identifying the dispenser.

FH MODEL NUMBERING SCHEME



3 - INSTALLATION INSTRUCTIONS

This section provides information for proper installation and wiring of your ***Fuel-house*** series dispensers and related equipment. It is essential that you understand the requirements of the system before attempting the installation. You should be familiar with, and have available for reference, the appropriate programming manuals and installation manuals for all other equipment to be installed and connected with the dispenser.

WARNING

Gasoline blends containing 15% or more ethanol may not be compatible with certain materials and hydraulic components. Leaks or component failure may result, causing fire or explosion or environmental damage.

When dispensing gasoline blends containing 15% or more ethanol, consult the manufacturer of all fuel system components to verify compatibility with the fuel being dispensed. This includes the fuel dispenser itself.

WARNING

The installation must conform with all applicable Federal, State and Local building / fire code requirements. This includes, but not limited to, NFPA (National Fire Protection Agency) 30 Flammable and Combustible Liquids Code , NFPA 30A Code for Motor Fuel Dispensing Facilities and Repair Garages and NFPA 70 National Electrical Code® . Failure to adhere to these requirements could result in severe injury or death.

WARNING

Gasoline and petroleum products that may be present during the installation of a dispenser are flammable and explosive, creating a dangerous environment requiring safe practices to prevent or avoid serious injury or death. Read and understand all sections of this manual prior to beginning an installation. Follow all instructions and heed all DANGER, WARNING and CAUTION blocks .

General Requirements

- Read and understand the entire Safety Information section located at the front of this manual.
- The complete instructions for other equipment used in the installation of the dispensers, such as STPs, shear valves, etc., must be provided by the manufacturer of that equipment.
- Plan the installation carefully and follow instructions. Many dispenser problems are caused by faulty installations.
- The dispenser installation MUST be done by a qualified installer / electrician.

Survey Site Prior to Installation

Prior to beginning installation of the dispenser, survey the site and verify that other components of the fueling system are installed properly according to the component manufacturer's instructions and applicable codes.

- Emergency Power Cut-Off Switch
- Grounding system for all equipment
- Circuit Breakers
- Impact Box and Containment
- Verify all fuel lines are marked in containment box.
- Shear Valves
- Verify that piping layout in impact box / containment matches the foot-print of the dispenser being installed. Verify supply line fuel grades and shear valve and conduit locations. Corrections are much easier prior to placing the dispenser on the island.
- Verify proper conduit is used for the area classification in which it is installed (i.e. Conduit and fittings are Class 1 Group C & D where req'd).
- Seal-off is installed as the first fitting on the conduit as it leaves the ground below the dispenser.
- Pump control relay box with provisions for isolation of control signals from dispensers.
- Pump - Dispenser must be installed in a system with a power operated pump incorporating a pressure relief that maintains system pressures at or below 50 psi. The pressure relief device must be located and verified as being installed as required.
- If a pump other than a submersible turbine pump is used, provisions must be made to prevent air from being pumped through the dispenser.
- The FH dispenser must be installed in a system that maintains near operating pressure in the supply line when the supply pump is turned off. Most submersible pumping systems provide this capability. Maintaining pressure on the supply line minimizes the fuel displaced out of the hose as it constricts when the supply pump is turned off, causing erroneous counts at the start of the next transaction as the displaced fuel is pushed back into the hose.

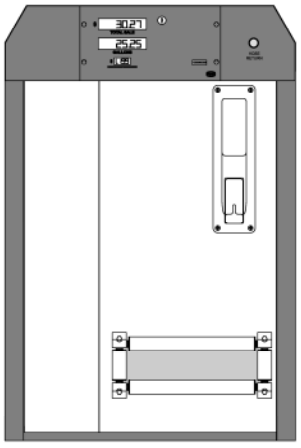


Figure 1: Typical Front View of FH Marine Dispenser

Verify Plumbing Configuration

Prior to placing the dispenser on the fuel island, verify that the shear valve for the product supply matches the footprint of the dispenser being installed. Pay close attention to the dispenser orientation.

Placing The Dispenser

WARNING

Heavy equipment that is being lifted or moved can fall, causing severe injury or death. Equipment used to lift and/or move the dispenser must be rated for the load (including safety factor). Lift the dispenser only as high as necessary to complete the task. Stand clear when lifting or lowering the dispenser.

CAUTION

Only lift the dispenser by the base or the main frame. Lifting the dispenser using the nozzle boot, fuel outlet or panels may cause damage to the dispenser.

Use a forklift or other mechanical lifting device to place the dispenser. It is not recommended that the dispenser be lifted manually due to the units weight.

1. Adjust the spacing on the forklift's tines so that the outside edges are about 26-28 inches apart.
2. Place the dispenser on the tines so that it is centered as closely as possible. Using a strap, secure the dispenser to the forklift to reduce the risk it may tip over or fall.
3. Carefully lift and position the dispenser on its installation location.
4. Do not securely anchor the dispenser to the island until installation and alignment of inlet piping is complete. However, provisions must be made so the dispenser cannot fall over.

Requirements for Plumbing Installation

WARNING

Shear valves that are improperly installed or anchored may fail to operate correctly, causing a fire or explosion that results in severe injury or death. All shear valves must be installed and anchored per the manufacturer's instructions.

- The ***Fuelhouse*** dispenser must be installed with a shear valve on the supply line. This applies to both above grade and below grade product supply configurations. Verify that the shear valves are mounted correctly according to the valve manufacturer's instructions and code requirements.
- Remove all shipping plugs and caps that may be present in piping, shear valves and unions.
- Ensure all pipe threads are properly cut and undamaged with the inside edge reamed to remove burrs.

WARNING

Gasoline blends containing 15% or more ethanol may not be compatible with certain materials and hydraulic components. Leaks or component failure may result, causing fire or explosion or environmental damage.

When dispensing gasoline blends containing 15% or more ethanol, consult the manufacturer of all fuel system components to verify compatibility with the fuel being dispensed. This includes the fuel dispenser itself.

- All contractor supplied pipe and fittings must be Schedule 40. FH-510 units require 1-1/2" NPT and FH-515 units require 2" NPT pipe and fittings. All contractor supplied piping and fittings shall be black steel or stainless steel. All material must be compatible with the fuel and installation type (Marine / Aviation / General Service).

WARNING

A shear valve may be damaged or broken if not properly supported when tightening fittings into it. The installer must use two wrenches to prevent stress from being applied to the shear point during tightening.

- The ***Fuelhouse*** dispenser must be installed with a contractor provided union must on top of the shear valve. Refer to valve manufacturer instructions for proper procedure to tighten union to shear valve.
- The shear point of each shear valve must be within +/- 3/4" of the plane of the bottom of the dispenser base, or within valve manufacturer's installation requirement, whichever is less. Failure to install shear valve correctly can result in valve not functioning properly. See Figure 2 below for details.

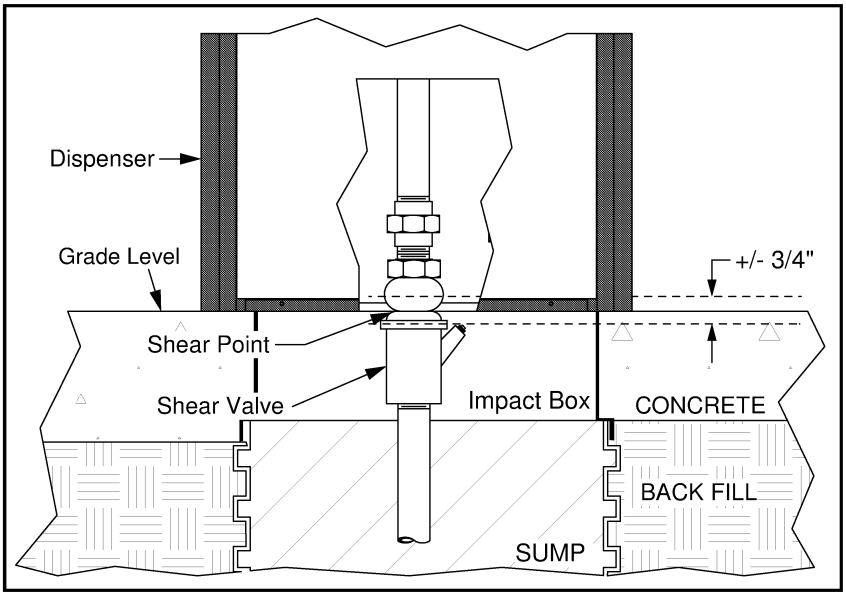


FIGURE 2: Shear Valve must be installed with the shear point within +/- 3/4" from the bottom plane of the dispenser base.

- Each supply inlet and satellite feed connection on the dispenser is provided with a removable, NPT threaded flange for connection of piping to the dispenser.
- The vertical supply riser must be cut to the proper height in order to avoid stress on the dispenser.
- Clean all debris from pipes before assembly. Debris can damage the filter / strainer, allowing other foreign material to pass through, potentially damaging the dispenser.

Connecting Fuel Line(s) to Dispenser

WARNING

Do not use flexible or non-metallic pipe to connect the shear valve to the dispenser inlet. The shear valve may not operate correctly, resulting in a fire or explosion that can cause severe injury or death. Use only rigid, metallic pipe and fittings between the shear valve and the dispenser inlet.

Use the following procedure to pipe the shear valve to the connection point on the dispenser.

1. The installer must provide all piping and fittings necessary to connect the shear valve to the dispenser inlet. Use only schedule 40 black iron or stainless steel parts. Use only LISTED thread sealant that is approved for use with the appropriate fuel type. Follow manufacturer's instructions for the compound's use.

WARNING

Prying or otherwise using excessive force to align an inlet pipe will stress components and may damage the shear valves, unions or other parts of the dispenser. Stressed or damaged components may fail and leak fuel causing a fire or explosion that can result in severe injury or death. Properly positioned shear valves should not require the inlet piping to be forced. It may be necessary to temporarily remove the dispenser from the island to align the shear valve(s) properly.

2. Loosely connect the union halves together and double check the alignment of the piping before tightening. Tighten the unions.
3. Verify the shear point of each shear valve is within 3/4" of the plane of the bottom of the dispenser base. See Figure 3 for details.
4. Verify the shear valves are properly secured to the valve anchor bracket.
5. All liquid carrying lines must be checked for leaks. Remember to allow all pipe compound to cure or set before performing the leak tests.
6. Close the shear valve and leave closed until startup of the dispenser.

Mounting the Dispenser to the Island

The dispenser footprint indicating the mounting / anchor points on the dispenser's base can be seen in Figure 3. This structural footprint is common to all ***Fuelhouse*** models.

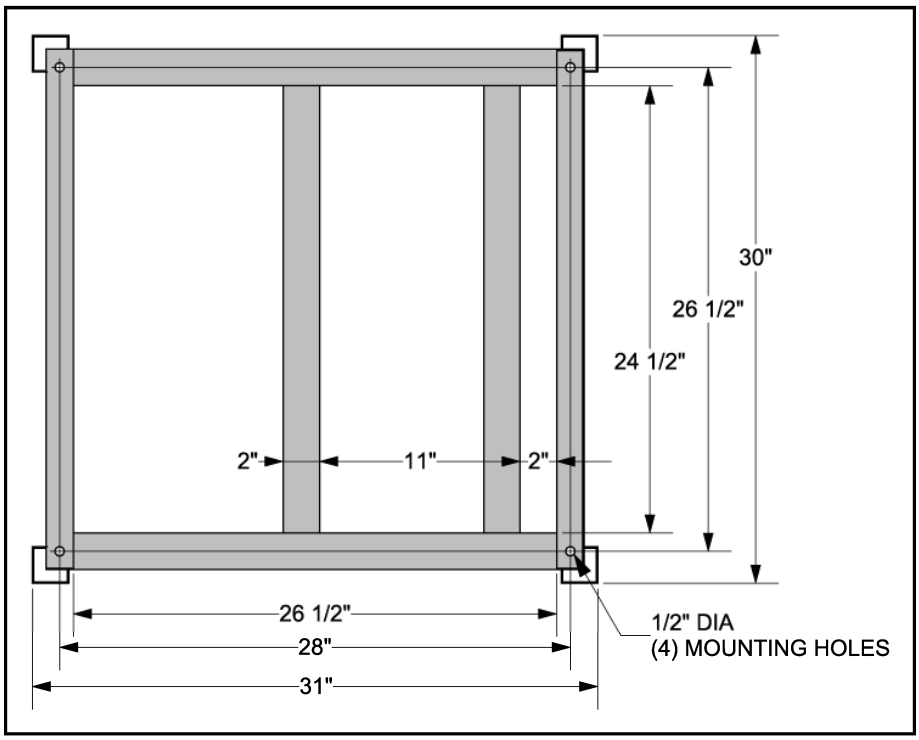


Figure 3: Structural footprint of the FH Series Dispensers

WARNING

Improperly anchoring the dispenser can result in damage to the equipment, severe injury or death if the unit were to fall over due to impact or drive-off. The dispenser must be securely anchored per the instructions that follow.

Anchor the dispenser to the fueling island using all four (4) of the mounting holes in the bottom frame.

1. Use only 1/2-inch, Grade 5 (or above) steel hardware that is treated to prevent corrosion. Do not use plastic or lower grade hardware.
2. Securely anchor the bolts / studs to the island or impact box.
3. Securely anchor the dispenser to the island using heavy duty washers and nuts on the anchor bolts / studs. Tighten the nuts.

Requirements for Electrical Installation

WARNING

The electrical work must conform with all applicable Federal, State and Local building / fire code requirements. This includes, but not limited to, NFPA (National Fire Protection Agency) 30 Flammable and Combustible Liquids Code , NFPA 30A Code for Motor Fuel Dispensing Facilities and Repair Garages and NFPA 70 National Electrical Code® . Failure to adhere to these requirements could result in severe injury or death.

CAUTION

Do not attempt to wire the dispenser without first reviewing the appropriate wiring diagrams and associated notes. Failure to follow the correct wiring diagrams may result in damage to the dispenser.

- All electrical wiring must be done by a qualified, licensed electrician.
- Read, understand and follow this manual and all applicable materials / labeling supplied with this dispenser.
- All dispensers must be wired on the same phase.

WARNING

Unauthorized dispenser modifications may compromise the safety of the dispenser and create a condition that results in severe injury or death from fire, explosion or electric shock. Do not make, or allow to be made, any changes or modifications to the dispenser that are not factory authorized.

- Only factory provided equipment is to be installed in the head of the dispenser.
- The vapor barrier forming the base of the head is an important part of the safety design of the dispenser and MUST remain as shipped from the factory. DO NOT drill or punch any holes in this barrier!
- All conduit and electrical fittings must be listed for use in Class 1, Division 1, Groups C & D hazardous locations. The conduit must be threaded, rigid, metal conduit. PVC or other non-metallic conduit is not acceptable. See **Figure 4** for clarification of what the hazardous area classifications are on the ***Fuelhouse*** dispenser and where they are located.
- All threaded conduit connections must be drawn tight with a minimum of 5 threads of engagement.
- All field wiring must be connected in the main junction box.
- AC Neutral conductors must be solid WHITE or LIGHT GRAY.

WARNING

Performing work on a dispenser without first removing all power may result in electric shock, causing severe injury or death. All electricity must be turned off and tagged out prior to beginning any electrical work on the dispenser. More than one disconnect may be required. Use a digital multimeter to verify all power is off.

- Ground conductors must be solid GREEN or GREEN with one or two YELLOW stripes.
- Use only insulated, **STRANDED COPPER WIRE** that is properly sized, UL labeled and gasoline / oil resistant. Rated to 300V.
- All field wires must be color coded and/or labeled to facilitate equipment checkout and service.
- All wires must be pulled and connected as a continuous run to the dispenser junction box. Splices and field box terminal connectors are not permitted.
- Do not use gaskets or other sealing compounds on the cover of the explosion-proof junction box. The mating surfaces between the junction box and the cover must be clean and free of nicks or scratches.
- All required conduit seal-offs must be in place and poured when installation is complete.
- Make sure that all covers, plugs, etc. are in place and tight before replacing the dispenser's lower panels.
- All unused openings in the dispenser's main junction box must be plugged when finished with the installation of the dispenser.

Ground

The ***Fuelhouse*** dispenser MUST be connected to an equipment grounding conductor located in the conduit as per National Electric Code, Article 250.

- Grounding conductor must be at minimum 12 AWG with insulation colored green or green with one or two yellow stripes.
- Grounding conductor must be connected to the equipment grounding terminal / lug in the dispenser's main junction box.
- A dedicated ground conductor from each dispenser to the electrical panel is required. This conductor must be connected to the green grounding screw in the dispenser's main junction box and the ground bus bar in the electrical panel.
- Verify that the main electrical panel and all sub panels are properly grounded per NEC requirements.

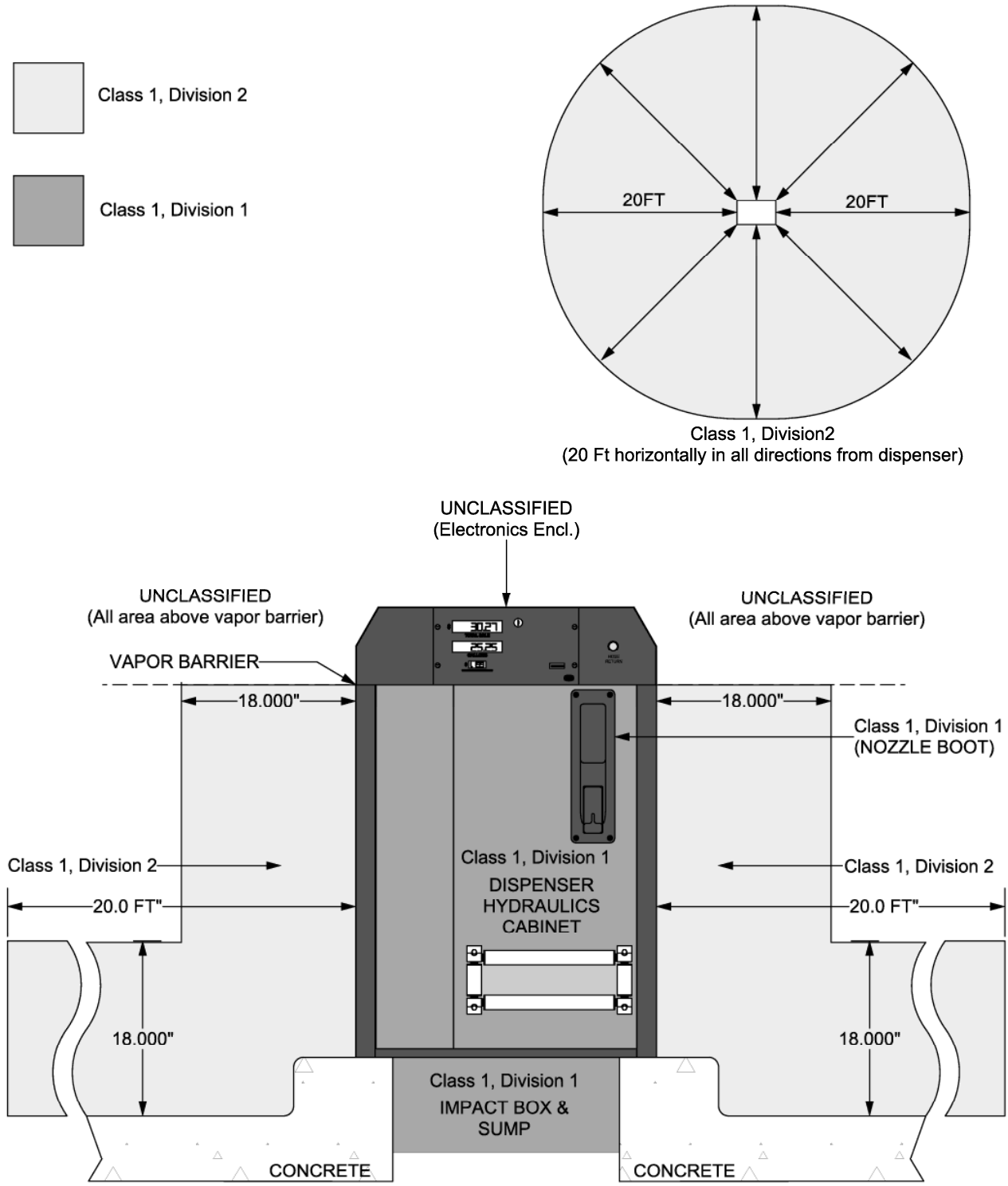


FIGURE 4: HAZARDOUS AREA CLASSIFICATIONS

Emergency Power Disconnect Switch

- One or more emergency power disconnect switches must be installed to control power to the entire fueling system. See NEC Article 514-5 and NFPA 30A for specifics.
- The emergency power disconnect switch is a single control point that simultaneously disconnects all power to the fueling system including the dispensers, pumps/STPs, lights, etc.
- If more than one disconnect is used, they must be interconnected so that activation of any one of them will disconnect electrical power.
- The emergency disconnect switch must be clearly marked and located in an accessible location between 20 and 100 feet from the fuel dispensers it serves.
- The disconnect switch must be one that can only be reset with manual intervention in a manner subject to approval by local authorities.

Circuit Breakers

- Power to each dispenser must be supplied from a dedicated **switched neutral circuit breaker**. No other equipment or dispensers shall be powered from it. A dedicated breaker allows for isolation of the dispenser.
- Use of two single pole breakers with handle ties is not permitted.
- The circuit breaker must be properly sized for the power load. Consult specifications for load of dispenser model being installed.

Pump Control

A motor control relay must be installed on each pump being controlled by the dispenser. The control relay allows the dispenser's low amperage PUMP START control signal to control a high amperage/high voltage pump motor.

CAUTION

Damage to the dispenser can result if the PUMP START control signal is used to directly power a pump motor, accidentally shorted to the conduit or otherwise miswired.

- The PUMP START signal can supply up to 0.5 Amps AC to activate the coil on the motor control relay.
- When the control signal from more than one fueling point can activate a given pump motor, means must be provided to isolate the dispenser's control signals from one another.
- An isolation relay, or other means of isolation, must be provided for each pump control signal. Combination pump motor control relay & isolation relay interface boxes are recommended for ease of installation.

WARNING

Failure to isolate the dispensers' control signals can result in electric shock from electricity back-feeding from one dispenser to another via these signals, resulting in severe injury or death. Ensure all dispenser control signals are isolated from one another.

CAUTION

Failure to isolate dispenser control signals can result in damage to the dispenser's electronics from cross phasing that occurs when signals from two or more dispensers powered by different AC phases are connected together. Ensure all dispensers are powered by the same phase (as mandated in **Requirements for Electrical Installation**). Additionally, ensure all dispenser control signals are isolated from those of other dispensers.

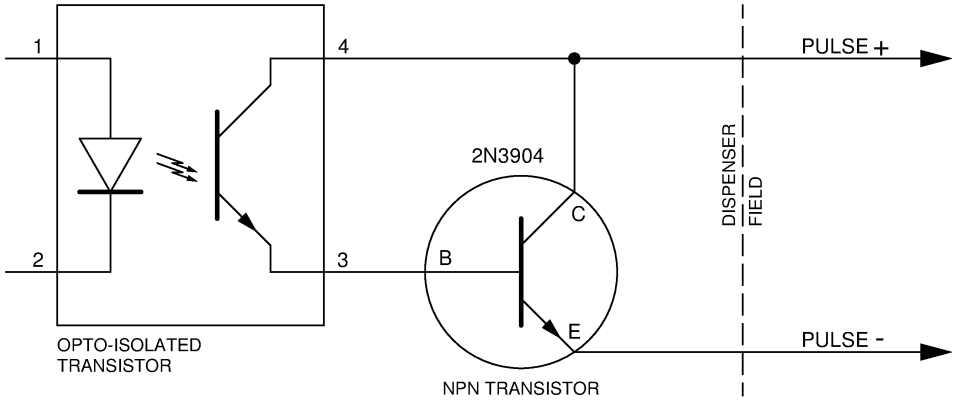
- If not used, the PUMP START control signal must be capped off to prevent it from shorting to the junction box.

DC Pulse and Communications Wiring

The ***Fuelhouse*** series DC pulse and communications wires should not be run in the same conduit as the AC power and signal wires. Wire used for these DC signals must meet the following requirements:

Environmental:	Gas & oil resistant; suitable for wet or dry environment.
Operating Temp:	-20C to +75C dry
Voltage Rating:	300V
Conductors:	18 AWG stranded, copper wire, twisted pair
Shield:	100% coverage
Drain Wire:	Foil: 20AWG or larger

DC Pulse Out Circuit



Wiring the Dispenser

All field wire connections to the ***Fuelhouse*** dispenser are made in the main junction box located on the left side of the dispenser's lower cabinet.

WARNING

Performing work on a dispenser without first removing all power may result in electric shock, causing severe injury or death. All electricity must be turned off and tagged out prior to beginning any electrical work on the dispenser. More than one disconnect may be required. Use a digital multimeter to verify all power is off.

CAUTION

Do not attempt to wire the dispenser without first reviewing the appropriate wiring diagrams and associated notes. Failure to follow the correct wiring diagrams may result in damage to the dispenser.

1. Select the appropriate wiring diagram(s) for the installation. Select the drawings from the "**Wiring Diagrams**" section of this manual. Study the diagram(s) and any notes that may be present.
2. Remove the left door of the lower cabinet on the dispenser. Store the door in a safe manner so that it is not damaged.
3. Remove the cover from the main junction box. Store the cover and its six bolts for re-assembly later.
4. Verify that a conduit seal-off fitting is the first fitting on each conduit as it leaves the ground below the dispenser.
5. Verify that all field wires to be connected to the dispenser are:
   - long enough to make connections in junction box
   - rated for a minimum of 300V
   - gas/oil resistant
   - identified in some manner to differentiate the connectors
5. Connect the field wiring conduit(s) below the dispenser to the junction box using 3/4" conduit and fittings rated for Class 1 Division 1 Group C & D environments. Be careful not to damage or pinch the wires.
6. Test each wire conductor to verify that its insulation has not been damaged while being pulled through the conduit.
   A. Wires to be tested MUST be disconnected at both ends.
   B. Use a multimeter to measure resistance of each wire to ground.
   C. Use a multimeter to measure resistance between all wires.
   D. A reading of 50 Megaohms or greater for each test is acceptable.
   E. Any wires that fail the test must be replaced.

F. After all wires have passed the insulation test, pour the seal-off fittings below the junction box.

7. Make all necessary connections as required by the wiring diagram(s) appropriate to the installation. Use only properly sized, Listed wire nuts to make the connections.
8. Individually cap all unused wires in junction box otherwise damage to the dispenser may occur if they short out.
9. Seal all unused conduit holes in the junction box using threaded, listed 3/4" conduit plugs.
10. Replace junction box cover using ***all*** six bolts removed in step 2 above. Make sure to not pinch any wires.
11. Replace the door on the left side of the lower cabinet of the dispenser.

Hose Assembly Requirements

WARNING

Improper installation of the hanging hardware may result in the failure of the break-away in the event of a drive-off, causing the hose assembly to rupture or the dispenser to be pulled over. A fire or explosion can occur, resulting in severe injury or death.

All hanging hardware must be installed per manufacturer's instructions and in accordance with all applicable codes.

WARNING

Gasoline blends containing 15% or more ethanol may not be compatible with certain materials and hydraulic components. Leaks or component failure may result, causing fire or explosion or environmental damage.

When dispensing gasoline blends containing 15% or more ethanol, consult the manufacturer of all fuel system components to verify compatibility with the fuel being dispensed. This includes the fuel dispenser itself.

- All hoses and related hanging hardware must be Listed and installed per the manufacturer's instructions and in accordance with all applicable codes.
- Use only UL pipe sealant rated for the fuel being dispensed.
- Use pipe sealant on male threads only.
- DO NOT USE Teflon tape to seal fittings on the hose assembly. Teflon tape reduces the friction to the point that the fittings can easily be over-tightened, resulting in fractures or other failures of the fittings.
- Check ground continuity of the hose / nozzle assembly when finished.

Install Hanging Hardware

WARNING

An improperly grounded nozzle spout can result in static discharge while fueling, igniting a fire / explosion, resulting in severe injury or death. Continuity must be present between the nozzle spout and the dispenser to prevent static discharge. All components of the hose assembly should be Listed . Continuity of each hose assembly must be tested and verified prior to use.

Install the hanging hardware on the dispenser using the following procedure.

1. Clean all fittings to remove dirt and oil from their threads.
2. Install the short hose whip for the breakaway to the dispenser outlet.
3. Attach the breakaway to the hose whip. Follow the breakaway manufacturer's instructions.
4. Install the swivel in to the base of the nozzle. Follow the swivel and nozzle manufacturers' instructions. Only use nozzles listed on the "Installation Instructions" label located on the dispenser door near the main junction box.
5. Assemble the hose to the swivel / nozzle assembly. Follow the hose manufacturer's instructions.
6. Assemble the free end of the hose to the breakaway.
7. Check the entire hose assembly for continuity. Publication RP400 titled *Recommended Procedure for Testing Electrical Continuity of Fuel Dispensing Hanging Hardware*, published by the Petroleum Equipment Institute, should be used as a reference guide to perform the continuity tests.

Verify Proper Nozzle Fit

After installing the hose and nozzle on the dispenser, verify that the nozzle fits correctly into the dispenser's nozzle boot. If the nozzle does not fit correctly, it should be removed and cannot be used with the dispenser.

