Introduction

Coverage

This manual provides instructions to install:

1. New Dual Diesel Exhaust Fluid (DEF) - This unit arrives in two boxes and needs to be assembled onsite.

2. Field upgrade - Single DEF kit onto non-DEF Ultra-Hi™.

3. Field upgrade - Add the second DEF to field Ultra-Hi with a single DEF hose.
   - This is limited to 2-sided units. Based on the unit type, single-sided units may be converted to 2-sided unit with a separate kit.

4. Crossover Adapter (M17478A001) - Order option to pipe DEF from one end of dual unit to second DEF cabinet. For more information on Pit Box connections for DEF, refer to notes in "Appendix D: Crossover Adapter Installation" on page 84.
   - This manual provides instructions to install the Ultra-Hi DEF+1 and Dual DEF Retrofit Kit (EN DEF RF) in Encore 500/700/S units.

   Note: On standard Ultra-Hi units, EN DEF RF kit may be installed only on the side A of the unit. The NA4 and NPA can use the Dual DEF dispenser option, in which a DEF cabinet is installed on side A and side B of the unit.

5. Field upgrade - Instructions on moving the DEF grade to the side B of the unit.

Purpose

To install the kit, the dispenser must have one free wire from the station. Otherwise, the wire must be supplied to the dispenser for control of the DEF pump.

Notes: 1) For removing and replacing the graphics, read the instructions provided in MDE-4625 Graphic Panel Application for The Advantage® Series, Encore®, Eclipse®, and Encore S.

2) The Ultra-Hi DEF Retrofit Kit cannot be used in Encore units manufactured before 2005.

3) Some DEF nozzle types require a Magnetic Ring (M10656B001) to be placed over the nozzle to allow flow through the nozzle. Determine the nozzle type before visiting the site and have a magnetic nozzle adapter available for purging and calibrating, if required.

4) The 24 V cable must be M05547A003 REV D (or later), M05547A00 EV D (or later), or M05547A005, or M05547A006.

Intended Users

This manual is intended for Gilbarco®-trained and certified Authorized Service Contractors (ASCs).

Table of Contents

Required Tools and Materials

IMPORTANT INFORMATION

Ensure that all the tools and materials listed in this section are available during the installation. Non-availability of these tools or materials will delay the installation process.

The following tools and materials are required for installing the Ultra-Hi DEF and Dual DEF Retrofit Kits in Encore 500/700/S units:

- Flat-blade Screwdriver
- Phillips® Screwdriver
- Ball Pein Hammer
- Square Drive Bit Set with Driver
- Socket Wrench with Society of Automotive Engineers (SAE) and Metric Sockets
- 12-inch Extension Bar for the Socket Set
- Magnetic Retriever Tool
- Paint Scraper
- 4-mm Allen® Wrench
- Shackle
- Fork Lift
- Ladder
- Clean Drum

- Stainless Steel Prover Can (5 gallons) DEF Dedicated
- Safety Barricades
- 3M™ Hi-strength 90 Spray Adhesive
- Adhesive Remover
- Piping Insulation
- Tie-wraps
- 1-inch 304 or 316 Stainless Steel or High Density Polyethylene (HDPE) Piping
- 12 gauge Stranded/Insulated Wire (if there is no spare wire from the station to the dispenser)
- Piping Sealant
- Conduit and Fittings
- Wiring Tools (Wire Cutters, Wire Nuts, Terminals, and so on)
- Silicone Sealant
- 5- to 6-inch C-clamps
- Pulser (Standard Encore)
- Jump Jacks
- Magnetic Ring (for magnetically activated nozzle installations)
- Electrostatic Discharge (ESD) Kit
- Knife (for scoring insulation)
- Loctite® Blue 242®
- Loctite 7649 Primer
- Loctite 567 Thread Sealant

⚠ WARNING

Do NOT use spark-producing (for example, drills, battery powered screwdrivers, and grinders) or high-heat producing tools on the fueling island.

Parts List

The following table lists the parts included in the Ultra-Hi DEF and Dual DEF Retrofit Kits:

Item #	Description	Part Number	Quantity
1	DEF Valve Control Cable and Conduit	M10075A005	1
2	Washer	N16599-108	2
3	Nut	N23655-01	2
4	DEF Interface Cable and Conduit	M04114A006	1
5	Heater Conduit Mounting Bracket	M10179B001	1
6	Nut	M00414B003	5
7	U-Bolt	Q11677-24	1
8	1/4-inch Nut	Q11890-04	4
9	Cable Clamp (Flat)	Q13459-01	1
	Cable Clamp (Round)	Q13558-04	1
10	Coriolis Interface Board Assembly	M07368A002	1
11	Mounting Screw	M00417B009	4
12	Straight Threaded Bolt	M00415B010	2

Item #	Description	Part Number	Quantity
13	Encore 500 Bezel Price per Unit (PPU)		
	• Single Level	M13048A001	1
	• Dual Level	M13051A001	1
	Encore S Enhanced Bezel PPU		
	• Single Level		
	- DEF Right	M12982A010	1
	- DEF Left	M12982A011	1
	• Dual Level		
	- DEF Right	M12982A017	1
	- DEF Left	M12982A018	1
	2-grade Ultra-Hi PPU		
	• DEF Left	M12982A012	1
	• DEF Right	M12982A013	1
14	Insulation	M10263A017	1
		M10263B015	2
15	Insulation Panel Full	M10263A001	1
16	Insulation Top Long	M10263A106	2
17	Insulation Top Short	M10263A107	2
18	Screw Thread Forming	M00417B009	2
19	Insulation Inner Sheathing	M10263A005	1
20	Frozen Input Cable	M10059A001	1
21	Pulser Power/Data Cable	M10060A001	1
	Pulser Power/Data Cable (Dual Master)	M10060A002	1
	Single DEF Pulser Cable	M10060A003	1
22	Coriolis Power Cable	M07141A002	1
23	24 V Cable*	M05547*	1
24	Stand-off	Q10651-02	4
25	DEF Interface Board	M10030A001	1
26	Pulser Assembly	M04012B001	1
27	Magnetic Nozzle Adapter	M10656B001	1
28	Pump Handle Extender Cable**	M00497A001	1
29	Valve Control/Adapter Cable	M07782A001	1
	Valve Control/Adapter Cable (Dual Master)	M07782A002	1
	Valve Control/Adapter Cable (Dual Master with DEF)	M07782A003	1
30	Cable, Satellite Encore Ultra-Hi	M02371A002	1
31	Card Reader Gasket	M13127B006	1
32	Blanking Plate	M00329A018	1
33	Screw, Pan Head	M01118B001	2
34	AC Valve Feed Cable	M04406A004	1
35	Valve Cable	M02338A001	1
36	Pulser Cable 2-grade Single Side	M03755A003	1
37	Ultra-Hi Valve Board	M08223A001	1
38	Ultra-Hi Security Shield	M10534A011	1
39	Pump Control Board (PCB) Stand-offs	Q10651-51	4
40	PCB Spacers	Q10651-09	2
41	Carriage Bolt 1/4-20 X 3/4	K02394-34	2

Item #	Description	Part Number	Quantity
42	Assembly, PPU Display Module Square Bezel Sandpiper™ (SP) III	M12855A001	2
43	Printed Circuit Assembly (PCA), SP III Door Node 5, 6-Digit	M13170A001	1
44	Cable, Main Display to PPU	M10699A004	1
45	Assembly, Conduit and Cable	M04114A012	1
46	Assembly, Upper Hydraulics DEF Encore	M16178A001	1
47	Assembly, Canopy Support Encore DEF	M16179A001	2
48	Cable, Heater Control Power	M16184A001	1
49	Cable, Ultra-Hi Pulser	M03755A004	1

**The 24 V cable must be M05547A003 REV D (or later), M05547A004 REV D (or later), or M05547A005, or M05547A006.*

***Pump handle extender cable is required only for left-hand DEF units. This cable is supplied with all kits.*

The following table lists the parts included in the Dual DEF Connections Kit (M16190K001):

Item #	Description	Part Number	Quantity
1	Dual DC Conduit Cable	M04114A012	1
2	Pulser Cable	M03755A004	1
3	Dual 24 Volt cable	M16184A001	1
4	PCA, Ultra High Interface	M08223A001	1
5	Spacer	Q10651-09	2
6	Locking PCB Support	Q10651-02	4
7	PCB Mounting Bracket	M10534B008	1
8	P1206 AC Power	M04406A004	1
9	Valve Cable	M02338A001	1
10	Bolt 1/4-20 X3/4	K02394-34	2
11	Nut	Q11890-04	4
12	NPA Dual DEF Cable	M07782A004	1
13	NPC Dual DEF Cable	M07782A005	1

Related Documents

Document Number	Title	GOLD℠ Library
FE-363	Field Wiring Diagram Encore 500/700 (M07555 Power Supply Only)	• Encore and Eclipse • Encore Eclipse Installers • Field Wiring Diagrams
MDE-3804	Encore and Eclipse Start-up/Service Manual	• Encore and Eclipse • Service Manual
MDE-3985	Encore Installation Manual	• Encore and Eclipse • Installation Manual • Footprints and Elevations
MDE-4625	Graphic Panel Application for The Advantage Series, Encore, Eclipse and Encore S	• Encore and Eclipse • Advantage and Legacy® Models
MDE-4995	Warranty Registration Checklist for Diesel Exhaust Fluid (DEF) Kits	• Encore and Eclipse • Encore Eclipse Installers • Gilbarco Forms

Abbreviations and Acronyms

Term	Description
ASC	Authorized Service Contractor
CD	Computer Display
DEF	Diesel Exhaust Fluid
ESD	Electrostatic Discharge
GOLD	Gilbarco Online Documentation
HDPE	High Density Polyethylene
I.S.	Intrinsic Safety
LON	Local Operating Network
NEC®	National Electric Code
NFPA®	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
PCA	Printed Circuit Assembly
PCB	Pump Control Board
PCN	Pump Control Node
POS	Point of Sale
PPU	Price per Unit
SAE	Society of Automotive Engineers
SP	Sandpiper
STP	Submersible Turbine Pump
TAC	Technical Assistance Center
UHF	Ultra-Hi Flow
UL®	Underwriters Laboratories

Important Safety Information

Notes: 1) Save this Important Safety Information section in a readily accessible location.

2) Although DEF is non-flammable, Diesel is flammable. Therefore, for DEF cabinets that are attached to Diesel dispensers, follow all the notes in this section that pertain to flammable fuels.

This section introduces the hazards and safety precautions associated with installing, inspecting, maintaining, or servicing this product. Before performing any task on this product, read this safety information and the applicable sections in this manual, where additional hazards and safety precautions for your task will be found. Fire, explosion, electrical shock, or pressure release could occur and cause death or serious injury, if these safe service procedures are not followed.

Preliminary Precautions

You are working in a potentially dangerous environment of flammable fuels, vapors, and high voltage or pressures. Only trained or authorized individuals knowledgeable in the related procedures should install, inspect, maintain, or service this equipment.

Emergency Total Electrical Shut-Off

The first and most important information you must know is how to stop all fuel flow to the pump/dispenser and island. Locate the switch or circuit breakers that shut off all power to all fueling equipment, dispensing devices, and Submerged Turbine Pumps (STPs).

⚠ WARNING

The EMERGENCY STOP, ALL STOP, and PUMP STOP buttons at the cashier's station WILL NOT shut off electrical power to the pump/dispenser. This means that even if you activate these stops, fuel may continue to flow uncontrolled.
You must use the TOTAL ELECTRICAL SHUT-OFF in the case of an emergency and not the console's ALL STOP and PUMP STOP or similar keys.

Total Electrical Shut-Off Before Access

Any procedure that requires access to electrical components or the electronics of the dispenser requires total electrical shut off of that unit. Understand the function and location of this switch or circuit breaker before inspecting, installing, maintaining, or servicing Gilbarco equipment.

Evacuating, Barricading, and Shutting Off

Any procedure that requires access to the pump/dispenser or STPs requires the following actions:

- An evacuation of all unauthorized persons and vehicles from the work area
- Use of safety tape, cones, or barricades at the affected unit(s)
- A total electrical shut-off of the affected unit(s)

Read the Manual

Read, understand, and follow this manual and any other labels or related materials supplied with this equipment. If you do not understand a procedure, call the Gilbarco Technical Assistance Center (TAC) at 1-800-743-7501. It is imperative to your safety and the safety of others to understand the procedures before beginning work.

Follow the Regulations

Applicable information is available in National Fire Protection Association (NFPA) 30A; *Code for Motor Fuel Dispensing Facilities and Repair Garages*, NFPA 70; *National Electrical Code (NEC)*, Occupational Safety and Health Administration (OSHA) regulations and federal, state, and local codes. All these regulations must be followed. Failure to install, inspect, maintain, or service this equipment in accordance with these codes, regulations, and standards may lead to legal citations with penalties or affect the safe use and operation of the equipment.

Replacement Parts

Use only genuine Gilbarco replacement parts and retrofit kits on your pump/dispenser. Using parts other than genuine Gilbarco replacement parts could create a safety hazard and violate local regulations.

Federal Communications Commission (FCC) Warning

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

Safety Symbols and Warning Words

This section provides important information about warning symbols and boxes.

Alert Symbol

This safety alert symbol is used in this manual and on warning labels to alert you to a precaution which must be followed to prevent potential personal safety hazards. Obey safety directives that follow this symbol to avoid possible injury or death.

Signal Words

These signal words used in this manual and on warning labels tell you the seriousness of particular safety hazards. The precautions below must be followed to prevent death, injury, or damage to the equipment:

DANGER: Alerts you to a hazard or unsafe practice which will result in death or serious injury.

WARNING: Alerts you to a hazard or unsafe practice that could result in death or serious injury.

CAUTION with Alert symbol: Designates a hazard or unsafe practice which may result in minor injury.

CAUTION without Alert symbol: Designates a hazard or unsafe practice which may result in property or equipment damage.

Working With Fuels and Electrical Energy

Prevent Explosions and Fires

Fuels and their vapors will explode or burn, if ignited. Spilled or leaking fuels cause vapors. Even filling customer tanks will cause potentially dangerous vapors in the vicinity of the dispenser or island.

DEF is non-flammable. Therefore, explosion and fire safety warnings do not apply to DEF lines.

No Open Fire

Open flames from matches, lighters, welding torches or other sources can ignite fuels and their vapors.

No Sparks - No Smoking

Sparks from starting vehicles, starting or using power tools, burning cigarettes, cigars or pipes can also ignite fuels and their vapors. Static electricity, including an electrostatic charge on your body, can cause a spark sufficient to ignite fuel vapors. Every time you get out of a vehicle, touch the metal of your vehicle, to discharge any electrostatic charge before you approach the dispenser island.

Working Alone

It is highly recommended that someone who is capable of rendering first aid be present during servicing. Familiarize yourself with Cardiopulmonary Resuscitation (CPR) methods, if you work with or around high voltages. This information is available from the American Red Cross. Always advise the station personnel about where you will be working, and caution them not to activate power while you are working on the equipment. Use the OSHA Lockout/Tagout procedures. If you are not familiar with this requirement, refer to this information in the service manual and OSHA documentation.

Working With Electricity Safely

Ensure that you use safe and established practices in working with electrical devices. Poorly wired devices may cause a fire, explosion or electrical shock. Ensure that grounding connections are properly made. Take care that sealing devices and compounds are in place. Ensure that you do not pinch wires when replacing covers. Follow OSHA Lockout/Tagout requirements. Station employees and service contractors need to understand and comply with this program completely to ensure safety while the equipment is down.

Hazardous Materials

Some materials present inside electronic enclosures may present a health hazard if not handled correctly. Ensure that you clean hands after handling equipment. Do not place any equipment in the mouth

⚠ WARNING

In the event of inclement weather, including snow, ice, or flooding that makes driving conditions dangerous, please avoid servicing units. Always use available door stops to secure upper doors against unwanted/unexpected movement, especially during high winds. If necessary, reschedule service to avoid damage to the equipment. Weather may change unexpectedly; be aware of local weather conditions. During service, if conditions develop making service unsafe, close the unit(s) and proceed to a safe location.

⚠ WARNING

The pump/dispenser contains a chemical known to the State of California to cause cancer.

⚠ WARNING

The pump/dispenser contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Gilbarco Veeder-Root encourages the recycling of our products. Some products contain electronics, batteries, or other materials that may require special management practices depending on your location. Please refer to your local, state, or country regulations for these requirements.

In an Emergency

Inform Emergency Personnel

Compile the following information and inform emergency personnel:

- Location of accident (for example, address, front/back of building, and so on)
- Nature of accident (for example, possible heart attack, run over by car, burns, and so on)
- Age of victim (for example, baby, teenager, middle-age, elderly)
- Whether or not victim has received first aid (for example, stopped bleeding by pressure, and so on)
- Whether or not a victim has vomited (for example, if swallowed or inhaled something, and so on)

⚠ WARNING

Gasoline/DEF ingested may cause unconsciousness and burns to internal organs. Do not induce vomiting. Keep airway open.
Oxygen may be needed at scene. Seek medical advice immediately.

⚠ WARNING

DEF generates ammonia gas at higher temperatures. When opening enclosed panels, allow the unit to air out to avoid breathing vapors. If respiratory difficulties develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek medical attention.

⚠ WARNING

Gasoline inhaled may cause unconsciousness and burns to ls, mouth and lungs.
Keep airway open.
Seek medical advice immediately.

⚠ WARNING

Gasoline/DEF spilled in eyes may cause burns to eye tissue.
Irrigate eyes with water for approximately 15 minutes.Seek medical advice immediately.

⚠ WARNING

Gasoline/DEF spilled on skin may cause burns.
Wash area thoroughly with clear water.
Seek medical advice immediately.

⚠ WARNING

DEF is mildly corrosive. Avoid cont with eyes, skin, and clothing. Ensure that eyewash stations and safety showers are close to the work location. Seek medical advice/recommended treatment if DEF spills into eyes.

IMPORTANT: Oxygen may be needed at scene if gasoline has been ingested or inhaled. Seek medical advice immediately.

Lockout/Tagout

Lockout/Tagout covers servicing and maintenance of machines and equipment in which the unexpected energization or start-up of the machine(s) or equipment or release of stored energy could cause injury to employees or personnel. Lockout/Tagout applies to all mechanical, hydraulic, chemical, or other energy, but does not cover electrical hazards. Subpart S of 29 CFR Part 1910 - Electrical Hazards, 29 CFR Part 1910.333 contains specific Lockout/Tagout provision for electrical hazards.

Preparing to Install Ultra-Hi DEF Retrofit Kit in Encore 500/700/S Units

⚠ CAUTION

Hard hats and safety glasses must be worn during the installation. Gloves must be worn while handling sheet metal.

Before you begin, read and understand all safety information found in *MDE-3804 Encore and Eclipse Start-up/Service Manual.*

To install the Ultra-Hi DEF Retrofit Kit in the Encore 500/700/S units, proceed as follows:

1 Inform the manager that the power must be removed and remove all power supplied to the unit at the breaker located in the building. Block off the unit from customers. Follow OSHA lockout/tagout procedures.

⚠ WARNING

Failure to turn off the unit during the installation of the kit may cause injury or bodily harm from electrical shock. Ensure that all power to the unit is switched off before opening the door to the unit and during kit installation.

⚠ CAUTION

A properly grounded ESD wrist strap must be worn while servicing any electronic devices or components. Failure to use electrostatic precautions may damage electronic components and void warranty.

2 Match the parts received in the kit with “Parts List” on page 3.

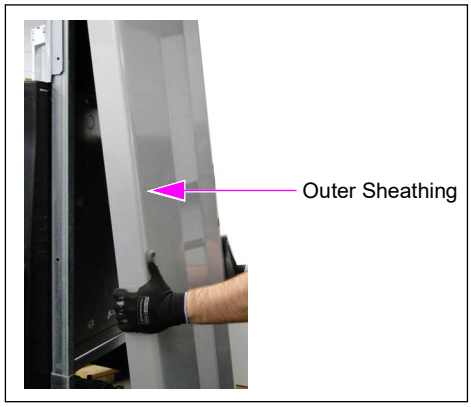
IMPORTANT INFORMATION

For Dual DEF NA4 dispensers, the two DEF heaters CANNOT be on the same AC breaker. The heater in the second DEF cabinet must be on a (15 A) breaker that is separate from the dispenser and the original DEF heater. Refer to Figure 104 on page 88.

3 Remove the outer sheathing on the side of the dispenser to install the DEF module (see Figure 1) using a Phillips screwdriver. Retain the mounting screws and discard the outer sheathing.