To verify proper fit:

1. Insert the hose nozzle valve over the nozzle hook and into the boot. The nozzle shall not slip out of the boot and the pump shall not operate.
2. The pump shall only operate when the nozzle is removed from the nozzle boot.
3. The pump shall stop when the nozzle is returned to into the nozzle boot.
4. The nozzle shall be able to be padlocked to the hanger or nozzle boot to prevent tampering and starting the pump motor so that no fluid can be discharged.

4 - PROGRAMMING

The dispenser's main CPU board(s) are accessed by opening the display panel located on the front of the dispenser's head. The CPU board must be programmed so that the dispenser will operate correctly with the system in which it is installed. Programming is set by a group of a 4 position dip switches, a 4 Shunt Block, and PPG Rotary switches located on the main CPU board.

IMPORTANT

If the Fuelhouse dispenser is equipped to communicate with a Fuel Controller via 2 -wire RS-485, the price per unit volume will be set by the Fuel Controller. Any price set by the rotary switches will be overridden by the controller unless the dispenser is placed in STAND ALONE operation. See Appendix 'A' for details.

IMPORTANT

After changing any programming setting on the CPU board, including price, the CPU board MUST BE RESET by cycling power or pressing the RESET button in the middle of the board.

Price Per Volume

(RETAIL versions only) Setting the price per unit volume of product is done using four rotary switches located in the lower right corner of the board. See **Figure 5A.** SW2 sets the dollar amount, SW3, SW4 and SW5 set the 10¢, 1¢, and 0.1¢ amounts, respectively. For a price of 1.399 per gallon, switches 2 thru 5 would be set to 1, 3, 9, & 9. ***Note: If price is set to '0.000', the dispenser will not activate***.

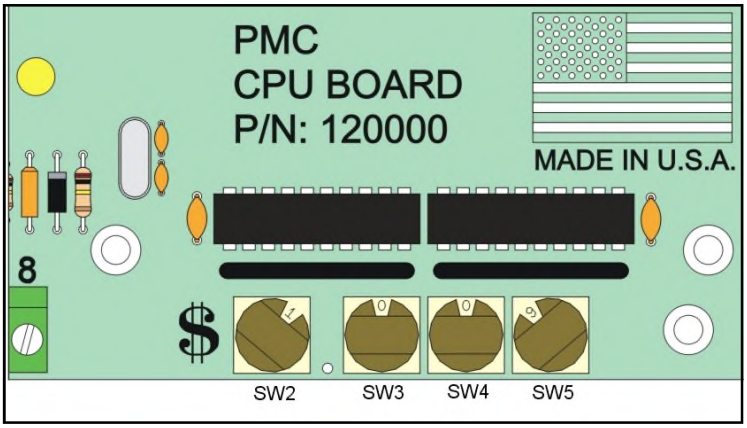
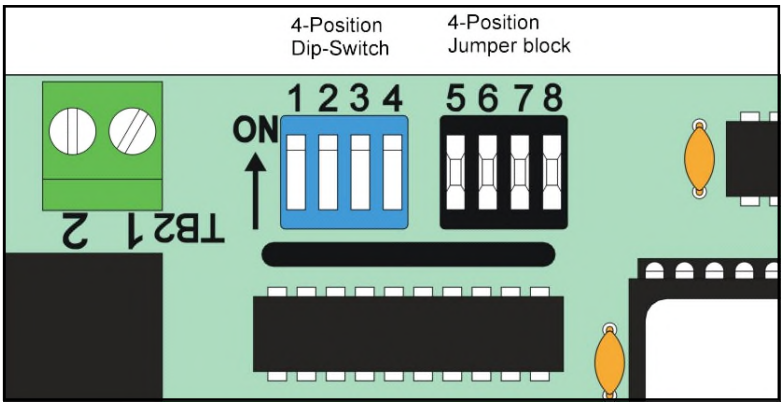


Figure 5 - Corner of CPU board showing price setting switch locations. Note that price setting only applies to RETAIL dispensers.

IMPORTANT

After changing any programming setting on the CPU board, including price, the CPU board MUST BE RESET by cycling power or pressing the RESET button in the middle of the board.



Shunt Block and Dip SwLocation on CPU Board

DIP SWITCH PARAMETERS	**Position**
Dispenser Operating Mode (Table 6A)	1
Volumetric Pulse Resolution (Table 6B)	2
Display TEST (Table 6C)	3
Hose Reel Pre-pressurization (Table 6D)	4

JUMPER PARAMETERS	**Position**
Liters / Gallons Unit of Measure (Table 6D)	5
FH Model Selection (Table 6E)	6
Volume or Penny Pulse Output (Table 6F)	7
UNUSED	8

Parameter settings are detailed in tables on next page

Programming Tables

Dip Switch positions 1-4 and Jumper Positions 5-8

DIP SWITCH SETTINGS

TABLE 6A - Position #1

	Dip Switch Position #1
Requires external 110VAC Permissive from card system or terminal	OFF*
Stand-alone mode	ON

Dispenser Operating Mode

If the dispenser is controlled by a console or card system, then this position should be set to OFF. Setting this to ON bypasses the requirement for an external authorize signal to the dispenser. If a 120040x-FH communications daughter board is installed, See Appendix 'A'.

TABLE 6B - Position #2

	Dip Switch Position #2
10 pulse per unit volume	OFF*
100 pulses per unit volume	ON

Volumetric Pulse-out Resolution

If the pulse output type (see Table 6E below) is set for Volumetric, then this setting determines the resolution of the signal. If the pulse output type is set to PENNY pulse, this setting has no effect.

TABLE 6C - Position #3

	Dip Switch Position #3
Display Segment Test	OFF*
No Display Segment Test	ON

Display Segment Test

Set whether to have the Display Segment Test or not. If selected, the dispenser will show all '8' digits for 5 seconds, then reset and open the solenoid when the unit is enabled to dispense.

TABLE 6D - Position #4

	Dip Switch Position #4
Hose Reel Pre-pressurization Disabled	OFF*
Hose Reel Pre-pressurization Enabled	ON

Hose Reel Pre-pressurization

Helps eliminate meter jump from hose pressurization when dispenser is used with long hoses.

JUMPER SETTINGS

TABLE 6D - Position #5

	Jumper Position #5
LITERS	CUT
GALLONS	SHORTED*

Liters / Gallons Unit of Measure

Set the Unit of Measure for the dispenser. Default is US Gallons. If Liters is desired, then CUT the foil or jumper on POSITION #5.

TABLE 6E - Position #6

	Jumper Position #6
NOT VALID	CUT
FH-510, FH-515, FH-720	SHORTED*

Dispenser Model

Set MODEL of dispenser the CPU board is installed in. Default is FH-510, FH-515 or FH-720. At this time, this is the only valid setting for this position.

TABLE 6F - Position #7

	Jumper Position #7
Volumetric Pulse Output	CUT
Penny Pulse Output	SHORTED*

Pulse Output Type

Set the pulse output channel to either VOLUMETRIC or PENNY pulse out. If VOLUMETRIC is selected, Table 6B above determines resolution. If PENNY is selected , a pulse per penny of the TOTAL SALE is transmitted.

***** = *default setting***

Note: Jumper position #8 is not used at this time.

5 - STARTUP

Pre-Startup Checklist

The items in the following checklist must be inspected and verified as having been completed correctly prior to starting up the dispenser. All items should already be complete as required in previous sections. Only after the checklist is complete should power be applied to the dispenser.

- Power is turned off to the dispenser and associated product pump.
- The dispenser is securely anchored to the island using all four mounting locations in its base.
- All shear valves for dispensers being installed should be closed.
- Filters and strainers in dispenser are installed and tight.
- Dispenser is properly grounded.
- All conduit is complete.
- All unused conductors in the junction box are capped off.
- All ports or openings in junctions boxes or fittings must be plugged according to manufacturer's instructions.

CAUTION

The ***Fuelhouse*** dispenser MUST NOT be used to remove water from the storage tanks or damage to the dispenser can occur.

- Enough fuel is in the storage tank for proper operation of the pump(s). Any water in the storage tank has been removed.

CAUTION

Air must be purged from the fueling system slowly. Failure to follow the proper procedure as described can result in extensive damage to the dispenser's meter and will void the unit's warranty.

Purge Air from Supply Trunk Lines

All air must be purged from the dispenser and its product supply piping prior to beginning the startup procedure for the dispenser. The following procedure must be used to purge air from the supply piping.

1. Turn off all power to the product pump on the line being purged.
2. Verify that all shear valves on the product trunk and branch lines are closed.

3. Repeat steps 4 thru 10 for each product trunk and branch line.
4. Go to the dispenser furthest from the product pump on the trunk or branch line being purged.
5. Assemble a small ball valve to a 1/4” or 3/8” conductive hose that is compatible with the fuel in the line being purged. Make sure that the ball valve is closed.
6. Identify the shear valve associated with the line being purged and remove the plug from its test port. Connect the other end of the bleed hose to the test port using the appropriate NPT to hose fitting.

WARNING

Fire / explosions caused by sparks from static discharge are a potential danger anytime fuel is being dispensed, possibly causing serious injury or death. Use only approved, metallic containers and always keep the nozzle in contact with the container when fueling.

7. Place the ball valve in an approved metallic container. Keep the ball valve in contact with the container at all times while bleeding air.
8. Restore power to the product supply pump. Activate the pump.
9. Slowly open the ball valve and keep open until the air is purged and a steady stream of fuel is coming out of the ball valve. Close the ball valve. Be sure to maintain contact between the ball valve and the container to eliminate static buildup / discharge.
9. De-activate the product supply pump.
10. Disconnect power from the pump and dispenser using the appropriate breakers.
11. Place ball valve on the bleed line into the fuel container and open to relieve pressure on the supply line. Remove the hose / ball valve assembly from the test port of the shear valve.
12. Re-install the test port plug on the shear value using listed sealant rated for the fuel being dispensed.

CAUTION

Air must be purged from the product trunk and branch lines ***PRIOR*** to purging air from the dispenser. Failure to purge the supply lines can result in damage to the dispenser meter.

Purge Air from the Dispenser

The following procedure must be used to purge air from the dispenser.

1. Turn off all power to the product pump for the dispenser being purged.

2. Place the dispenser in STAND ALONE mode. See Programming Section of this manual.
3. Make sure that the nozzles are hung in their proper boot.
4. Restore power to the dispenser and associated product pump.
5. Verify that the dispenser displays have powered up and are showing information.
6. Slowly open the dispenser's shear valve on the supply line.
7. Lift the associated nozzle from its boot and lift the boot lever to activate the pump and pressurize the line.
8. Verify that the correct supply pump has been activated.

WARNING

Fire / explosions caused by sparks from static discharge are a potential danger anytime fuel is being dispensed, possibly causing serious injury or death. Use only approved, metallic containers and always keep the nozzle in contact with the container when fueling.

9. Place the nozzle in the metallic container used earlier. Be sure to maintain contact between the nozzle and the container.
10. Slowly open the nozzle only part way, and hold, until air stops coming out and is replaced by a steady stream of fuel.
11. Open the nozzle valve at least half way and dispense about 40 to 50 gallons per hose to eliminate all residual air in the lines / dispenser.
12. Hang up the nozzle in its boot.
13. Return all fuel dispensed to the appropriate product supply tank.
14. Disconnect power from the pump and dispenser using the appropriate breakers.
15. If testing is complete with this shear valve, remove the hose / ball valve assembly from its test port .
16. If the hose/valve assembly was removed in step 15, re-install the test port plug on the shear value using listed sealant rated for the fuel being dispensed.
17. Closely inspect the dispenser's hose assembly and internal piping for any signs of leaking fuel.

Verify Display and Totalizer Operation

Use the following procedure to properly startup the dispenser and prepare it to be placed into service. Before testing or operating the dispenser, air must have already been purged from the supply piping and the dispenser.

1. Restore power to the dispenser and pump with the appropriate breakers.
2. Configure the dispenser for the application in which it is used. If used in Console mode, the dispenser requires an authorize signal from any other device. Standalone mode does not require this.
3. Press the RESET button on the dispenser CPU board.
4. Record the current totalizer readings for the dispenser.
5. If the dispenser is used in Console mode, authorize the dispenser using the external control device.
6. Remove the nozzle from the boot and lift the handle to activate the dispenser.
7. Observe the reset sequence and verify the displays work properly.

WARNING

Fire / explosions caused by sparks from static discharge are a potential danger anytime fuel is being dispensed, possibly causing serious injury or death. Use only approved, metallic containers and always keep the nozzle in contact with the container when fueling.

8. Dispense some fuel into an approved container, taking care not to spill any and not to over flow the container.
9. Observe the displays to verify the counting looks smooth and consistent. Erratic or otherwise jumpy counting may indicate a problem with the display board or with the communications between it and the CPU.
10. When finished dispensing, gently replace the nozzle in the boot and verify that the dispenser is deactivated.
11. To verify that the dispenser is no longer authorized, try to dispenser more fuel into the container without lifting the nozzle boot lever. There should not be any fuel dispensed.
12. Verify that the supply pump has turned off.
13. Check the current totalizer readings with the ones recorded in step 4 above. Verify that the difference is the same as the amount of fuel dispensed.
14. Repeat steps 1 thru 13 for each dispenser being started up.

Accuracy Verification of Meters

Verify / set the calibration of the dispenser meters using procedures from the **CALIBRATION** Section of this manual.

6 - CALIBRATION

All meters are tested, calibrated and sealed before a dispenser is shipped from the factory. However, the accuracy of the meter must be verified as part of the startup procedure.

Additionally, the meters used in the ***Fuelhouse*** dispenser require a break-in period after initial installation, during which the meter's calibration can change slightly. It is strongly recommended that the accuracy of each meter be re-checked after 90 days with calibration changes made as necessary.

In custody transfer applications involving the resale of fuel, the meter must be sealed by the appropriate Weights and Measures authority before initial use and after any changes are made to its calibration.

Minimum Size of Calibration Container

The accuracy of the meters used in the dispenser must be verified using a certified calibration container. NIST Handbook 44 defines the minimum size of the calibration container required to verify the meter's accuracy. The size is determined by the maximum flow rate achieved by the installed meter. For flow rates less than 20 GPM, the container must be large enough to hold at least 5 gallons. For flow rates of 20 GPM or greater, the container must be large enough to allow the meter to operate at least one minute at full flow. Generally, the minimum calibration container size required to test the meters used in the ***Fuelhouse*** dispensers are:

- **FH-510:** 25 or 50 gallon (depending on installation flow rate)
- **FH-515:** 50 or 100 gallon (depending on installation flow rate)

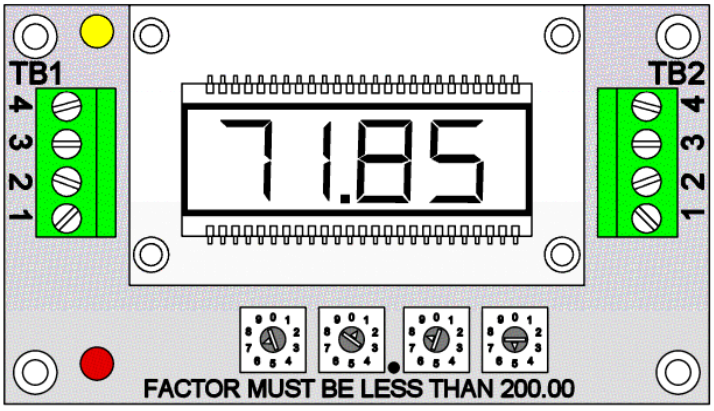
Note that these are minimum sizes . It is permissible to use larger calibration containers than required.

Calibration Tolerances

TABLE 1: *(This table is for reference only. The tolerances that apply to the actual installation are determined by the local authority having jurisdiction.)*

Acceptance Tolerance		Maintenance Tolerance	
FH-510 Dispenser		**FH-510 Dispenser**	
25 gallon test (0.3%):	+/- 17.3 in^3	25 gallon test (0.5%):	+/- 28.8 in^3
50 gallon test (0.2%):	+/- 23.1 in^3	50 gallon test (0.3%):	+/- 34.6 in^3
FH-515 Dispenser		**FH-515 Dispenser**	
50 gallon test (0.2%):	+/- 23.1 in^3	50 gallon test (0.3%):	+/- 34.6 in^3
100 gallon test (0.2%):	+/- 46.2 in^3	100 gallon test (0.3%):	+/- 69.3 in^3

M5S1 Meter



110500C Factor Board

Calibration Adjustment Procedure

The Fuelhouse dispenser is calibrated by setting a correction factor on the 110500C Factor Board *(see above)* located under a protective security cover inside of the rear panel of the dispenser head. The board's cover is held in place with two screws and a seal wire to prevent tampering. The electronic board has four rotary switches that are used to set the correction factor for the dispenser's meter. The correction factor is used by the board to manipulate the raw pulse stream generated by the meter to produce exactly 400 pulses per gallon expected by the dispenser's CPU board. Formula 6-1 is used to determine a new correction factor if it is determined that an adjustment of the correction factor is needed when calibrating the dispenser.

Formula 6-1

$$\textbf{New Factor Setting}^{1A} = \text{Current Factor Setting} \times \left[\frac{\text{Prover Volume}^{1B}}{\text{Dispenser Volume}} \right]$$

Notes

1A. The correction factor for the M-5 meter should be in the range of 97.50 to 99.50. If an adjustment is necessary and the results of the calculation require that the correction factor be set to a number outside of this range, it may indicate a problem with the meter, pulser or calibration board. Futher troubleshooting would be necessary to determine which.

1B. If calibrating in gallons, any cubic inch amount included in the 'Prover Volume' must be converted to a decimal format by dividing the amount by $231in.^3$. For example, if the volume in a 50 gallon prover was under by $46in.^{3,}$, the calculated 'prover volume' for the Formula 6-1 would be:

Prover Volume = 50.00 - (46 / 231) = 49.80

Calibration Procedure

1. Dispense product into a certified calibration prover to wet the interior. Empty the fuel back into storage. Allow the prover to continue draining for exactly 30 seconds after flow stops.
2. Dispense product into the prover until the dispenser reads exactly the rated volume of the container. (i.e. 50.00 gallons for a 50 gallon prover, etc.).
3. Record the reading from the sight glass on the calibration container and compare it to the allowed tolerances in Table 1.
4. If the sight glass reading is within the applicable tolerance range, no change to the meter's calibration is necessary. Go to step 8 below.
5. If the reading is outside the applicable tolerance range, the calibration of the meter must be adjusted. Using 'Formula 6-1', calculate the new setting for the meter calibration board. Use the rotary switches on the board to adjust the correction factor to this new setting.
6. Empty the prover back into storage. Allow the prover to continue draining for exactly 30 seconds after flow stops.
7. Repeat steps 2 thru 6 to verify the new calibration of the meter.
8. Repeat steps 2 thru 8 for each meter as necessary.

Example calibration calculations.

Example 1 (US Gallons):

The accuracy of a new Fuelhouse dispenser is checked using a 50 gallon prover. The current calibration setting is 98.67. The prover's sight glass reading of –30 $in.^3$ is outside of the allowed tolerance and the meter must be adjusted.

$$\text{New Setting} = 98.67 \times \left[\frac{50 + (-30 / 231)}{50} \right] = 98.41$$

Change the correction factor to this new value using the 4 rotary switches on the 110500C board.

Example 2 (US Gallons):

The accuracy of a new Fuelhouse dispenser is checked using a 100 gallon prover. The current calibration setting is 99.18. The prover's sight glass reading of +85 $in.^3$ is outside of the allowed tolerance and the meter must be adjusted.

$$\text{New Setting} = 98.93 \times \left[\frac{100 + (85 / 231)}{100} \right] = 99.29$$

Change the correction factor to this new value using the 4 rotary switches on the 110500C board.

7 - OPERATING INSTRUCTIONS

WARNING

Per UL87A requirements, a dispenser must not be changed from its original application by changing fuel types once installed. For instance, if installed for a gasoline / ethanol blend such as E25 or E85, the dispenser can not be changed to traditional gasoline at a later date.

Leaks and potential environmental hazards can result or components may fail prematurely.

Do not change fuel types for a dispenser once it has been installed.

Prior to operating the dispenser, review the section "**IMPORTANT SAFETY INFORMATION**" at the front of this manual.

Dispenser Controls

The only user accessible control on the dispenser is the nozzle boot lever that the nozzle rests on when it is placed in the boot. When a user wants to begin a transaction, the nozzle is removed from the boot and the lever is raised. When the user wants to end a transaction, the lever is lowered and the nozzle is replaced in the boot.

WARNING

A vehicle's engine can generate sparks when running, potentially igniting fuel / vapors. Never fuel a vehicle with its engine running.

Dispenser Operating Sequence

1. Remove the nozzle from the boot and lift the lever to activate the dispenser.
2. If the dispenser is in Standalone mode or is in Console Mode and has been authorized by the console, the dispenser will begin its reset cycle.
    - The fuel supply pump turns on, pressurizing the system.
    - The dispenser does a display segment test showing all 8's for 5sec.
    - At the end of the 5sec test, the displays clear to 0 and the solenoid is opened.
3. Dispense fuel. The sale information will be displayed on the face of the dispenser. The dispenser will remain active and able to dispense fuel until one of the following occurs:
    - The nozzle boot lever is lowered (turned off).
    - The external authorize is removed by the console (console mode).
    - A quantity of 9999.90 Gallons or $9999.90 is reached.
    - PRESET AMOUNT set by a console/controller is reached.
    - Power failure

4. The sale is complete and ready to pay:
    - The product supply pump is turned off.
    - The solenoid valves in the dispenser are closed.
    - The current sale information will remain on the displays until the dispenser is authorized for another sale.

WARNING

Pulling hose out from or stowing hose on to a reel incorrectly can result in serious injury or equipment damage. Operation of the hose reel mechanism in a Fuelhouse dispenser should only be performed by qualified and trained personnel.

Rewinding the Hose onto the Reel

The Fuelhouse dispensers are equipped with internal reels used to stow the fuel hose when not in use. Depending on whether the hose reel has electric or spring rewind will determine how the hose is stowed on the reel. Make sure the hose is clear of any obstructions and personnel before rewinding. Care should be taken to wind the hose onto the reel in level layers to avoid high spots that may jam the reel and hose against the dispenser frame. Rewinding the hose on to the reel should only be performed by trained operators.

Electric Rewind:

Pressing the HOSE RETURN button on the face of the dispenser will activate the hose retrieval and releasing the button will stop it.

Spring Rewind:

The spring rewind reels are equipped with a ratchet mechanism that prevents the hose from reeling back in while fueling. As the hose is pulled out and the reel drum turns, loud metallic clicking is heard from the ratchet pawl. Once the desired length of hose is pulled out, continue pulling slowly until the ratchet noise is heard. This should indicate that the ratchet mechanism has engaged the drum. Gently, let off the tension used to pull the hose out. The hose should stay where it is and not be pulled back to the reel. If the hose is not locked, gently pull the hose out some more and try to lock the hose again once the ratchet makes noise.

To reel the hose back onto a spring reel, the ratchet lock needs to be released. Gently pull the hose out more. The ratchet may make a couple of clicks as the hose begins to pull out, but then there will be a quite area as the reel continues to turn. During this quite zone, the reel is unlocked and the hose can be gently walked back to the dispenser. NEVER release the hose as injury or equipment damage may result.

Power Failure

When there is a power failure, dispenser ends the current transaction, stores all transaction information to non-volatile memory and continues to display the sale information for 15 minutes. When power is restored, the sales information is recalled from memory and presented on the displays until the dispenser is authorized for the next sale. All transactions in progress when the power failed are ended and should be paid. If the user wishes to get more fuel, the dispenser will need to be reauthorized for a new sale.

Reading The Dispenser Totalizer

The dispenser is equipped with a 6-digit, non-resettable electro-mechanical totalizer that indicates the total volumetric throughput for the dispenser. The totalizer is located on the dispenser's display panel and indicates whole units of measure that the dispenser is configured for. In other words, Gallons when set to dispense in gallons and Liters when set to dispenser in liters.

8 - OWNER MAINTENANCE INSTRUCTIONS

The following section outlines simple maintenance procedures and routines for the Fuelhouse dispenser that can be performed by the operator. All other maintenance and repairs involving the dispenser should only be preformed by qualified and trained service personnel.

Safety Precautions

Prior to inspecting or performing any maintenance on the dispenser, review the section "**IMPORTANT SAFETY INFORMATION**" at the front of this manual. Failure to conform to safety procedures as outlined in this manual can result in severe injury or death.

Owner Inspections

The owner has a key role in maintaining the safe operation of the dispenser by performing equipment inspections on a periodic basis looking for leaks, worn or damaged parts, and any other hazards that may be present. When a hazard is identified, the dispenser should immediately be taken out of service and blocked off to prevent access to it. Only trained service personnel are to make the repairs necessary to fix the hazard.

Following is a recommended inspection routine to be performed by the station owner in order to identify potential hazards or other items that need to be repaired to maintain top performance and appearance of the dispenser. All safety precautions and procedures must be followed when performing the inspections. Any inspection or maintenance item not specifically covered should only be performed by trained service personnel.

WARNING

Inspecting, servicing or repairing a fuel dispenser is potentially dangerous due to the presence of flammable fuel / vapors and high voltage electricity.

- **Read and obey all safety precautions to prevent serious injury or death.**
- **Barricade the lane(s) next to the dispenser to prevent access by vehicles and non-authorized personnel.**
- **Wear gloves and proper eye protection.**
- **Disconnect all power to the dispenser prior to opening any of its panels. More than one disconnect may be required. Use proper lockout / tag out procedures to secure the disconnect(s) in the off position.**
- **Disconnect all power to the associated supply pump prior to opening any of the panels on the dispenser's lower hydraulic cabinet. More than one disconnect may be required. Use proper lockout / tag out procedures to secure the disconnect(s) in the off position.**
- **If accessing the lower cabinet of the dispenser, remove the doors and allow any vapors that may be present to disperse for a few minutes before beginning any work.**

WARNING

Using a dispenser with leaking, damaged or worn parts can create a condition that may result in serious injury or death from fire, explosion or electric shock. If leaks or damaged parts are discovered during an inspection, remove the dispenser from service and contact service personnel for repair.

WARNING

Servicing or repairing a dispenser incorrectly can result in serious injury or death from fire, explosion or electric shock. Only qualified and trained service personnel should service or perform repairs on the dispenser.

WEEKLY INSPECTIONS

- **External Leaks:** Check the dispenser for any external leaks. Check around the base of the dispenser for signs of a recent spill or leak. All leaking, damaged, or worn parts must be repaired immediately by qualified service personnel.
- **Hanging Hardware:** Check all hanging hardware closely for leaks, cracks, wear and damage. The components checked should include the hose, whip hose, breakaway, swivel and nozzle. Consult component manufacturer for any additional inspections required. All leaking, damaged, or worn parts must be replaced immediately by qualified service personnel.
- **Breakaway:** Verify that the breakaway connection is secure. If brake away is not secure, notify service personnel to correct or repair as necessary.
- **Nozzle Boot Lever:** Check nozzle boot lever for ease of movement by moving up and down several times. If lever sticks or does not have free movement over full range, contact trained service personnel to make repairs.
- **Panels / Locks:** Verify all panels and locks are in place on the dispenser. Do not operate the dispenser if a exterior panel or lock is missing or severely damaged.
- **Labels:** Verify all required safety and product labels on dispenser are present, legible and unobstructed.

MONTHLY INSPECTIONS

- **Internal Leaks:** Slowly remove the lower doors from the dispenser and check for any internal leaks. Refer to safety precautions detailed in the **WARNING** on page 8-1.
- **Filter** (if present): Check if filter needs replacement. Filter should be replaced every 250,000 gallons, every six months or when fuel flow slows significantly. Anytime a filter is replaced, the date and totalizer reading should be written on the new filter. Compare the current date and totalizer reading to that written on the filter last time it was replaced to determine if the filter should be replaced. If the filter needs replacement, contact the service personnel.

- **LCD Displays:** Observe the dispenser's LCD displays and look for missing segments. LCDs with missing segments must be replaced.

Preventative Maintenance

The ***Fuelhouse*** Series dispensers are designed to give many years of trouble free service. However, like any mechanical device, they require periodic maintenance to prevent problems from developing.

PM Schedule (Owner)

The owner should only perform the following preventive maintenance items on the ***Fuelhouse*** dispensers. All other items not specifically outlined here should only be performed by trained service personnel.

MONTHLY MAINTENANCE (Owner / Operator)

1. **Locks:** The locks on the various panels of the dispenser require lubrication to prevent internal corrosion that may prevent proper operation. Use a standard lock oil and squirt a small amount into the key slot. Do not over lubricate and wipe off excess oil. Lock lubrication is very important in high corrosion environments such as salt water marinas.
2. **CPU Backup Battery:** Inspect the 9V backup battery on the dispenser's CPU board and replace if signs of leakage or corrosion are observed. Use only a 8.4V NiMH rechargeable battery. NEVER replace with an alkaline or Lion battery as it may overheat causing it to leak or explode.

CAUTION

Do not wash the dispenser with a pressurized water source. Water may be forced passed seals into the dispenser and damage electronics or other components.

CAUTION

Do not use petroleum based or abrasive cleaners to clean the exterior of the dispenser as they can damage the finish.

3. **Clean the Dispenser**: Use a mild soap (such as Dawn dish detergent) and water with a soft cloth to clean the exterior of the dispenser. If stains persist, use a non-abrasive industrial cleaner, such as Simple Green, on the stains. Wipe off the dispenser with a clean rag and clean water to remove any soap residue. Cleaning the dispenser should be done more often in high corrosion environments such as salt water marinas.

SEMI-ANNUAL MAINTENANCE (Owner / Operator)

1. **Wax / Seal the Dispenser Panels**: The dispenser panels should be thoroughly cleaned and then waxed every six months to maintain its original appearance and prevent corrosion. A high grade, non-abrasive automobile wax can be used. Be careful not to get wax on textured surfaces or the finish may be ruined. Waxing the dispenser panels should be done more often in high corrosion environments such as salt water marinas. The panels must be thoroughly cleaned before applying wax or other sealing agent to prevent salt from being trapped against the stainless steel panel. Failing to remove the salt thoroughly may actually accelerate corrosion.

WARNING

Using a dispenser with leaking, damaged or worn parts can create a condition that may result in serious injury or death from fire, explosion or electric shock. If leaks or damaged parts are discovered during an inspection, remove the dispenser from service and contact service personnel for repair.

WARNING

Servicing or repairing a dispenser incorrectly can result in serious injury or death from fire, explosion or electric shock. Only qualified and trained service personnel should service or perform repairs on the dispenser.

2. **Grease Reel Swivel:** Grease the reel swivel using the grease fittings located on it. Care must be taken not to over pack the bearing with grease as that can cause the bearing to become excessively hard to turn. If it does drag after packing the bearings, simply removing and reinstalling the grease fittings on the swivel should relieve the pressure and allow the swivel to again move freely. If the swivel's bearings are damaged, the swivel assembly must be replaced.

3. **Reel Drum Bearings:** Inspect the reel's main bearings that the drum rotates on. The bearing material is Delrin and a typical sign of damage is cracking. If damage is detected, replace the bearing.

4. **Hose Roller Assembly:** The hose rollers protect the hose from damage as it is goes in/out of the dispenser. Check each roller tube for damage. Typical wear damage is cracking of the Delrin inserts in the ends of the roller tubes. Abuse of the rollers can also result in one or more of the tubes being bent. This usually only occurs if the roller is subject to an impact force such as being kicked or struck by a vehicle. If roller damage is detected, replace the defective part.

Service / Inspections By Service Contractor

In addition to the periodic inspection and preventive maintenance schedule performed by the owner, the dispenser and fuel system should be fully inspected by qualified service personnel at least once a year. Many times, a trained observer can find problems / issues that may be overlooked. Anytime repairs, upgrades or modifications are made to the dispenser, the following WARNING information must be adhered to.

WARNING

When making repairs to the dispenser's internal hydraulic system, only identical parts can be used. Substitute parts may compromise the reliability / safety of the dispenser and create a condition that results in severe injury or death from fire, explosion or electric shock.

WARNING

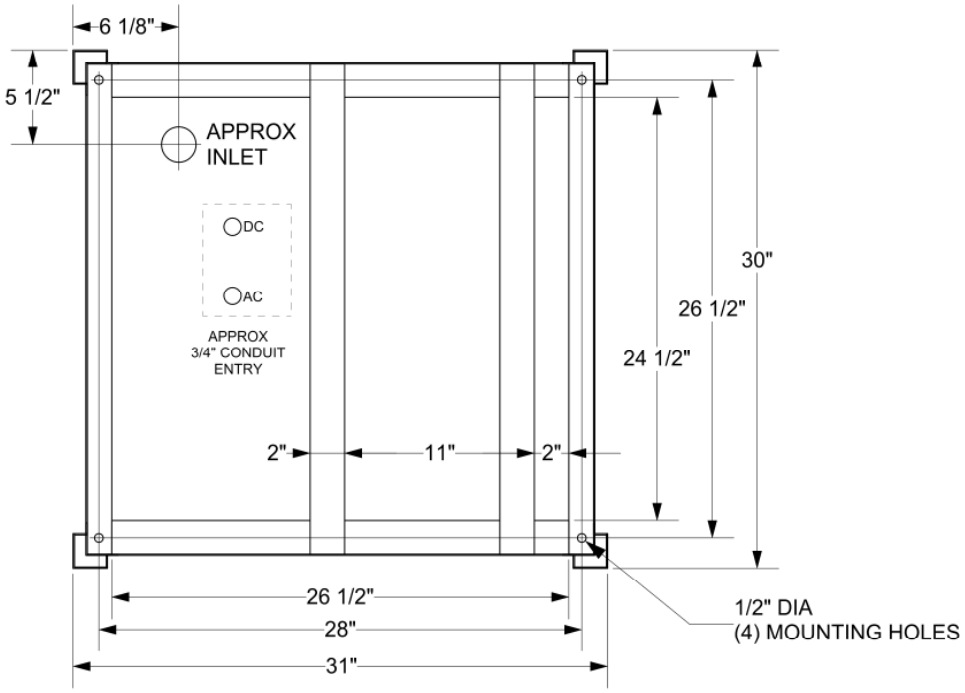
Unauthorized dispenser modifications may compromise the safety of the dispenser and create a condition that results in severe injury or death from fire, explosion or electric shock. Do not make, or allow to be made, any changes or modifications to the dispenser that are not factory authorized.

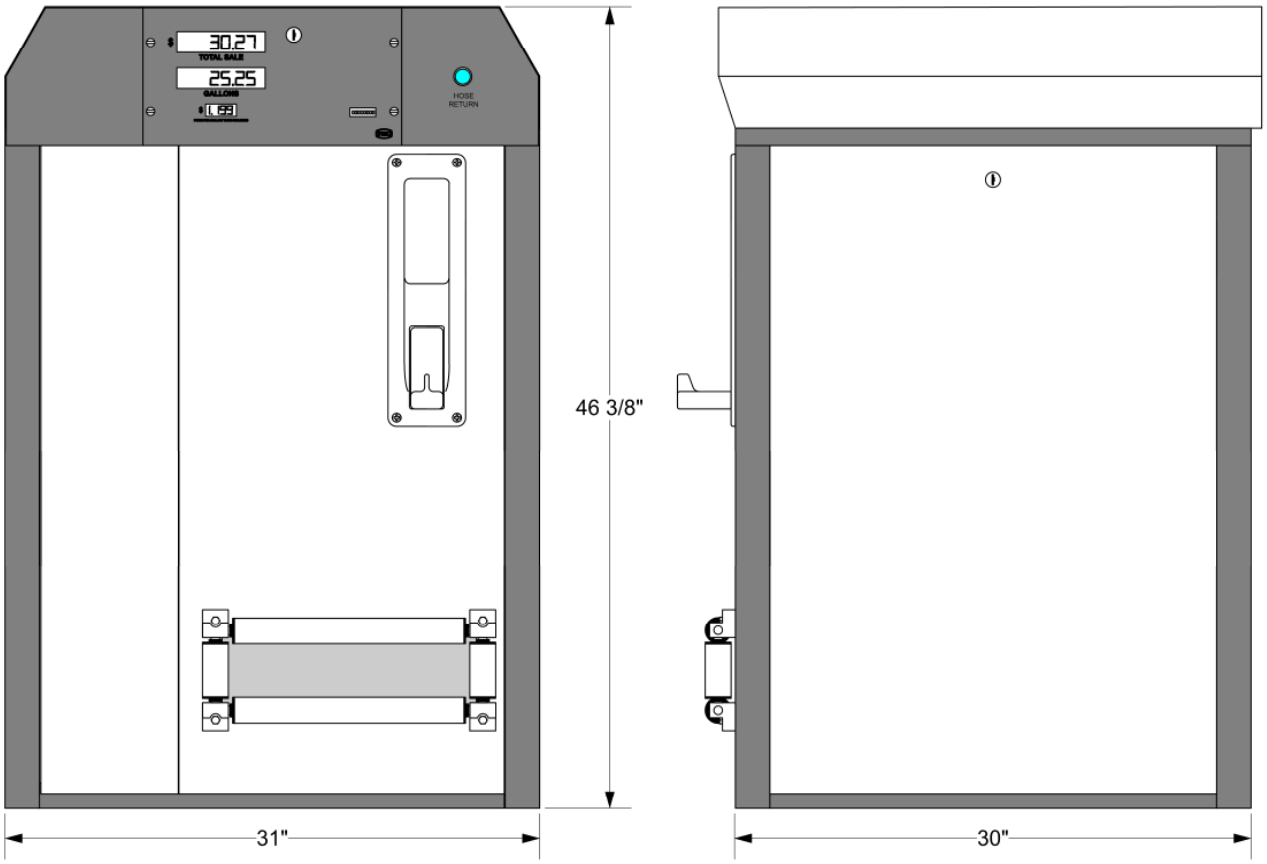
WARNING

Draining fuel from a section of the dispenser while performing service or repairs can result in a dry seal condition, leading to leaks. Leaking fuel posses both an environmental and safety hazard. Always replace seals and gaskets with new when servicing or repairing the dispenser.

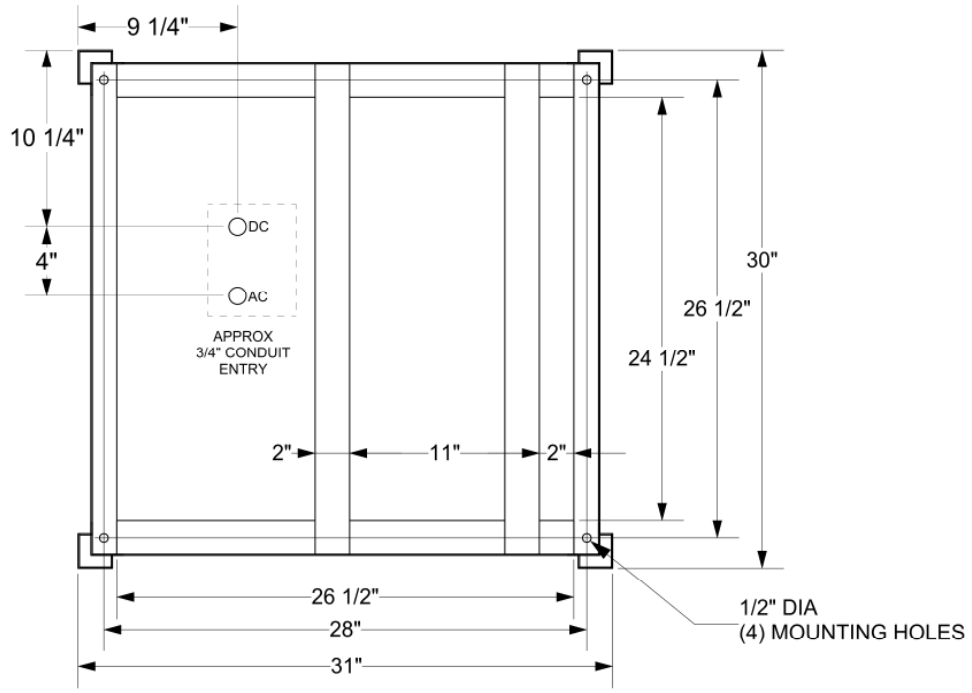
9 - Mechanical & Component Parts Drawings

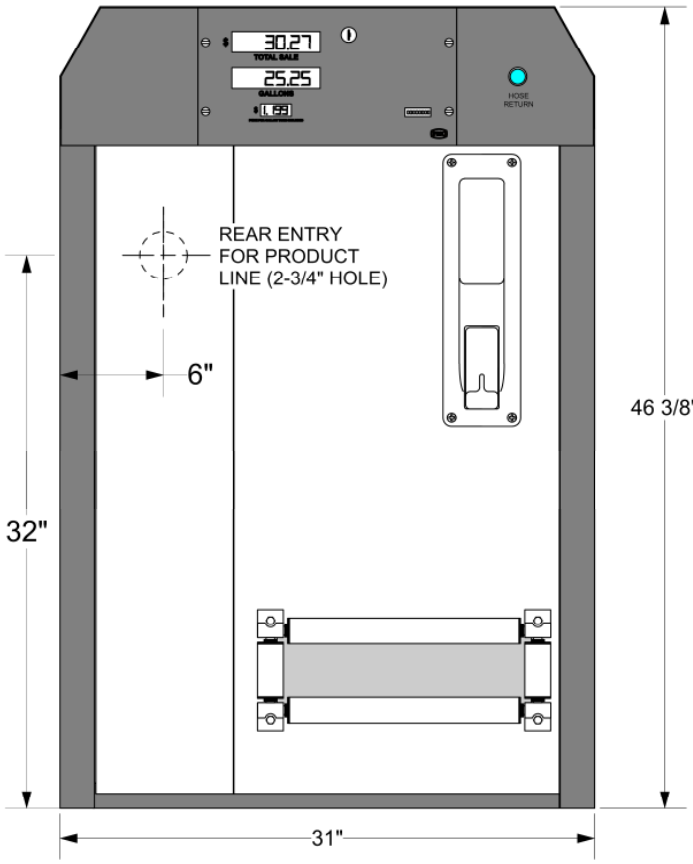
The diagrams / drawings are provided to identify key sub-assemblies and components of the ***Fuelhouse*** dispensers. The drawings are generic and that they visually identify the parts, but do not directly provide the P/N required for ordering. To use locate the part numbers, first identify the part of interest and its associated identification number on the drawings. The following manual page will have a table used to associate this identification number and the part number depending on the Fuelhouse model (Marine / Aviation / General Service). Ensure that the part number associated with the correct column on the table is used when ordering replacement / repair parts.

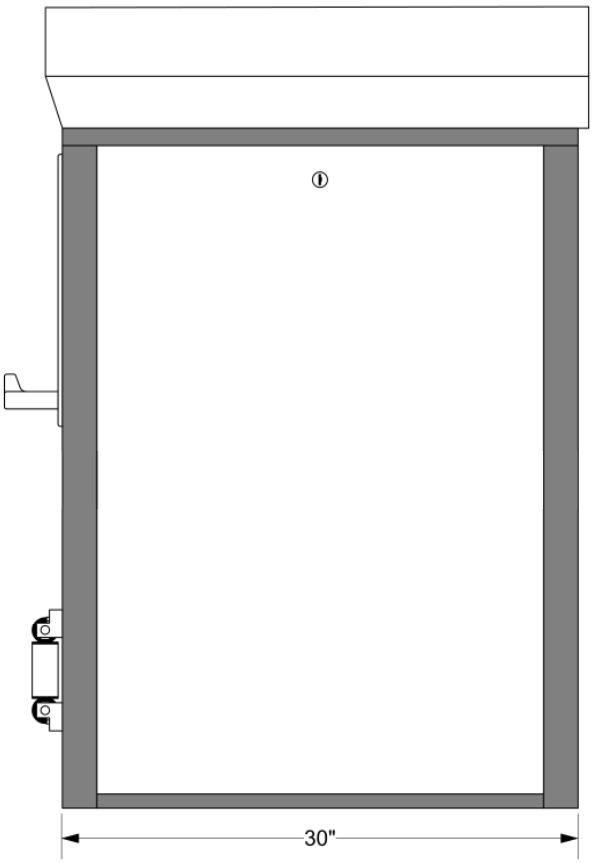




PMC Pump Measure Control, Inc. 1070 Nine North Drive, Suite 100 Alpharetta, GA 30004 PH. 770-667-0667 FAX 770-667-0476 DRAWING NUMBER: 91-20G07281	FUELHOUSE DISPENSER DIMENSIONS (w / BELOW GRADE FEED) DATE: 5/20/03 DRAWN BY: CAT SCALE: 1" = 5" "THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND IS SUBJECT TO COPYRIGHT OWNERSHIP BY PMC, INC"







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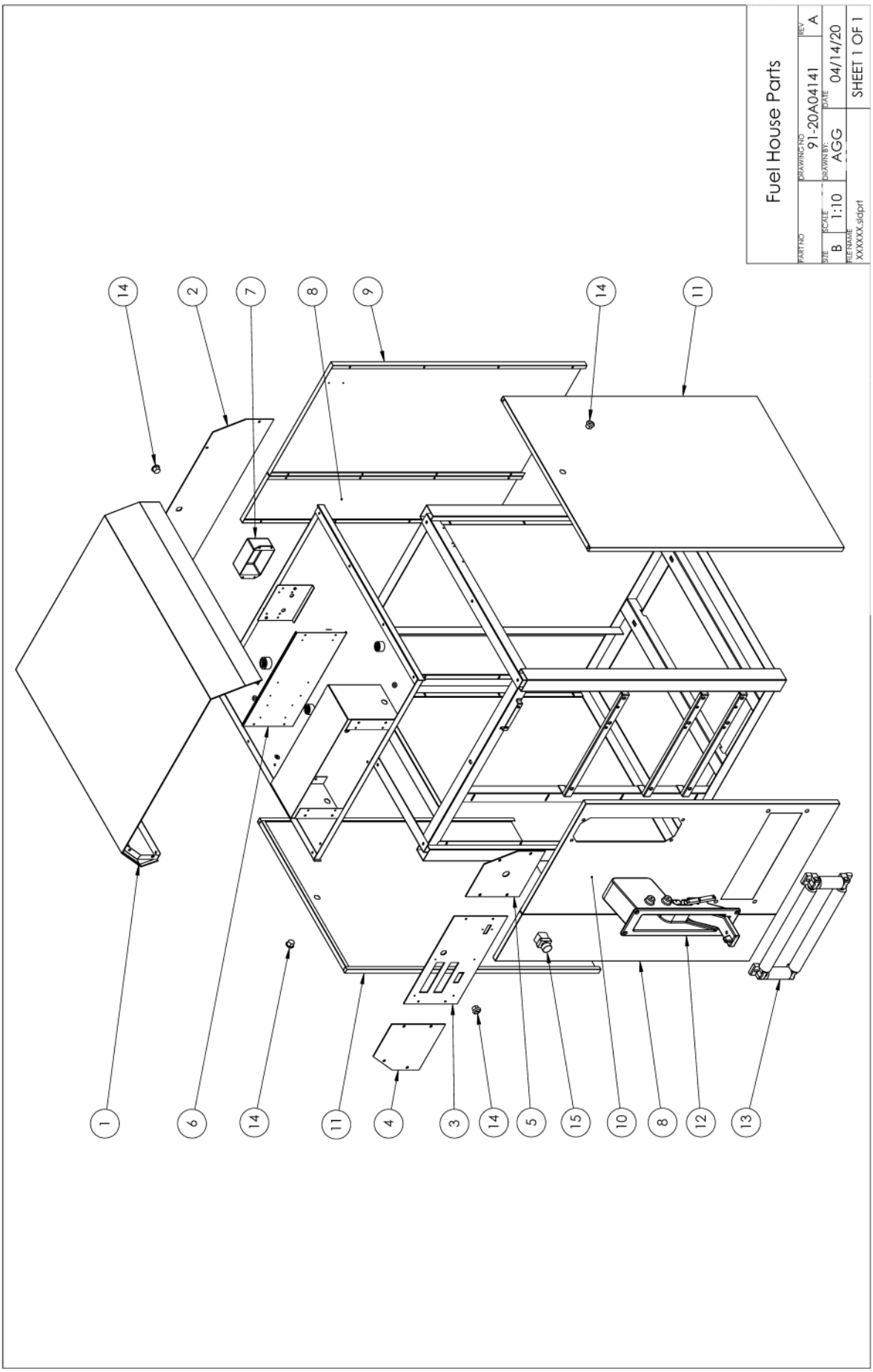
DRAWING NUMBER: 91-20G07282

FUELHOUSE DISPENSER DIMENSIONS (w / ABOVE GRADE FEED)

DATE: 5/20/03 | DRAWN BY: CAT

SCALE: 1" = 5"


Fuel House Parts
PART NO
DRAWING NO
91-20A04141
REV
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SIZE
B
SCALE
1:10
DRAWN BY:
AGG
DATE
04/14/20
FILE NAME
XXXXXX.sldprt
SHEET 1 OF 1
14
2
7
8
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14
11
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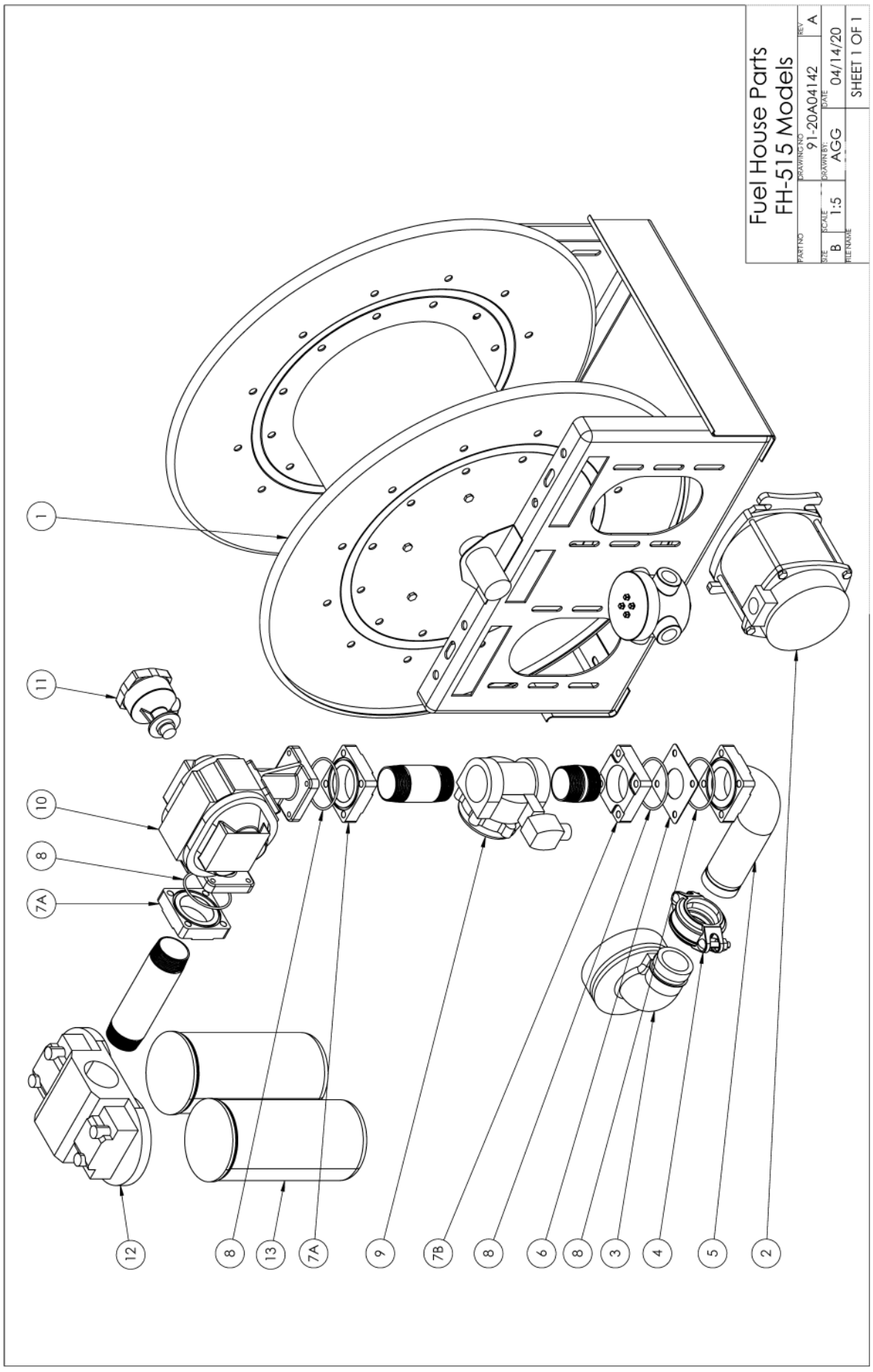
12
13

EXTERIOR PANELS / PARTS - FH SERIES DISPENSERS

(See Drawing 91-20A04141 for Reference Numbers)

Ref. #	Drawing Description	MARINE (-MA)	AVIATION (-AV)	GENERAL SERVICE (-GS)
1	Dispenser Lid / Top	20-FH1515-6	20-FH1515-4	20-FH1515-4
2	Rear Face Panel	20-FH1516-SS	20-FH1516	20-FH1516
3	Front Display Panel - Retail Front Display Panel - Volume Only	20-FH1518-SS 20-FH1523-SS	20-FH1518-SS 20-FH1523-SS	20-FH1518-SS 20-FH1523-SS
4	Front Left Face Panel	20-FH1517-SS	20-FH1517	20-FH1517
5	Front Right Face Panel	20-FH1519-SS	20-FH1519	20-FH1519
6	CPU Board Mounting Plate	20-10004-SS	20-10004	20-10004
7	Calibrator Cover	60-BOX4-3	60-BOX4-3	60-BOX4-3
8	Access Panel - Brushed Stainless	20-FH1511-6	20-FH1511-4	20-FH1511-4
9	Rear Panel - Brushed Stainless	20-FH1512-6	20-FH1512-4	20-FH1512-4
10	Front Panel - Brushed Stainless - Small Rollers - Large Rollers	20-FH1520-6 20-FH1514-6	20-FH1520-6 20-FH1514-4	20-FH1520-6 20-FH1514-4
11	Side Door Panel - Brushed Stainless	20-FH1513-6	20-FH1513-4	20-FH1513-4
12	Nozzle Boot	NB-2	NB-AV	NB-2
13	Small Hose Roller Assembly - 5.375” x 11.5” Large Hose Roller Assembly - 5.375” x 15.5”	40-ROLLASM-2 40-ROLLASM-1	40-ROLLASM-2 40-ROLLASM-1	40-ROLLASM-2 40-ROLLASM-1
14	Panel Lock Assembly w/ 2-Keys	39-CL-58-2	39-CL-58-2	39-CL-58-2
15	Reel Rewind Switch Assembly	60-4B689	60-4B689	60-4B689


Fuel House Parts
FH-515 Models
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91-20A04142
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AGG
DATE
04/14/20
TITLE NAME
SHEET 1 OF 1
1
11
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7A
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7A
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7B
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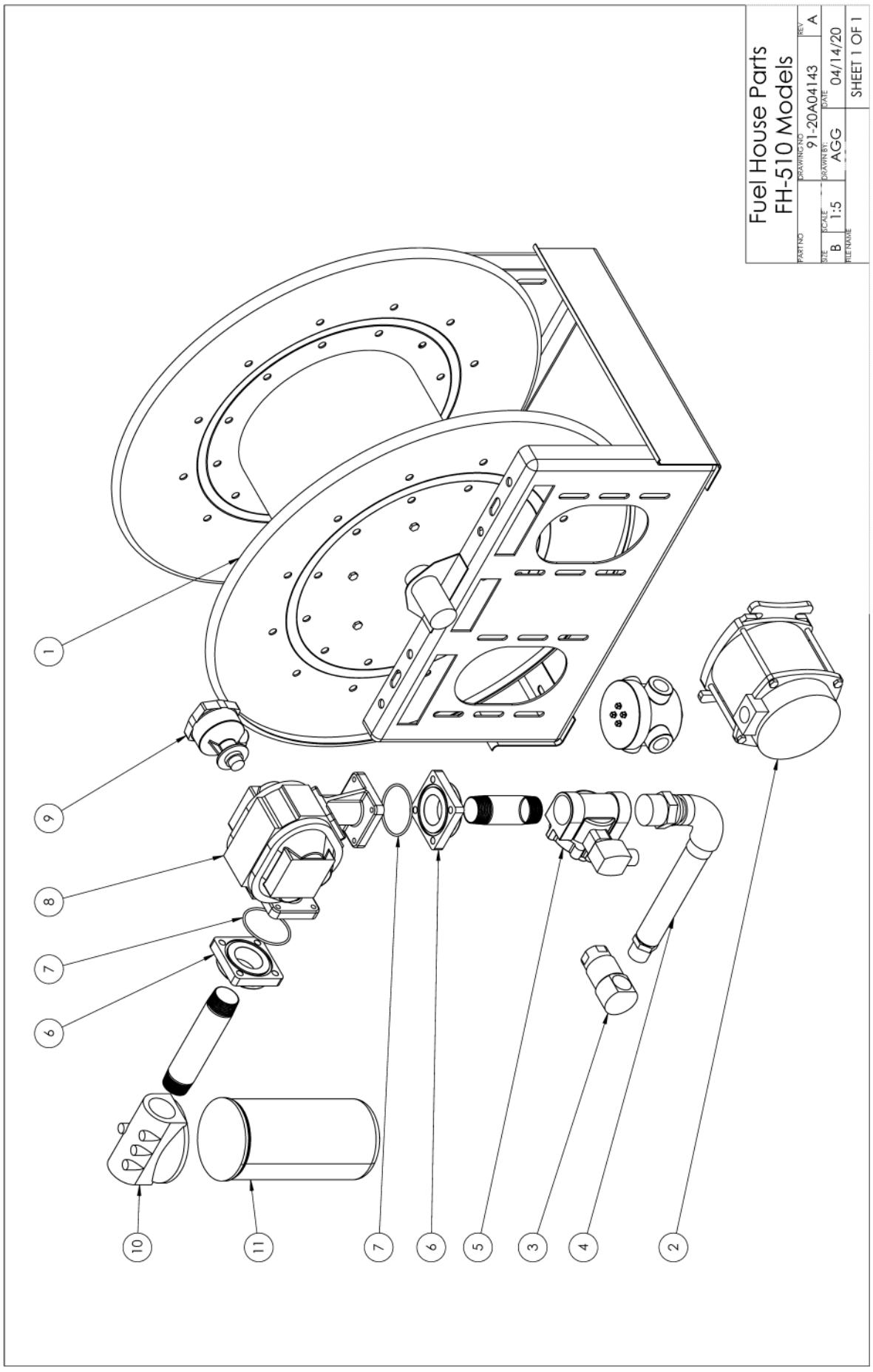
2