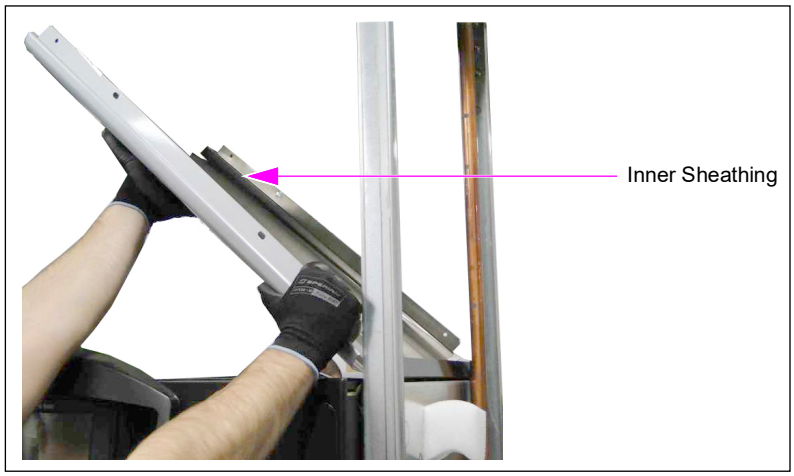
Note: To determine side A of the dispenser, locate the power supply. If the power supply is on the left side of the dispenser, then it is side A. If you are installing a right-hand kit, then remove the sheathing to your right. If you are installing a left-hand kit, then remove the sheathing to your left.

Figure 1: Removing Outer Sheathing



4 Remove the inner sheathing of the dispenser on the DEF side (see Figure 2). Retain the inner sheathing and mounting screws, and protect from damage.

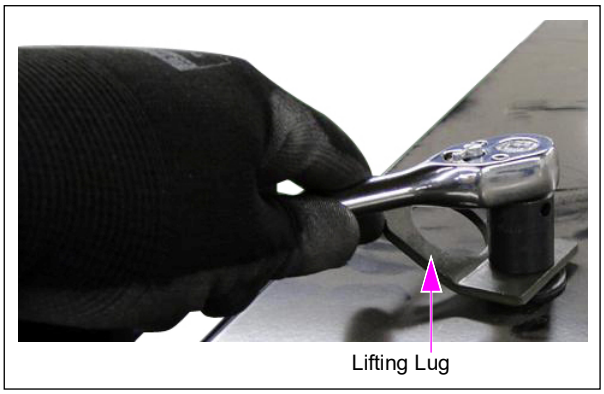
Figure 2: Removing Inner Sheathing



5 Remove the two Styrofoam™ blocks attached to the side column.

6 Remove and retain the lifting lugs on the dispenser for reuse (see Figure 3).

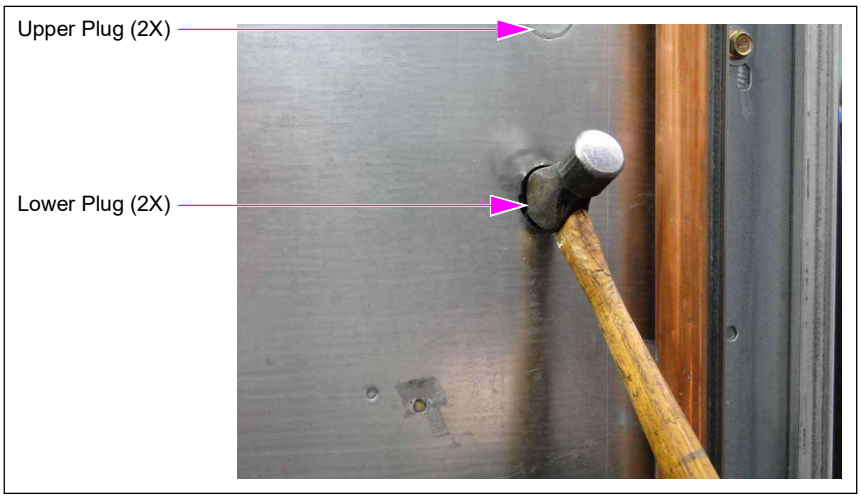
Figure 3: Removing Lifting Lugs



7 Remove the upper hydraulic housing canopy and top cover using a 17-mm socket, ladder, and lift. Retain the hardware and discard the upper housing cover and top cover.
Note: Two ASCs are recommended for removing the cover.

8 Knock out the two lower plugs (of the four available plugs) on the DEF side column using a ball pein hammer (see Figure 4). Use a punch to push the plug, if required. Ensure that the knockouts are at the same height.

Figure 4: Creating Knockouts



9 Install the DEF Valve Control Cable and Conduit (M10075A005) through side B knockout (see Figure 5) using the N16599-108 Washers and N23655-01 Nuts.
Note: Ensure that the sealed wires [blue sealant - shorter wires (see Figure 5)] are routed outside the dispenser.

Figure 5: Installing DEF Valve Control Cable and Conduit

10 Install the DEF Interface Cable and Conduit (M04114A006) through side A knockout using the N16599-108 Washers and N23655-01 Nuts.
Note: Ensure that the sealed wires [blue sealant - shorter wires (see Figure 6)] are routed outside the dispenser.

11 For two-sided DEF units, one kit utilizes one M04114A006 and the other uses one M04114A012. The M04114A012 can be installed on either side. On dual DEF units, remove the Cable (M04114A006) from the new DEF kit and replace with the Cable (M04114A012). Insert Cable (M04114A012) into Side A knockout using the N16599-108 Washers and N23655-01 Nuts. For more information on M04114A012 connections inside the DEF cabinet, see page 44 through page 48.

Figure 6: Installing DEF Interface Cable and Conduit

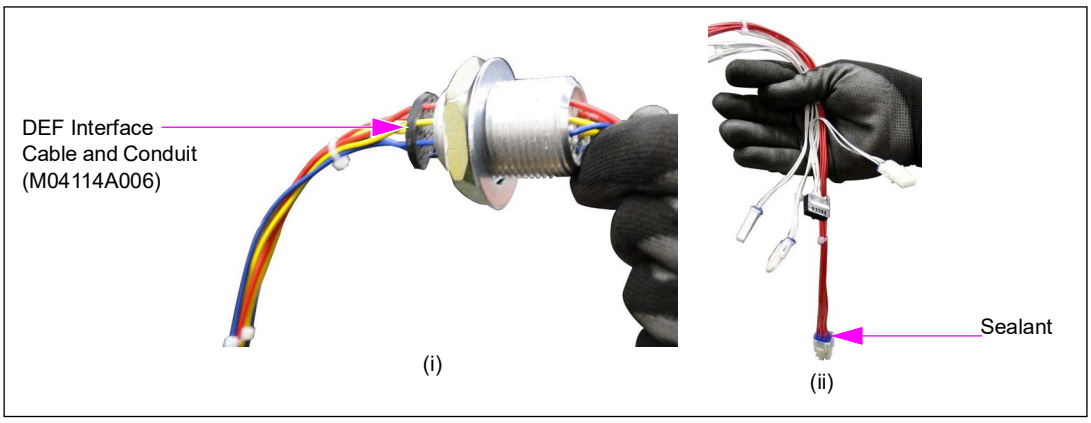
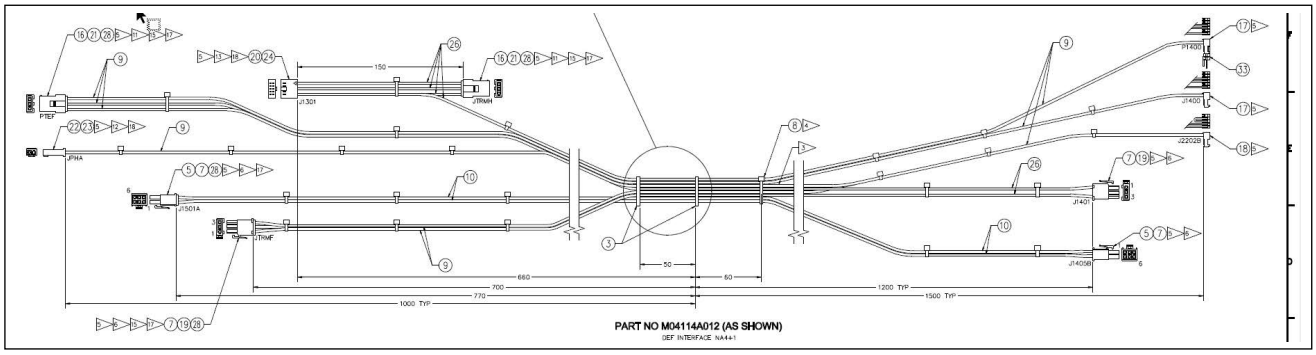


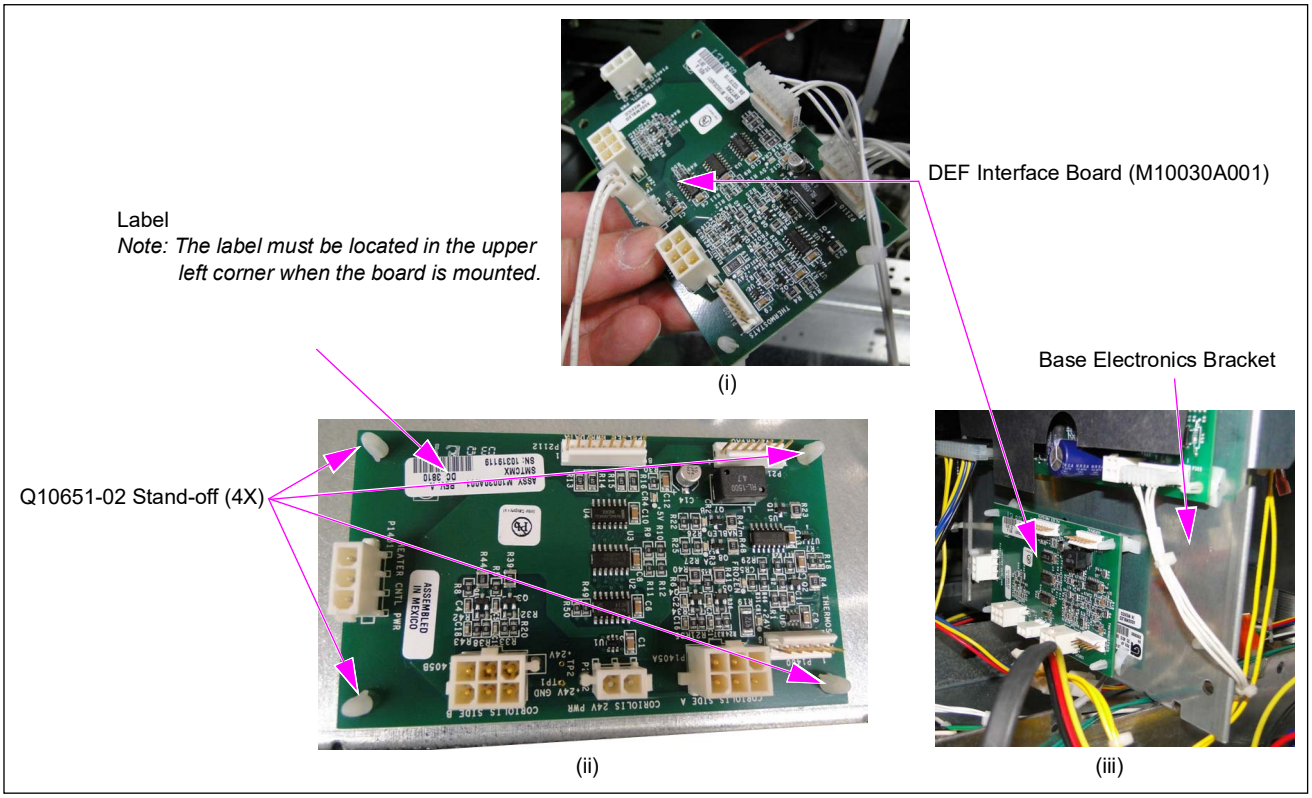
Figure 7: Dual DEF Cable M0411A012



12 Install the DEF Interface Board (M10030A001) on the rear side of the base electronics bracket using the four Q10651-02 Stand-offs (see Figure 8).

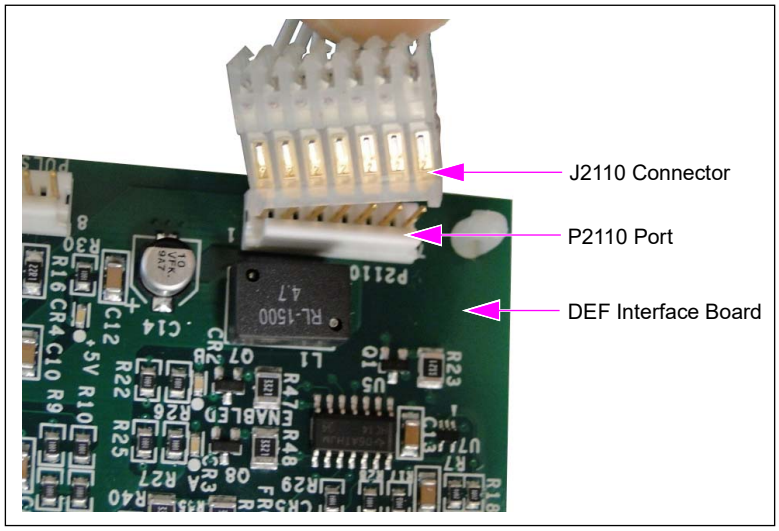
Note: If not installed already, it is recommended that you insert the stand-offs on the DEF interface board and then onto the base electronics bracket.

Figure 8: Installing DEF Interface Board



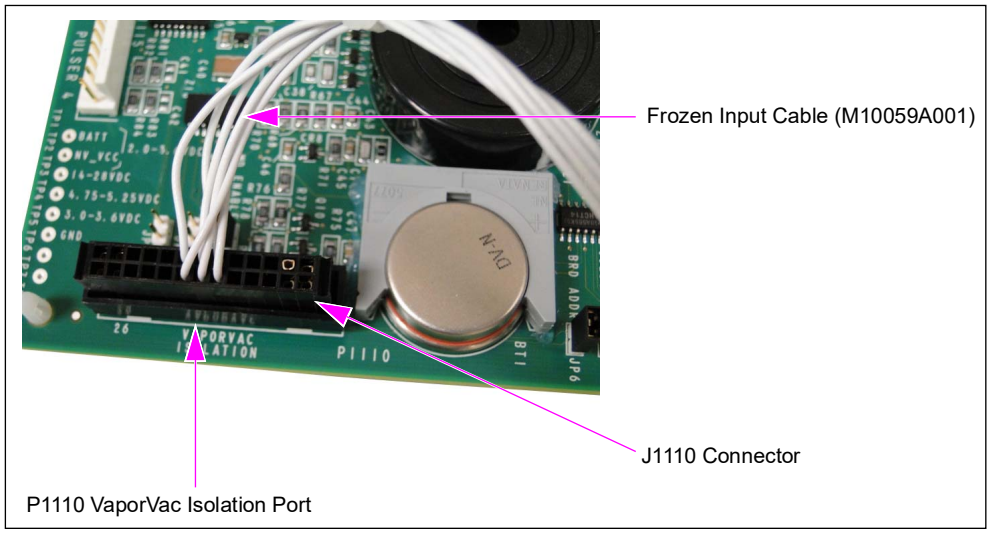
13 Connect the J2110 connector on the Frozen Input Cable (M10059A001) to the P2110 port on the DEF interface board (see Figure 9).

Figure 9: Connecting J2110 Connector to P2110 Port



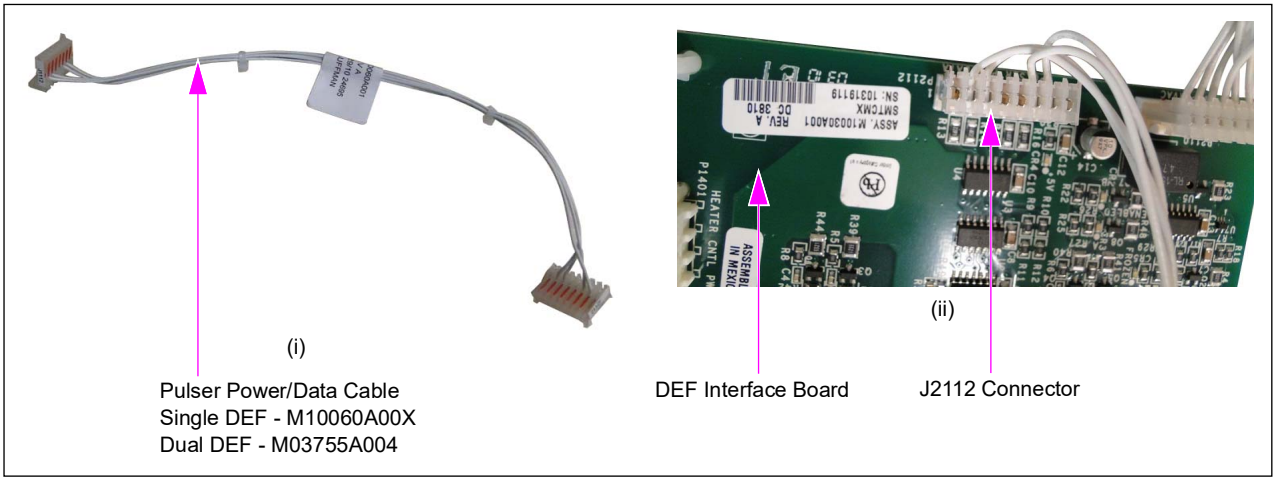
14 Connect the J1110 connector on the opposite end of the frozen input cable to the P1110 VaporVac® isolation port on the Pump Control Node (PCN) located on the other side of the base electronics bracket (see Figure 10).

Figure 10: Connecting J1110 Connector to P1110 VaporVac Isolation Port



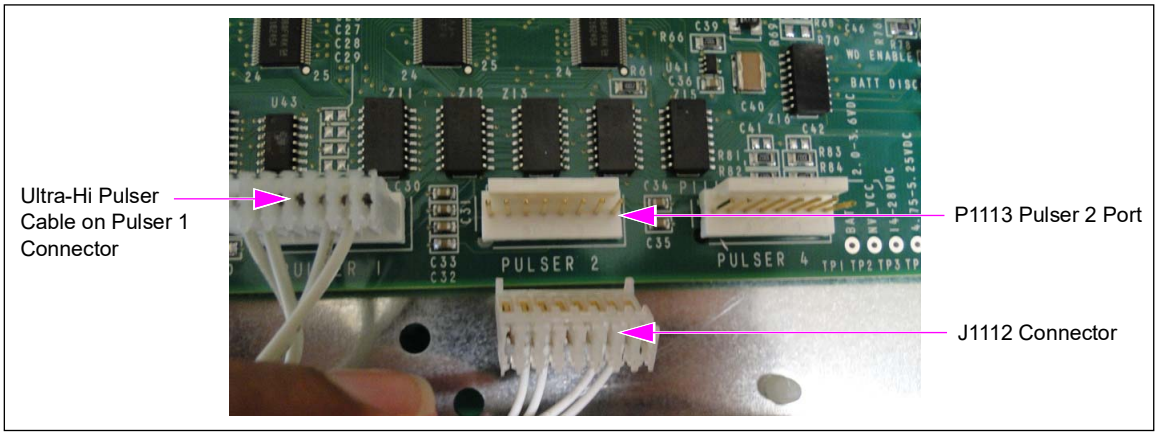
15 Connect the J2112 connector on the Pulser Power/Data Cable (M10060A00X) for single DEF and M03755A004 for dual DEF, to the P2112 connector on the DEF interface board.
Note: Refer to the block diagram of each unit for detailed connections.