HYDRAULIC COMPONENTS - FH-515 MODELS

(See Drawing 91-20A04142 for Reference Numbers)

Ref. #	Drawing Description	MARINE (-MA)	AVIATION (-AV)	GENERAL SERVICE (-GS)
1	REEL - See Hannay Literature for Parts	7522-30-31-MA	7522-30-31-AV	7522-30-31-GS
2	Reel Motor—115VAC / 60Hz	40-9915.0237	40-9915.0237	40-9915.0237
3	Swivel Assembly - 1-1/2” x 90 Degree	40-9930.4312	40-9930.4312	40-9930.4312
4	Victaulic Clamp - 2”	40-75-2.0”	40-75-2.0”	40-75-2.0”
5	Elbow Assembly - 2” Flange x Victaulic	45-FL90-5.5VICT	45-FL90-5.5VICTx1/4NPT	45-FL90-5.5VICT
6	Flange Spacer - Stainless Steel	20-10005-SS	20-10005-SS	20-10005-SS
7A **7B**	2” NPT Flange 2” NPT Flange w/ 3/8” Thread Inserts	LC-A2212 LC-A2212-HELI	LC-A2212 LC-A2212-HELI	LC-A2212 LC-A2212-HELI
8	O-ring - Flange	49-233-VITON	49-233-VITON	49-233-VITON
9	Solenoid Valve Assembly - MAIN Solenoid Valve Assembly - BYPASS	AS-EFLG100V (2”) N/A	AS-ELFG022V-NI (1-1/2”) AS-EFLH086V (1/4”)	AS-EFLG100V (2”) N/A
10	Meter Assembly w/ Pulse Output Device	M5S1-FH	M5S2-FH	M5S1-FH
11	Pulse Output Device	LC-P.O.D.	LC-P.O.D.	LC-P.O.D.
12	Filter Housing	40FLTR50011	Call Factory	40FLTR50011
13	Filter Element	40FLTR70063 (qty 2)	Call Factory	40FLTR70063 (qty 2)


Fuel House Parts
FH-510 Models
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91-20A04143
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DATE
04/14/20
TITLE NAME
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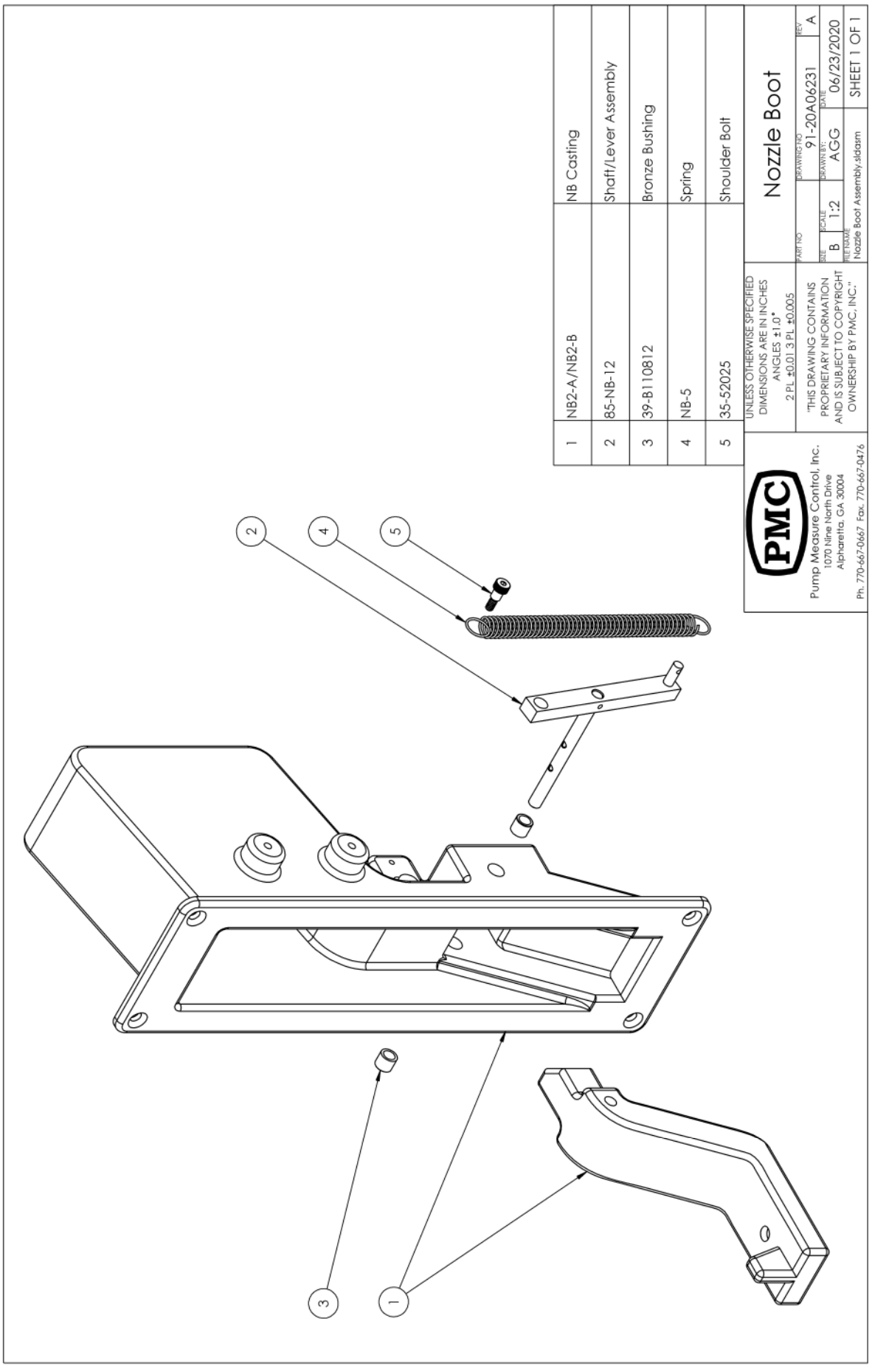
11

HYDRAULIC COMPONENTS - FH-510 MODELS

(See Drawing 91-20A04143 for Reference Numbers)

Ref. #	Drawing Description	MARINE (-MA)	AVIATION (-AV)	GENERAL SERVICE (-GS)
1	REEL - See Hannay Literature for Parts	6022-30-31-MA	6022-30-31-AV	6022-30-31-GS
2	Reel Motor—115VAC / 60Hz	40-9915.0237	40-9915.0237	40-9915.0237
3	Swivel Assembly - 1” x 90 Degree	40-9929.8522	40-9930.4312	40-9930.4312
4	Flex / Elbow Assembly - 1-in NPT x 90DEG 12” SS Flex Line (AV) 1” Straight Flange (AV) 1” 90Deg Flanged Elbow (AV)	93-20310012 N/A N/A N/A	N/A 93-20000012 85-FL1 85-FL1-90	93-20310012 N/A N/A N/A
5	Solenoid Valve Assembly - MAIN Solenoid Valve Assembly - BYPASS	AS-EFLG022V (1.5”) N/A	AS-ELFG004V-NI (1”) AS-EFLH086V (1/4”)	AS-EFLG022V (1.5”) N/A
6	2” NPT Flange	LC-A2212	LC-A2212	LC-A2212
7	O-ring - Flange	49-233-VITON	49-233-VITON	49-233-VITON
8	Meter Assembly w/ Pulse Output Device	M5S1-FH	M5S2-FH	M5S1-FH
9	Pulse Output Device	LC-P.O.D.	LC-P.O.D.	LC-P.O.D.
10	Filter Housing	40FLTR500163	Call Factory	40FLTR500163
11	Filter Element	40FLTR70063	Call Factory	40FLTR70063


1 NB2-A/NB2-B NB Casting
2 85-NB-12 Shaft/Lever Assembly
3 39-B110812 Bronze Bushing
4 NB-5 Spring
5 35-52025 Shoulder Bolt
PMC
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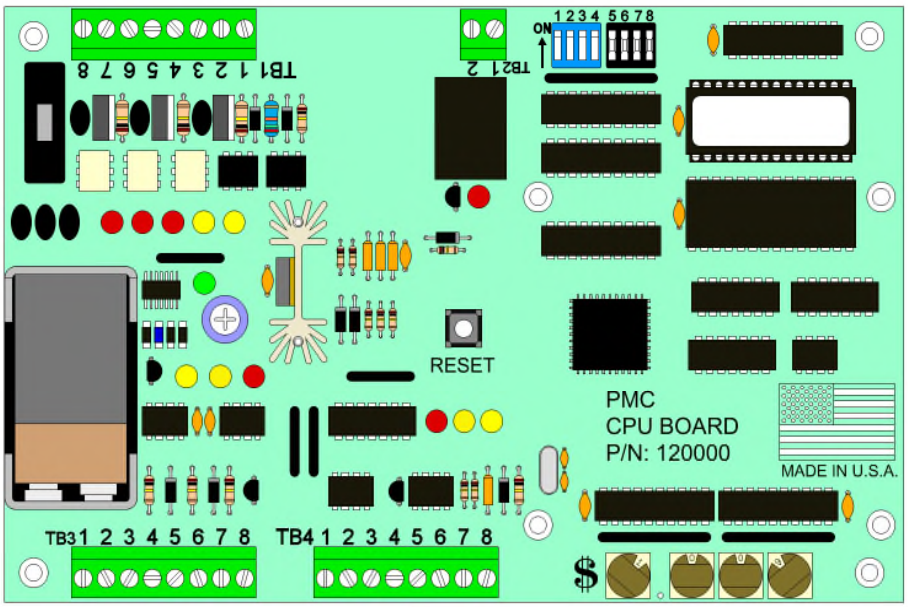
Alpharetta, GA 30004
Ph. 770-667-0667 Fax. 770-667-0476
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
ANGLES ±1.0°
2 PL ±0.01 3 PL ±0.005
"THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND IS SUBJECT TO COPYRIGHT OWNERSHIP BY PMC, INC."
PART NO
SIZE B
SCALE 1:2
FILE NAME Nozzle Boot Assembly.sldasm
Nozzle Boot
DRAWING NO 91-20A06231
DRAWN BY: AGG
DATE 06/23/2020
REV A
SHEET 1 OF 1



TB-1 AC POWER

Terminal	Connection	Type
1.	External Permissive Input	Input
2.	Dispenser Handle Input	Input
3.	Pump Start Output	Output
4.	Solenoid #1 Output	Output
5.	Solenoid #2 Output	Output
6.	Earth Ground	Input
7.	AC Neutral	Input
8.	AC Power	Input

TB-2 RELAY CONTACT

Terminal	Connection
1.	Nozzle Switch Relay Contact Normally Open
2.	Nozzle Switch Relay Contact Common

TB-3 DC

Terminal	Connection	Type
1.	+12 VDC Power Supply	Input
2.	DC Ground	Input
3.	+12 VDC	Output
4.	DC Ground	Output
5.	Meter Pulse Input (Channel A)	Input
6.	Meter Pulse Input (Channel B)	Input
7.	DC Pulse Out +	Output
8.	DC Pulse Out -	Output

TB-4 DC

Terminal	Connection	Type
1.	+12 VDC	Output
2.	DC Ground	Output
3.	Display Communications +	Output
4.	Display Communications -	Output
5.	Volume Pulse Out	Output
6.	+12 VDC	Output
7.	DC Ground	Output
8.	ON / OFF Lever Input	Input

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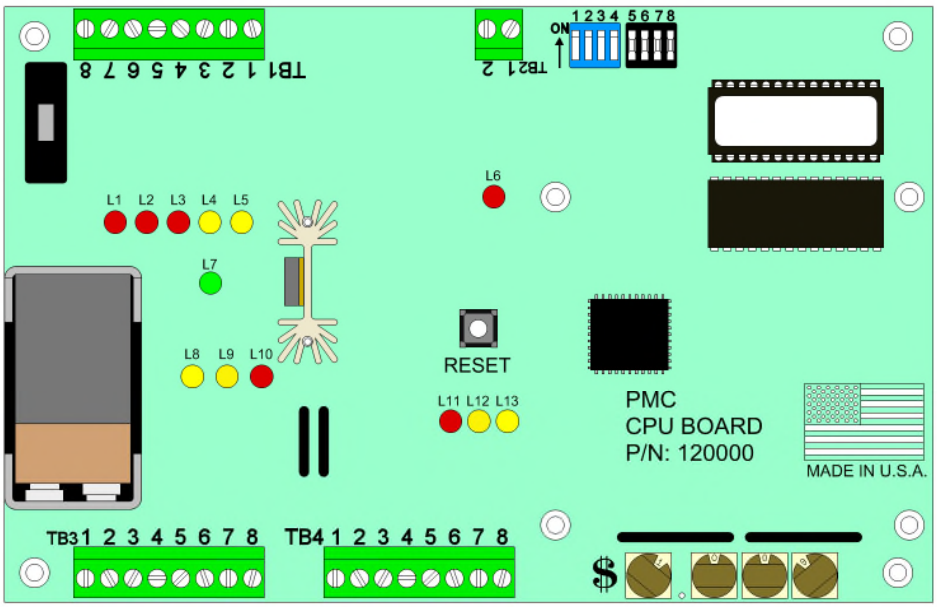
DRAWING NUMBER: 91-03A44

CPU BOARD P/N 120000
TERMINAL DESCRIPTIONS

DATE: 2/28/03 DRAWN BY: CAT

SCALE: NTS



LED INDICATORS

LED Number	Function	Color
L1	Solenoid #2	Red
L2	Solenoid #1	Red
L3	Pump Start Out	Red
L4	Dispenser Handle (AC)	Yellow
L5	External Permissive	Yellow
L6	Relay Energized	Red
L7	+12 VDC OK	Green
L8	Pulse Input (Channel A)	Yellow
L9	Pulse Input (Channel B)	Yellow
L10	Programmable Pulse Out	Red
L11	Volume Pulse Out	Red
L12	Dispenser Handle Switch (DC)	Yellow
L13	AC Power Detect	Yellow

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DRAWING NUMBER: 91-03A45

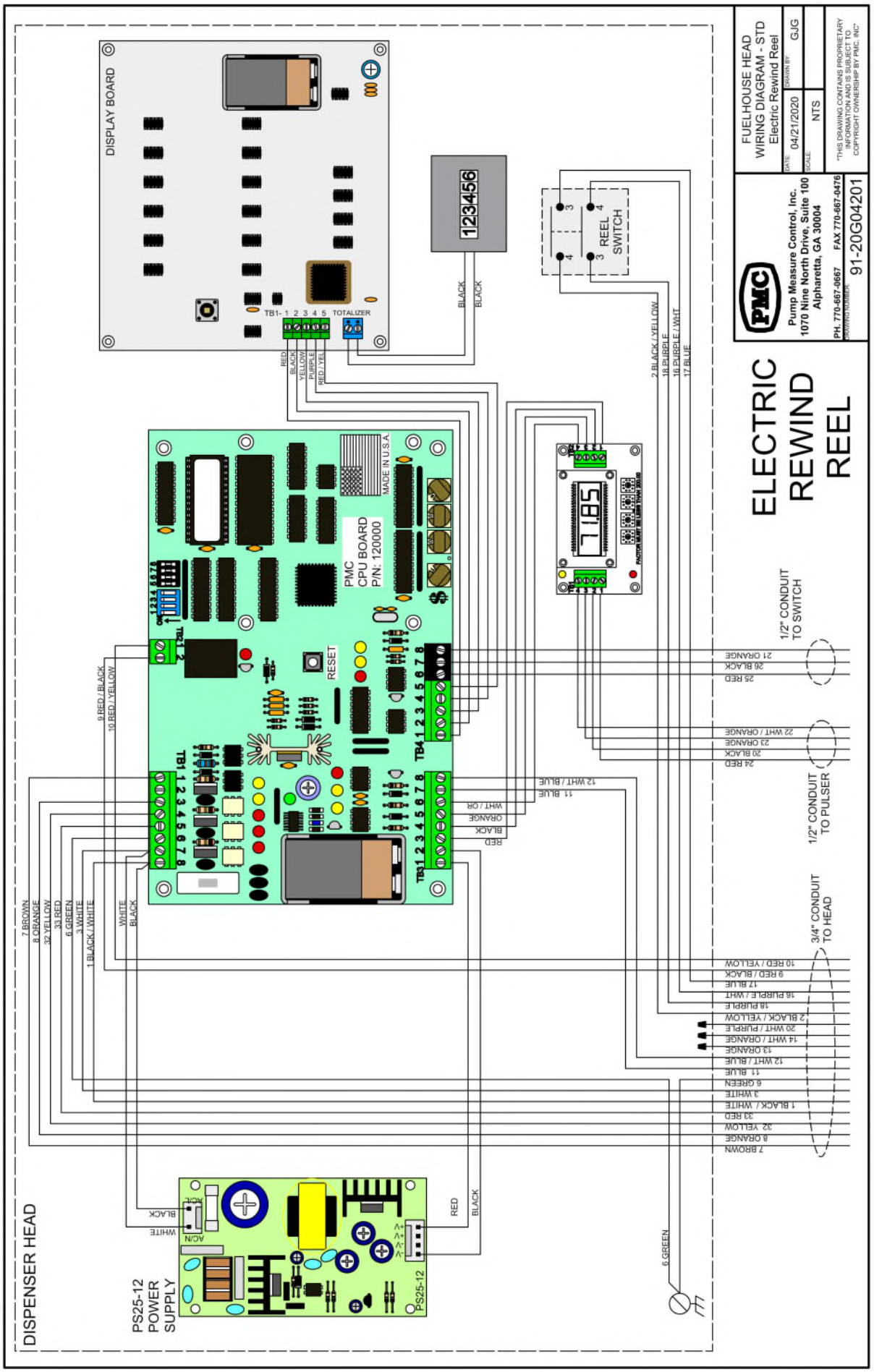
CPU BOARD P/N 120000
LED FUNCTIONS

DATE: 2/28/03 DRAWN BY: CAT
SCALE: NTS

10 - WIRING DIAGRAMS

The following wiring diagrams / drawings are provided to assist the installer in wiring the ***Fuelhouse Marine and General Service*** models of the dispenser. Ensure that the proper diagram(s) is/are used for the installation. Failure to properly wire the dispenser may result in damage to both the dispenser and other equipment connected to it. Be sure to pay attention to any and all notes associated with the diagrams.

Marine and General Service Models


FUELHOUSE HEAD
WIRING DIAGRAM - STD
Electric Rewind Reel
DATE 04/21/2020
DRAWN BY: GJG
SCALE NTS
"THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND IS SUBJECT TO COPYRIGHT OWNERSHIP BY PMC, INC"
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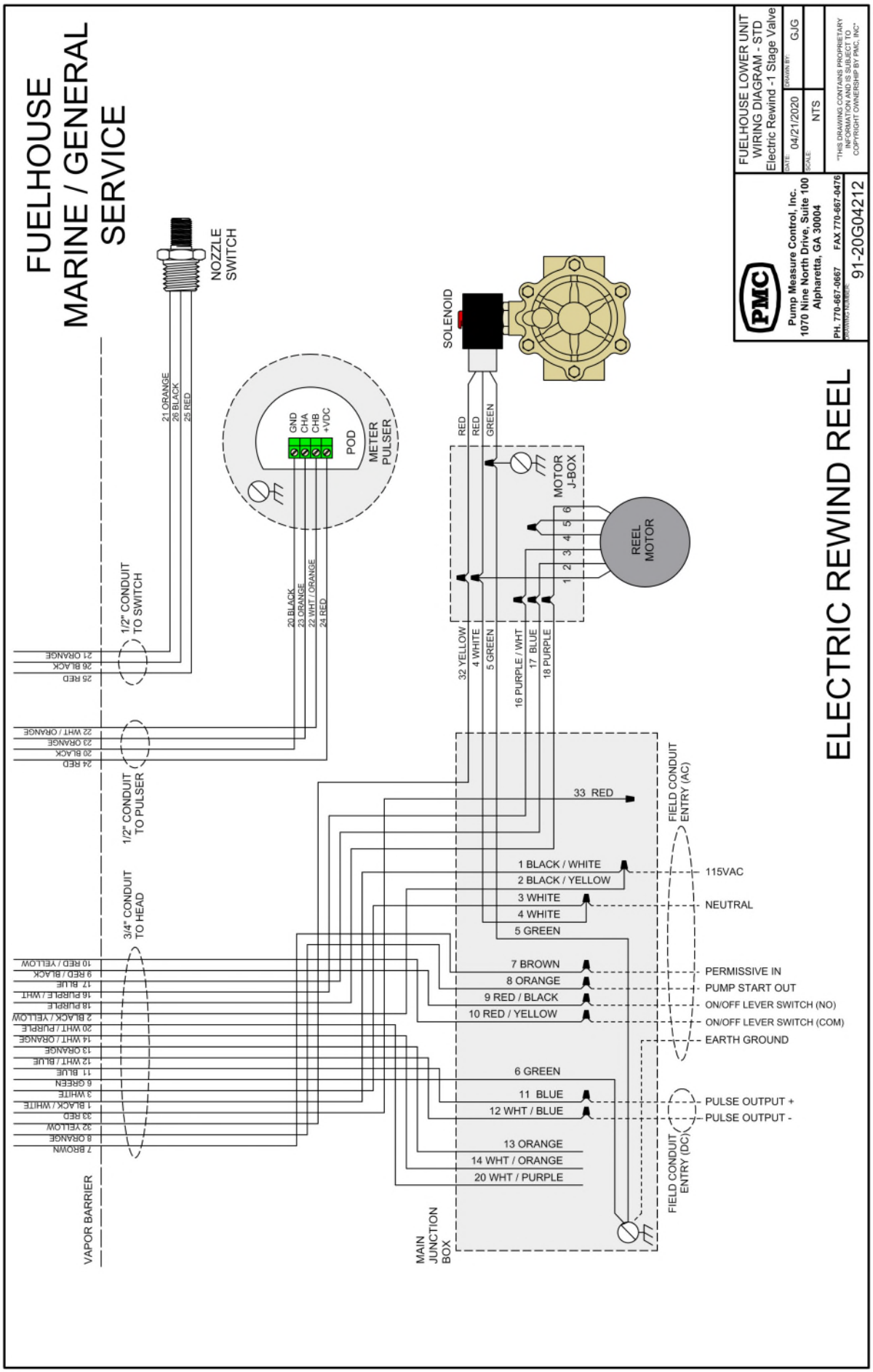
1070 Nine North Drive, Suite 100
Alpharetta, GA 30004
PH. 770-667-0667 FAX 770-667-0476
DRAWING NUMBER 91-20G04201
ELECTRIC
REWIND
REEL
DISPLAY BOARD
TB1- 1 2 3 4 5 TOTALIZER
123456
REEL SWITCH
PMC
CPU BOARD
P/N: 120000
MADE IN U.S.A.
RESET
DISPENSER HEAD
PS25-12
POWER
SUPPLY
1/2" CONDUIT
TO SWITCH
1/2" CONDUIT
TO PULSER
3/4" CONDUIT
TO HEAD


FUELHOUSE
MARINE / GENERAL
SERVICE
ELECTRIC REWIND REEL
NOZZLE SWITCH
SOLENOID
POD
METER PULSER
GND
CHA
CHB
+VDC
MOTOR J-BOX
REEL MOTOR
1/2" CONDUIT TO SWITCH
1/2" CONDUIT TO PULSER
3/4" CONDUIT TO HEAD
VAPOR BARRIER
MAIN JUNCTION BOX
FIELD CONDUIT ENTRY (AC)
FIELD CONDUIT ENTRY (DC)
21 ORANGE
26 BLACK
25 RED
20 BLACK
23 ORANGE
22 WHT / ORANGE
24 RED
RED
RED
GREEN
32 YELLOW
4 WHITE
5 GREEN
16 PURPLE / WHT
17 BLUE
18 PURPLE
33 RED
1 BLACK / WHITE
2 BLACK / YELLOW
3 WHITE
4 WHITE
5 GREEN
7 BROWN
8 ORANGE
9 RED / BLACK
10 RED / YELLOW
6 GREEN
11 BLUE
12 WHT / BLUE
13 ORANGE
14 WHT / ORANGE
20 WHT / PURPLE
115VAC
NEUTRAL
PERMISSIVE IN
PUMP START OUT
ON/OFF LEVER SWITCH (NO)
ON/OFF LEVER SWITCH (COM)
EARTH GROUND
PULSE OUTPUT +
PULSE OUTPUT -
FUELHOUSE LOWER UNIT
WIRING DIAGRAM - STD
Electric Rewind -1 Stage Valve
DATE 04/21/2020
DRAWN BY: GJG
SCALE: NTS
PMC
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Alpharetta, GA 30004
PH. 770-667-0667 FAX 770-667-0476
DRAWING NUMBER
91-20G04212
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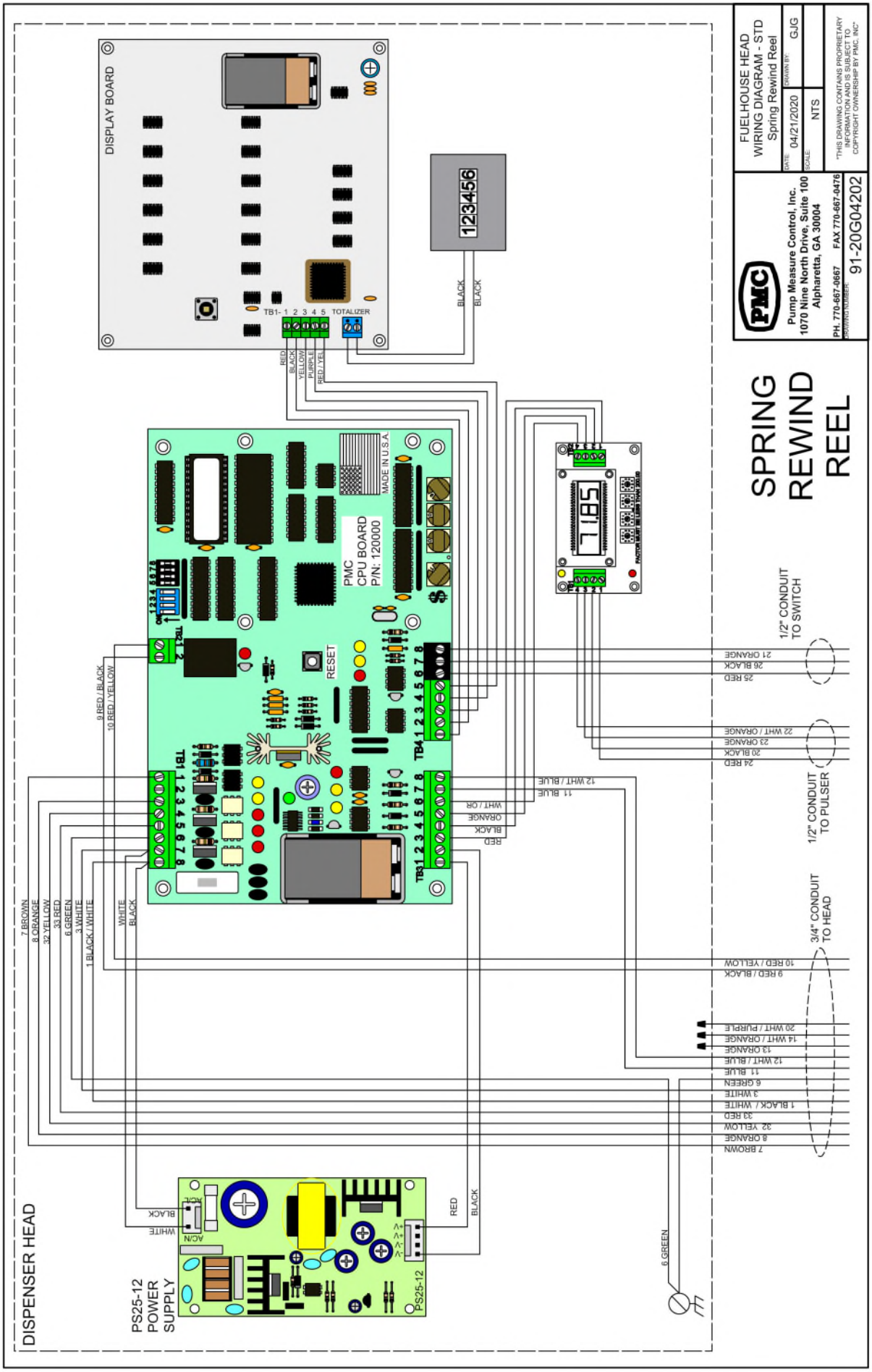
FUELHOUSE HEAD
WIRING DIAGRAM - STD
Spring Rewind Reel
DATE 04/21/2020
DRAWN BY: GJG
SCALE NTS
"THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND IS SUBJECT TO COPYRIGHT OWNERSHIP BY PMC, INC"
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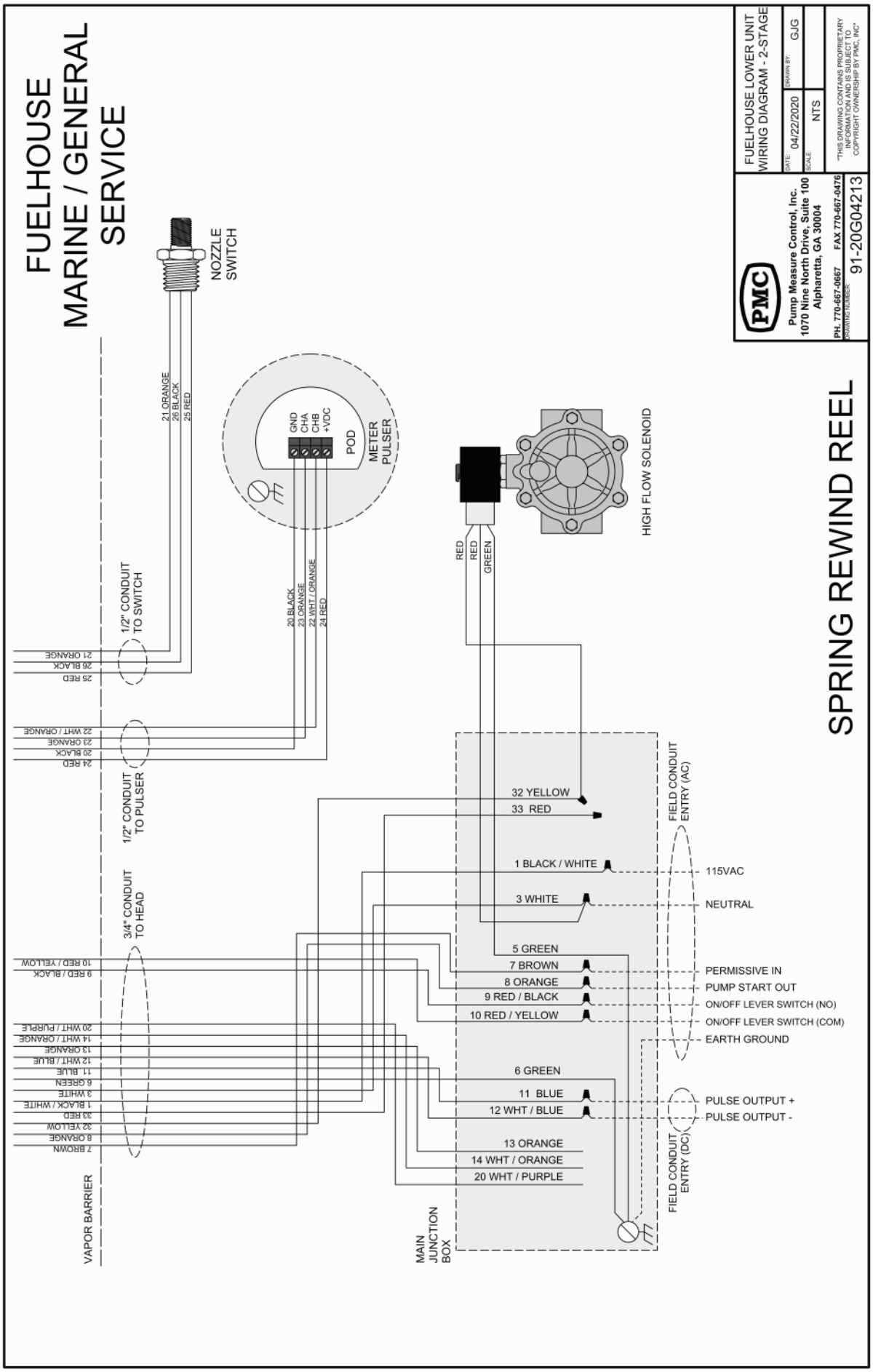
1070 Nine North Drive, Suite 100
Alpharetta, GA 30004
PH. 770-667-0667 FAX 770-667-0476
DRAWING NUMBER 91-20G04202
SPRING REWIND REEL
DISPENSER HEAD
DISPLAY BOARD
TB1- 1 2 3 4 5 TOTALIZER
123456
BLACK
BLACK
RED
BLACK
YELLOW
PURPLE
RED / YEL
PMC
CPU BOARD
P/N: 120000
MADE IN U.S.A.
RESET
TB1 1 2
TB2 1 2 3 4 5 6 7 8
TB3 1 2 3 4 5 6 7 8
TB4 1 2 3 4 5 6 7 8
7.185
9 RED / BLACK
10 RED / YELLOW
7 BROWN
8 ORANGE
32 YELLOW
33 RED
6 GREEN
3 WHITE
1 BLACK / WHITE
WHITE
BLACK
12 WHT / BLUE
11 BLUE
WHT / OR
ORANGE
BLACK
RED
1/2" CONDUIT TO SWITCH
21 ORANGE
26 BLACK
25 RED
22 WHT / ORANGE
23 ORANGE
20 BLACK
24 RED
1/2" CONDUIT TO PULSER
3/4" CONDUIT TO HEAD
20 WHT / PURPLE
14 WHT / ORANGE
13 ORANGE
12 WHT / BLUE
11 BLUE
6 GREEN
3 WHITE
1 BLACK / WHITE
33 RED
32 YELLOW
8 ORANGE
7 BROWN
6 GREEN
PS25-12 POWER SUPPLY
AC/N
AC/L
+V
-V
PS25-12
BLACK
WHITE
RED
BLACK