Figure 11: Connecting J2112 Connector to P2112 Connector



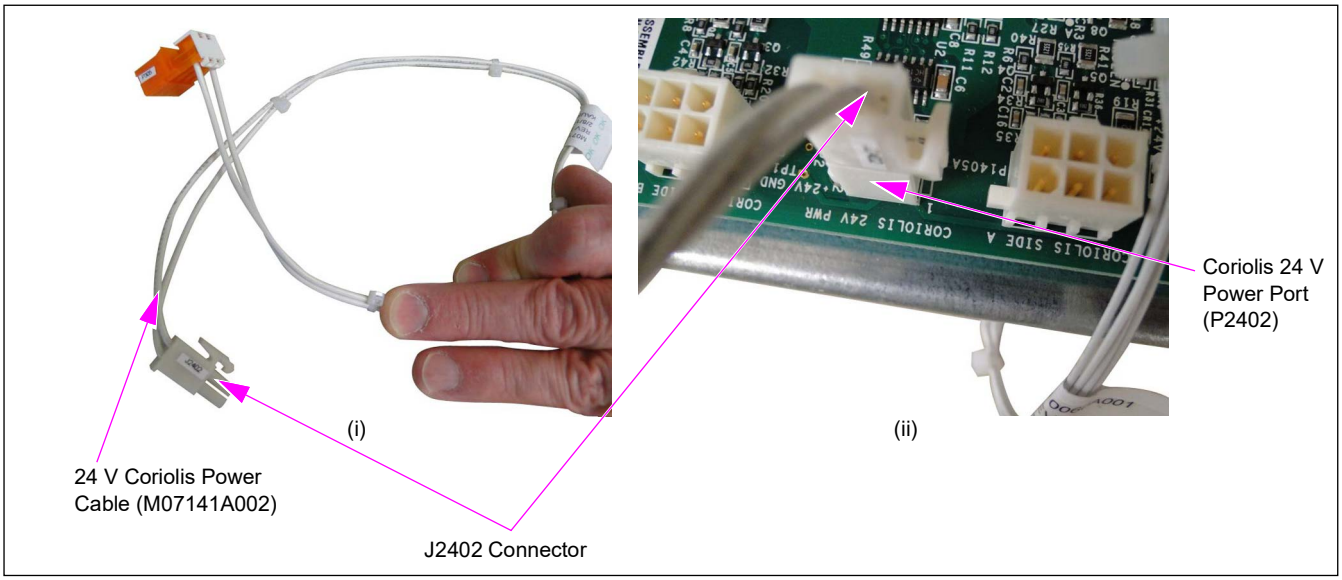
16 Connect the J1112 connector on the opposite end of the Pulser Power/Data Cable (M03755A004) in place of M10060A00X to the P1113 pulser 2 port on the PCN.
- For NPA - Connect J1113 connector to P1113, pulse port 2 on PCN.
- For NA4 - Connect J1113 connector to P1112, pulse port 1 on PCN.

Figure 12: Connecting J1112 Connector to P1113 Pulser 2 Port



17 Connect the J2402 connector on the 24 V Coriolis Power Cable (M07141A002) to the P2402 Coriolis 24 V power port on the DEF interface board.
Note: Magmeter connections are the same as Coriolis.

Figure 13: Connecting J2402 Connector to Coriolis 24 V Power Port



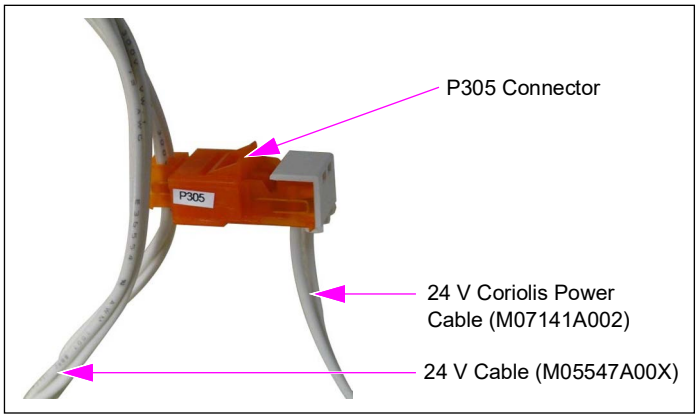
18 Connect the P305 connector on the other end of the 24 V Coriolis power cable to the J305 connector on the 24 V Cable (M05547A00X) that connects the dispenser power supply and PCB (see Figure 14).

⚠ CAUTION

Ensure that you do not connect the Coriolis power cable to an AC power distribution cable that will accept the connection. This connection will destroy the Coriolis interface board on power up.

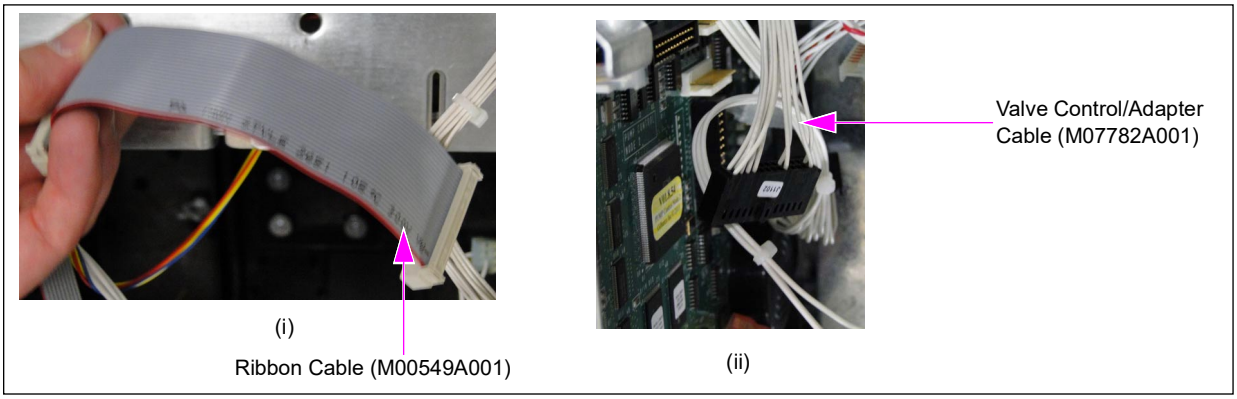
Note: The 24 V cable must be M05547A003 REV D (or later), M05547A004 REV D (or later), or M05547A005, or M05547A006.

Figure 14: Connecting P305 Connector to 24 V Cable (M05547A00X)



19 Replace the Ribbon Cable (M00549A001) with Valve Control/Adapter Cable (M07782A001) (see Figure 15). For dual master, use Valve Control/Adapter Cable [Dual Master (M07782A002)]. For dual master single-sided with DEF, use Valve Control/Adapter Cable (M07782A003).
Note: On NA4 dual DEF units, the Ribbon Cable (M00549A001) should remain in place.

Figure 15: Ribbon Cable and Valve Control/Adapter Cable



The following table lists the Valve Cables needed per unit type (from P1102 of PCN to P1201 of Valve Boards):

Item #	Description	Cable	Unit type	Supports Dual DEF?
1	Dual DEF	M00549A001	NA4	Yes
2	Ultra-High + 1	M07782A001	NP3	No
3	One-Grade UH/Two-Side + DEF	M07782A002*	NPA	No
4	Two-Grade UH/Single-Side + DEF	M07782A003**	NPC	No
5	One-Grade UH/Two-Side + Two DEF	M07782A004	NPA	Yes
6	Two-Grade UH/Single-Side + DEF	M07782A005	NPC	Yes
7	Ultra-High +1	M15278A001	NP3	Yes
8	One-Grade UH/Two-Side + DEF	M15278A002*	NPA	No
9	Two-Grade UH/Single-Side + DEF	M15278A003**	NPC	No

* Replaced by M07782A004
** Replaced by M07782A005

20 Connect the J1102 connector on the valve control/adapter cable to the P1102 port on the PCN. Connect the J1201 connector on the other end of the valve control/adapter cable to the P1201 port on the Valve Driver Board (M03615A002/M08223A001).

Notes: 1) Do not connect the connectors backwards. If connected backwards, an error code 4322 appears.
2) There are three wires from a potted nipple wire assembly. The green wire must be connected to a ground wire bundle tied to the wiring trough at the bottom of the electronics cabinet. The yellow spare wire must be capped. The DEF Submersible Turbine Pump (STP) must be connected to STP 2 signal of the power supply board, if the unit has no spare wire going from the station to dispenser. Otherwise, the black wire must be capped.

For Encore 500 units, refer to "Preparing to Install Ultra-Hi DEF Retrofit Kit in Encore 500/700/S Units" on page 9.

For Encore Ultra-Hi Dual Master and 2-grade Single Side units, refer to "Installing DEF Retrofit Kit in Ultra-Hi Dual Master and 2-grade Single-sided Units" on page 29.

Single DEF Cabinet on Side B

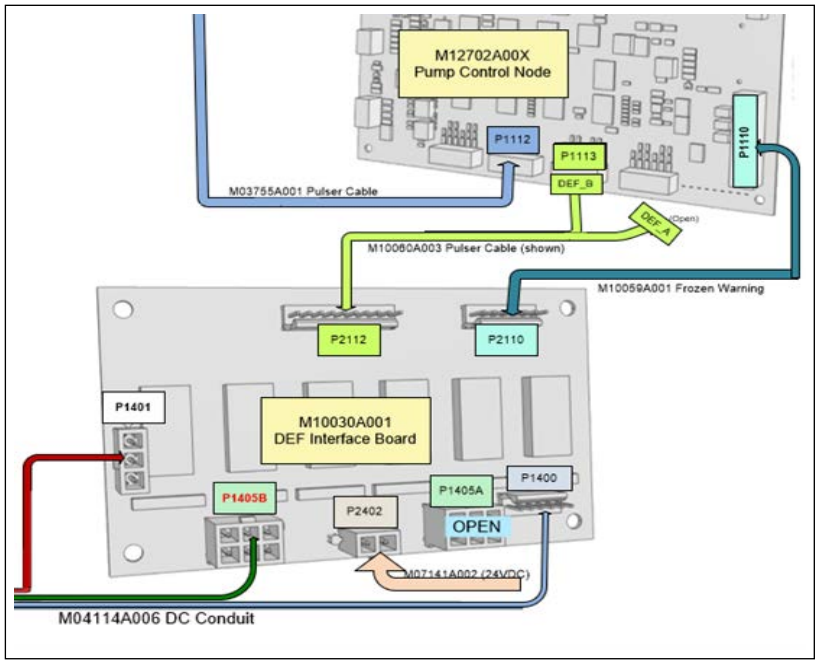
Gilbarco Veeder-Root now supports single DEF cabinets on side A or side B of the dispenser. These installation instructions will help you to install a DEF cabinet on the side B of the dispenser without a DEF cabinet on the side A.

The installation of the side B DEF cabinet is almost identical to the side A installation. The single DEF cabinet (side A or B) will always use the **M04114A006** DC Conduit. The M04114A012 DC Conduit will only be needed, if there are two DEF cabinets installed (Dual DEF).

The M10030A001 DEF Interface Board: The side B connections will be exactly the same as side A DEF except the meter will be plugged into **J1405B**. There is also a new pulser cable; plug J2112 of the **M10060A003** pulser cable to P2112 on the M10030A001 board.

The M12702A00X Pump Control Node: When the single DEF cabinet is on side B, plug the opposite end of the **M10060A003** cable (DEF_B) into the DEF pulser position. The DEF_A connector will be unused. Use DEF_A when the DEF cabinet is on side A & DEF_B will be unused.

Figure 16: Single DEF Cabinet on Side B



Additional Connections for Dual DEF (NA4 and NPA) Units

Note: These connections will be made on the DEF interface board that is already installed in step 12 on page 13 and has existing cables connections for DEF+1 units.

1 The following are the connections for the Cable (M04114A012) inside the main electronics cabinet.

a Plug P1405 from the new DEF cabinet to P1405B.

b Remove J1401 from the DEF interface board. Plug the new M16184A001 Splitter Cable to P1401.

c Reuse J1401 removed in step b and plug into P1401A of splitter cable.

d Use J1401 from the new cabinet and plug to P1401B.

e Plug J2202 from the new conduit to PPU on side B of the unit.

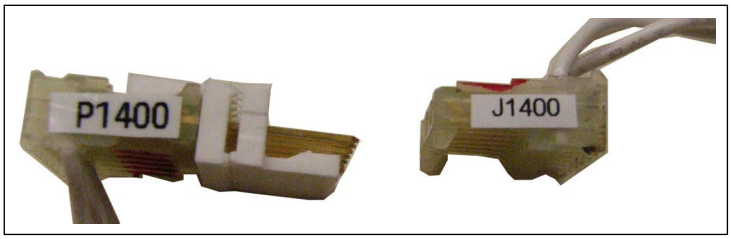
f Plug PA1 from M10075 conduit to B1 of M02338 valve cable.

g Remove J1400 from the DEF interface board.

h Reuse J1400 removed in step g and plug to P1400A of M04114A012 Cable.

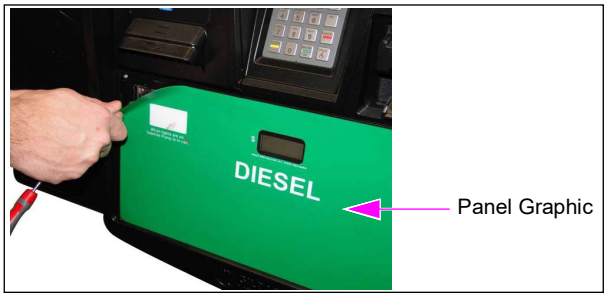
i Use J1400 from the new M04114A012 Cable and plug to P1400 of the DEF interface board.

Figure 17: Cable Connections (J1400 to P1400)



2 Remove the existing brand panel graphic and clean the area using adhesive remover, paint scraper, and towel/rag (see Figure 18). For detailed instructions, refer to *MDE-4625 Graphic Panel Application for The Advantage Series, Encore, Eclipse and Encore S.*

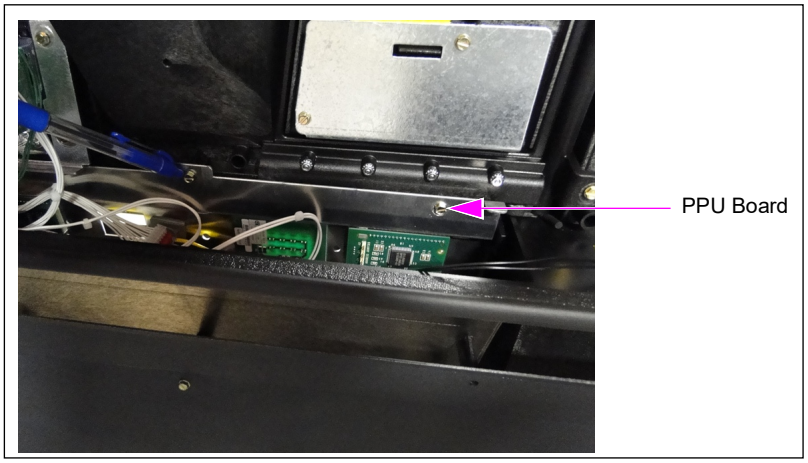
Figure 18: Removing Brand Panel Graphic



3 Disconnect and remove the existing PPU board using a nut driver. Retain the mounting screws. Also, remove the card reader to access the PPU panel. However, do not disconnect the cables from the card reader.

Note: The card reader can remain connected to the cables and moved to a temporary position out of the way.

Figure 19: Removing PPU Board

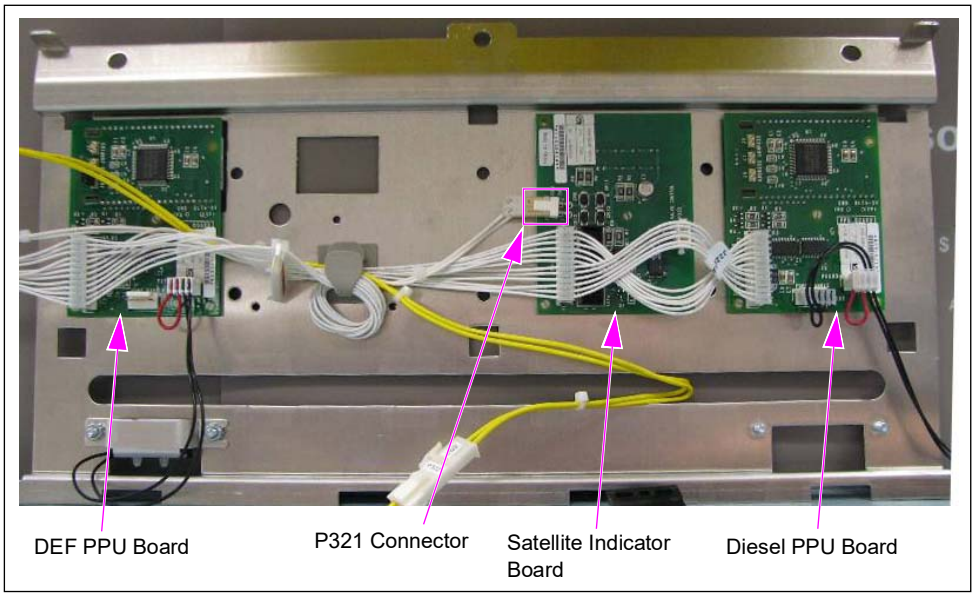


4 Arrange the appropriate PPU board assembly (refer to item 13 on page 4) and ensure that the connections are accurate before you assemble the PPU to the bezel (see Figure 20 and Figure 100 on page 81).

Notes: 1) Ensure that the PPU jump jack is inserted correctly (DEF PPU Only) as 2-grade. There must be no jumper on the Diesel PPU board JP0. Do not use the J2200 plug connector.

2) Left-hand DEF units require a DEF Pump Handle Extender Cable (M00497A001).

Figure 20: DEF PPU Board Assembly Panel (Right)



a Connect the pump handle connector J2202A from the DEF interface cable and conduit to the P2202 2-grade DEF PPU.

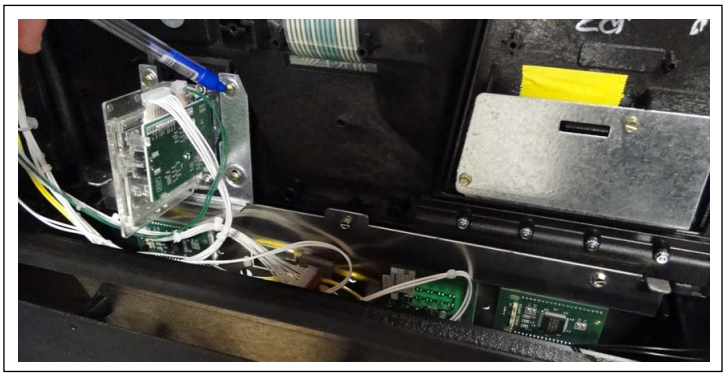
b Connect the J121 connector on the M02371A002 Cable to the P321 connector on the satellite indicator board (see Figure 20 on page 20).

5 Replace the Card Reader Gasket.

6 Connect all the cables.

7 Install the new PPU board and remount the card reader. For more information on installing the PPU Board, refer to "Appendix F: Encore-Dual Ultra-Hi Flow (UHF) DEF" on page 90.

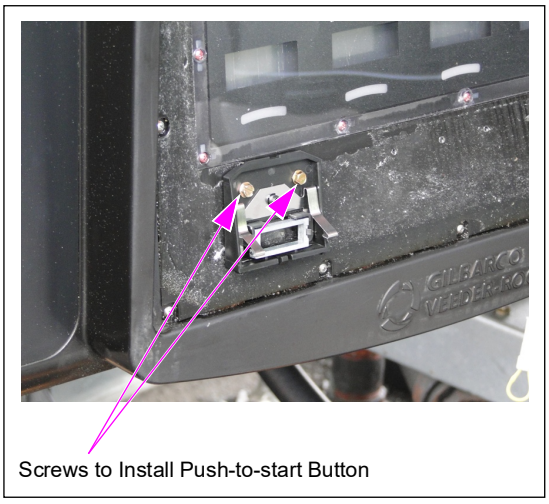
Figure 21: Installing New PPU Board



8 Install the DEF push-to-start button using the two screws (see Figure 22). Use the graphic to determine the exact location of the switch.

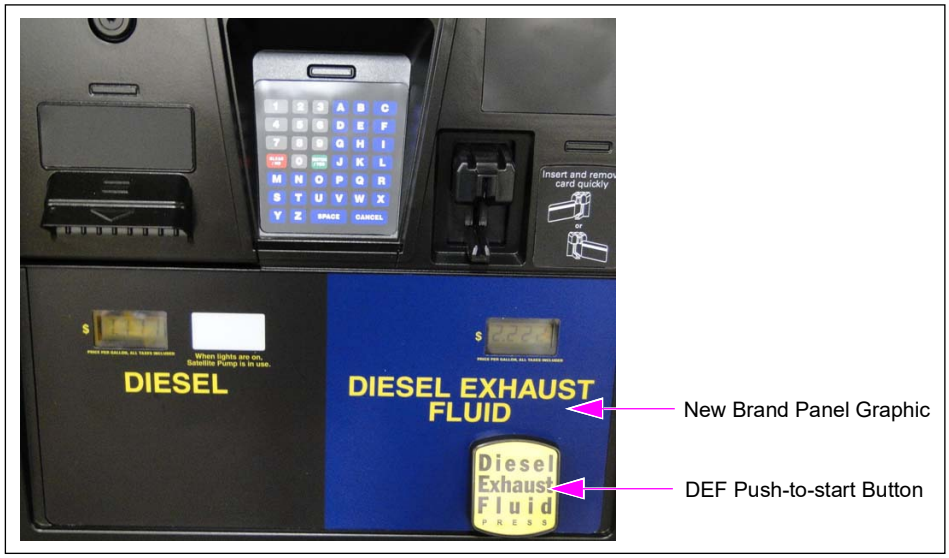
Note: You may have to install the new brand panel graphics after you install the rear portion of the push-to-start button and then install the front portion of the button (see Figure 23 on page 22).

Figure 22: Push-to-start DEF Button



9 Ensure that the displays and PPU windows align correctly. Apply the new brand panel graphic with two PPU openings (see Figure 23).
Note: Adhesive setting time for graphics may be longer in cold weather.

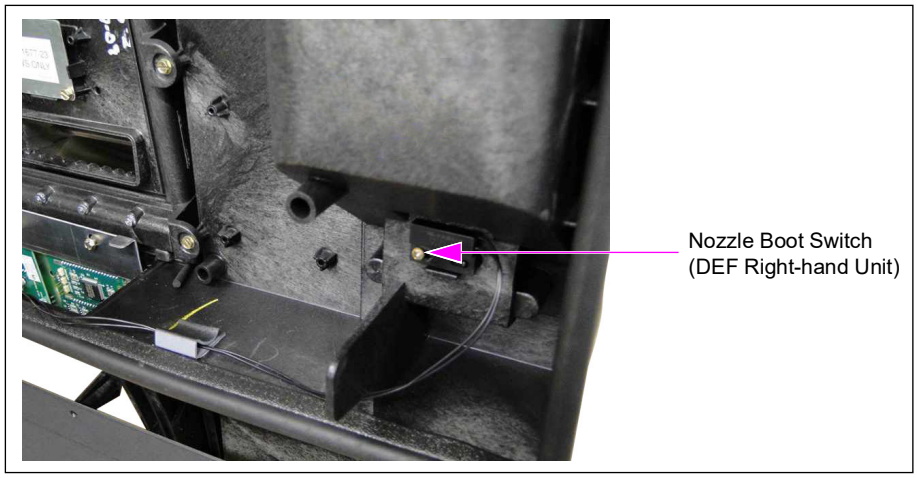
Figure 23: New Brand Panel Graphic



10 Install the DEF push-to-start button and label.

11 Connect the nozzle boot switch on the PPU board either to the left or right side diesel boot, depending on the final location of the diesel nozzle (see Figure 24).

Figure 24: Nozzle Boot Switch

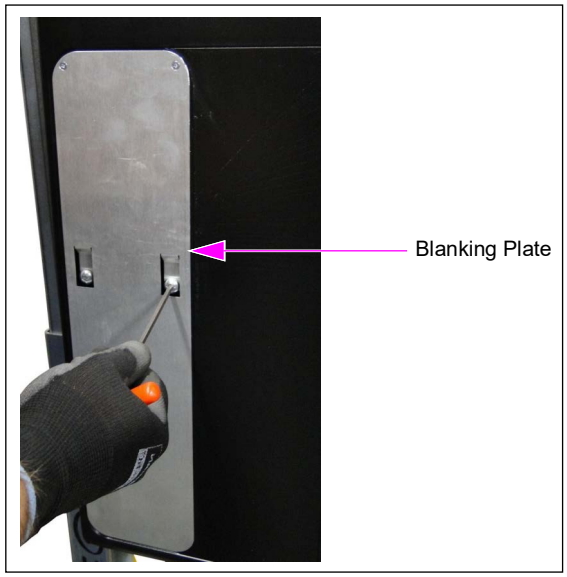


Note: Steps 12 to 18 on page 24 are applicable to DEF right-hand units only. If you are performing a DEF left-hand unit installation, proceed to "Installing DEF Cabinet" on page 36.

12 Remove and discard the nozzle boot switch on the right of the door (facing outside).

13 Remove the left side graphic and blanking plate [facing outside (see Figure 25)].

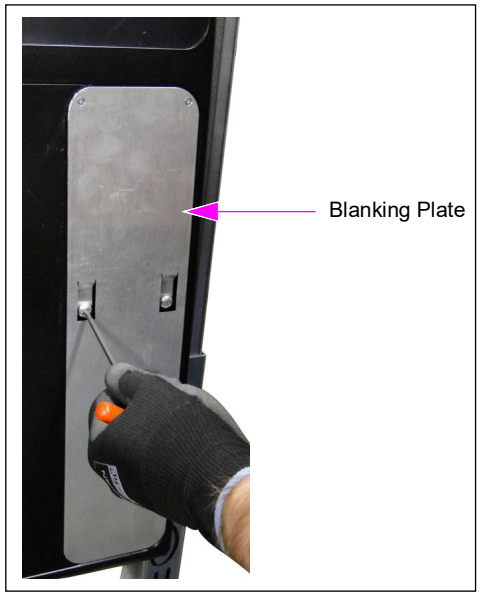
Figure 25: Removing Blanking Plate



14 Remove the existing nozzle boot on the right side (facing outside) and graphic panel on the left side of it, using a square-head screwdriver.
Note: This step is performed for right-hand units only.

15 Install the nozzle boot blanking plate removed in step 13 onto the right side (facing outside) and then apply the blank graphic (see Figure 26).
Notes: 1) This step is performed for right-hand units only.
2) Adhesive setting time for graphics may be longer in cold weather.

Figure 26: Installing Blanking Plate



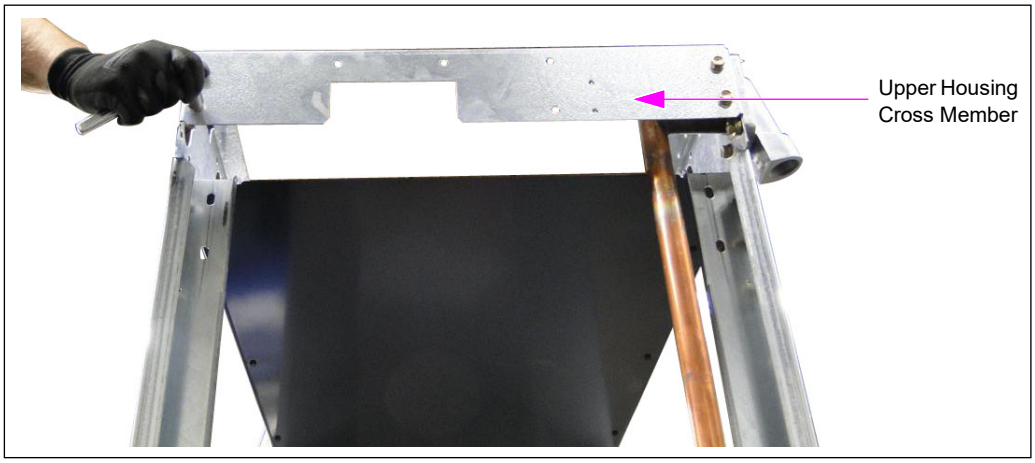
16 Install the nozzle boot removed from the right side onto the left side and apply the nozzle boot graphic (see Figure 27).
Note: This step is performed for right-hand units only.

Figure 27: Replacing Nozzle Boot

17 Apply the DEF instructions graphic vertically above the blank graphic [installed in step 15 on page 23 (on the side opposite to the diesel nozzle)].
Note: Adhesive setting time for graphics may be longer in cold weather.

18 Remove the upper housing cross member on the DEF side using a 13-mm socket and wrench (see Figure 28).
Note: Retain the removed screws for mounting the DEF cabinet.

Figure 28: Removing Upper Housing Cross Member



Installing DEF Retrofit Kit in Encore 500 Units

To prepare for installing the DEF retrofit kit on Encore 500 units, follow step 1 on page 9 to step 20 on page 17 from "Preparing to Install Ultra-Hi DEF Retrofit Kit in Encore 500/700/S Units" on page 9 and proceed as follows:

1 Remove the brand panel graphic and blanking plate (see Figure 29).

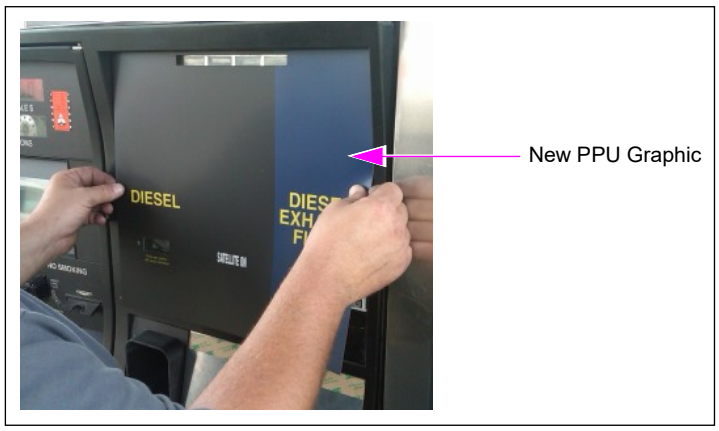
Figure 29: Removing Brand Panel Graphics and Blanking Plate

2 Remove the nozzle boot (see Figure 30).
Note: This step is performed for right-hand units only.

Figure 30: Removing Nozzle Boot

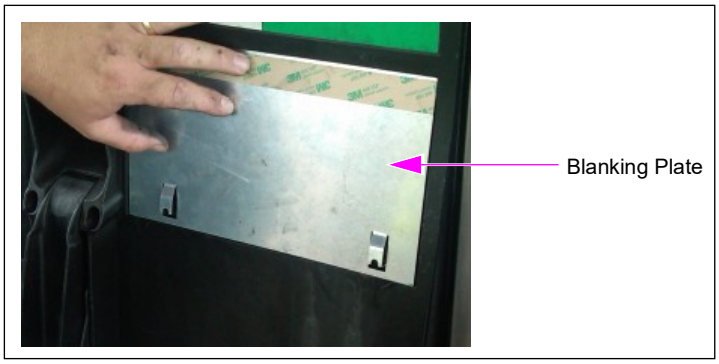
3 Apply the new PPU graphic (see Figure 31).

Figure 31: Applying New PPU Graphic



4 Install the blanking plate (see Figure 32).
Note: Ensure that the open position of the nozzle is below the diesel PPU graphic.

Figure 32: Installing Blanking Plate

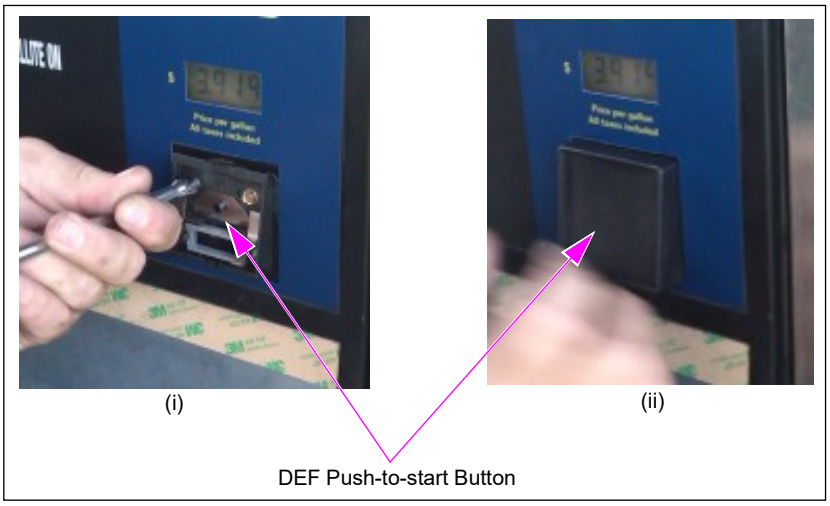


5 Install the lift to start the nozzle boot (see Figure 33).

Figure 33: Installing Lift

6 Install the push-to-start button.
Note: Ensure that the push-to-start button is positioned below the DEF PPU graphic.

Figure 34: Installing Push-to-start Button



Connecting Cables to M13170A001 Door Node

To connect cables to the M13170A001 Door Node, proceed as follows:

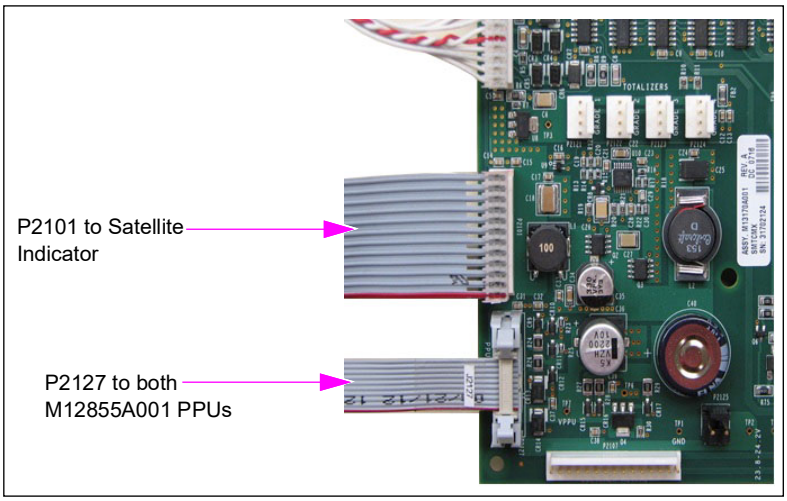
1 Remove all cables from the present door node and replace with the M13170A001 Door Node.

2 Reconnect the Local Operating Network (LON) cable, card reader, and all keypad cables to the M13170A001 Door Node.

3 Connect the M10699A004 Data Cable to P2127 on the new door node.

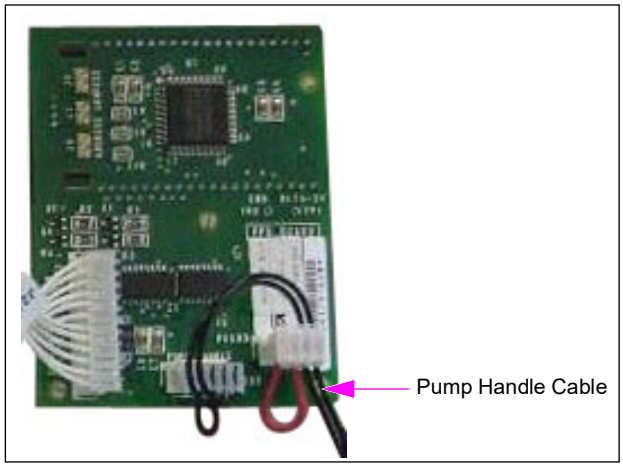
4 Connect the M04547 PPU Data Cable to P2101 of the M13170A001 Door Node.

Figure 35: Connecting PPU on M13170A001 Door Node



5 Install the new Pump Handle Cable (M12088A001) to the diesel PPU (see Figure 36).

Figure 36: Installing New Pump Handle Cable



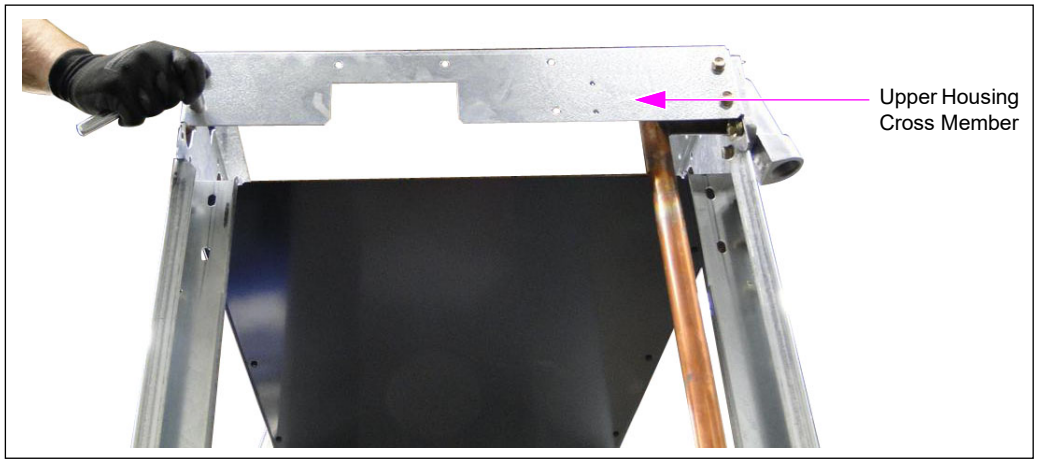
6 Connect the pump handle connector J2202A from the DEF interface cable and conduit to the P2202 2-grade DEF PPU.

7 Install the brand panel graphics on the blanking plate.

8 Apply the DEF instructions graphic vertically above the blank graphic (on the side opposite to the diesel nozzle).
Note: Adhesive setting time for graphics may be longer in cold weather.

9 Remove the upper housing cross member on the DEF side using a 13-mm socket and wrench (see Figure 37).
Note: Retain the removed screws for mounting the DEF cabinet.

Figure 37: Removing Upper Housing Cross Member



Installing DEF Retrofit Kit in Ultra-Hi Dual Master and 2-grade Single-sided Units

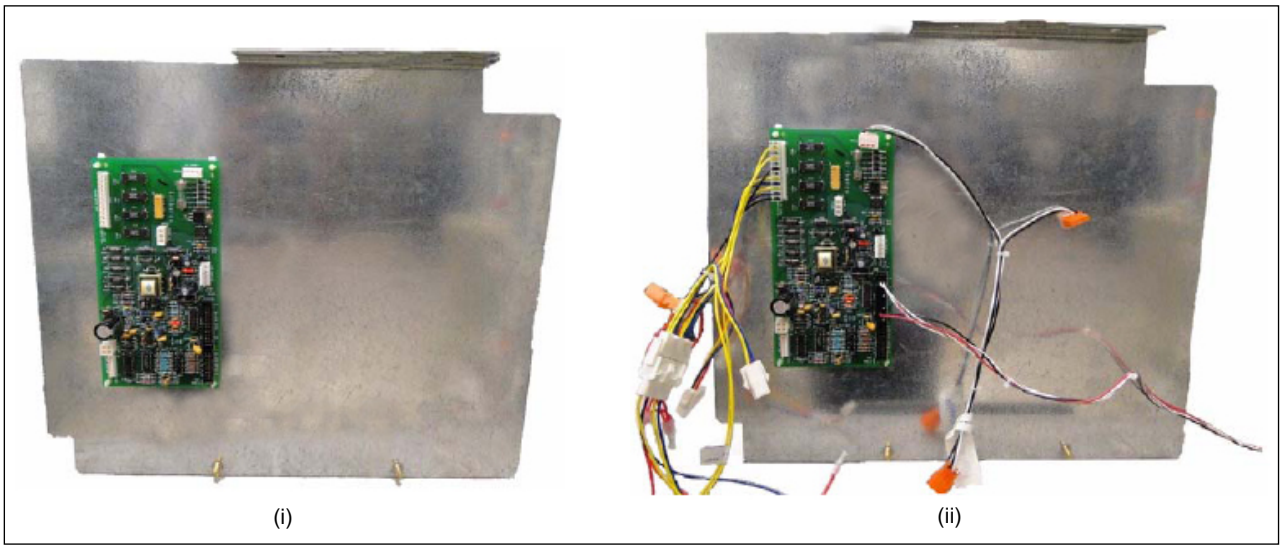
Note: For installing Encore Ultra-Hi single-sided dual door units, follow the instructions listed from page 30 to page 35.

To prepare for installing the DEF Retrofit Kit in Ultra-Hi dual master and 2-grade single-sided units, follow step 1 on page 9 to step 10 on page 12 from "Preparing to Install Ultra-Hi DEF Retrofit Kit in Encore 500/700/S Units" on page 9 and proceed as follows:

IMPORTANT INFORMATION
If a **right-handed** DEF cabinet is being installed on a single-sided 2-grade dispenser, the right most diesel nozzle boot may need to be removed temporarily to fully open the bezel door for servicing.

1. Loosen the hardware and remove the existing security bracket.
2. Mount the valve board using the Q10651 Stand-offs.
3. Make the required cable connections to the new valve board.