FUELHOUSE
MARINE / GENERAL
SERVICE
NOZZLE
SWITCH
21 ORANGE
26 BLACK
25 RED
GND
CHA
CHB
+VDC
POD
METER
PULSER
HIGH FLOW SOLENOID
RED
RED
GREEN
1/2" CONDUIT
TO SWITCH
1/2" CONDUIT
TO PULSER
3/4" CONDUIT
TO HEAD
VAPOR BARRIER
20 BLACK
23 ORANGE
22 WHT / ORANGE
24 RED
32 YELLOW
33 RED
1 BLACK / WHITE
3 WHITE
5 GREEN
7 BROWN
8 ORANGE
9 RED / BLACK
10 RED / YELLOW
6 GREEN
11 BLUE
12 WHT / BLUE
13 ORANGE
14 WHT / ORANGE
20 WHT / PURPLE
115VAC
NEUTRAL
PERMISSIVE IN
PUMP START OUT
ON/OFF LEVER SWITCH (NO)
ON/OFF LEVER SWITCH (COM)
EARTH GROUND
PULSE OUTPUT +
PULSE OUTPUT -
FIELD CONDUIT
ENTRY (AC)
FIELD CONDUIT
ENTRY (DC)
MAIN
JUNCTION
BOX
SPRING REWIND REEL
PMC
Pump Measure Control, Inc.
1070 Nine North Drive, Suite 100
Alpharetta, GA 30004
PH. 770-667-0667 FAX 770-667-0476
DRAWING NUMBER
91-20G04213
FUELHOUSE LOWER UNIT
WIRING DIAGRAM - 2-STAGE
DATE 04/22/2020
DRAWN BY: GJG
SCALE: NTS
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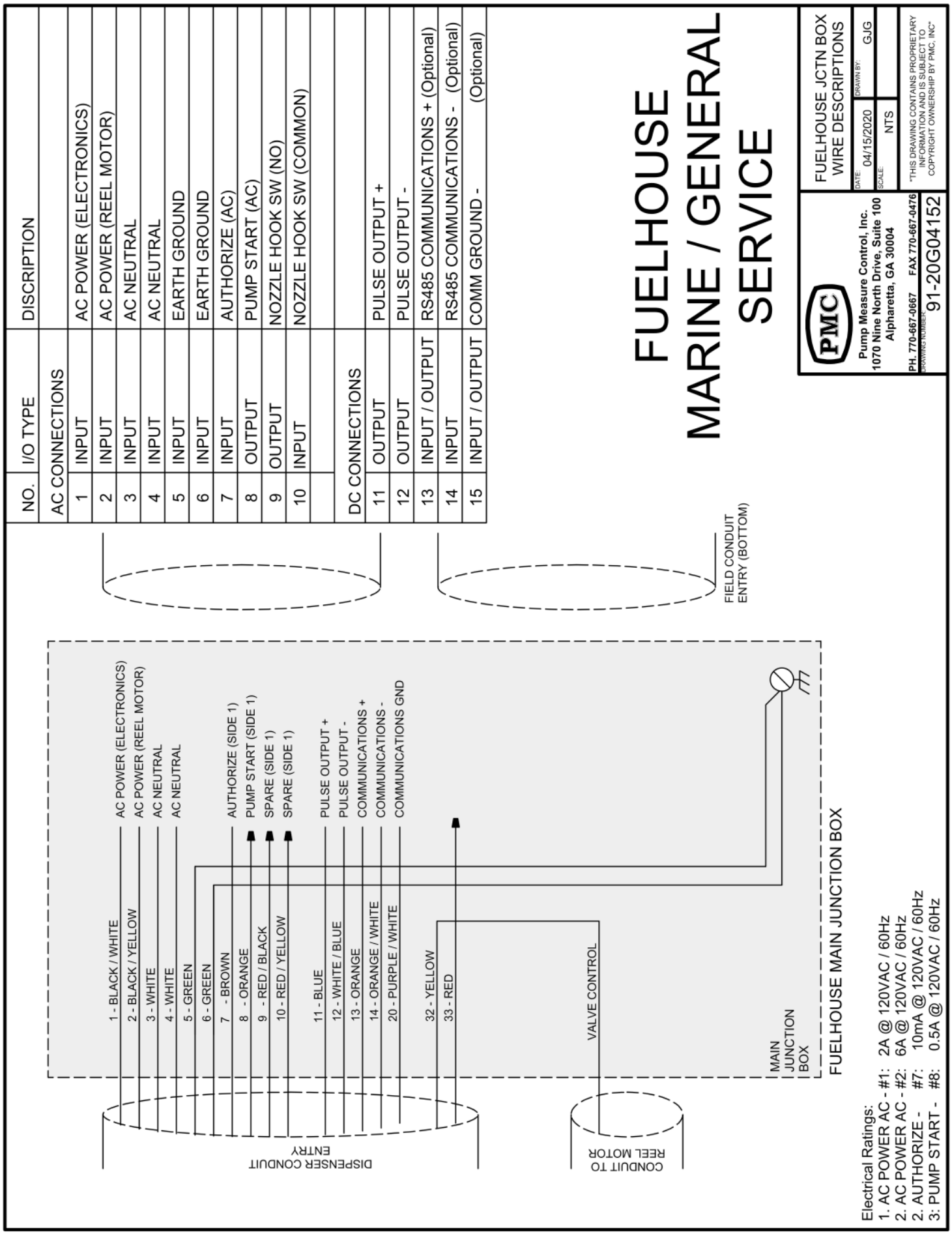
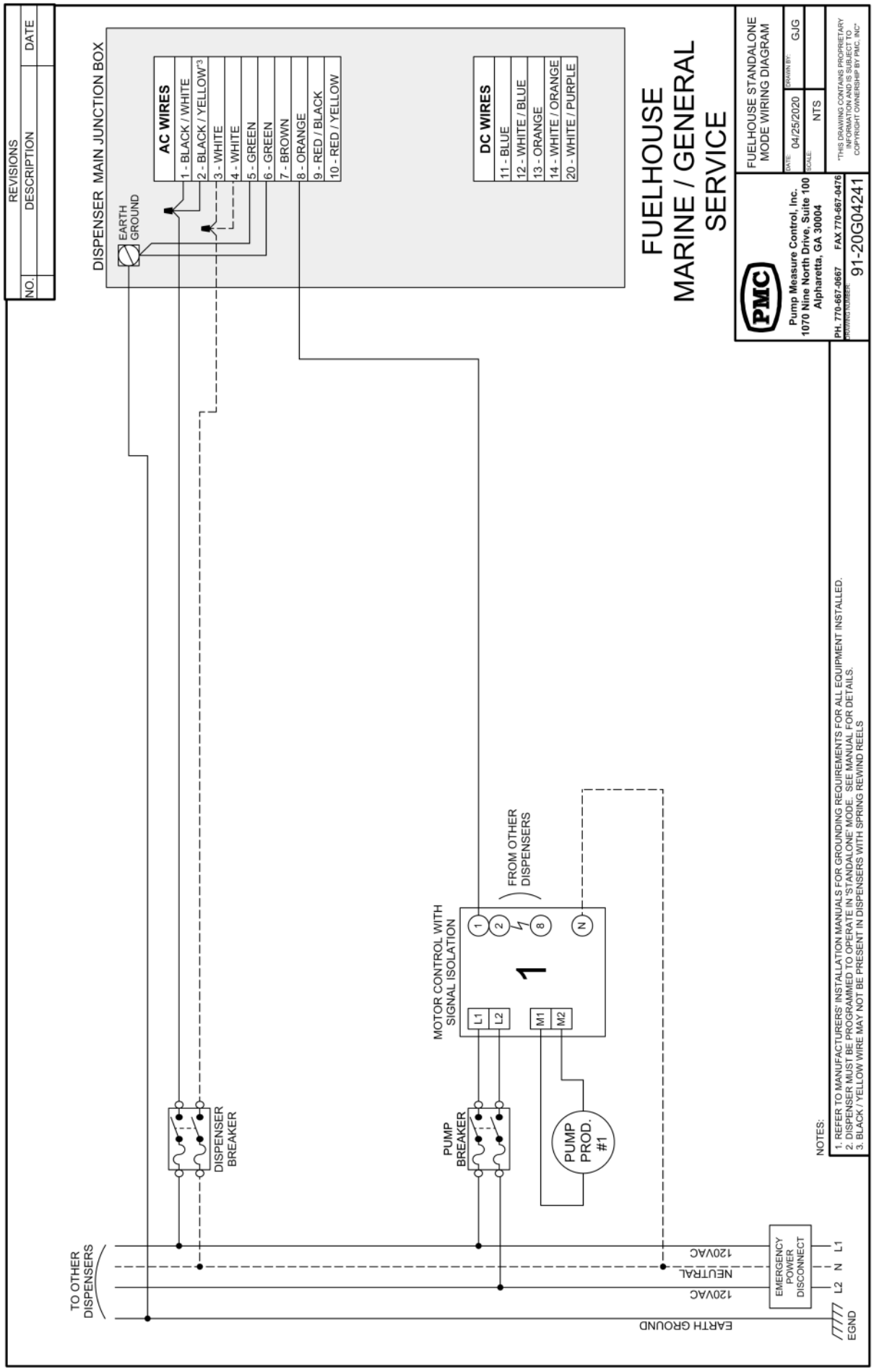
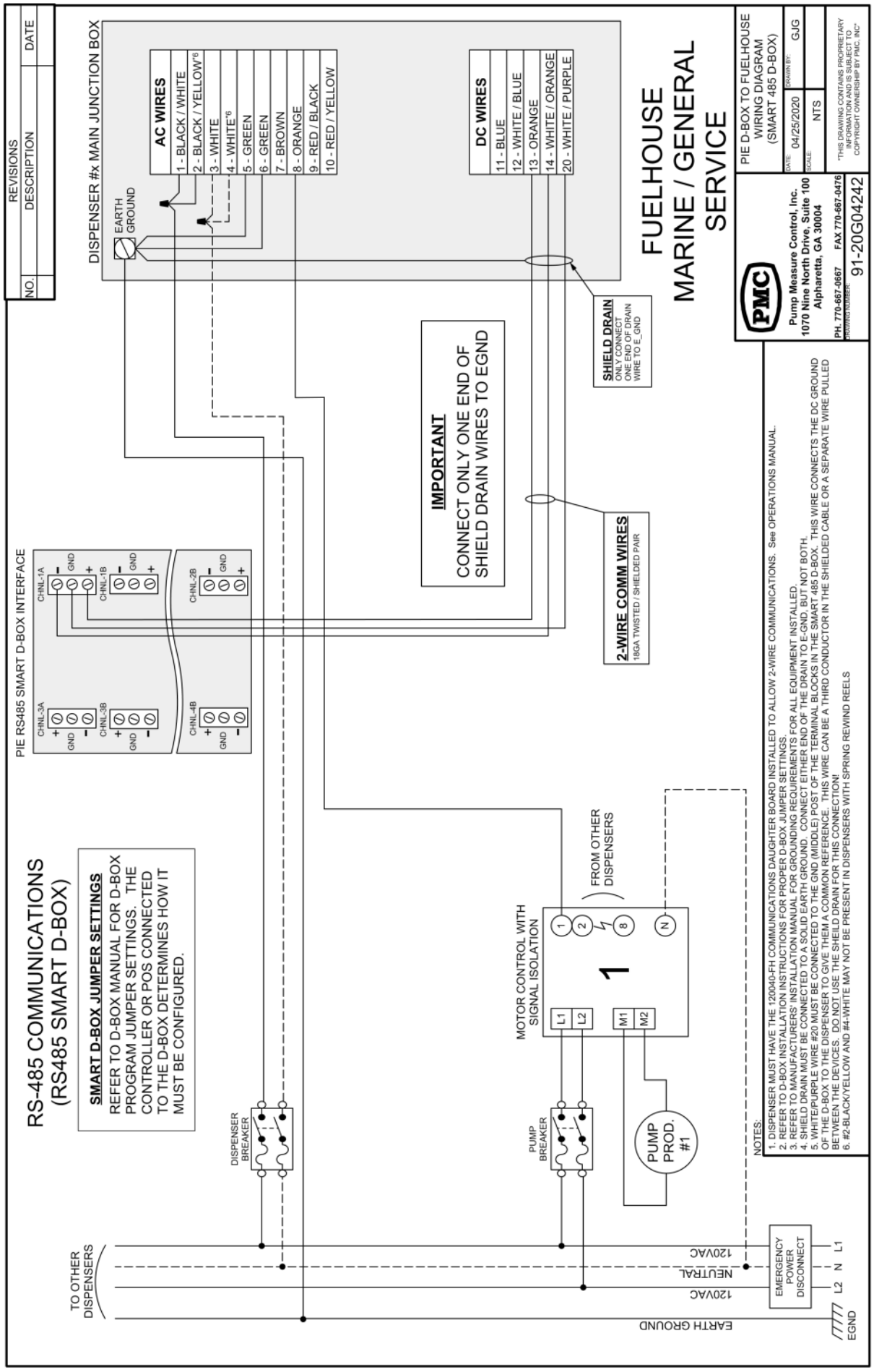
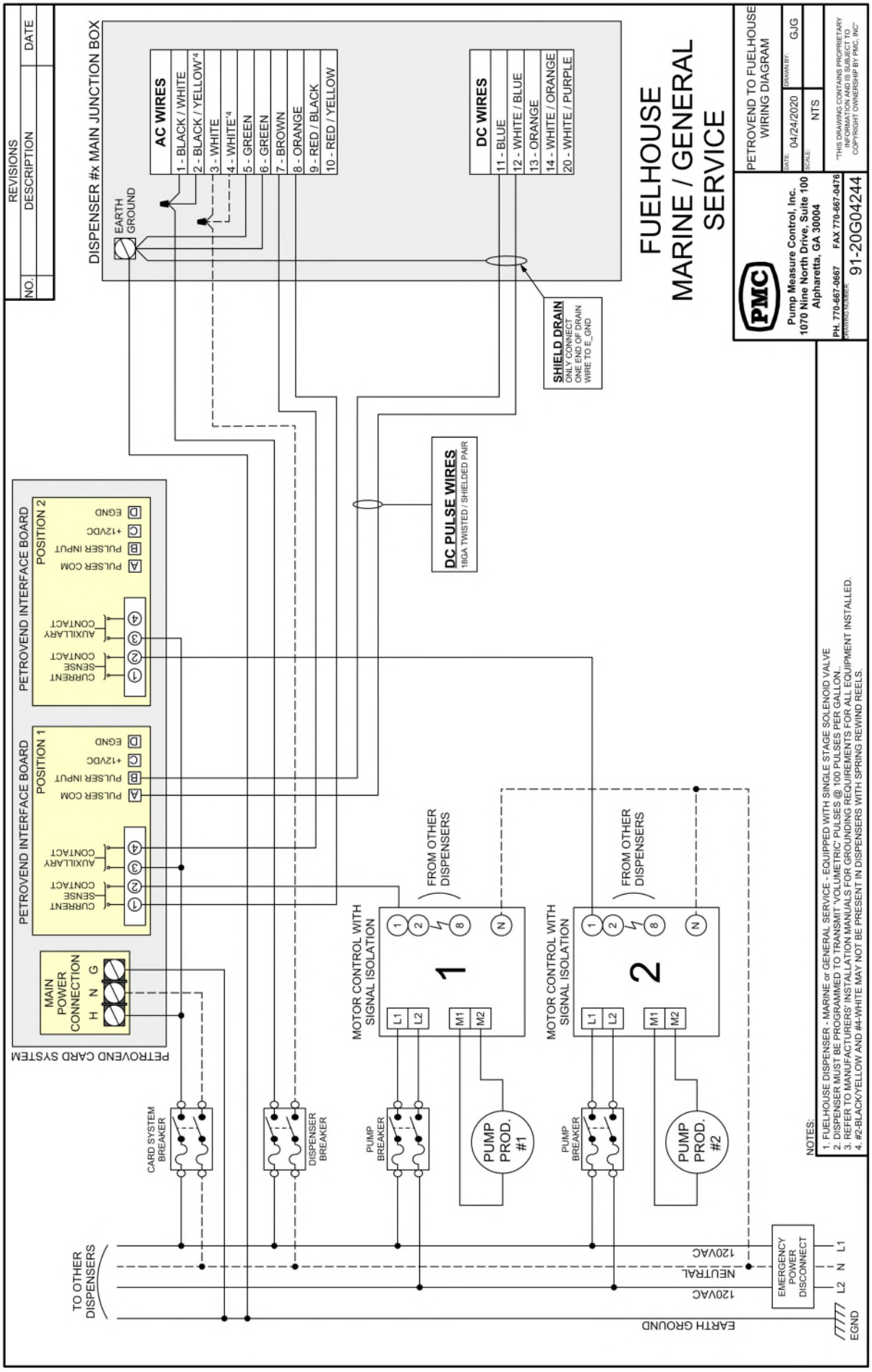

FUELHOUSE
MARINE / GENERAL
SERVICE
PMC
Pump Measure Control, Inc.
1070 Nine North Drive, Suite 100
Alpharetta, GA 30004
PH. 770-667-0667 FAX 770-667-0476
DRAWING NUMBER: 91-20G04152
FUELHOUSE JCTN BOX
WIRE DESCRIPTIONS
DATE: 04/15/2020
DRAWN BY: GJG
SCALE: NTS
"THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND IS SUBJECT TO COPYRIGHT OWNERSHIP BY PMC, INC"
NO. | I/O TYPE | DISCRIPTION
AC CONNECTIONS
1 | INPUT | AC POWER (ELECTRONICS)
2 | INPUT | AC POWER (REEL MOTOR)
3 | INPUT | AC NEUTRAL
4 | INPUT | AC NEUTRAL
5 | INPUT | EARTH GROUND
6 | INPUT | EARTH GROUND
7 | INPUT | AUTHORIZE (AC)
8 | OUTPUT | PUMP START (AC)
9 | OUTPUT | NOZZLE HOOK SW (NO)
10 | INPUT | NOZZLE HOOK SW (COMMON)
DC CONNECTIONS
11 | OUTPUT | PULSE OUTPUT +
12 | OUTPUT | PULSE OUTPUT -
13 | INPUT / OUTPUT | RS485 COMMUNICATIONS + (Optional)
14 | INPUT | RS485 COMMUNICATIONS - (Optional)
15 | INPUT / OUTPUT | COMM GROUND - (Optional)
FIELD CONDUIT ENTRY (BOTTOM)
DISPENSER CONDUIT ENTRY
CONDUIT TO REEL MOTOR
FUELHOUSE MAIN JUNCTION BOX
MAIN JUNCTION BOX
VALVE CONTROL
1 - BLACK / WHITE
2 - BLACK / YELLOW
3 - WHITE
4 - WHITE
5 - GREEN
6 - GREEN
7 - BROWN
8 - ORANGE
9 - RED / BLACK
10 - RED / YELLOW
11 - BLUE
12 - WHITE / BLUE
13 - ORANGE
14 - ORANGE / WHITE
20 - PURPLE / WHITE
32 - YELLOW
33 - RED
AC POWER (ELECTRONICS)
AC POWER (REEL MOTOR)
AC NEUTRAL
AC NEUTRAL
AUTHORIZE (SIDE 1)
PUMP START (SIDE 1)
SPARE (SIDE 1)
SPARE (SIDE 1)
PULSE OUTPUT +
PULSE OUTPUT -
COMMUNICATIONS +
COMMUNICATIONS -
COMMUNICATIONS GND
Electrical Ratings:
1. AC POWER AC - #1: 2A @ 120VAC / 60Hz
2. AC POWER AC - #2: 6A @ 120VAC / 60Hz
2. AUTHORIZE - #7: 10mA @ 120VAC / 60Hz
3: PUMP START - #8: 0.5A @ 120VAC / 60Hz


REVISIONS
NO.
DESCRIPTION
DATE
DISPENSER MAIN JUNCTION BOX
EARTH GROUND
AC WIRES
1 - BLACK / WHITE
2 - BLACK / YELLOW*3
3 - WHITE
4 - WHITE
5 - GREEN
6 - GREEN
7 - BROWN
8 - ORANGE
9 - RED / BLACK
10 - RED / YELLOW
DC WIRES
11 - BLUE
12 - WHITE / BLUE
13 - ORANGE
14 - WHITE / ORANGE
20 - WHITE / PURPLE
FUELHOUSE
MARINE / GENERAL
SERVICE
PMC
Pump Measure Control, Inc.
1070 Nine North Drive, Suite 100
Alpharetta, GA 30004
PH. 770-667-0667 FAX 770-667-0476
DRAWING NUMBER
91-20G04241
FUELHOUSE STANDALONE
MODE WIRING DIAGRAM
DATE: 04/25/2020
DRAWN BY: GJG
SCALE: NTS
"THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND IS SUBJECT TO COPYRIGHT OWNERSHIP BY PMC, INC"
MOTOR CONTROL WITH SIGNAL ISOLATION
FROM OTHER DISPENSERS
1
2
8
N
L1
L2
M1
M2
DISPENSER BREAKER
PUMP BREAKER
PUMP PROD. #1
TO OTHER DISPENSERS
120VAC
NEUTRAL
120VAC
EARTH GROUND
EMERGENCY POWER DISCONNECT
L1
N
L2
EGND
NOTES:
1. REFER TO MANUFACTURERS' INSTALLATION MANUALS FOR GROUNDING REQUIREMENTS FOR ALL EQUIPMENT INSTALLED.
2. DISPENSER MUST BE PROGRAMMED TO OPERATE IN 'STANDALONE' MODE. SEE MANUAL FOR DETAILS.
3. BLACK / YELLOW WIRE MAY NOT BE PRESENT IN DISPENSERS WITH SPRING REWIND REELS


REVISIONS
NO.
DESCRIPTION
DATE
DISPENSER #x MAIN JUNCTION BOX
EARTH GROUND
AC WIRES
1 - BLACK / WHITE
2 - BLACK / YELLOW*6
3 - WHITE
4 - WHITE*6
5 - GREEN
6 - GREEN
7 - BROWN
8 - ORANGE
9 - RED / BLACK
10 - RED / YELLOW
DC WIRES
11 - BLUE
12 - WHITE / BLUE
13 - ORANGE
14 - WHITE / ORANGE
20 - WHITE / PURPLE
FUELHOUSE
MARINE / GENERAL
SERVICE
PIE D-BOX TO FUELHOUSE
WIRING DIAGRAM
(SMART 485 D-BOX)
PMC
Pump Measure Control, Inc.
1070 Nine North Drive, Suite 100
Alpharetta, GA 30004
PH. 770-667-0667 FAX 770-667-0476
DRAWING NUMBER
91-20G04242
DATE 04/25/2020
DRAWN BY: GJG
SCALE: NTS
"THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND IS SUBJECT TO COPYRIGHT OWNERSHIP BY PMC, INC"
PIE RS485 SMART D-BOX INTERFACE
CHNL-1A
CHNL-1B
CHNL-2B
CHNL-3A
CHNL-3B
CHNL-4B
GND
IMPORTANT
CONNECT ONLY ONE END OF
SHIELD DRAIN WIRES TO EGND
SHIELD DRAIN
ONLY CONNECT
ONE END OF DRAIN
WIRE TO E_GND
2-WIRE COMM WIRES
18GA TWISTED / SHIELDED PAIR
RS-485 COMMUNICATIONS
(RS485 SMART D-BOX)
SMART D-BOX JUMPER SETTINGS
REFER TO D-BOX MANUAL FOR D-BOX
PROGRAM JUMPER SETTINGS. THE
CONTROLLER OR POS CONNECTED
TO THE D-BOX DETERMINES HOW IT
MUST BE CONFIGURED.
MOTOR CONTROL WITH
SIGNAL ISOLATION
FROM OTHER
DISPENSERS
L1
L2
M1
M2
1
2
8
N
DISPENSER
BREAKER
PUMP
BREAKER
PUMP
PROD.
#1
TO OTHER
DISPENSERS
120VAC
NEUTRAL
120VAC
EARTH GROUND
EMERGENCY
POWER
DISCONNECT
L1
N
L2
EGND
NOTES:
1. DISPENSER MUST HAVE THE 120040-FH COMMUNICATIONS DAUGHTER BOARD INSTALLED TO ALLOW 2-WIRE COMMUNICATIONS. See OPERATIONS MANUAL.
2. REFER TO D-BOX INSTALLATION INSTRUCTIONS FOR PROPER D-BOX JUMPER SETTINGS.
3. REFER TO MANUFACTURERS' INSTALLATION MANUAL FOR GROUNDING REQUIREMENTS FOR ALL EQUIPMENT INSTALLED.
4. SHIELD DRAIN MUST BE CONNECTED TO A SOLID EARTH GROUND. CONNECT EITHER END OF THE DRAIN TO E-GND, BUT NOT BOTH.
5. WHITE/PURPLE WIRE #20 MUST BE CONNECTED TO THE GND (MIDDLE) POST OF THE TERMINAL BLOCKS IN THE SMART 485 D-BOX. THIS WIRE CONNECTS THE DC GROUND OF THE D-BOX TO THE DISPENSER TO GIVE THEM A COMMON REFERENCE. THIS WIRE CAN BE A THIRD CONDUCTOR IN THE SHIELDED CABLE OR A SEPARATE WIRE PULLED BETWEEN THE DEVICES. DO NOT USE THE SHIELD DRAIN FOR THIS CONNECTION!
6. #2-BLACK/YELLOW AND #4-WHITE MAY NOT BE PRESENT IN DISPENSERS WITH SPRING REWIND REELS