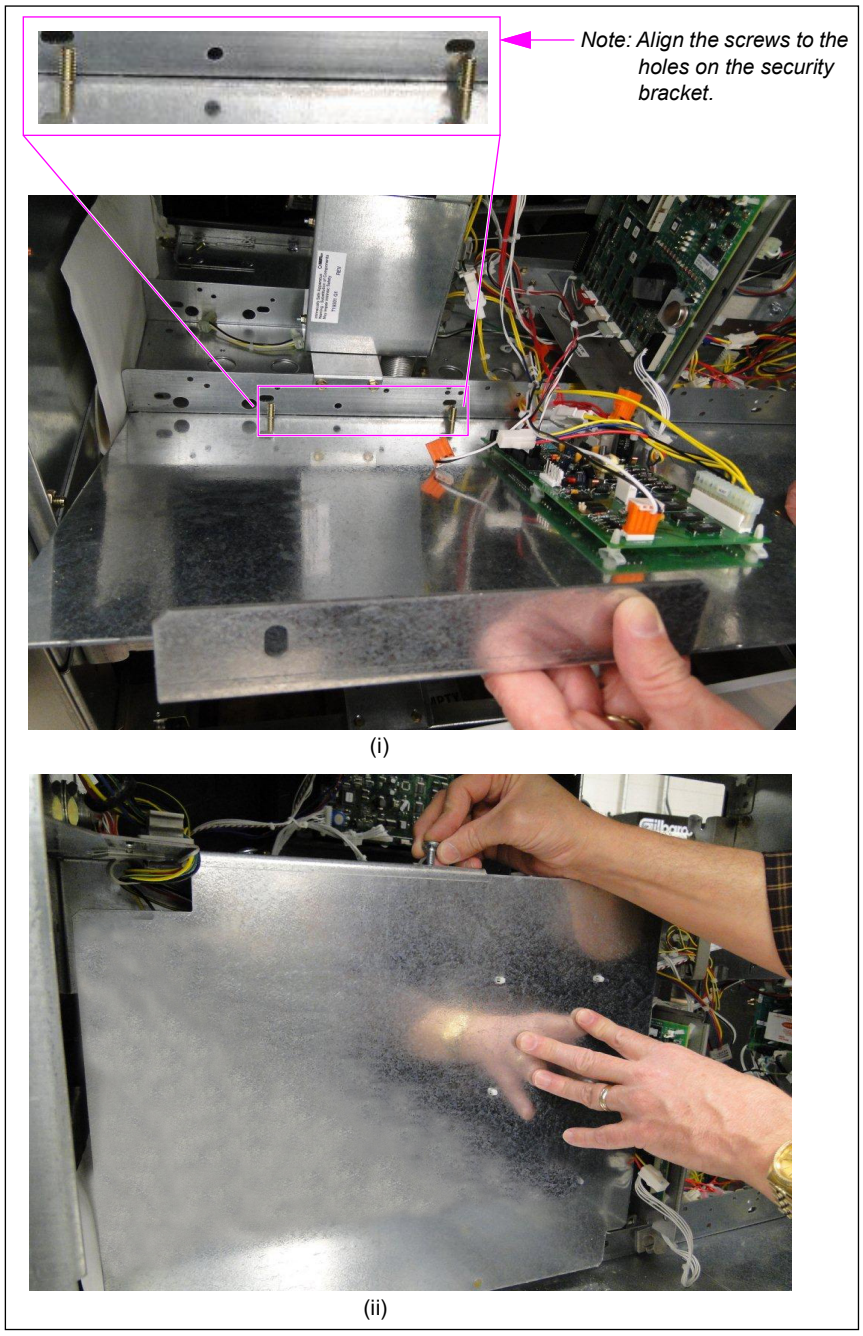
Figure 38: Ultra-Hi Dual Master + DEF Interface Assembly



(i) (ii)

4 Install the new security bracket in the dispenser (see Figure 39).
Note: Ensure that the screws in the DEF interface assembly are aligned to the holes on the base electronics bracket.

Figure 39: Installing New Security Bracket



5 Make the following cable connections:

a Connect the J604 connector of AC Valve Feed Cable (M04406A004) to P604 on the new Valve Cable (M02338), J1206 to P1206 on the new valve board, and cache to the cache of distribution cable.

b Connect the J309 connector of Valve Cable (M02338A001) to P309 on the new valve board. Connect A1 connector to DEF valve. Connect A1 connector to PA1 of M10075 conduit.

c For 2-grade single-sided units, proceed as follows:

i Remove the Pulser Cable (M03755).

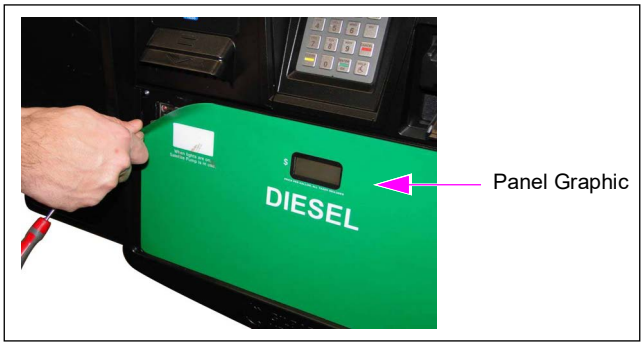
ii Connect J305 of Pulser Cable 2-grade Single Side (M03755A003) to P305 on the original valve board, J1112 to P1112, and J114 to P1114 on PCN.

d For dual master, connect J1201 (DEF) of valve control/adapter cable (dual master) to J1201 on the new valve board, J1102 to P1102 on PCN, and J1201 to J1201 of the original valve board.

Note: For more information on cable connections, see Figure 89 on page 70.

6 Remove the existing brand panel graphic and clean the area using adhesive remover, paint scraper, and towel/rag (see Figure 40). For detailed instructions, refer to *MDE-4625 Graphic Panel Application for The Advantage Series, Encore, Eclipse, and Encore S.*

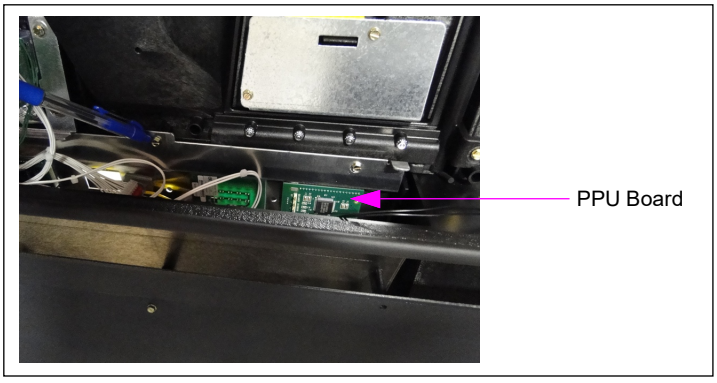
Figure 40: Removing Brand Panel Graphic



7 Disconnect and remove the existing PPU board using a nut driver. Retain the mounting screws. Also, remove the card reader to access the PPU panel. However, do not disconnect the cables from the card reader.

Note: The card reader can remain connected to the cables and moved to a temporary position out of the way.

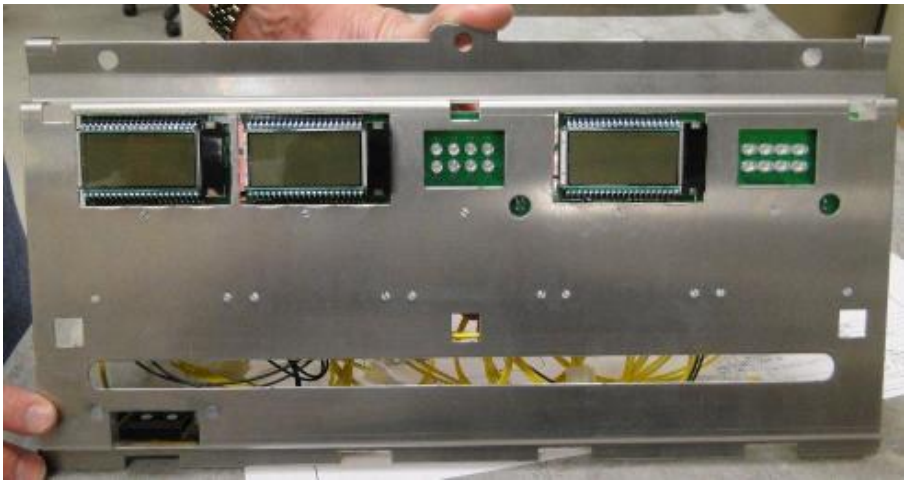
Figure 41: Existing PPU Board



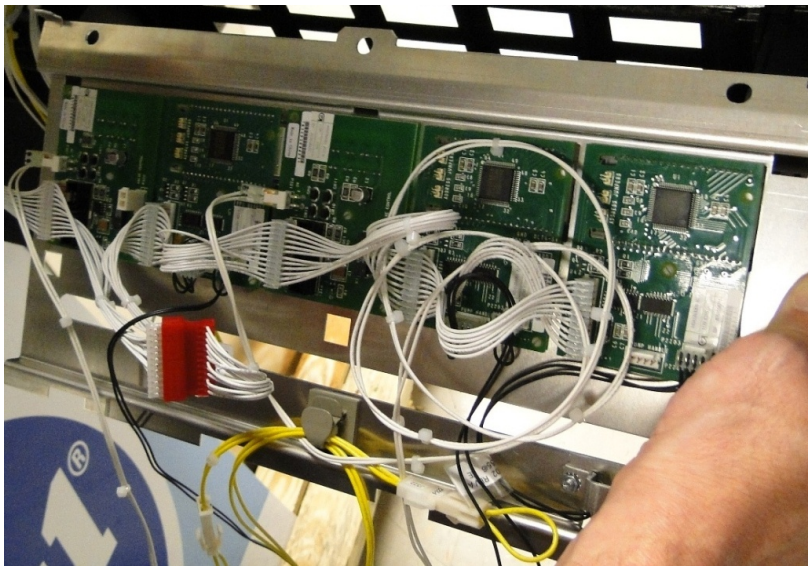
8 Arrange the appropriate PPU board assembly (refer to step 13 on page 4) and ensure that the connections are accurate before you assemble the PPU to the bezel (see Figure 42 and Figure 100 on page 81).

Note: Ensure that the PPU jump jack is inserted correctly (DEF PPU only) as 2-grade. There must be no jumper on the diesel PPU board JP0. Do not use the J2200 plug connector.

Figure 42: Front and Rear Views of PPU Board



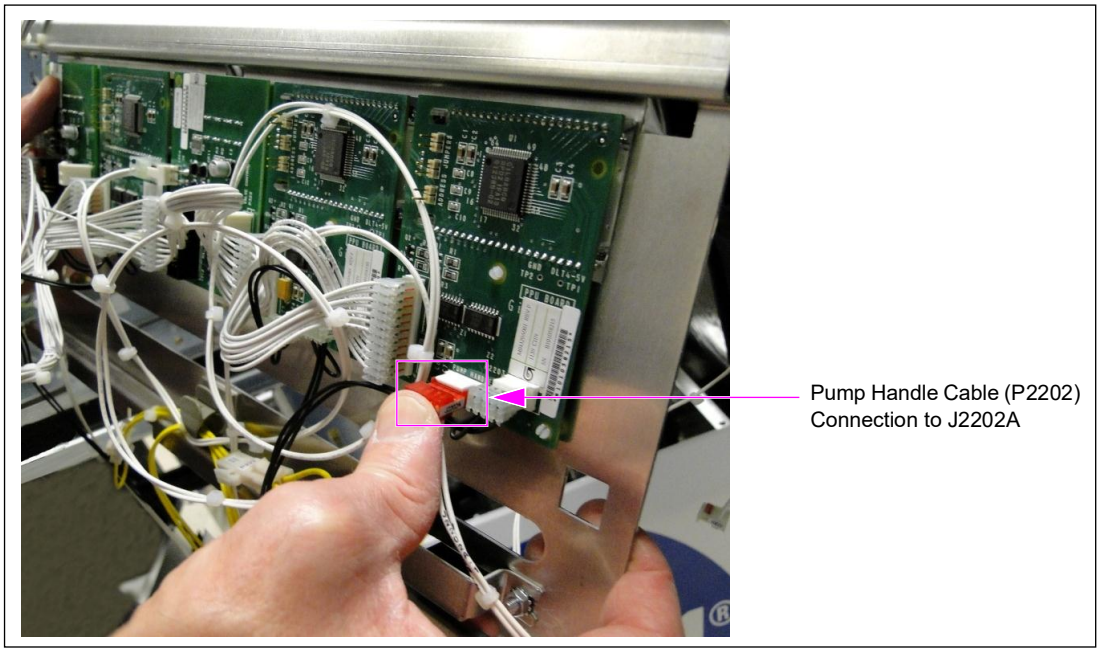
(i)
Front View



(ii)
Rear View

- Connect the P2201 of 2-grade Ultra-Hi PPU DEF Left (M06424A011) to J2201 of Cable M06115A002.
- Connect the P2202 of 2-grade Ultra-Hi PPU DEF left cable to J2202A of DEF interface cable and conduit (see Figure 43).

Figure 43: Cable Connection

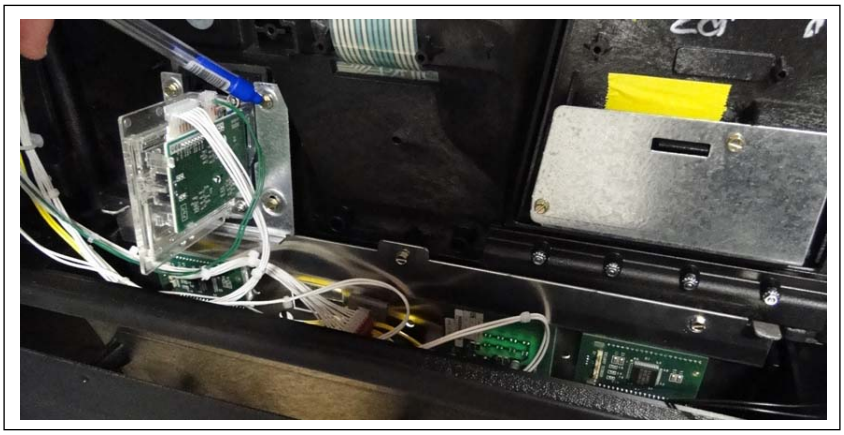


9 Replace the Card Reader Gasket (M13127B006).

10 Connect all the cables.

11 Install the new PPU board. Remount the card reader (see Figure 44).

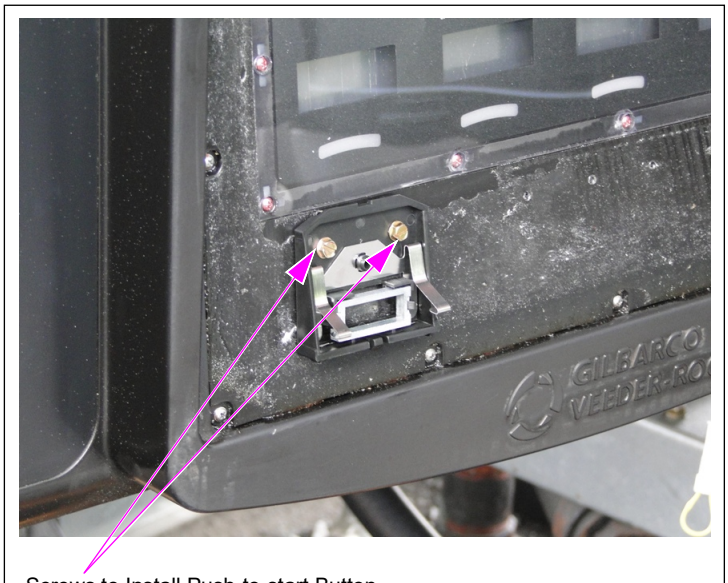
Figure 44: Installing New PPU Board



12 Install the DEF push-to-start button using the two screws (see Figure 45). Use the graphic to determine the exact location of the switch.

Note: You may have to install the new brand panel graphics after you install the rear portion of the push-to-start button and then install the front portion of the button (see Figure 23 on page 22).

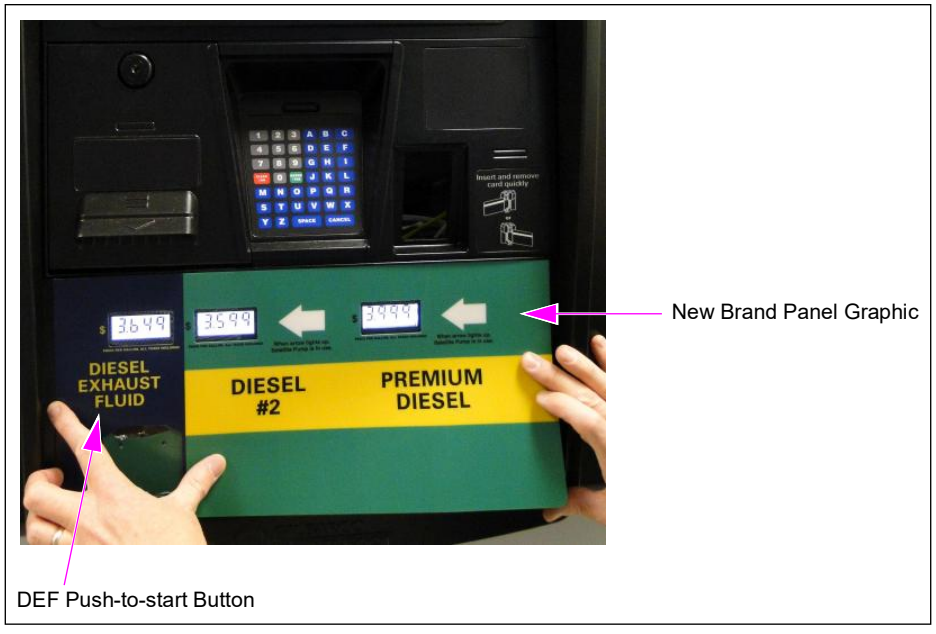
Figure 45: Push-to-start DEF Button



13 Ensure that the displays and PPU windows align correctly. Apply the new brand panel graphic with three PPU openings (see Figure 46).

Note: Adhesive setting time for graphics may be longer in cold weather.

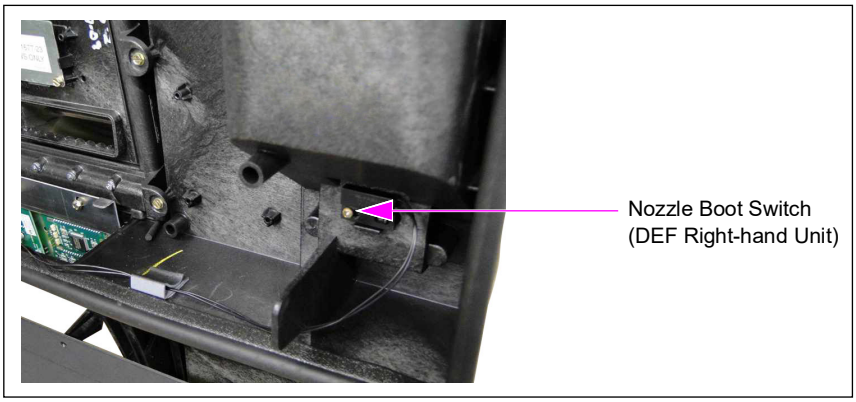
Figure 46: New Brand Panel Graphic



14 Install the DEF push-to-start button and label.

15 Connect the nozzle boot switch on the PPU board either to the left or right side diesel boot, depending on the final location of the diesel nozzle (see Figure 47).

Figure 47: Nozzle Boot Switch



Proceed to "Installing DEF Cabinet" on page 36.

Installing DEF Cabinet

To install the DEF cabinet, proceed as follows:

1 Unpack the DEF cabinet from packaging and leave it mounted on the pallet. Dispose the packaging material.

⚠ WARNING

Avoid locating the pallet where it may tip over due to strong wind, during handling, and so on.