FUELHOUSE
MARINE / GENERAL
SERVICE
PETROVEND TO FUELHOUSE
WIRING DIAGRAM
Pump Measure Control, Inc.
1070 Nine North Drive, Suite 100
Alpharetta, GA 30004
PH. 770-667-0667 FAX 770-667-0476
91-20G04244
DRAWN BY: GJG
DATE: 04/24/2020
SCALE: NTS
REVISIONS
NO. DESCRIPTION DATE
DISPENSER #x MAIN JUNCTION BOX
EARTH GROUND
AC WIRES
1 - BLACK / WHITE
2 - BLACK / YELLOW*4
3 - WHITE
4 - WHITE*4
5 - GREEN
6 - GREEN
7 - BROWN
8 - ORANGE
9 - RED / BLACK
10 - RED / YELLOW
DC WIRES
11 - BLUE
12 - WHITE / BLUE
13 - ORANGE
14 - WHITE / ORANGE
20 - WHITE / PURPLE
SHIELD DRAIN
ONLY CONNECT ONE END OF DRAIN WIRE TO E_GND
DC PULSE WIRES
18GA TWISTED / SHIELDED PAIR
PETROVEND CARD SYSTEM
MAIN POWER CONNECTION
H N G
PETROVEND INTERFACE BOARD
POSITION 1
POSITION 2
CURRENT SENSE CONTACT
AUXILLARY CONTACT
PULSER COM
PULSER INPUT
+12VDC
EGND
MOTOR CONTROL WITH SIGNAL ISOLATION
FROM OTHER DISPENSERS
L1 L2 M1 M2
CARD SYSTEM BREAKER
DISPENSER BREAKER
PUMP BREAKER
PUMP PROD. #1
PUMP PROD. #2
TO OTHER DISPENSERS
120VAC
NEUTRAL
EARTH GROUND
EMERGENCY POWER DISCONNECT
L1 N L2
EGND
NOTES:
1. FUELHOUSE DISPENSER - MARINE or GENERAL SERVICE - EQUIPPED WITH SINGLE STAGE SOLENOID VALVE
2. DISPENSER MUST BE PROGRAMMED TO TRANSMIT 'VOLUMETRIC' PULSES @ 100 PULSES PER GALLON.
3. REFER TO MANUFACTURERS' INSTALLATION MANUALS FOR GROUNDING REQUIREMENTS FOR ALL EQUIPMENT INSTALLED.
4. #2-BLACK/YELLOW AND #4-WHITE MAY NOT BE PRESENT IN DISPENSERS WITH SPRING REWIND REELS.
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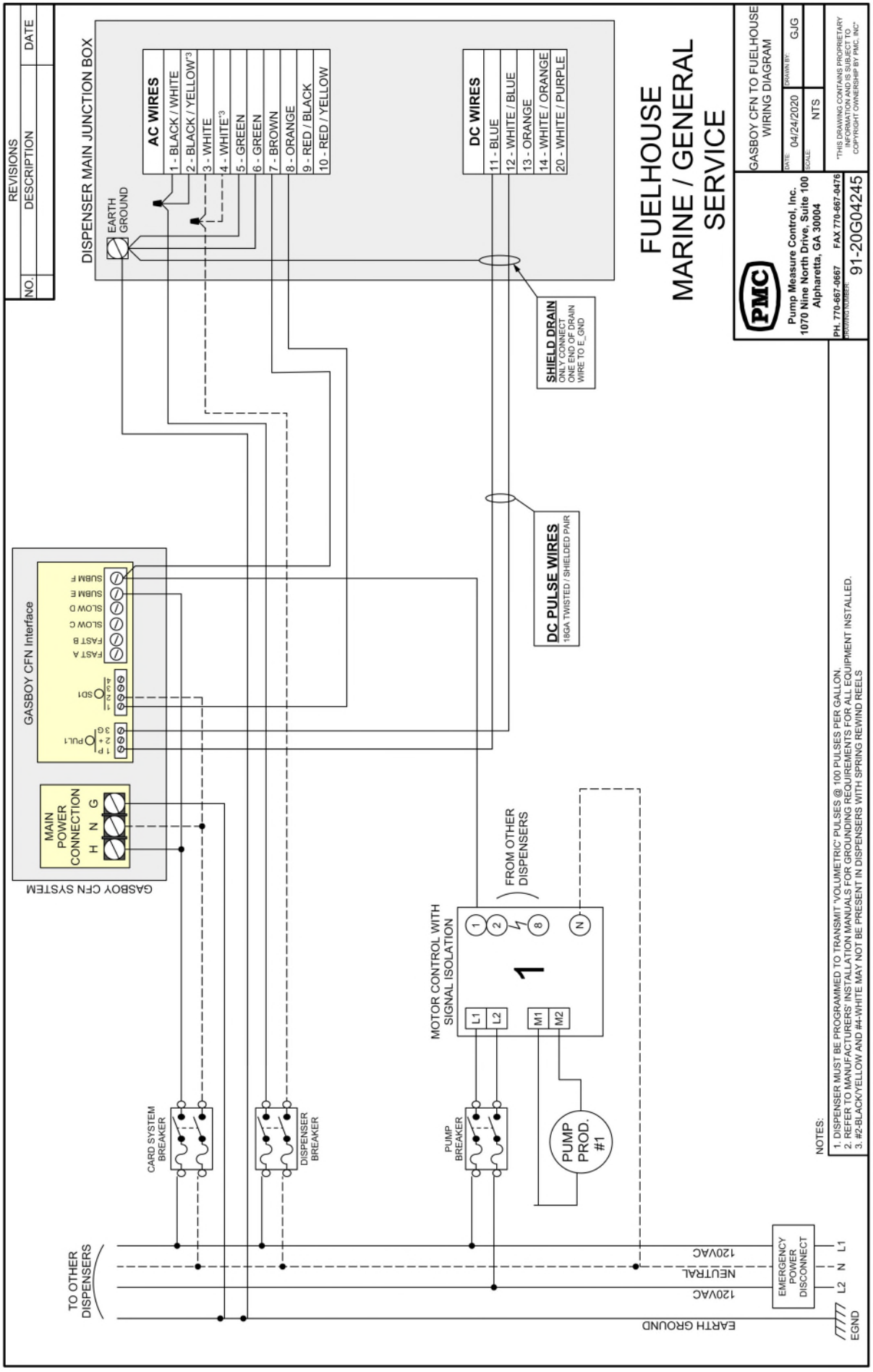
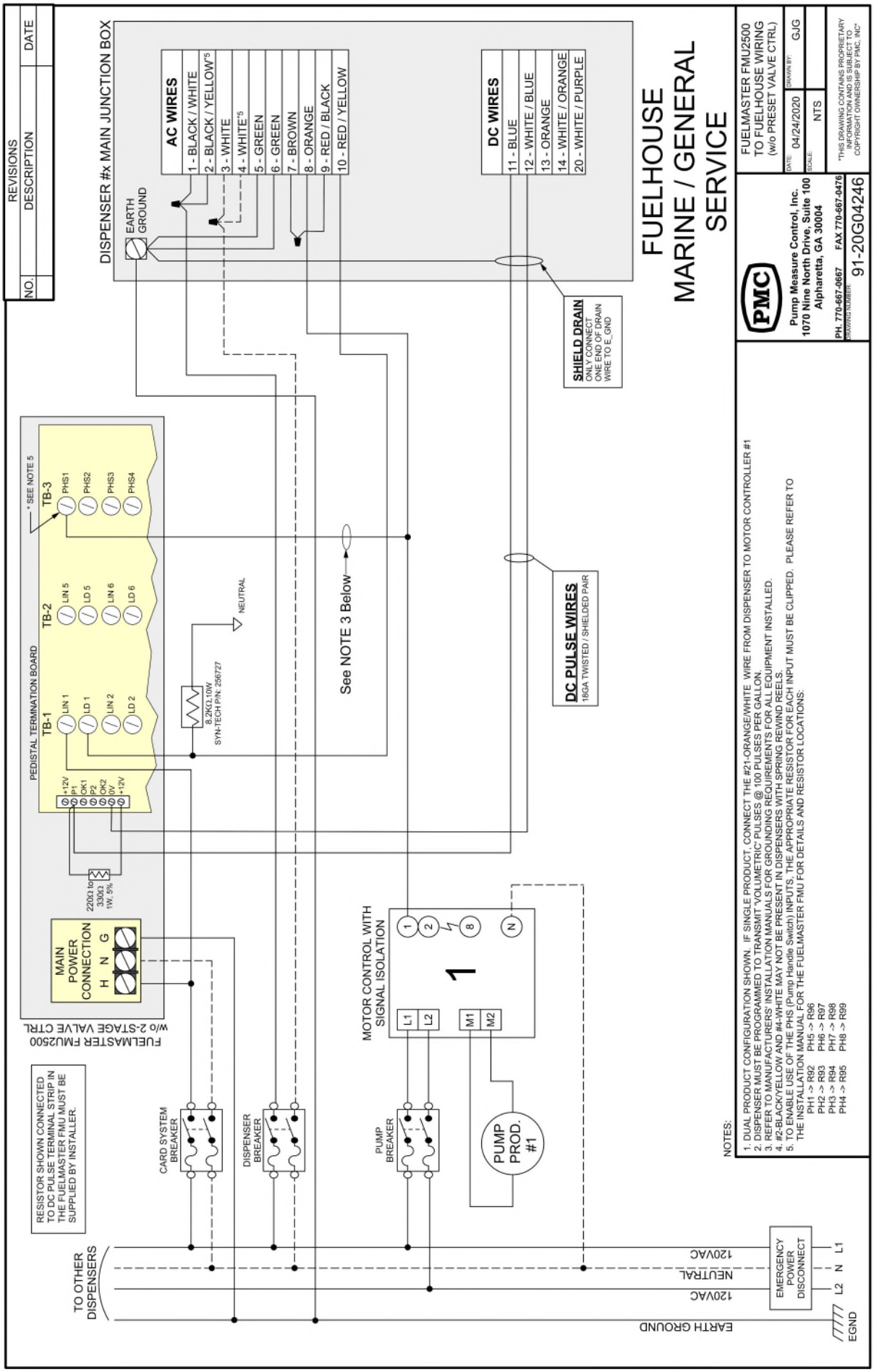
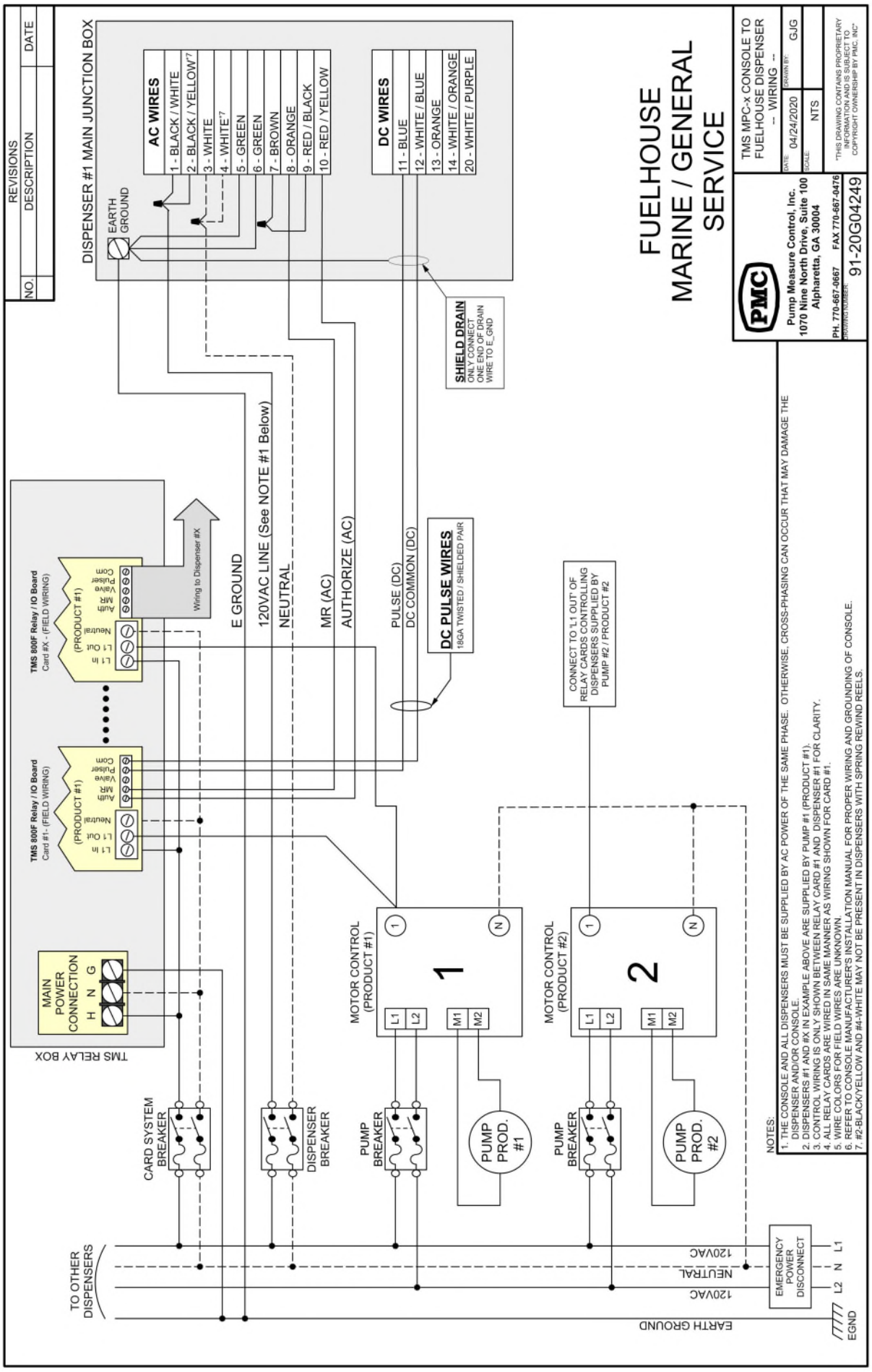

REVISIONS
NO.
DESCRIPTION
DATE
DISPENSER MAIN JUNCTION BOX
EARTH GROUND
AC WIRES
1 - BLACK / WHITE
2 - BLACK / YELLOW*3
3 - WHITE
4 - WHITE*3
5 - GREEN
6 - GREEN
7 - BROWN
8 - ORANGE
9 - RED / BLACK
10 - RED / YELLOW
DC WIRES
11 - BLUE
12 - WHITE / BLUE
13 - ORANGE
14 - WHITE / ORANGE
20 - WHITE / PURPLE
SHIELD DRAIN
ONLY CONNECT ONE END OF DRAIN WIRE TO E_GND
DC PULSE WIRES
18GA TWISTED / SHIELDED PAIR
FUELHOUSE
MARINE / GENERAL
SERVICE
PMC
Pump Measure Control, Inc.
1070 Nine North Drive, Suite 100
Alpharetta, GA 30004
PH. 770-667-0667 FAX 770-667-0476
DRAWING NUMBER
91-20G04245
GASBOY CFN TO FUELHOUSE WIRING DIAGRAM
DATE 04/24/2020
DRAWN BY: GJG
SCALE: NTS
"THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND IS SUBJECT TO COPYRIGHT OWNERSHIP BY PMC, INC"
GASBOY CFN SYSTEM
GASBOY CFN Interface
MAIN POWER CONNECTION
H N G
1 P 3 G N 2 PULS
SD1
FAST A
FAST B
SLOW C
SLOW D
SUBM E
SUBM F
MOTOR CONTROL WITH SIGNAL ISOLATION
FROM OTHER DISPENSERS
1
2
8
N
L1
L2
M1
M2
CARD SYSTEM BREAKER
DISPENSER BREAKER
PUMP BREAKER
PUMP PROD. #1
TO OTHER DISPENSERS
120VAC
NEUTRAL
120VAC
EARTH GROUND
EMERGENCY POWER DISCONNECT
L1
N
L2
EGND
NOTES:
1. DISPENSER MUST BE PROGRAMMED TO TRANSMIT 'VOLUMETRIC' PULSES @ 100 PULSES PER GALLON.
2. REFER TO MANUFACTURERS' INSTALLATION MANUALS FOR GROUNDING REQUIREMENTS FOR ALL EQUIPMENT INSTALLED.
3. #2-BLACK/YELLOW AND #4-WHITE MAY NOT BE PRESENT IN DISPENSERS WITH SPRING REWIND REELS


REVISIONS
NO.
DESCRIPTION
DATE
FUELHOUSE
MARINE / GENERAL
SERVICE
FUELMASTER FMU2500
TO FUELHOUSE WIRING
(w/o PRESET VALVE CTRL)
DATE: 04/24/2020
DRAWN BY: GJG
SCALE: NTS
Pump Measure Control, Inc.
1070 Nine North Drive, Suite 100
Alpharetta, GA 30004
PH. 770-667-0667 FAX 770-667-0476
DRAWING NUMBER: 91-20G04246
"THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND IS SUBJECT TO COPYRIGHT / OWNERSHIP BY PMC, INC"
DISPENSER #x MAIN JUNCTION BOX
EARTH GROUND
AC WIRES
1 - BLACK / WHITE
2 - BLACK / YELLOW*5
3 - WHITE
4 - WHITE*5
5 - GREEN
6 - GREEN
7 - BROWN
8 - ORANGE
9 - RED / BLACK
10 - RED / YELLOW
DC WIRES
11 - BLUE
12 - WHITE / BLUE
13 - ORANGE
14 - WHITE / ORANGE
20 - WHITE / PURPLE
SHIELD DRAIN
ONLY CONNECT ONE END OF DRAIN WIRE TO E_GND
DC PULSE WIRES
18GA TWISTED / SHIELDED PAIR
See NOTE 3 Below
NEUTRAL
8.2KΩ 10W
SYN-TECH P/N: 256727
PEDISTAL TERMINATION BOARD
TB-1
TB-2
TB-3
* SEE NOTE 5
LIN 1
LD 1
LIN 2
LD 2
LIN 5
LD 5
LIN 6
LD 6
PHS1
PHS2
PHS3
PHS4
+12V
P1
OK1
P2
OK2
0V
+12V
220Ω to 330Ω 1W, 5%
FUELMASTER FMU2500
w/o 2-STAGE VALVE CTRL
MAIN POWER CONNECTION
H N G
MOTOR CONTROL WITH SIGNAL ISOLATION
L1
L2
M1
M2
1
2
8
N
RESISTOR SHOWN CONNECTED TO DC PULSE TERMINAL STRIP IN THE FUELMASTER FMU MUST BE SUPPLIED BY INSTALLER.
CARD SYSTEM BREAKER
DISPENSER BREAKER
PUMP BREAKER
PUMP PROD. #1
TO OTHER DISPENSERS
EMERGENCY POWER DISCONNECT
120VAC
NEUTRAL
120VAC
EARTH GROUND
L2 N L1
EGND
NOTES:
1. DUAL PRODUCT CONFIGURATION SHOWN. IF SINGLE PRODUCT, CONNECT THE #21-ORANGE/WHITE WIRE FROM DISPENSER TO MOTOR CONTROLLER #1
2. DISPENSER MUST BE PROGRAMMED TO TRANSMIT VOLUMETRIC PULSES @ 100 PULSES PER GALLON.
3. REFER TO MANUFACTURERS' INSTALLATION MANUALS FOR GROUNDING REQUIREMENTS FOR ALL EQUIPMENT INSTALLED.
4. #2-BLACK/YELLOW AND #4-WHITE MAY NOT BE PRESENT IN DISPENSERS WITH SPRING REWIND REELS.
5. TO ENABLE USE OF THE PHS (Pump Handle Switch) INPUTS, THE APPROPRIATE RESISTOR FOR EACH INPUT MUST BE CLIPPED. PLEASE REFER TO THE INSTALLATION MANUAL FOR THE FUELMASTER FMU FOR DETAILS AND RESISTOR LOCATIONS:
PH1 -> R92 PH5 -> R96
PH2 -> R93 PH6 -> R97
PH3 -> R94 PH7 -> R98
PH4 -> R95 PH8 -> R99


FUELHOUSE
MARINE / GENERAL
SERVICE
TMS MPC-x CONSOLE TO
FUELHOUSE DISPENSER
-- WIRING --
Pump Measure Control, Inc.
1070 Nine North Drive, Suite 100
Alpharetta, GA 30004
PH. 770-667-0667 FAX 770-667-0476
91-20G04249
04/24/2020
GJG
NTS
REVISIONS
NO. DESCRIPTION DATE
DISPENSER #1 MAIN JUNCTION BOX
EARTH GROUND
AC WIRES
1 - BLACK / WHITE
2 - BLACK / YELLOW[7]
3 - WHITE
4 - WHITE[7]
5 - GREEN
6 - GREEN
7 - BROWN
8 - ORANGE
9 - RED / BLACK
10 - RED / YELLOW
DC WIRES
11 - BLUE
12 - WHITE / BLUE
13 - ORANGE
14 - WHITE / ORANGE
20 - WHITE / PURPLE
SHIELD DRAIN
ONLY CONNECT
ONE END OF DRAIN
WIRE TO E_GND
E GROUND
120VAC LINE (See NOTE #1 Below)
NEUTRAL
MR (AC)
AUTHORIZE (AC)
PULSE (DC)
DC COMMON (DC)
DC PULSE WIRES
18GA TWISTED / SHIELDED PAIR
Wiring to Dispenser #X
TMS 800F Relay / IO Board
Card #X - (FIELD WIRING)
TMS 800F Relay / IO Board
Card #1 - (FIELD WIRING)
(PRODUCT #1)
L1 In
L1 Out
Neutral
Auth MR
Valve Pulser
Com
TMS RELAY BOX
MAIN POWER CONNECTION
H N G
CONNECT TO 'L1 OUT' OF
RELAY CARDS CONTROLLING
DISPENSERS SUPPLIED BY
PUMP #2 / PRODUCT #2
MOTOR CONTROL
(PRODUCT #1)
1
MOTOR CONTROL
(PRODUCT #2)
2
L1
L2
M1
M2
CARD SYSTEM BREAKER
DISPENSER BREAKER
PUMP BREAKER
PUMP BREAKER
PUMP PROD. #1
PUMP PROD. #2
TO OTHER DISPENSERS
120VAC
NEUTRAL
120VAC
EARTH GROUND
EMERGENCY POWER DISCONNECT
L1
N
L2
EGND
NOTES:
1. THE CONSOLE AND ALL DISPENSERS MUST BE SUPPLIED BY AC POWER OF THE SAME PHASE. OTHERWISE, CROSS-PHASING CAN OCCUR THAT MAY DAMAGE THE DISPENSER AND/OR CONSOLE.
2. DISPENSERS #1 AND #X IN EXAMPLE ABOVE ARE SUPPLIED BY PUMP #1 (PRODUCT #1).
3. CONTROL WIRING IS ONLY SHOWN BETWEEN RELAY CARD #1 AND DISPENSER #1 FOR CLARITY.
4. ALL RELAY CARDS ARE WIRED IN SAME MANNER AS WIRING SHOWN FOR CARD #1.
5. WIRE COLORS FOR FIELD WIRES ARE UNKNOWN.
6. REFER TO CONSOLE MANUFACTURER'S INSTALLATION MANUAL FOR PROPER WIRING AND GROUNDING OF CONSOLE.
7. #2-BLACK/YELLOW AND #4-WHITE MAY NOT BE PRESENT IN DISPENSERS WITH SPRING REWIND REELS.
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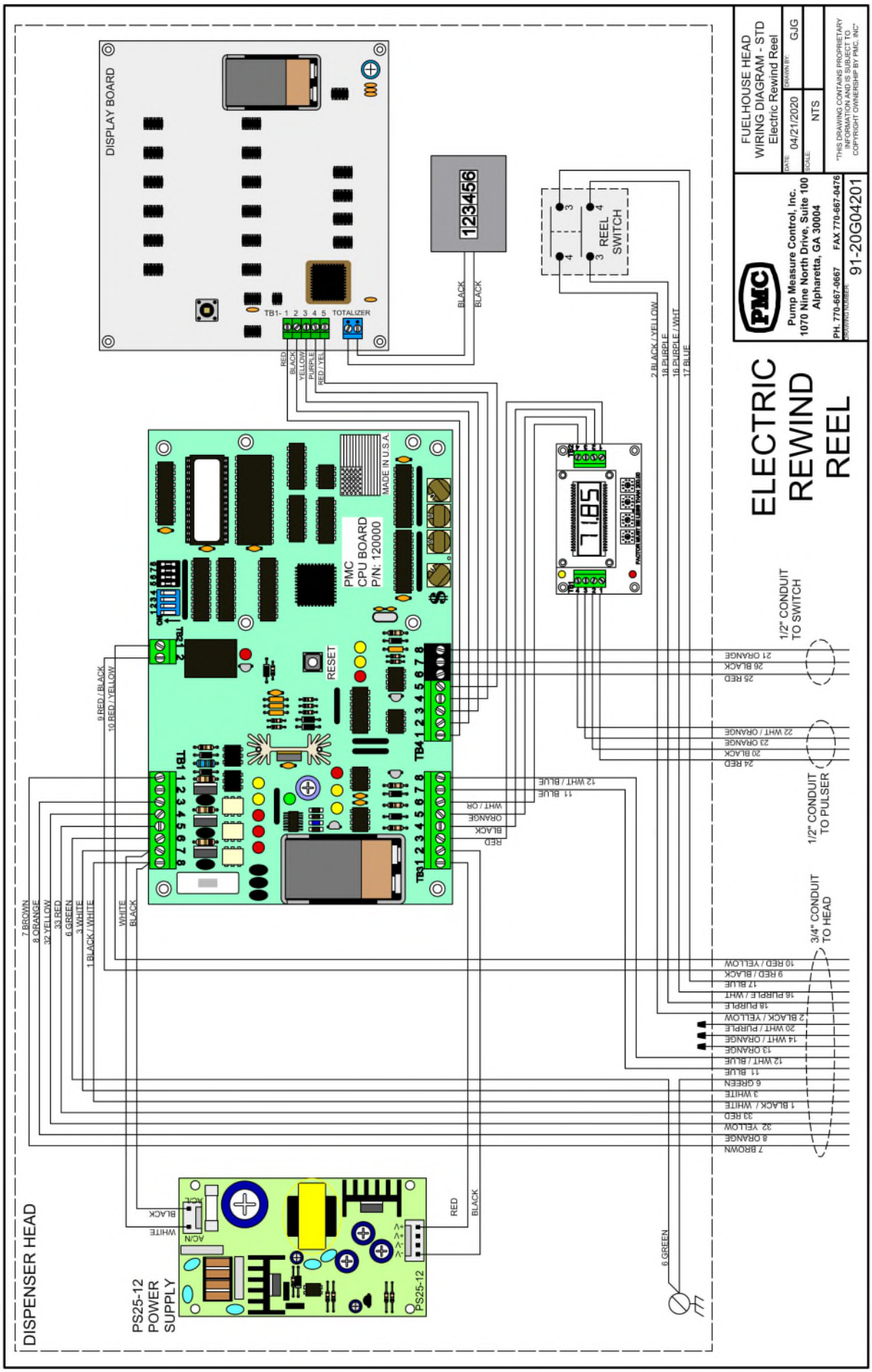
11 - WIRING DIAGRAMS

The following wiring diagrams / drawings are provided to assist the installer in wiring the ***Fuelhouse Aviation*** models of the dispenser. Ensure that the proper diagram(s) is/are used for the installation. Failure to properly wire the dispenser may result in damage to both the dispenser and other equipment connected to it. Be sure to pay attention to any and all notes associated with the diagrams.