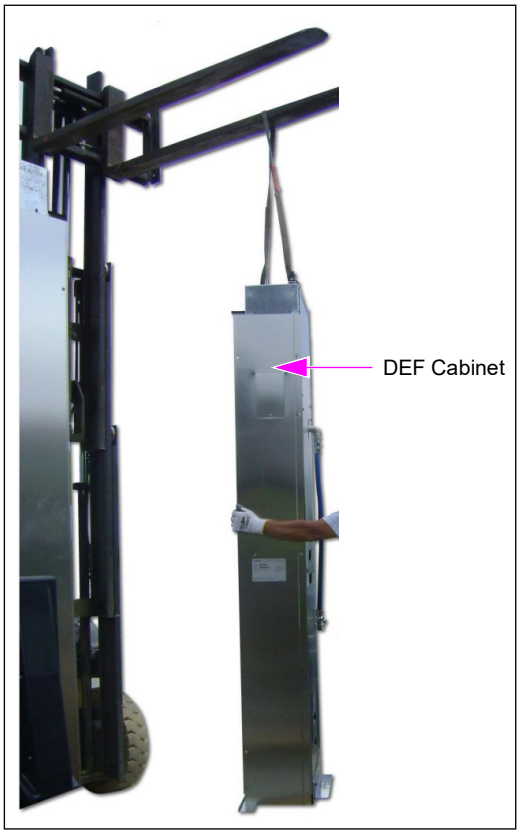
2 Secure the DEF cabinet to the lifting device to prevent falling or tilting (see Figure 48).

The lifting lugs removed in step 6 on page 11 can be reattached to the top of the DEF cabinet and used for lifting. As the lifting lugs are angled, position them pointing to or away from each other to ensure that the load does not tilt when lifted.

⚠ WARNING

The cabinet is very heavy and may tip during handling and moving. Falling on an installer or bystander may cause serious injury or death. It may also result in severe damage to the unit. A lifting device or securing shackle to prevent tipping must be used.

Figure 48: Securing DEF Cabinet



3 Remove the front, rear, and side sheathing and set it aside in a safe position on bubble wrap or other protective coverings (see Figure 49, Figure 50, and Figure 51 on page 38). Also, remove the upper rain shield.

⚠ CAUTION

Sheet metal can bend and crease if not handled or stored properly. Carefully handle and store the sheathing (you must carry the sheathing vertically to avoid damage) on bubble wrap or other protective covering to avoid bends, creases, or other damages.

Figure 49: Removing Side Sheathing and Upper Rain Shield

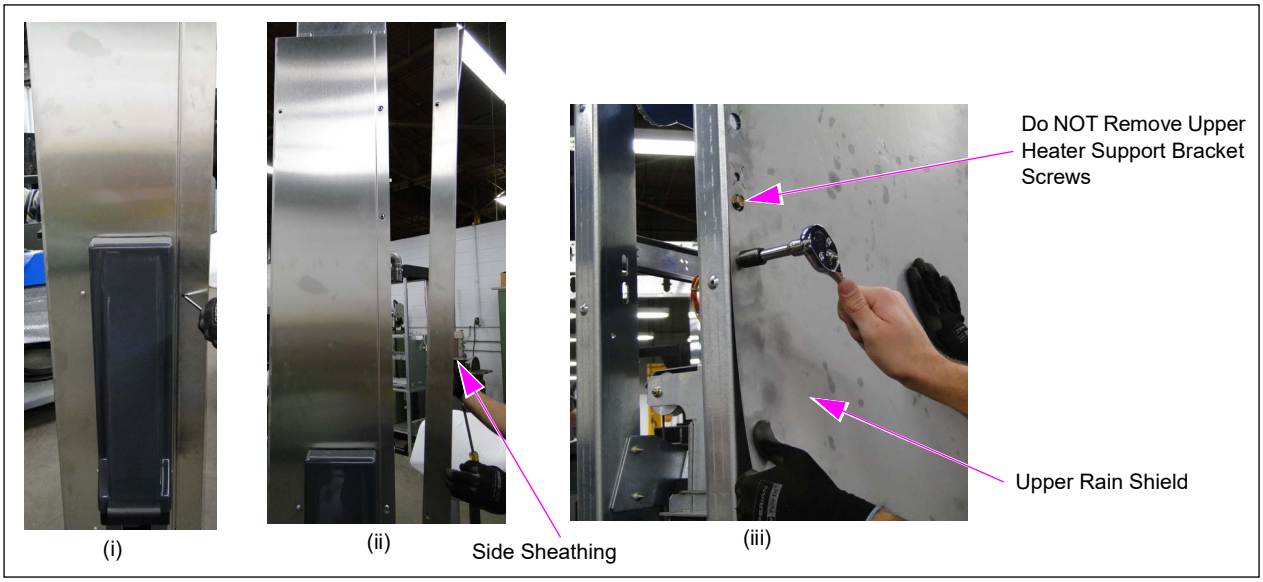


Figure 50: Removing Rear Sheathing

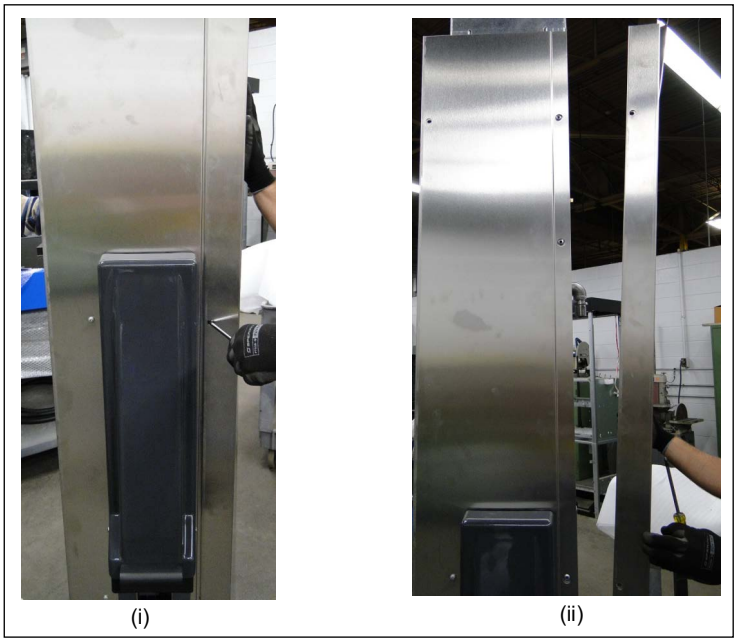
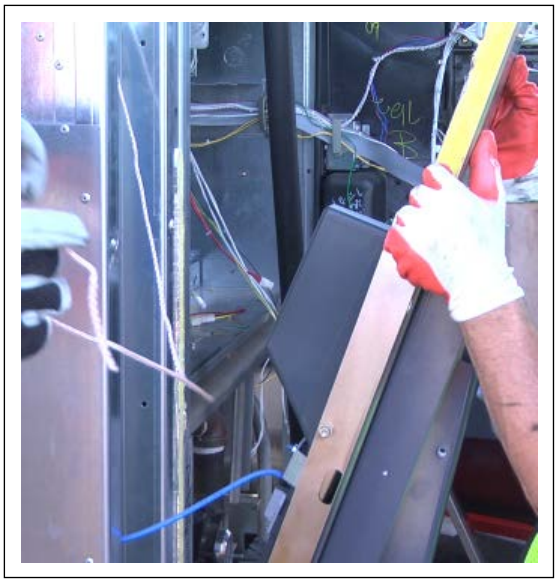


Figure 51: Removing Front Sheathing



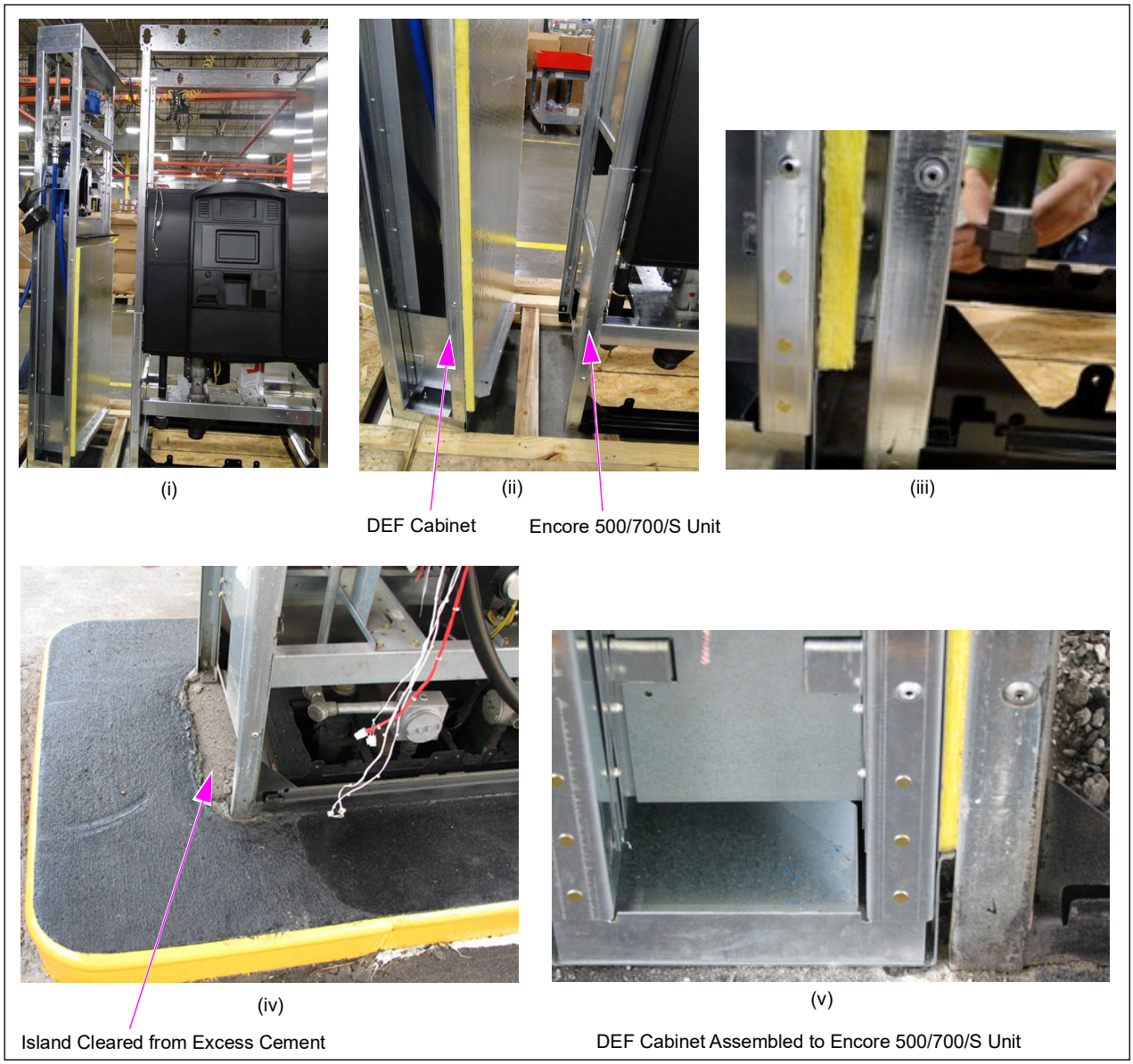
4 Disconnect the cabinet from pallet. Lift and position it in the vicinity of the Encore 500 S unit (see Figure 52 on page 39) using a forklift or a lifting device (with strap).

Note: It is not required to remove the shipping brackets from the pallet. Remove only the DEF cabinet from the shipping brackets.

5 Chip away any excess cement if present on the island using a chisel or hammer to ensure that the DEF cabinet can be securely assembled to the Encore 500/700/S unit and aligned properly.

Islands are built frequently with a crown in the center. The Encore dispenser can straddle this crown, such that when you attempt to assemble the DEF cabinet to the dispenser, the mounting holes of the cabinet in the dispenser will not align. Run a level across the location where the DEF cabinet is to be mounted.

Figure 52: Placing DEF Cabinet



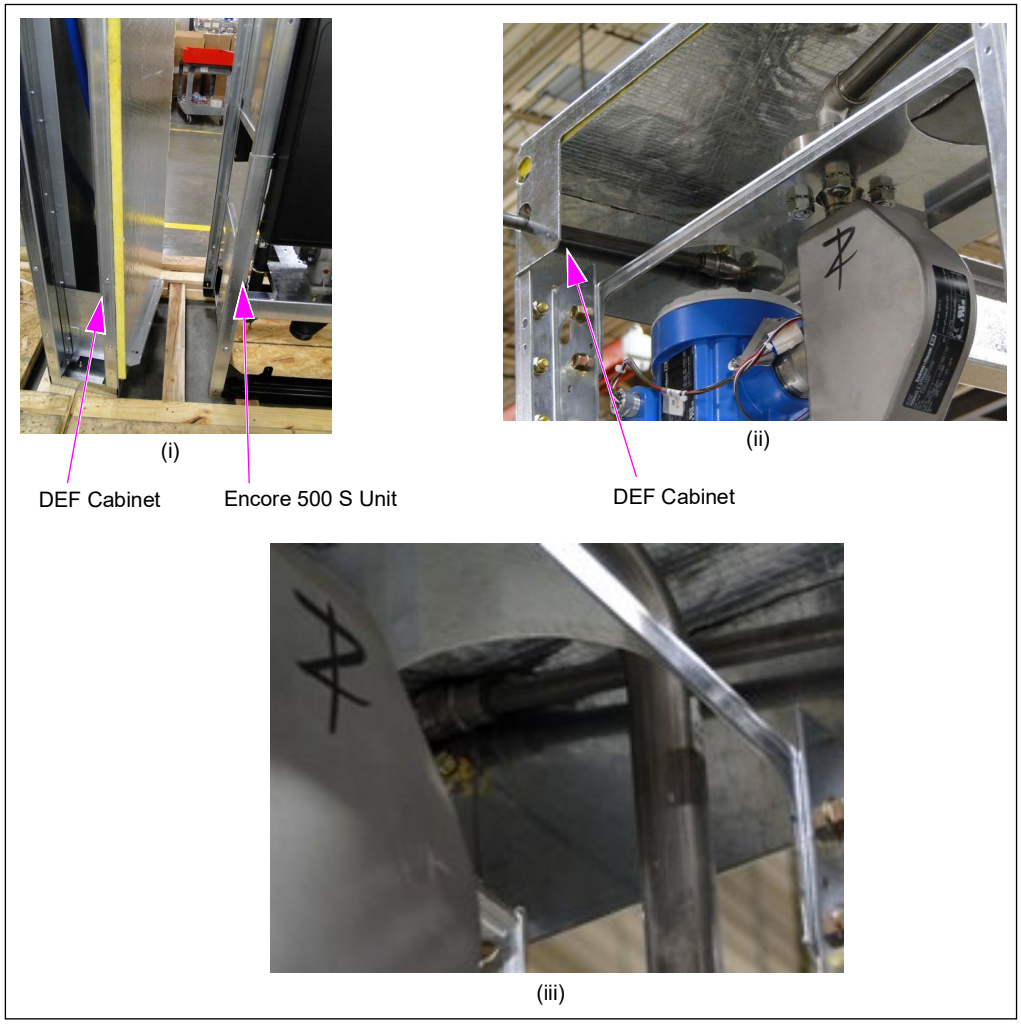
IMPORTANT INFORMATION
For elevated units, a C bracket must be used to close the bottom of the DEF cabinet.

6 Drape the potted wire cables over the top of the electronics cabinet to prevent damage and provide easier access to the cables.

Note: If the DEF cabinet is being mounted to a single-sided 2-grade Ultra-Hi dispenser, then two additional pieces of insulation must be added. Begin by locating and removing both pieces of black foam insulation as shown in Figure 52 on page 39, and replace with M12589B001 and M12589B002 in the same locations. Ensure that precut holes are aligned with the diesel pipe.

7 Secure the DEF cabinet to the upper housing frame of the Encore 500 S unit using the four M00417B009 Thread Forming Screws and a 13-mm socket with extension (see Figure 53).

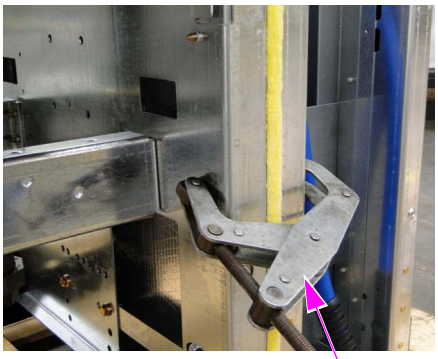
Figure 53: Securing DEF Cabinet to Upper Housing Frame



8 Secure the DEF cabinet to the Encore 500 S unit (see Figure 54) using the two Straight Threaded Bolts (M00415B010) provided and a 13-mm universal socket. Use a clamp to temporarily keep the parts together during the assembly as shown in Figure 54 (ii).

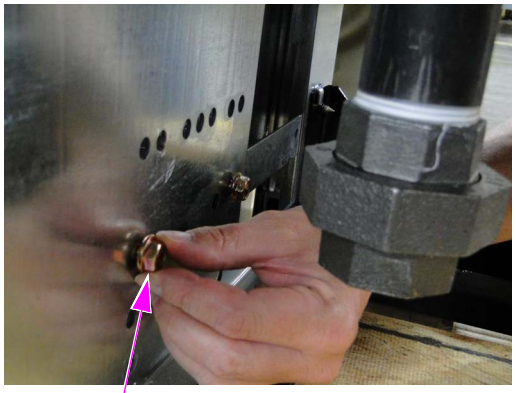
Figure 54: Securing DEF Cabinet at Lower Mounting Brackets

(i)



(ii)

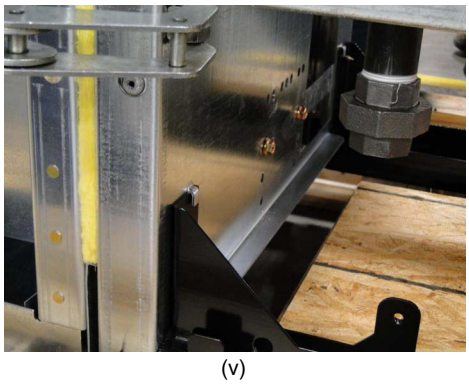
Clamp



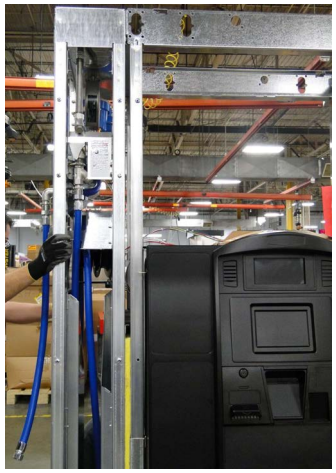
(iii)

Straight Threaded Bolt (M00415B010)

(iv)



(v)

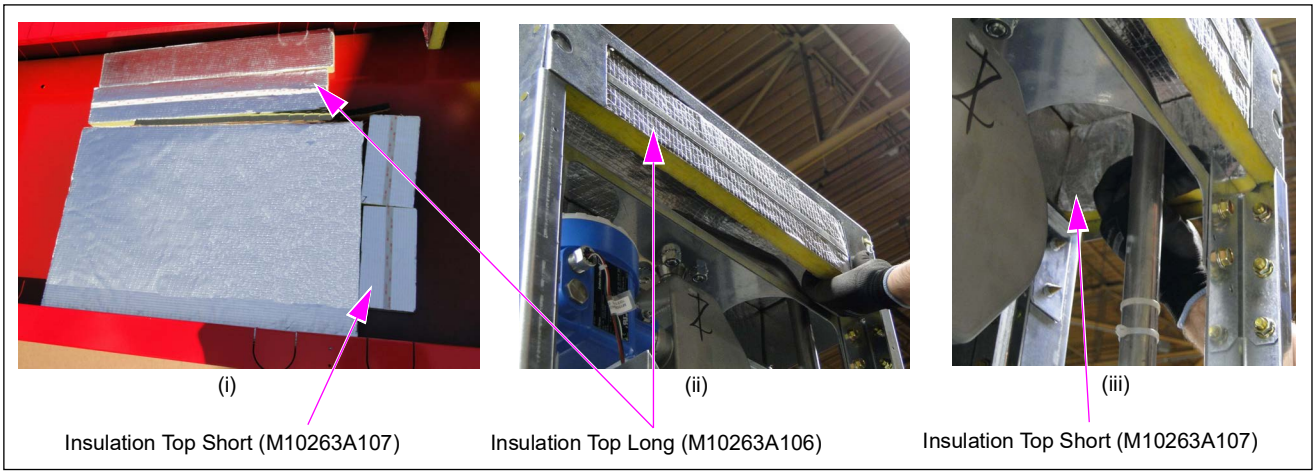


(vi)

Note: Rear view of right-hand DEF unit shown.

9 Install all top cover insulations [two 4 x 23 inches Insulation Top Long (M10263A106) and two 4 x 7.5 inches Insulation Top Short (M10263A107)] respectively (see Figure 55).
Note: Install the long insulations before installing the short insulations.