AVIATION Models


FUELHOUSE HEAD
WIRING DIAGRAM - STD
Electric Rewind Reel
DATE 04/21/2020
DRAWN BY: GJG
SCALE NTS
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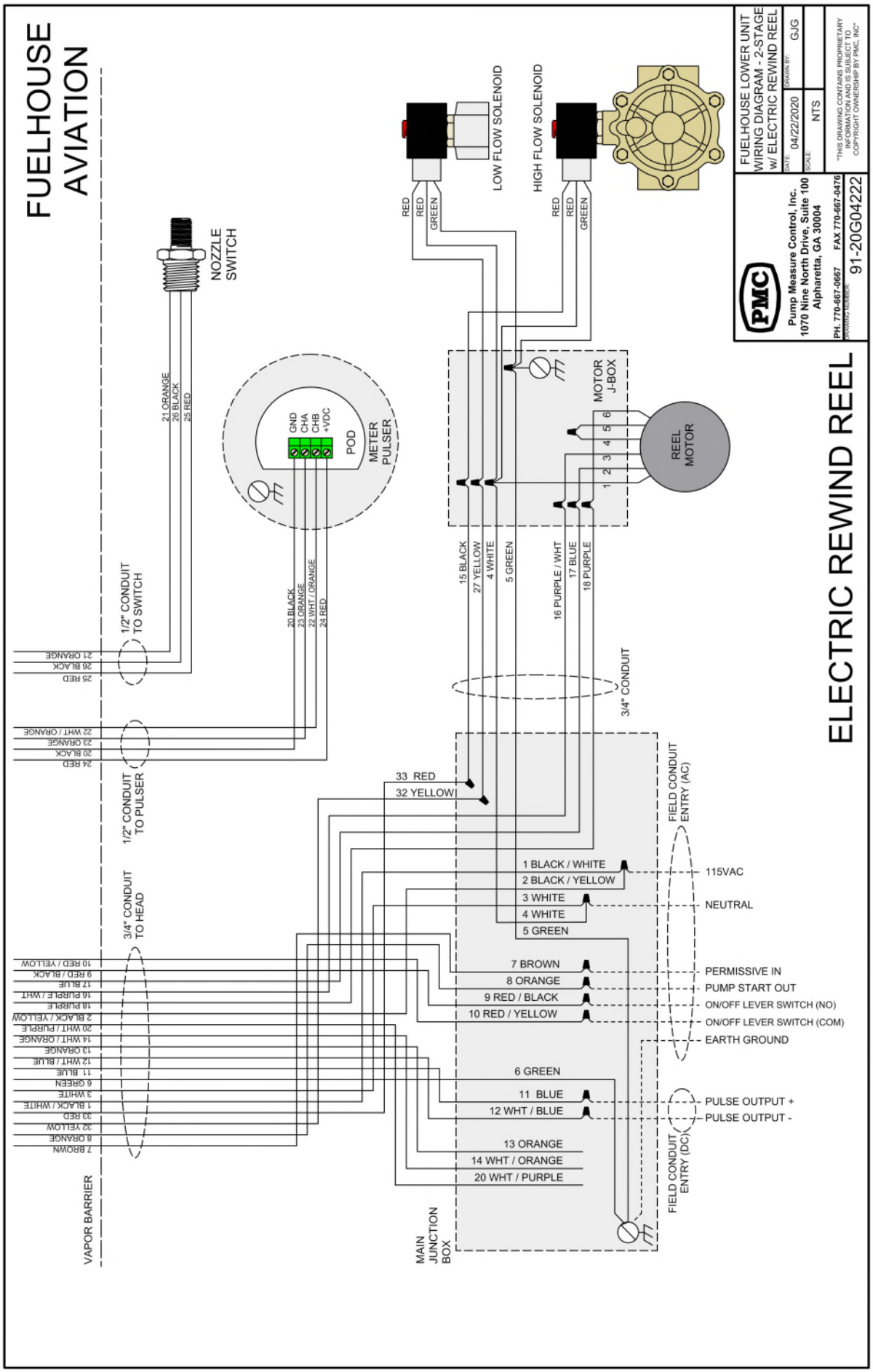
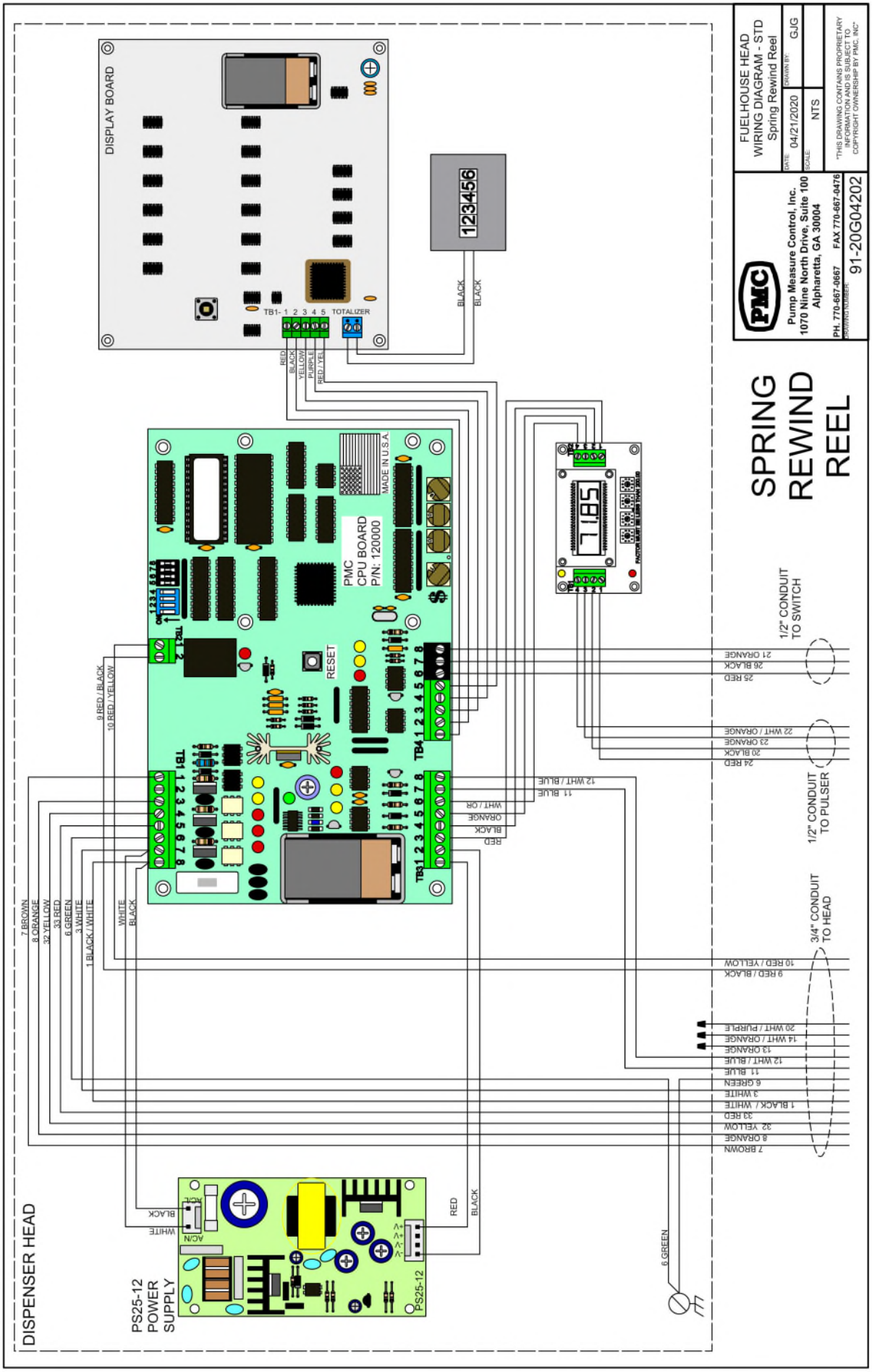
PMC
Pump Measure Control, Inc.
1070 Nine North Drive, Suite 100
Alpharetta, GA 30004
PH. 770-667-0667 FAX 770-667-0476
DRAWING NUMBER 91-20G04201
ELECTRIC
REWIND
REEL
DISPLAY BOARD
TB1- 1 2 3 4 5 TOTALIZER
123456
REEL SWITCH
PMC
CPU BOARD
P/N: 120000
MADE IN U.S.A.
RESET
TB1 TB2 TB3 TB4
DISPENSER HEAD
PS25-12
POWER
SUPPLY
AC/N
+V
-V
1/2" CONDUIT
TO SWITCH
1/2" CONDUIT
TO PULSER
3/4" CONDUIT
TO HEAD
7 BROWN
8 ORANGE
32 YELLOW
33 RED
6 GREEN
3 WHITE
1 BLACK / WHITE
2 BLACK / YELLOW
18 PURPLE
16 PURPLE / WHT
17 BLUE
9 RED / BLACK
10 RED / YELLOW
11 BLUE
12 WHT / BLUE
13 ORANGE
14 WHT / ORANGE
20 WHT / PURPLE
21 ORANGE
22 WHT / ORANGE
23 ORANGE
24 RED
20 BLACK
25 RED
26 BLACK
WHITE
BLACK
RED
YELLOW
PURPLE
RED / YEL
WHT / OR


FUELHOUSE AVIATION
ELECTRIC REWIND REEL
FUELHOUSE LOWER UNIT WIRING DIAGRAM - 2-STAGE w/ ELECTRIC REWIND REEL
DATE 04/22/2020
DRAWN BY: GJG
SCALE: NTS
"THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND IS SUBJECT TO COPYRIGHT OWNERSHIP BY PMC, INC"
PMC
Pump Measure Control, Inc.
1070 Nine North Drive, Suite 100
Alpharetta, GA 30004
PH. 770-667-0667 FAX 770-667-0476
DRAWING NUMBER 91-20G04222
LOW FLOW SOLENOID
HIGH FLOW SOLENOID
RED
RED
GREEN
NOZZLE SWITCH
21 ORANGE
26 BLACK
25 RED
METER PULSER
POD
GND
CHA
CHB
+VDC
MOTOR J-BOX
REEL MOTOR
1 2 3 4 5 6
20 BLACK
23 ORANGE
22 WHT / ORANGE
24 RED
15 BLACK
27 YELLOW
4 WHITE
5 GREEN
16 PURPLE / WHT
17 BLUE
18 PURPLE
1/2" CONDUIT TO SWITCH
1/2" CONDUIT TO PULSER
3/4" CONDUIT TO HEAD
3/4" CONDUIT
21 ORANGE
26 BLACK
25 RED
22 WHT / ORANGE
23 ORANGE
20 BLACK
24 RED
10 RED / YELLOW
9 RED / BLACK
17 BLUE
16 PURPLE / WHT
18 PURPLE
2 BLACK / YELLOW
20 WHT / PURPLE
14 WHT / ORANGE
13 ORANGE
12 WHT / BLUE
11 BLUE
6 GREEN
3 WHITE
1 BLACK / WHITE
33 RED
32 YELLOW
8 ORANGE
7 BROWN
VAPOR BARRIER
33 RED
32 YELLOW
1 BLACK / WHITE
2 BLACK / YELLOW
3 WHITE
4 WHITE
5 GREEN
7 BROWN
8 ORANGE
9 RED / BLACK
10 RED / YELLOW
6 GREEN
11 BLUE
12 WHT / BLUE
13 ORANGE
14 WHT / ORANGE
20 WHT / PURPLE
FIELD CONDUIT ENTRY (AC)
FIELD CONDUIT ENTRY (DC)
MAIN JUNCTION BOX
115VAC
NEUTRAL
PERMISSIVE IN
PUMP START OUT
ON/OFF LEVER SWITCH (NO)
ON/OFF LEVER SWITCH (COM)
EARTH GROUND
PULSE OUTPUT +
PULSE OUTPUT -


FUELHOUSE HEAD
WIRING DIAGRAM - STD
Spring Rewind Reel
DATE 04/21/2020
DRAWN BY: GJG
SCALE NTS
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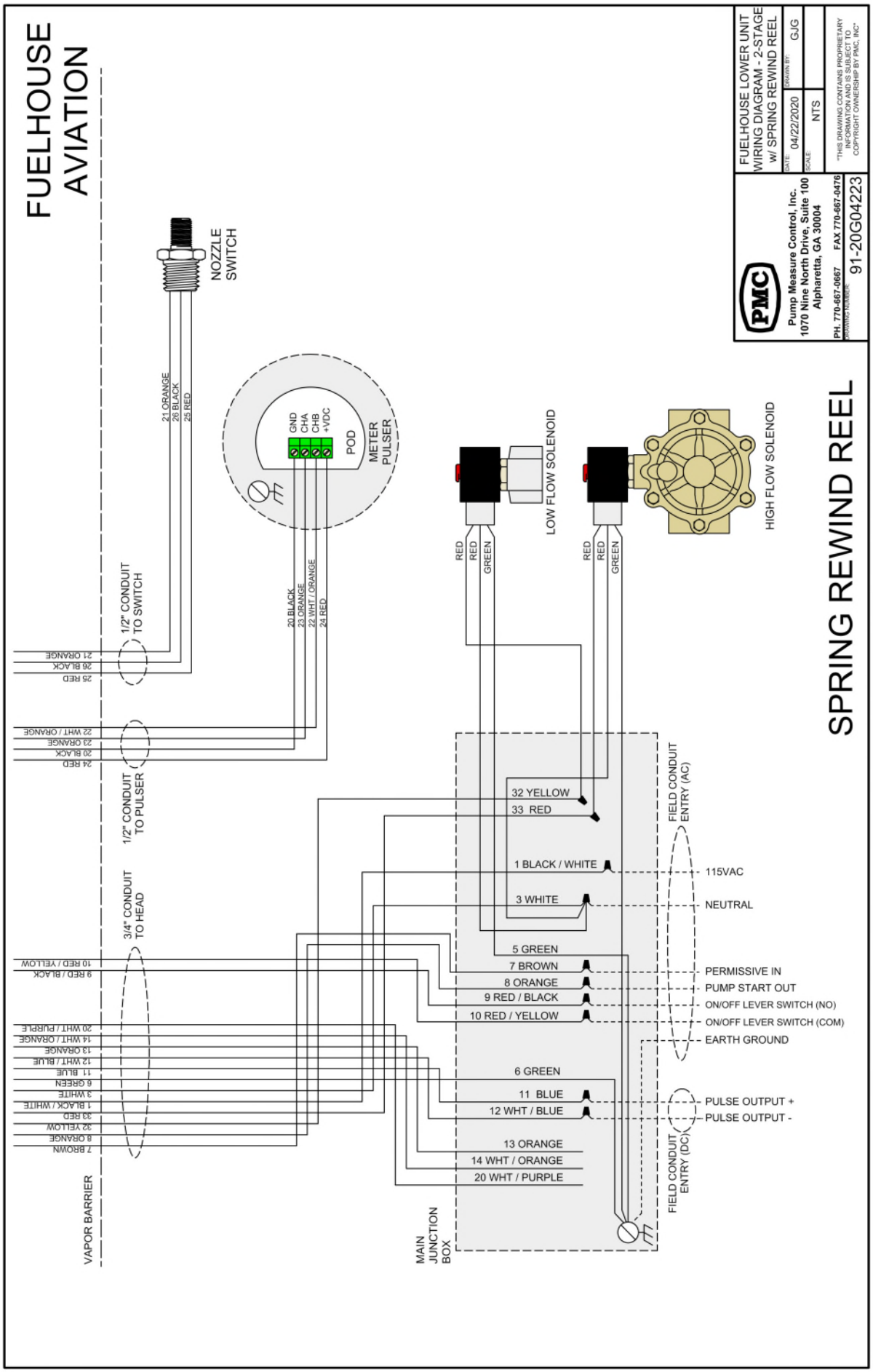
PMC
Pump Measure Control, Inc.
1070 Nine North Drive, Suite 100
Alpharetta, GA 30004
PH. 770-667-0667 FAX 770-667-0476
DRAWING NUMBER 91-20G04202
SPRING REWIND REEL
DISPLAY BOARD
TB1- 1 2 3 4 5 TOTALIZER
123456
BLACK
BLACK
RED
BLACK
YELLOW
PURPLE
RED / YEL
PMC
CPU BOARD
P/N: 120000
MADE IN U.S.A.
RESET
TB1 1 2 3 4 5 6 7 8
TB2 1 2
TB3 1 2 3 4 5 6 7 8
TB4 1 2 3 4 5 6 7 8
9 RED / BLACK
10 RED / YELLOW
7 BROWN
8 ORANGE
32 YELLOW
33 RED
6 GREEN
3 WHITE
1 BLACK / WHITE
WHITE
BLACK
12 WHT / BLUE
11 BLUE
WHT / OR
ORANGE
BLACK
RED
1/2" CONDUIT TO SWITCH
21 ORANGE
26 BLACK
25 RED
22 WHT / ORANGE
23 ORANGE
20 BLACK
24 RED
1/2" CONDUIT TO PULSER
3/4" CONDUIT TO HEAD
10 RED / YELLOW
9 RED / BLACK
20 WHT / PURPLE
14 WHT / ORANGE
13 ORANGE
12 WHT / BLUE
11 BLUE
6 GREEN
3 WHITE
1 BLACK / WHITE
33 RED
32 YELLOW
8 ORANGE
7 BROWN
DISPENSER HEAD
PS25-12 POWER SUPPLY
AC/N
AC/L
BLACK
WHITE
RED
BLACK
PS25-12
6 GREEN


FUELHOUSE AVIATION
NOZZLE SWITCH
21 ORANGE
26 BLACK
25 RED
GND
CHA
CHB
+VDC
POD
METER PULSER
20 BLACK
23 ORANGE
22 WHT / ORANGE
24 RED
LOW FLOW SOLENOID
HIGH FLOW SOLENOID
RED
RED
GREEN
1/2" CONDUIT TO SWITCH
1/2" CONDUIT TO PULSER
3/4" CONDUIT TO HEAD
VAPOR BARRIER
MAIN JUNCTION BOX
FIELD CONDUIT ENTRY (AC)
FIELD CONDUIT ENTRY (DC)
32 YELLOW
33 RED
1 BLACK / WHITE
115VAC
3 WHITE
NEUTRAL
5 GREEN
7 BROWN
PERMISSIVE IN
8 ORANGE
PUMP START OUT
9 RED / BLACK
ON/OFF LEVER SWITCH (NO)
10 RED / YELLOW
ON/OFF LEVER SWITCH (COM)
EARTH GROUND
6 GREEN
11 BLUE
PULSE OUTPUT +
12 WHT / BLUE
PULSE OUTPUT -
13 ORANGE
14 WHT / ORANGE
20 WHT / PURPLE
SPRING REWIND REEL
FUELHOUSE LOWER UNIT WIRING DIAGRAM - 2-STAGE w/ SPRING REWIND REEL
DATE 04/22/2020
DRAWN BY: GJG
SCALE: NTS
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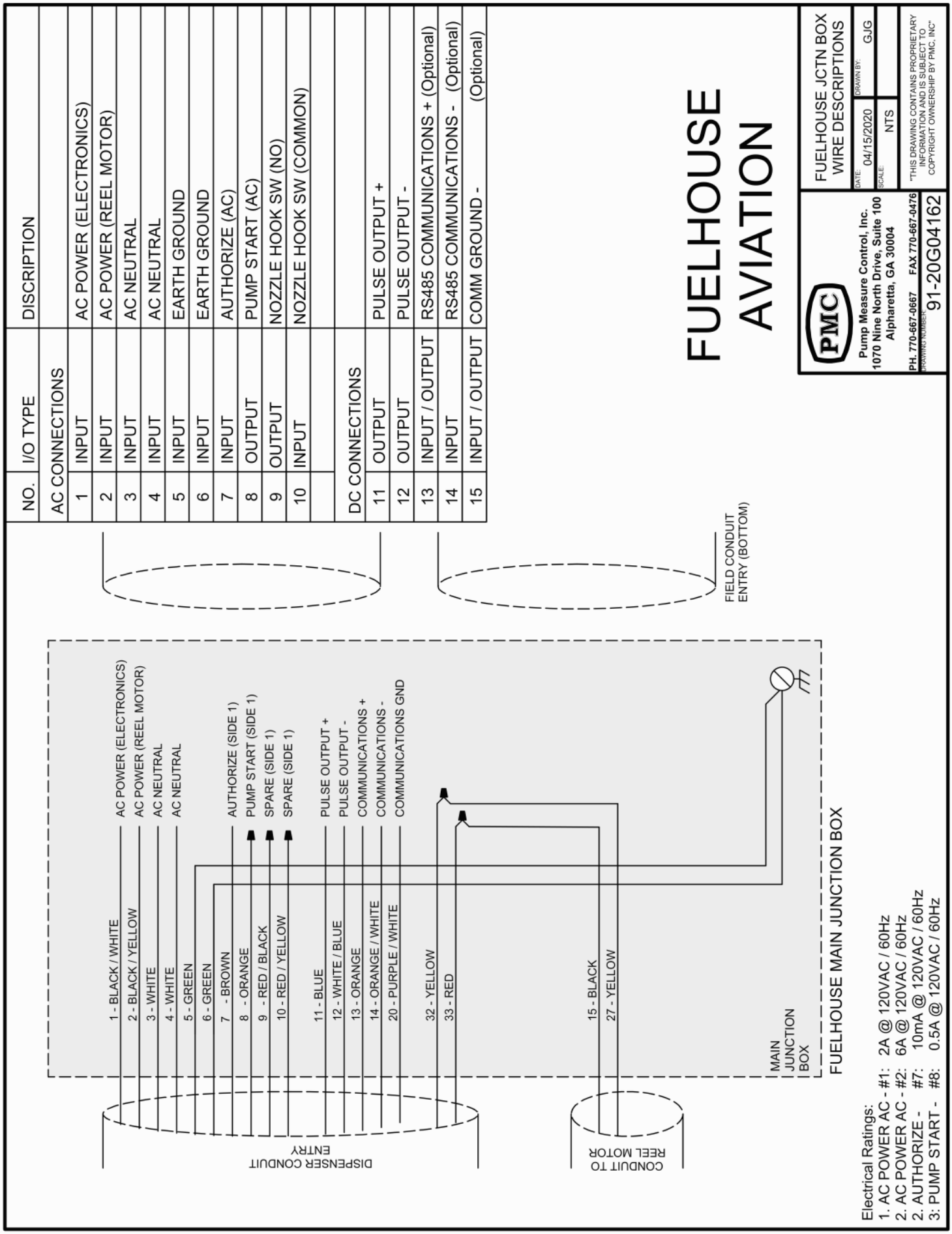
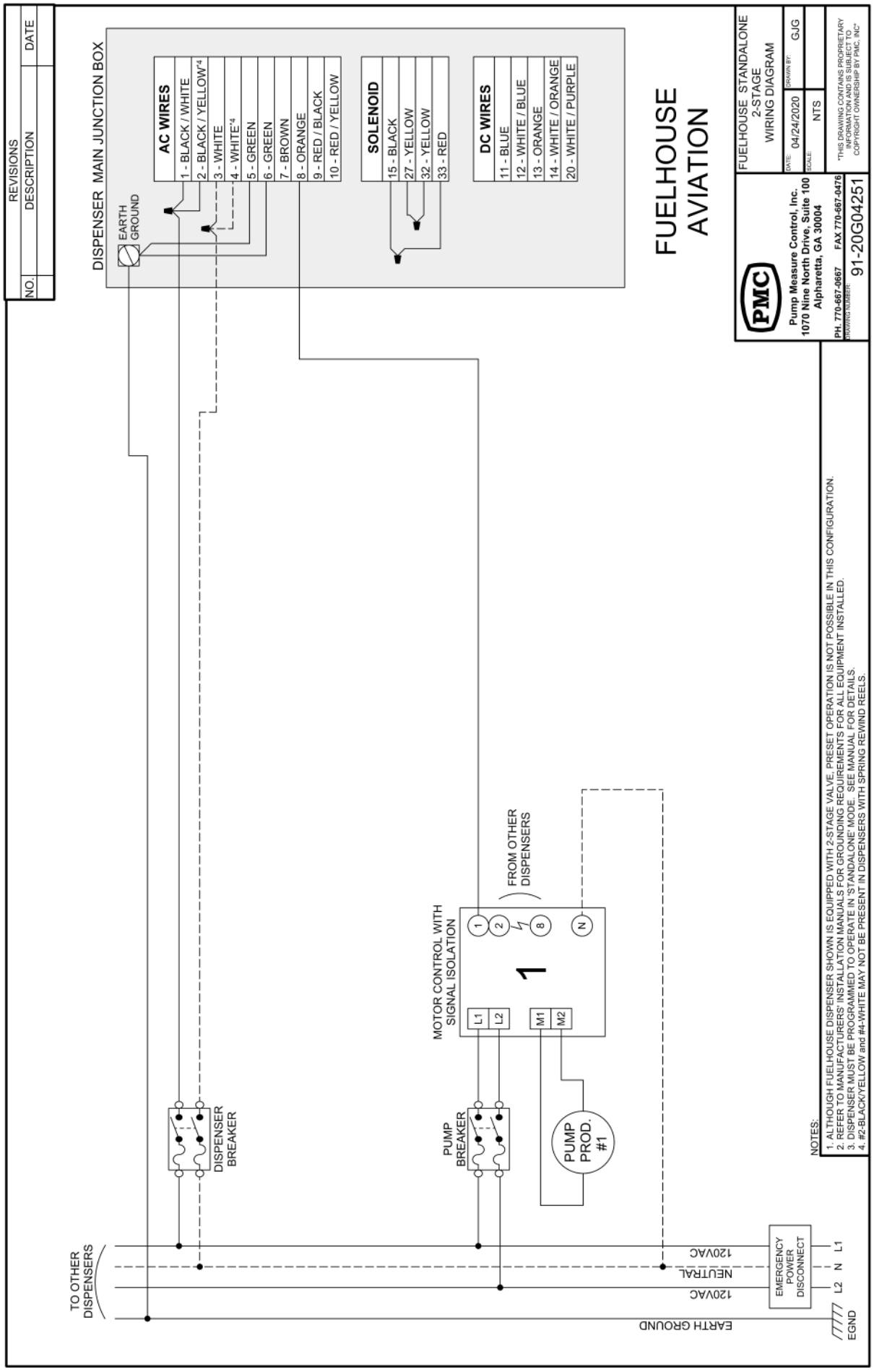
PMC
Pump Measure Control, Inc.
1070 Nine North Drive, Suite 100
Alpharetta, GA 30004
PH. 770-667-0667 FAX 770-667-0476
DRAWING NUMBER
91-20G04223


FUELHOUSE
AVIATION
FUELHOUSE JCTN BOX
WIRE DESCRIPTIONS
PMC
Pump Measure Control, Inc.
1070 Nine North Drive, Suite 100
Alpharetta, GA 30004
PH. 770-667-0667 FAX 770-667-0476
DRAWING NUMBER:
91-20G04162
DATE: 04/15/2020
DRAWN BY: GJG
SCALE: NTS
"THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND IS SUBJECT TO COPYRIGHT OWNERSHIP BY PMC, INC"
NO. I/O TYPE DISCRIPTION
AC CONNECTIONS
1 INPUT AC POWER (ELECTRONICS)
2 INPUT AC POWER (REEL MOTOR)
3 INPUT AC NEUTRAL
4 INPUT AC NEUTRAL
5 INPUT EARTH GROUND
6 INPUT EARTH GROUND
7 INPUT AUTHORIZE (AC)
8 OUTPUT PUMP START (AC)
9 OUTPUT NOZZLE HOOK SW (NO)
10 INPUT NOZZLE HOOK SW (COMMON)
DC CONNECTIONS
11 OUTPUT PULSE OUTPUT +
12 OUTPUT PULSE OUTPUT -
13 INPUT / OUTPUT RS485 COMMUNICATIONS + (Optional)
14 INPUT RS485 COMMUNICATIONS - (Optional)
15 INPUT / OUTPUT COMM GROUND - (Optional)
FIELD CONDUIT ENTRY (BOTTOM)
DISPENSER CONDUIT ENTRY
CONDUIT TO REEL MOTOR
MAIN JUNCTION BOX
FUELHOUSE MAIN JUNCTION BOX
1 - BLACK / WHITE AC POWER (ELECTRONICS)
2 - BLACK / YELLOW AC POWER (REEL MOTOR)
3 - WHITE AC NEUTRAL
4 - WHITE AC NEUTRAL
5 - GREEN
6 - GREEN
7 - BROWN AUTHORIZE (SIDE 1)
8 - ORANGE PUMP START (SIDE 1)
9 - RED / BLACK SPARE (SIDE 1)
10 - RED / YELLOW SPARE (SIDE 1)
11 - BLUE PULSE OUTPUT +
12 - WHITE / BLUE PULSE OUTPUT -
13 - ORANGE COMMUNICATIONS +
14 - ORANGE / WHITE COMMUNICATIONS -
20 - PURPLE / WHITE COMMUNICATIONS GND
32 - YELLOW
33 - RED
15 - BLACK
27 - YELLOW
Electrical Ratings:
1. AC POWER AC - #1: 2A @ 120VAC / 60Hz
2. AC POWER AC - #2: 6A @ 120VAC / 60Hz
2. AUTHORIZE - #7: 10mA @ 120VAC / 60Hz
3: PUMP START - #8: 0.5A @ 120VAC / 60Hz


REVISIONS
NO.
DESCRIPTION
DATE
DISPENSER MAIN JUNCTION BOX
EARTH GROUND
AC WIRES
1 - BLACK / WHITE
2 - BLACK / YELLOW[4]
3 - WHITE
4 - WHITE[4]
5 - GREEN
6 - GREEN
7 - BROWN
8 - ORANGE
9 - RED / BLACK
10 - RED / YELLOW
SOLENOID
15 - BLACK
27 - YELLOW
32 - YELLOW
33 - RED
DC WIRES
11 - BLUE
12 - WHITE / BLUE
13 - ORANGE
14 - WHITE / ORANGE
20 - WHITE / PURPLE
FUELHOUSE
AVIATION
FUELHOUSE STANDALONE
2-STAGE
WIRING DIAGRAM
DATE: 04/24/2020
DRAWN BY: GJG
SCALE: NTS
PMC
Pump Measure Control, Inc.
1070 Nine North Drive, Suite 100
Alpharetta, GA 30004
PH. 770-667-0667 FAX 770-667-0476
DRAWING NUMBER
91-20G04251
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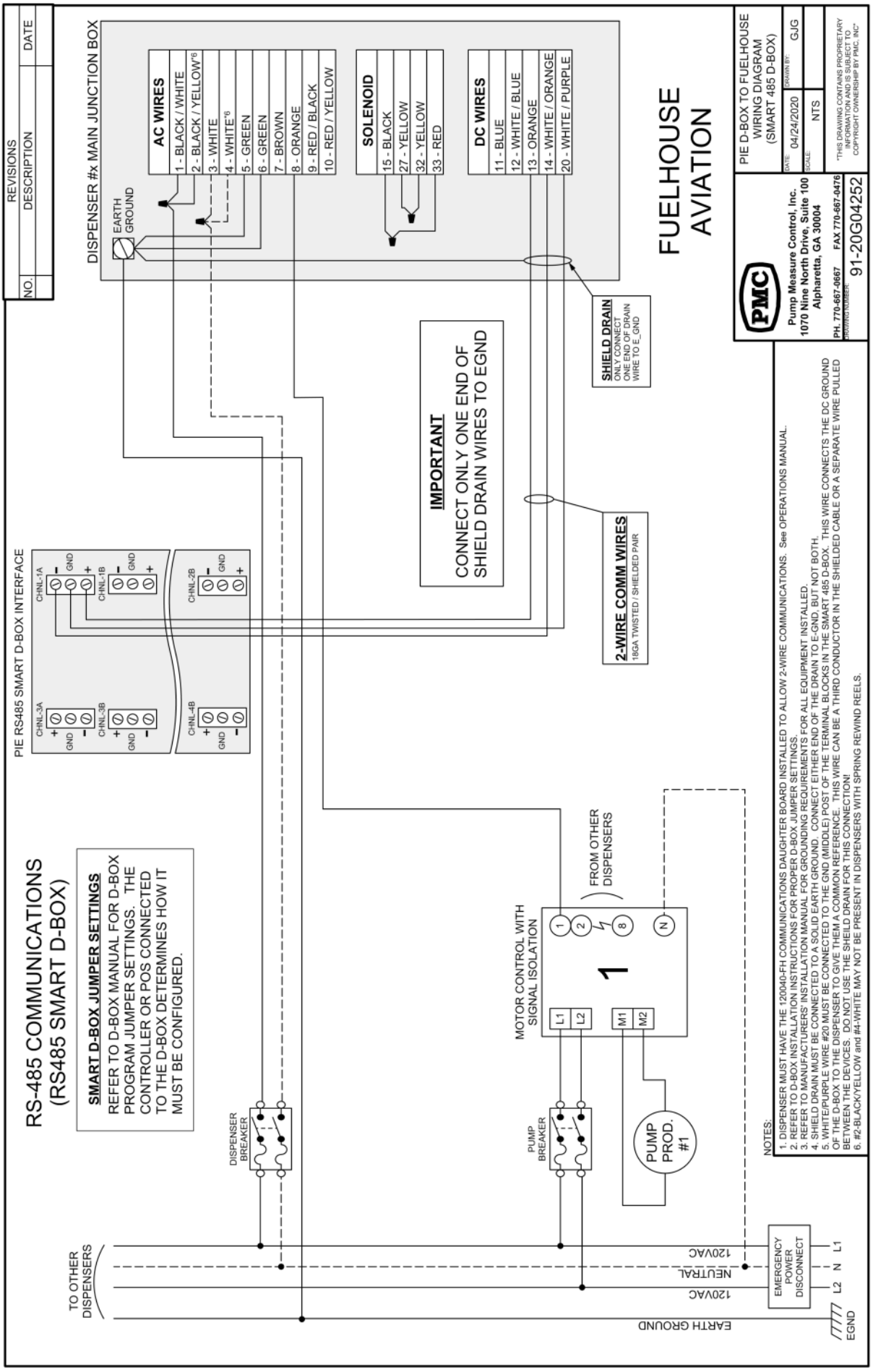
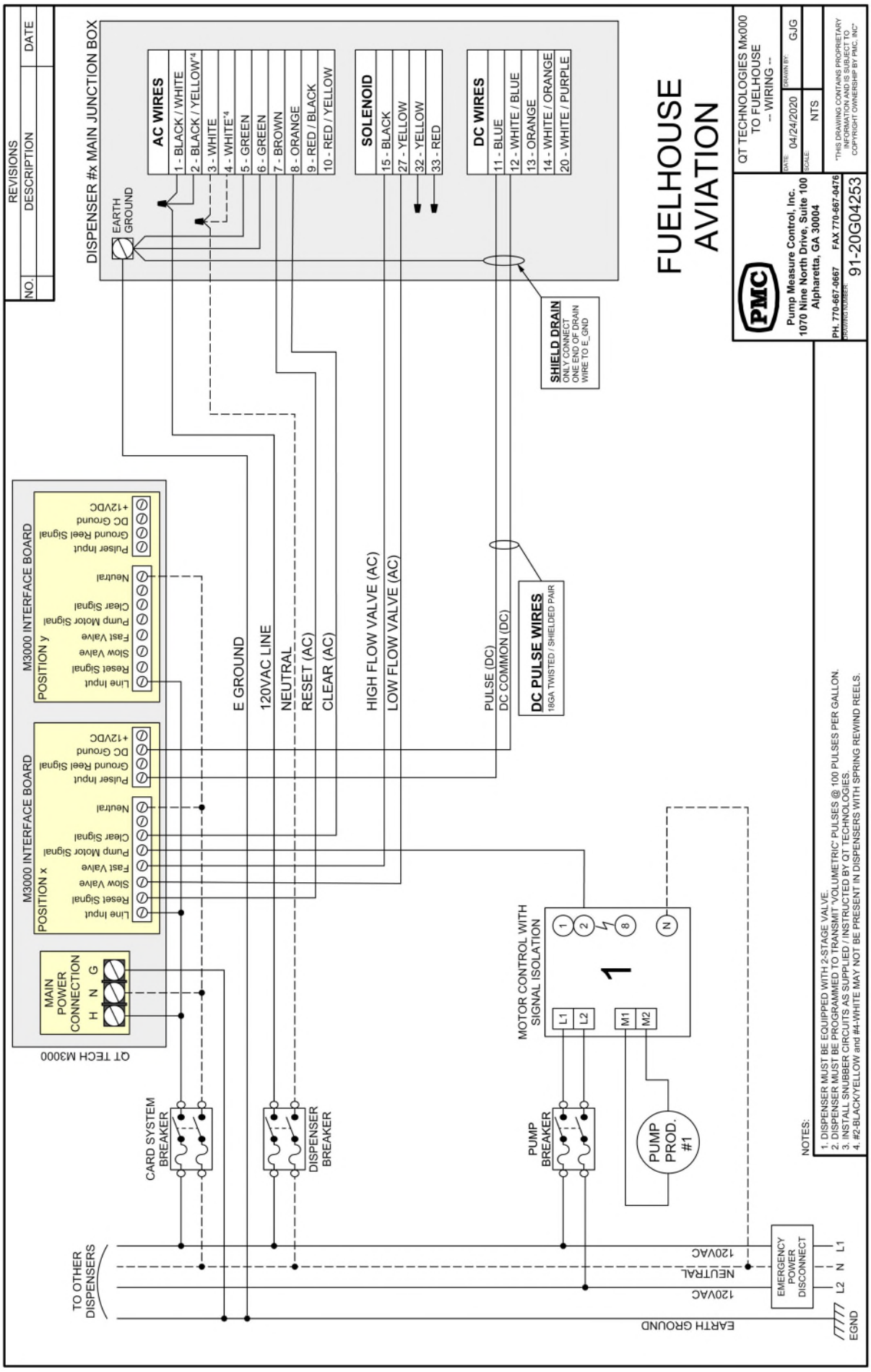
MOTOR CONTROL WITH
SIGNAL ISOLATION
L1
L2
M1
M2
1
2
8
N
1
FROM OTHER
DISPENSERS
PUMP
BREAKER
PUMP
PROD.
#1
DISPENSER
BREAKER
TO OTHER
DISPENSERS
120VAC
NEUTRAL
120VAC
EARTH GROUND
EMERGENCY
POWER
DISCONNECT
L1
N
L2
EGND
NOTES:
1. ALTHOUGH FUELHOUSE DISPENSER SHOWN IS EQUIPPED WITH 2-STAGE VALVE, PRESET OPERATION IS NOT POSSIBLE IN THIS CONFIGURATION.
2. REFER TO MANUFACTURERS' INSTALLATION MANUALS FOR GROUNDING REQUIREMENTS FOR ALL EQUIPMENT INSTALLED.
3. DISPENSER MUST BE PROGRAMMED TO OPERATE IN 'STANDALONE' MODE. SEE MANUAL FOR DETAILS.
4. #2-BLACK/YELLOW and #4-WHITE MAY NOT BE PRESENT IN DISPENSERS WITH SPRING REWIND REELS.


REVISIONS
NO.
DESCRIPTION
DATE
DISPENSER #x MAIN JUNCTION BOX
EARTH GROUND
AC WIRES
1 - BLACK / WHITE
2 - BLACK / YELLOW"6
3 - WHITE
4 - WHITE"6
5 - GREEN
6 - GREEN
7 - BROWN
8 - ORANGE
9 - RED / BLACK
10 - RED / YELLOW
SOLENOID
15 - BLACK
27 - YELLOW
32 - YELLOW
33 - RED
DC WIRES
11 - BLUE
12 - WHITE / BLUE
13 - ORANGE
14 - WHITE / ORANGE
20 - WHITE / PURPLE
FUELHOUSE
AVIATION
PIE D-BOX TO FUELHOUSE
WIRING DIAGRAM
(SMART 485 D-BOX)
PMC
Pump Measure Control, Inc.
1070 Nine North Drive, Suite 100
Alpharetta, GA 30004
PH. 770-667-0667 FAX 770-667-0476
DRAWING NUMBER
91-20G04252
DATE
04/24/2020
DRAWN BY:
GJG
SCALE:
NTS
"THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND IS SUBJECT TO COPYRIGHT OWNERSHIP BY PMC, INC"
PIE RS485 SMART D-BOX INTERFACE
CHNL-1A
CHNL-1B
CHNL-2B
CHNL-3A
CHNL-3B
CHNL-4B
GND
IMPORTANT
CONNECT ONLY ONE END OF
SHIELD DRAIN WIRES TO EGND
SHIELD DRAIN
ONLY CONNECT
ONE END OF DRAIN
WIRE TO E_GND
2-WIRE COMM WIRES
18GA TWISTED / SHIELDED PAIR
RS-485 COMMUNICATIONS
(RS485 SMART D-BOX)
SMART D-BOX JUMPER SETTINGS
REFER TO D-BOX MANUAL FOR D-BOX
PROGRAM JUMPER SETTINGS. THE
CONTROLLER OR POS CONNECTED
TO THE D-BOX DETERMINES HOW IT
MUST BE CONFIGURED.
MOTOR CONTROL WITH
SIGNAL ISOLATION
FROM OTHER
DISPENSERS
L1
L2
M1
M2
1
2
8
N
DISPENSER
BREAKER
PUMP
BREAKER
PUMP
PROD.
#1
TO OTHER
DISPENSERS
120VAC
NEUTRAL
120VAC
EARTH GROUND
EMERGENCY
POWER
DISCONNECT
L1
N
L2
EGND
NOTES:
1. DISPENSER MUST HAVE THE 120040-FH COMMUNICATIONS DAUGHTER BOARD INSTALLED TO ALLOW 2-WIRE COMMUNICATIONS. See OPERATIONS MANUAL.
2. REFER TO D-BOX INSTALLATION INSTRUCTIONS FOR PROPER D-BOX JUMPER SETTINGS.
3. REFER TO MANUFACTURERS' INSTALLATION MANUAL FOR GROUNDING REQUIREMENTS FOR ALL EQUIPMENT INSTALLED.
4. SHIELD DRAIN MUST BE CONNECTED TO A SOLID EARTH GROUND. CONNECT EITHER END OF THE DRAIN TO E-GND, BUT NOT BOTH.
5. WHITE/PURPLE WIRE #20 MUST BE CONNECTED TO THE GND (MIDDLE) POST OF THE TERMINAL BLOCKS IN THE SMART 485 D-BOX. THIS WIRE CONNECTS THE DC GROUND OF THE D-BOX TO THE DISPENSER TO GIVE THEM A COMMON REFERENCE. THIS WIRE CAN BE A THIRD CONDUCTOR IN THE SHIELDED CABLE OR A SEPARATE WIRE PULLED BETWEEN THE DEVICES. DO NOT USE THE SHIELD DRAIN FOR THIS CONNECTION!
6. #2-BLACK/YELLOW and #4-WHITE MAY NOT BE PRESENT IN DISPENSERS WITH SPRING REWIND REELS.


FUELHOUSE
AVIATION
QT TECHNOLOGIES Mx000
TO FUELHOUSE
-- WIRING --
Pump Measure Control, Inc.
1070 Nine North Drive, Suite 100
Alpharetta, GA 30004
PH. 770-667-0667 FAX 770-667-0476
91-20G04253
04/24/2020
GJG
NTS
REVISIONS
NO. DESCRIPTION DATE
DISPENSER #x MAIN JUNCTION BOX
EARTH GROUND
AC WIRES
1 - BLACK / WHITE
2 - BLACK / YELLOW*4
3 - WHITE
4 - WHITE*4
5 - GREEN
6 - GREEN
7 - BROWN
8 - ORANGE
9 - RED / BLACK
10 - RED / YELLOW
SOLENOID
15 - BLACK
27 - YELLOW
32 - YELLOW
33 - RED
DC WIRES
11 - BLUE
12 - WHITE / BLUE
13 - ORANGE
14 - WHITE / ORANGE
20 - WHITE / PURPLE
SHIELD DRAIN
ONLY CONNECT ONE END OF DRAIN WIRE TO E_GND
DC PULSE WIRES
18GA TWISTED / SHIELDED PAIR
PULSE (DC)
DC COMMON (DC)
HIGH FLOW VALVE (AC)
LOW FLOW VALVE (AC)
E GROUND
120VAC LINE
NEUTRAL
RESET (AC)
CLEAR (AC)
M3000 INTERFACE BOARD
POSITION y
M3000 INTERFACE BOARD
POSITION x
Line Input
Reset Signal
Slow Valve
Fast Valve
Pump Motor Signal
Clear Signal
Neutral
Pulser Input
Ground Reel Signal
DC Ground
+12VDC
QT TECH M3000
MAIN POWER CONNECTION
H N G
MOTOR CONTROL WITH SIGNAL ISOLATION
L1 L2 M1 M2
CARD SYSTEM BREAKER
DISPENSER BREAKER
PUMP BREAKER
PUMP PROD. #1
TO OTHER DISPENSERS
120VAC
NEUTRAL
120VAC
EARTH GROUND
EGND
EMERGENCY POWER DISCONNECT
L1 N L2
NOTES:
1. DISPENSER MUST BE EQUIPPED WITH 2-STAGE VALVE.
2. DISPENSER MUST BE PROGRAMMED TO TRANSMIT 'VOLUMETRIC' PULSES @ 100 PULSES PER GALLON.
3. INSTALL SNUBBER CIRCUITS AS SUPPLIED / INSTRUCTED BY QT TECHNOLOGIES.
4. #2-BLACK/YELLOW and #4-WHITE MAY NOT BE PRESENT IN DISPENSERS WITH SPRING REWIND REELS.
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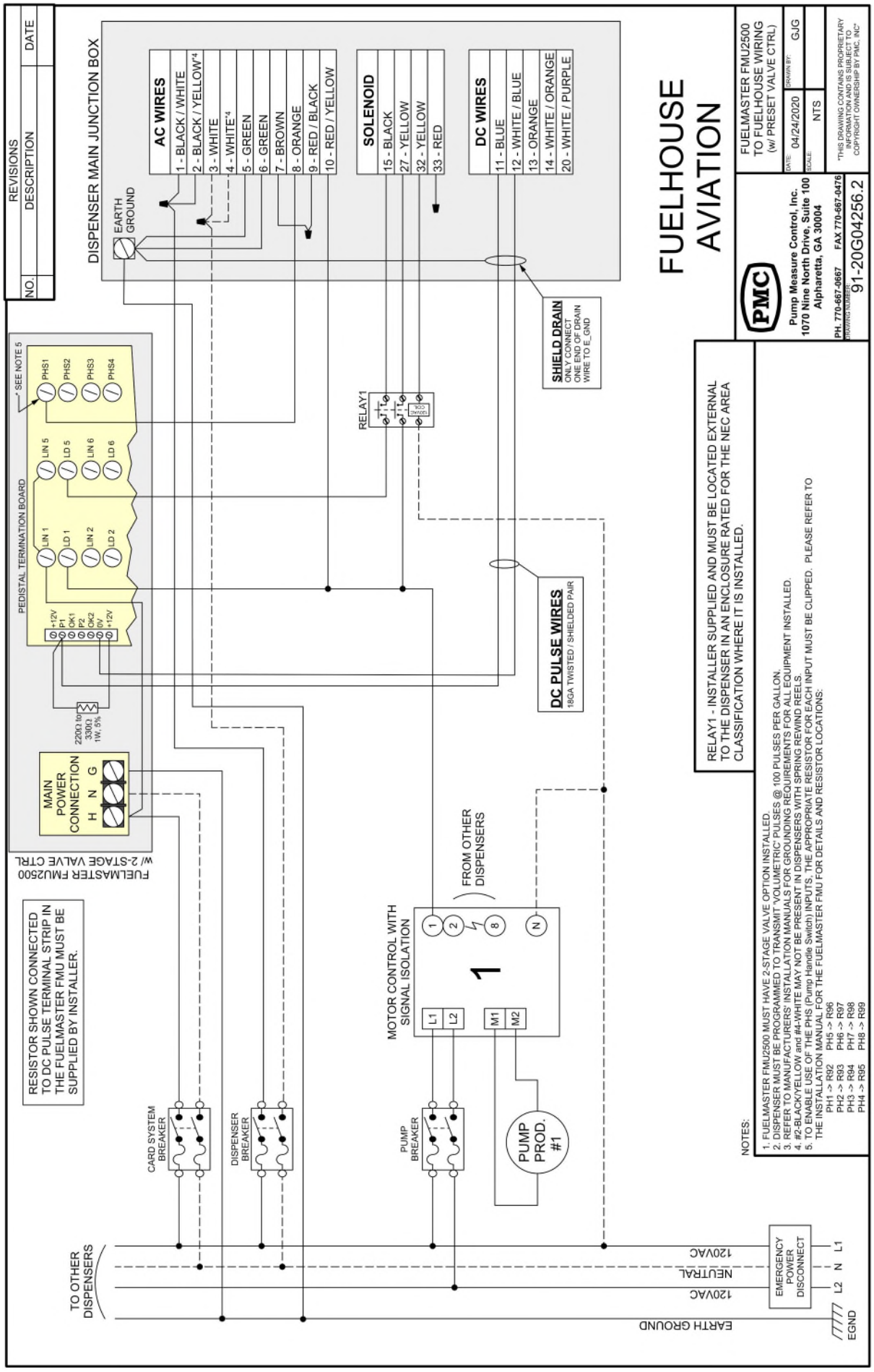
FUELHOUSE
AVIATION
FUELMASTER FMU2500
TO FUELHOUSE WIRING
(w/ PRESET VALVE CTRL)
PMC
Pump Measure Control, Inc.
1070 Nine North Drive, Suite 100
Alpharetta, GA 30004
PH: 770-667-0667 FAX 770-667-0476
91-20G04256.2
DATE: 04/24/2020
DRAWN BY: GJG
SCALE: NTS
REVISIONS
NO. DESCRIPTION DATE
DISPENSER MAIN JUNCTION BOX
EARTH GROUND
AC WIRES
1 - BLACK / WHITE
2 - BLACK / YELLOW*4
3 - WHITE
4 - WHITE*4
5 - GREEN
6 - GREEN
7 - BROWN
8 - ORANGE
9 - RED / BLACK
10 - RED / YELLOW
SOLENOID
15 - BLACK
27 - YELLOW
32 - YELLOW
33 - RED
DC WIRES
11 - BLUE
12 - WHITE / BLUE
13 - ORANGE
14 - WHITE / ORANGE
20 - WHITE / PURPLE
SHIELD DRAIN
ONLY CONNECT
ONE END OF DRAIN
WIRE TO E_GND
RELAY1
DC PULSE WIRES
18GA TWISTED / SHIELDED PAIR
SEE NOTE 5
PEDISTAL TERMINATION BOARD
PHS1
PHS2
PHS3
PHS4
LIN 1
LD 1
LIN 2
LD 2
LIN 5
LD 5
LIN 6
LD 6
+12V
P1
OK1
P2
OK2
0V
+12V
220Ω to 330Ω 1W, 5%
FUELMASTER FMU2500
w/ 2-STAGE VALVE CTRL
MAIN POWER CONNECTION
H N G
RESISTOR SHOWN CONNECTED TO DC PULSE TERMINAL STRIP IN THE FUELMASTER FMU MUST BE SUPPLIED BY INSTALLER.
RELAY1 - INSTALLER SUPPLIED AND MUST BE LOCATED EXTERNAL TO THE DISPENSER IN AN ENCLOSURE RATED FOR THE NEC AREA CLASSIFICATION WHERE IT IS INSTALLED.
MOTOR CONTROL WITH SIGNAL ISOLATION
FROM OTHER DISPENSERS
L1
L2
M1
M2
CARD SYSTEM BREAKER
DISPENSER BREAKER
PUMP BREAKER
PUMP PROD. #1
TO OTHER DISPENSERS
120VAC
NEUTRAL
120VAC
EARTH GROUND
EMERGENCY POWER DISCONNECT
L2
N
L1
EGND
NOTES:
1. FUELMASTER FMU2500 MUST HAVE 2-STAGE VALVE OPTION INSTALLED.
2. DISPENSER MUST BE PROGRAMMED TO TRANSMIT "VOLUMETRIC" PULSES @ 100 PULSES PER GALLON.
3. REFER TO MANUFACTURERS' INSTALLATION MANUALS FOR GROUNDING REQUIREMENTS FOR ALL EQUIPMENT INSTALLED.
4. #2-BLACK/YELLOW and #4-WHITE MAY NOT BE PRESENT IN DISPENSERS WITH SPRING REWIND REELS.
5. TO ENABLE USE OF THE PHS (Pump Handle Switch) INPUTS, THE APPROPRIATE RESISTOR FOR EACH INPUT MUST BE CLIPPED. PLEASE REFER TO THE INSTALLATION MANUAL FOR THE FUELMASTER FMU FOR DETAILS AND RESISTOR LOCATIONS:
PH1 -> R92 PH5 -> R96
PH2 -> R93 PH6 -> R97
PH3 -> R94 PH7 -> R98
PH4 -> R95 PH8 -> R99
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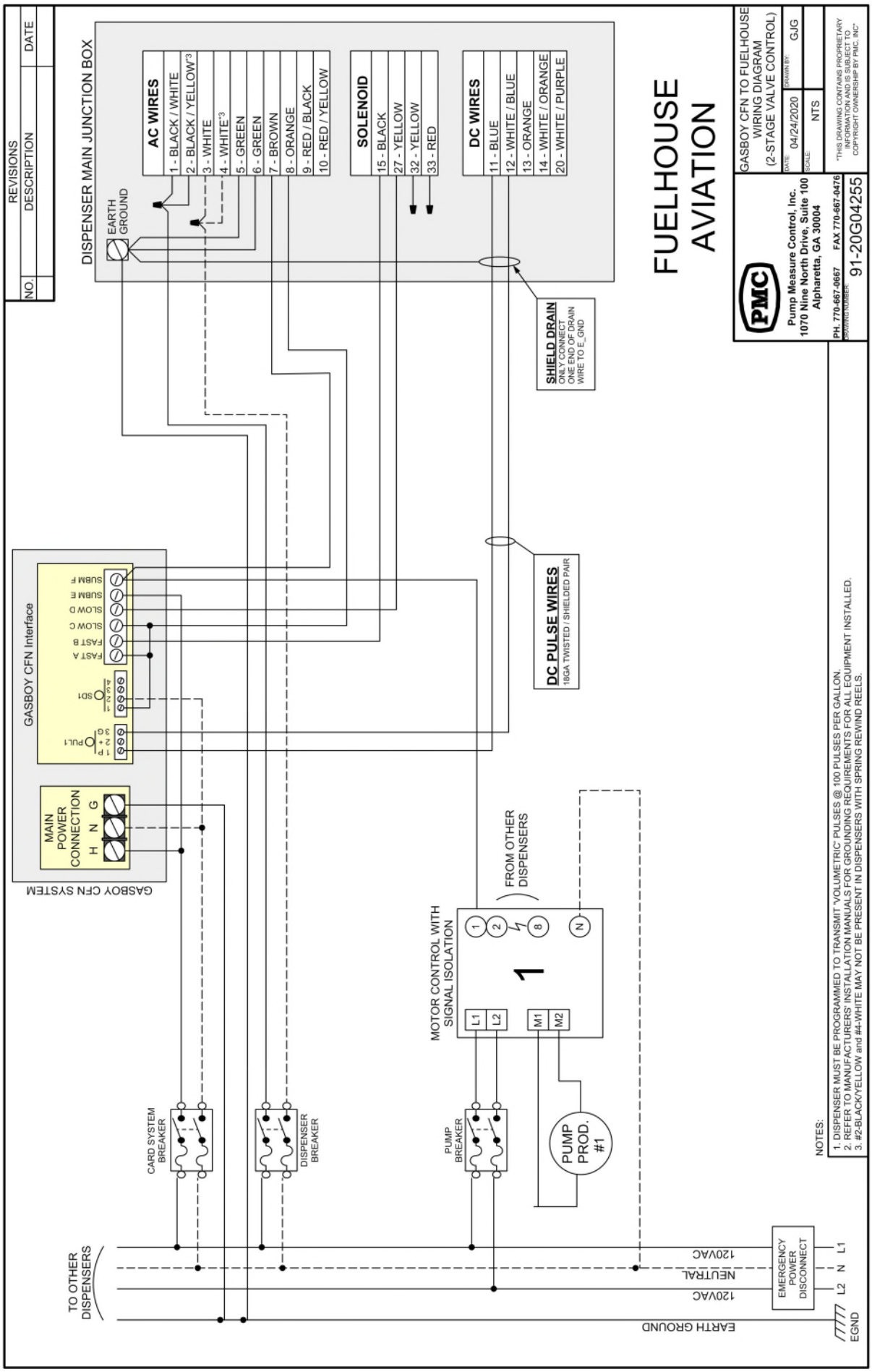
FUELHOUSE AVIATION
GASBOY CFN TO FUELHOUSE WIRING DIAGRAM (2-STAGE VALVE CONTROL)
DRAWN BY: GJG
DATE: 04/24/2020
SCALE: NTS
DRAWING NUMBER: 91-20G04255
Pump Measure Control, Inc.
1070 Nine North Drive, Suite 100
Alpharetta, GA 30004
PH. 770-667-0667 FAX 770-667-0476
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REVISIONS
NO. DESCRIPTION DATE
DISPENSER MAIN JUNCTION BOX
EARTH GROUND
AC WIRES
1 - BLACK / WHITE
2 - BLACK / YELLOW[3]
3 - WHITE
4 - WHITE[3]
5 - GREEN
6 - GREEN
7 - BROWN
8 - ORANGE
9 - RED / BLACK
10 - RED / YELLOW
SOLENOID
15 - BLACK
27 - YELLOW
32 - YELLOW
33 - RED
DC WIRES
11 - BLUE
12 - WHITE / BLUE
13 - ORANGE
14 - WHITE / ORANGE
20 - WHITE / PURPLE
SHIELD DRAIN
ONLY CONNECT ONE END OF DRAIN WIRE TO E_GND
DC PULSE WIRES
18GA TWISTED / SHIELDED PAIR
GASBOY CFN SYSTEM
GASBOY CFN Interface
SUBM F
SUBM E
SLOW D
SLOW C
FAST B
FAST A
SD1
PULS1
MAIN POWER CONNECTION
H N G
MOTOR CONTROL WITH SIGNAL ISOLATION
FROM OTHER DISPENSERS
1
2
8
N
L1
L2
M1
M2
CARD SYSTEM BREAKER
DISPENSER BREAKER
PUMP BREAKER
PUMP PROD. #1
TO OTHER DISPENSERS
120VAC
NEUTRAL
120VAC
EARTH GROUND
EGND
EMERGENCY POWER DISCONNECT
L1
N
L2
NOTES:
1. DISPENSER MUST BE PROGRAMMED TO TRANSMIT 'VOLUMETRIC' PULSES @ 100 PULSES PER GALLON.
2. REFER TO MANUFACTURERS' INSTALLATION MANUALS FOR GROUNDING REQUIREMENTS FOR ALL EQUIPMENT INSTALLED.
3. #2-BLACK/YELLOW and #4-WHITE MAY NOT BE PRESENT IN DISPENSERS WITH SPRING REWIND REELS.