Figure 55: Top Cover Insulations



10 Make all required electrical and cable connections (valve, meter, heater power, thermostats, and so on) to the DEF cabinet connectors (see circled DEF connections on "DEF Retrofit Kit Wiring Diagram 6" on page 75).

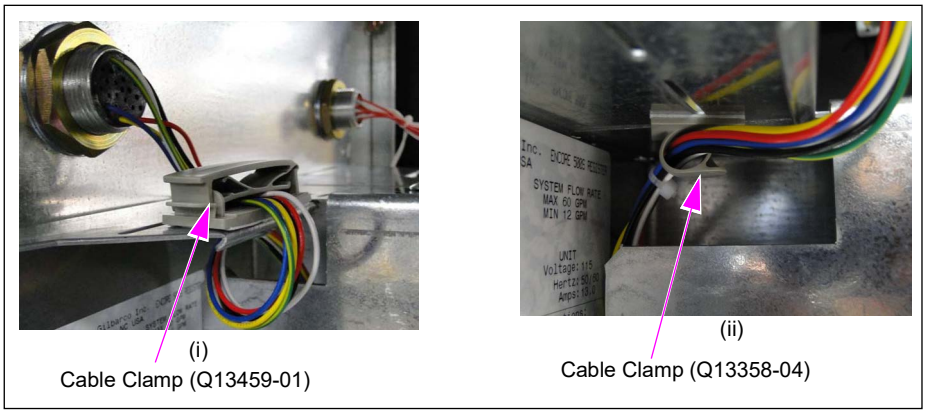
IMPORTANT INFORMATION
For All Dual DEF Units with cabinet heater, three 15-amp services must be used, one for the dispenser and one each for the DEF cabinet. For more information, refer to FE-363 Field Wiring Diagrams for Encore 500/700 (M07555 Power Supply Only).

If STP relay wires are run from above instead of in-ground, then the upper rain guard must be removed and drilled in the location of the locating dimple, to run the installer supplied flex conduit into the DEF cabinet. This joint must be concealed (rain tight) after installation. The conduit must run through insulation and pass through the hole to prevent the heat loss.

IMPORTANT INFORMATION
Avoid placing or routing wires where the wiring can rub against the sheet metal corners or parts that move.

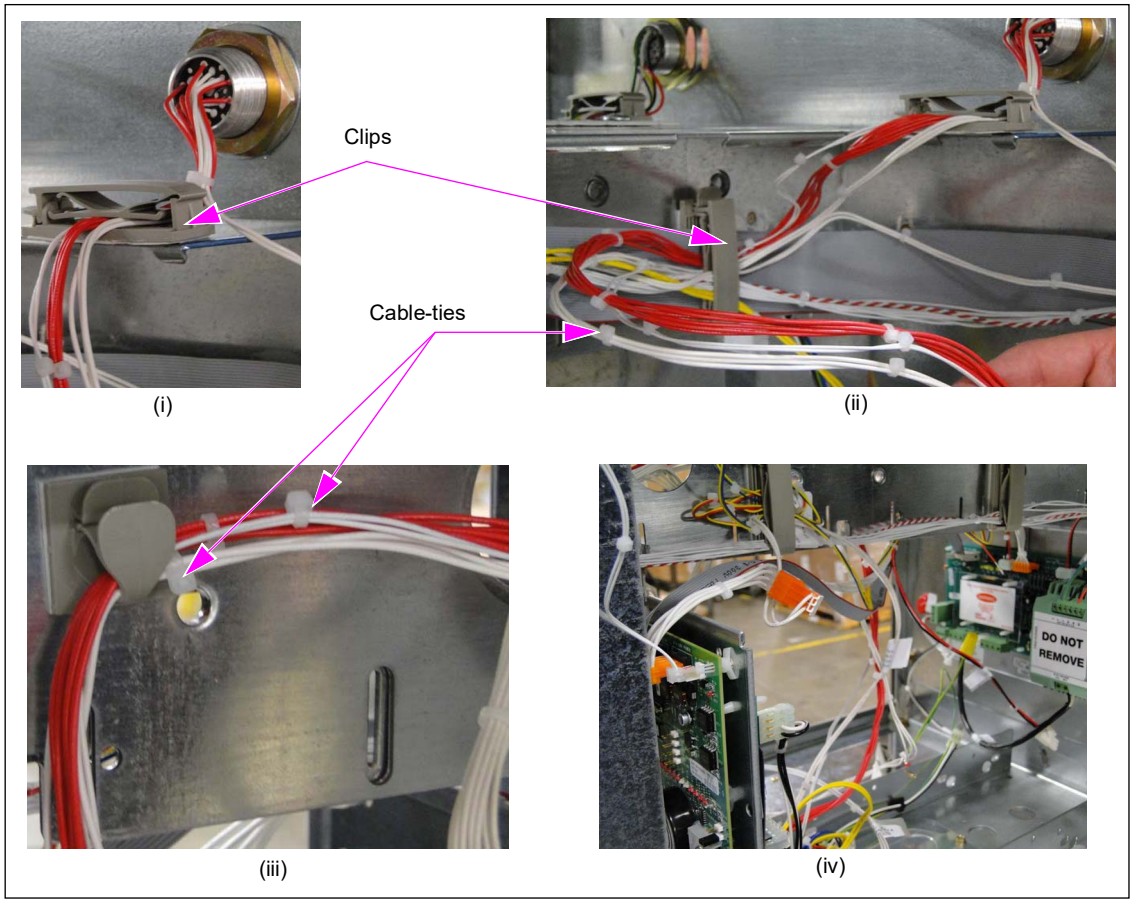
11 For both right-hand and left-hand units, route the AC conduit cables using cable clamps to avoid damaging of wires on any sheet metal edges or moving parts (see Figure 56).
For left-hand units, route the wires through the wire trough (a channel in the center of the electronics cabinet).

Figure 56: Routing AC Conduit Cables



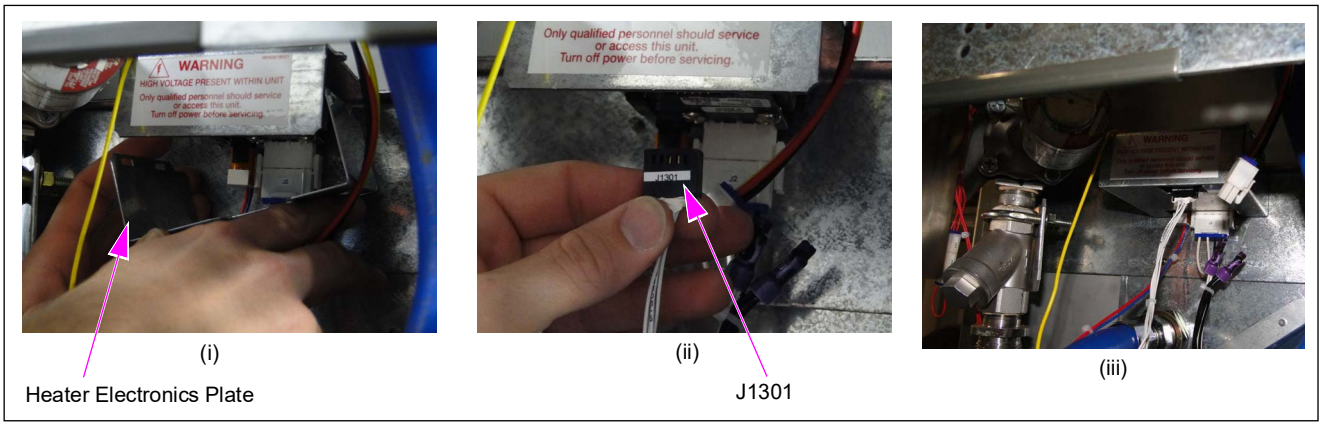
12 Route the DC conduit cables using cable-ties and clips to avoid damaging of wires on any sheet metal edges (see Figure 57).

Figure 57: Routing DC Conduit Cables



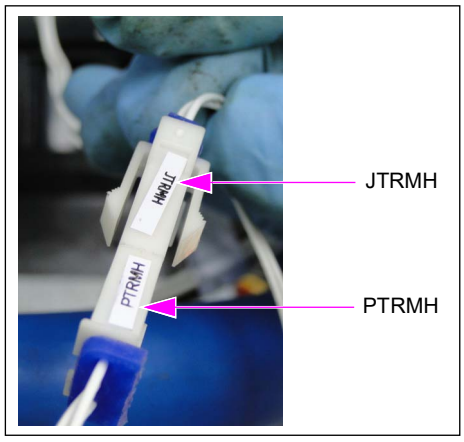
13 Remove the heater electronics cover plate to connect J1301 (see Figure 58).
Note: Replace the heater electronics cover plate after connecting.

Figure 58: Connecting J1301



14 Connect the JTRMH connector from the DC conduit to PTRMH from the heater thermostat (see Figure 59).

Figure 59: Connecting JTRMH to PTRMH



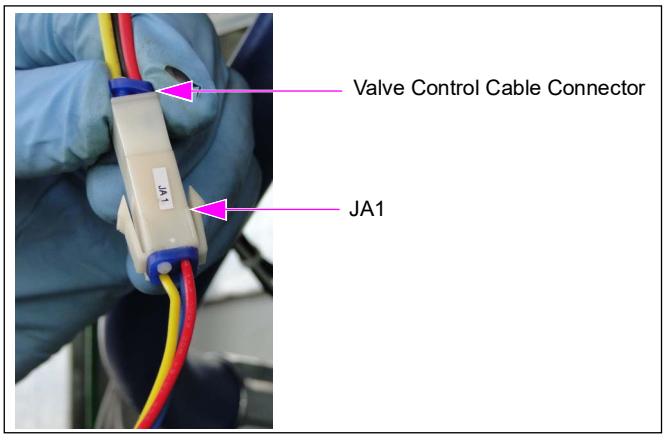
IMPORTANT INFORMATION

Avoid placing or routing wires where the wiring can rub against the sheet metal corners or parts that move.

Note: Ensure that the connection ends in H. If the connection is incorrect, the unit will power cycle when turned on.

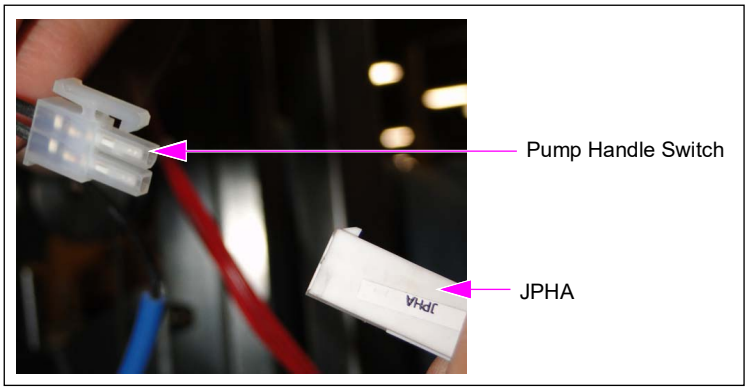
15 Connect the JA1 connector to the valve control cable connector (see Figure 60).

Figure 60: Connecting JA1 to Valve Control Cable



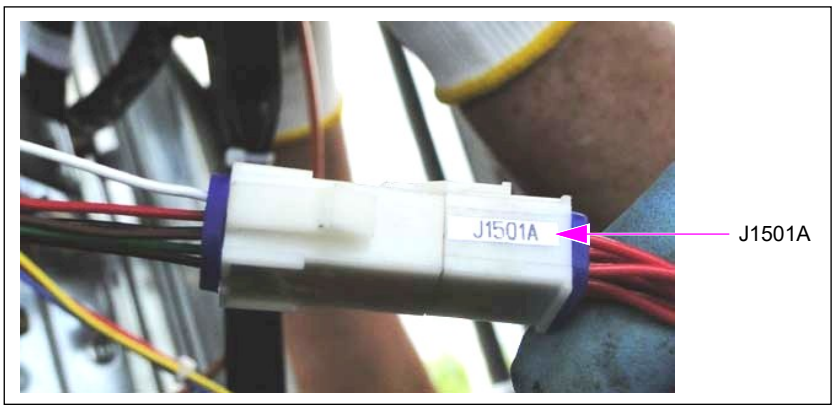
16 Connect the pump handle switch to JPHA of the DEF interface cable and conduit (see Figure 61).

Figure 61: Connecting Pump Handle Switch to JPHA



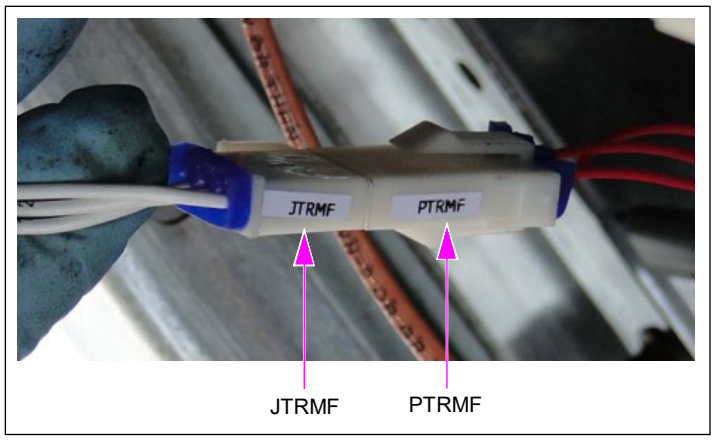
17 Connect the J1501A connector to the meter (see Figure 62).

Figure 62: Connecting J1501A to Meter



18 Connect the JTRMF connector to PTRMF [frozen thermostat (see Figure 63)].

Figure 63: Connecting JTRMF to PTRMF



Note: Ensure that the connection ends in F. If the connection is incorrect, the unit will power cycle when turned on.

IMPORTANT INFORMATION
Verify these connections are correctly attached. Improper connections will result in power cycling at power up.

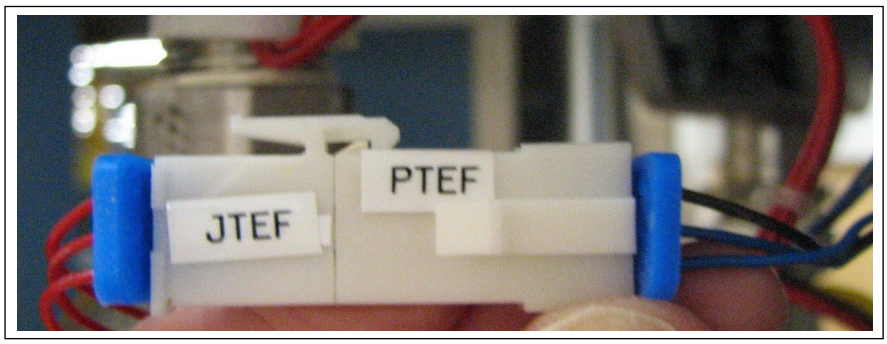
19 **(For Dual DEF units only)**

a Remove the shorting plug PTEF from the frozen thermostat (see Figure 64).

Figure 64: Removing Shorting Plug PTEF

b Plug PTEF from the M04114A012 Conduit into the now open connector JTEF. Route all the wires from PTEF away from the hose reel and all sharp edges.

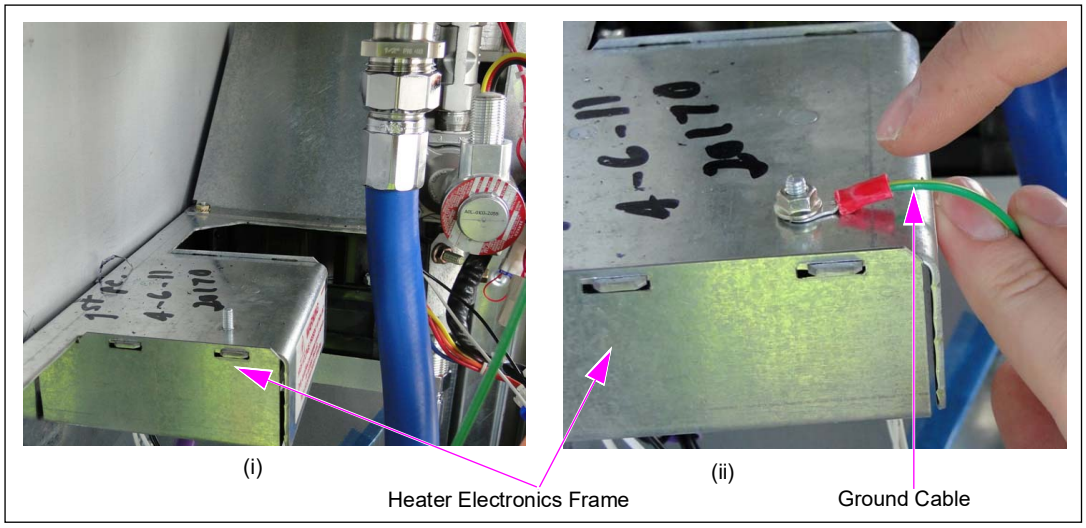
Figure 65: Plugging PTEF into JTEF



20 Connect the ground cable from the DEF valve control cable and conduit to the heater electronics frame (see Figure 66).

Note: The green unterminated wire must have a terminal clip attached and must be connected to the nut as shown in Figure 66 (ii).

Figure 66: Connecting Ground Cable to Heater Electronics Frame



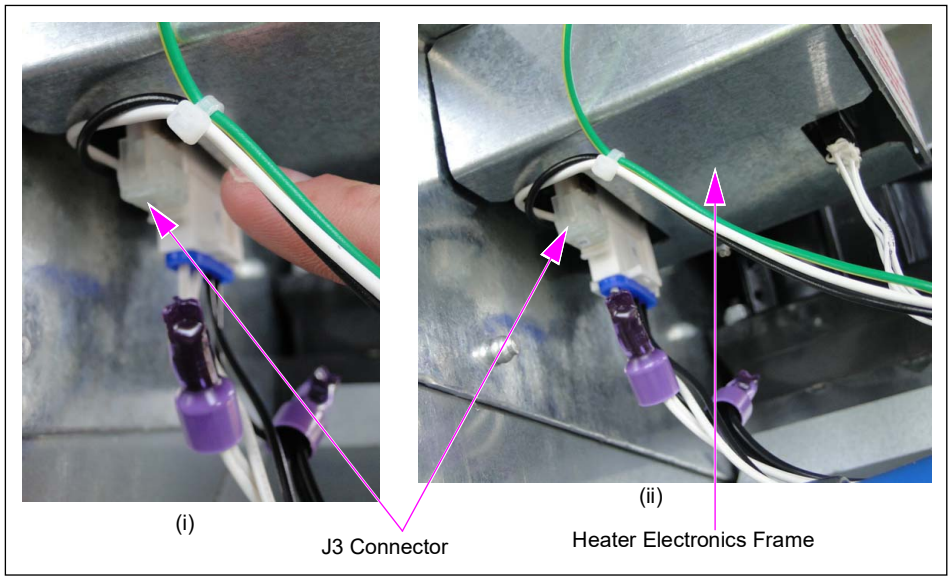
21 Connect the J3 connector from the DEF valve control cable and conduit to the connector on the heater electronics frame (see Figure 67).

Notes: 1) Reattach the cover plate after the connections are completed.

2) The black wire labeled DEF STP must be connected to an external pump relay signal wire for installations that do not have a spare wire from the station to the dispenser. If the installation has spare wire for the stop signal then, cap this wire with a wire nut. If the STP wire is in the DEF cabinet, you will require the black wire, otherwise it will need to be capped.

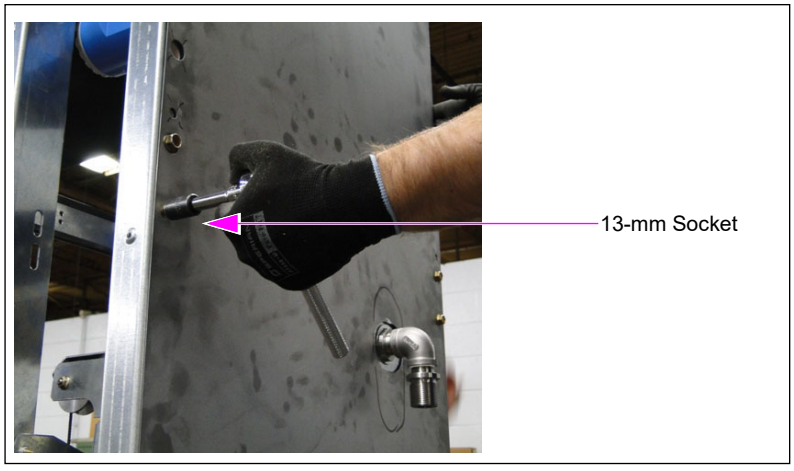
3) AC L and AC N must be wired to the main AC power from the dispenser breaker, no other options can be added that require an additional heater without adding an additional breaker. AC GND to be attached to the Computer Display (CD) module GND.

Figure 67: Connecting J3 to Connector on Heater Electronics Frame



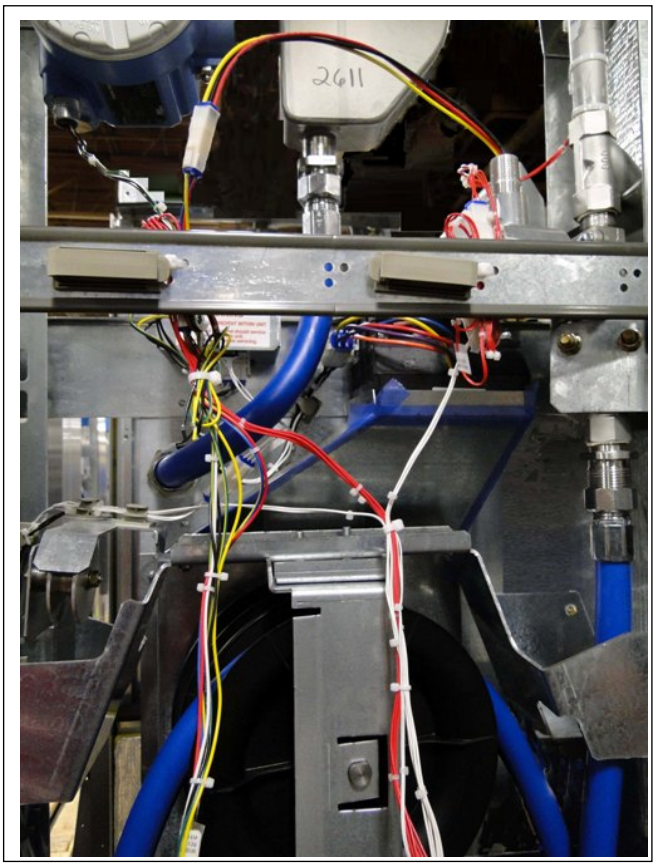
22 Remount and secure the Rain Shield (M10645B001) outside the DEF unit using two Thread Forming Screws (M00417B009) and a 13-mm socket (see Figure 68).

Figure 68: Securing Rain Shield



23 Route the cables using cable ties and clips to avoid damaging of wires on any sheet metal edges (see Figure 69).

Figure 69: Routing Cables

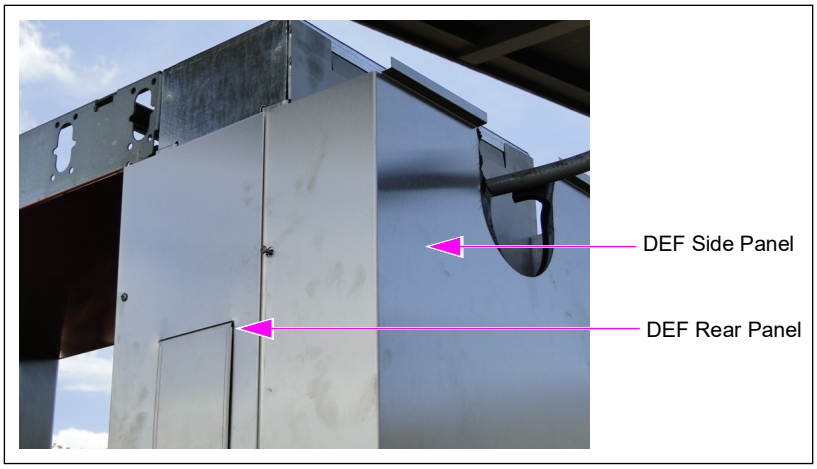


24 Ensure that all wires are dressed correctly and cable/wire connections are secure after completing the installation.

25 Mount and secure the DEF Rear Panel Assembly (M10762A001) to the DEF cabinet using sheathing screws and a Phillips screwdriver (see Figure 70).

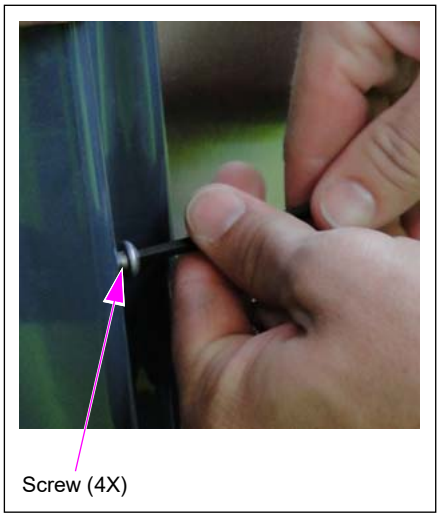
Notes: 1) Secure only the middle screws. Do not secure the other screws until inner and outer sheathings are installed.
2) Ensure that any insulation panels that are loose or become loose during handling are repaired using the 3M Hi-strength 90 spray adhesive.

Figure 70: Mounting and Securing DEF Rear Panel Assembly



26 Remove the four screws secure the fiber glass door as shown in Figure 71.

Figure 71: Removing Screws

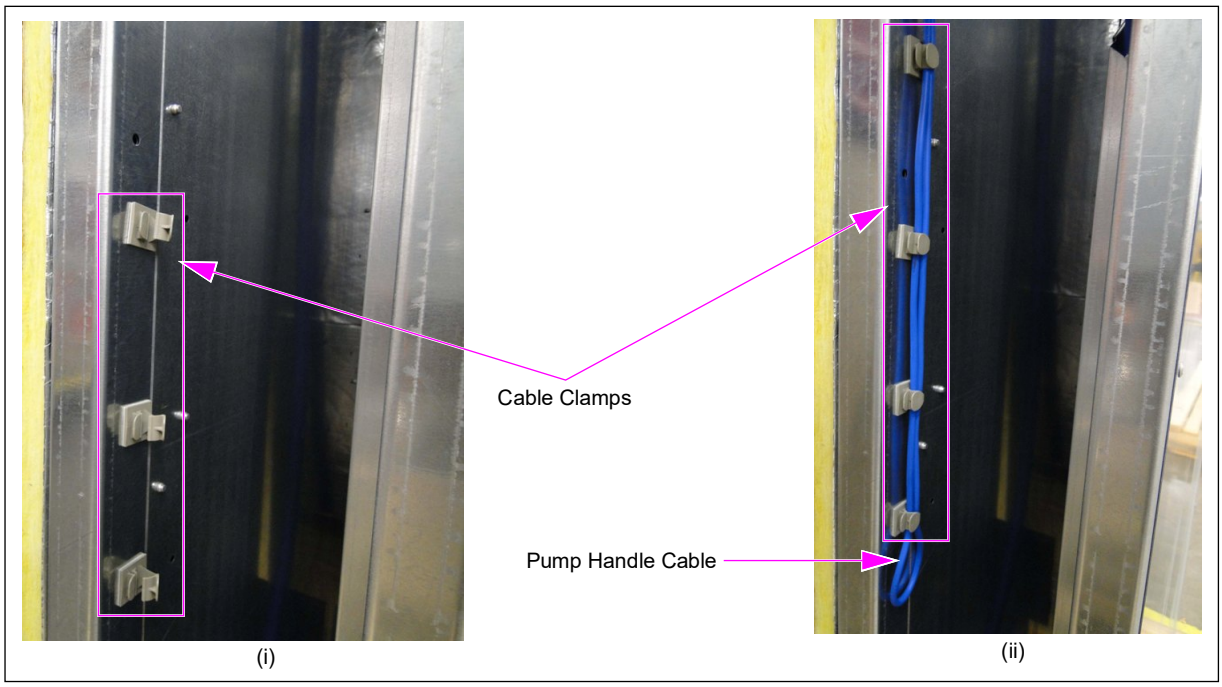


27 Position the front door in front of its original position on the DEF cabinet.

28 Connect the nozzle boot switch cable.

29 Ensure that the pump handle cable is routed appropriately in the cable clamp (see Figure 72).

Figure 72: Routing Pump Handle Cable

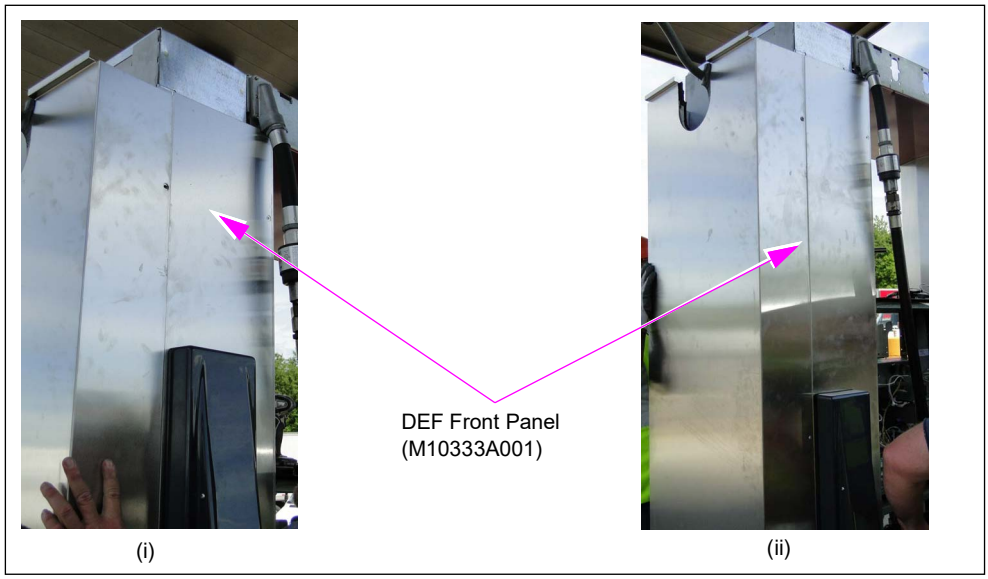


30 Install the DEF Front Panel (M10333A001) on the DEF cabinet using a sheathing screw and a Phillips screwdriver (see Figure 73 on page 52).

⚠ WARNING

Front Panel can easily bend if not properly supported during installation.

Figure 73: Installing DEF Front Panel on DEF Cabinet

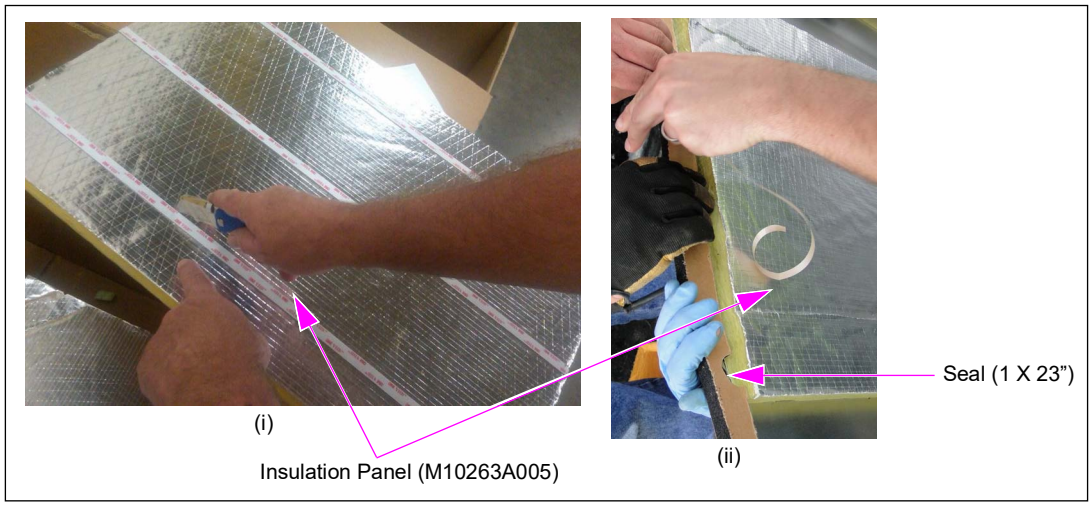


31 Insert the nozzle screen (if available) in the nozzle. Ensure that the dome of the screen points upstream.

32 Install the swivel and nozzle to outlet house using two channel locks.

33 Install the nozzle/hose assembly to the DEF hose.

Figure 74: Applying Insulation Panel



34 Reinstall the inner sheathing on the DEF side with 1 X 23 inches insulation stripe up.

Affixing DEF Upgrade Labels

DEF upgrade labels are provided with the upgrade kit. The appropriate upgrade labels must be affixed beside or above the original serial label on both sides of the dispenser (see Figure 76 on page 54).

Refer to the following table and Figure 75 to select the appropriate upgrade labels:

Existing Model Number Label on Dispenser	Additional DEF Upgrade Model Number Labels to be Affixed
NA4	Not required. No model change.
NP3 (Master Only)	NPA (Label Part Number - M12130B001 and M12707B001)
NP4 (Master-Satellite)	NPB (Label Part Number - M12130B002 and M12707B001)
NP6	NPC (Label Part Number - M12130B003 and M12707B001)

Figure 75: DEF Upgrade Labels

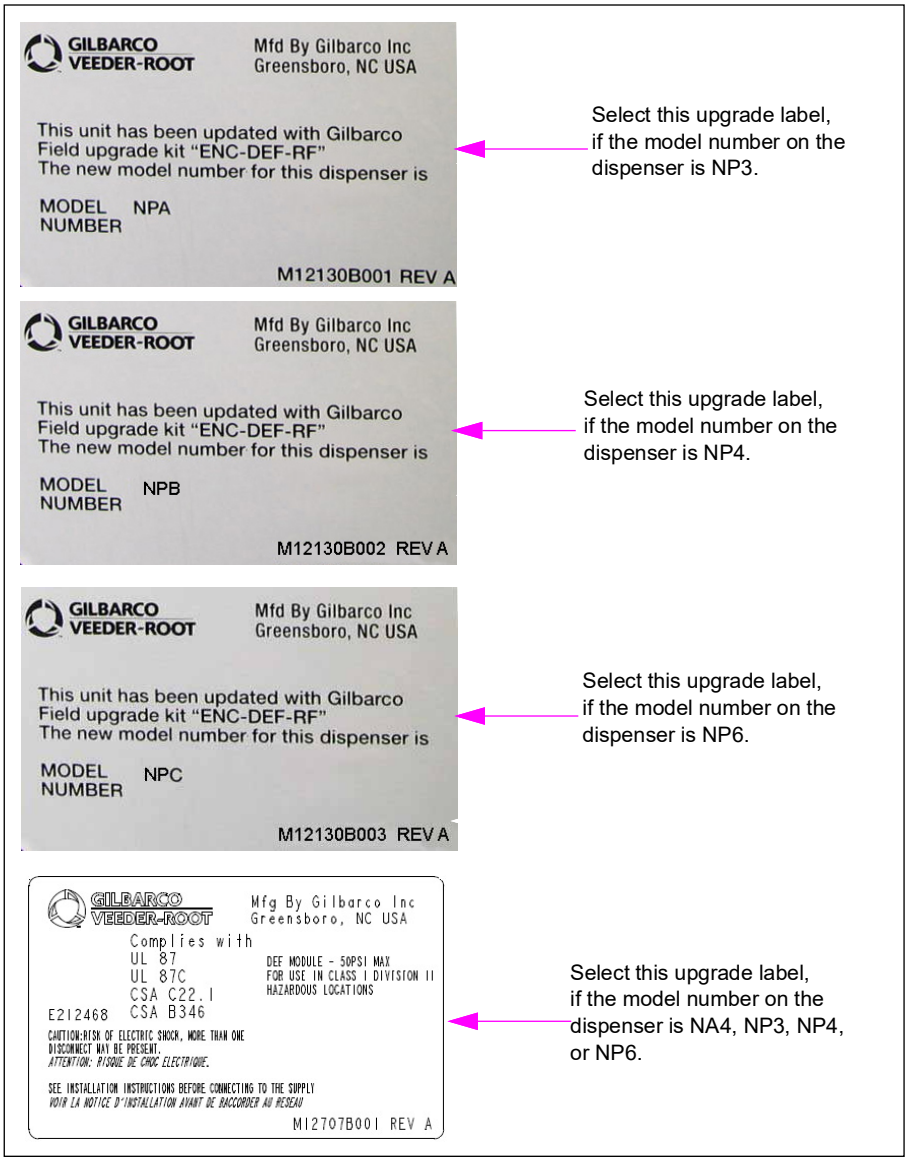
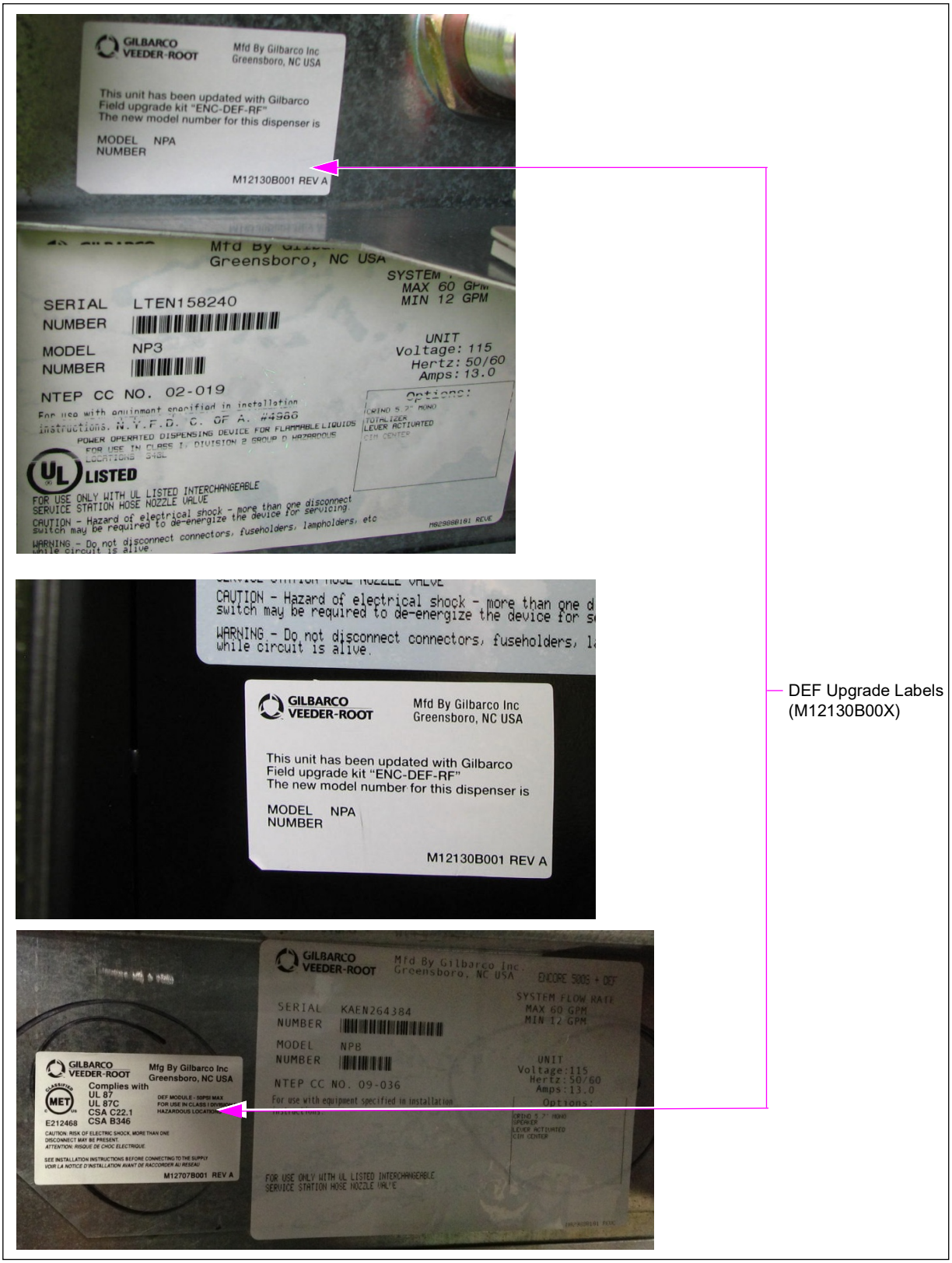


Figure 76 shows the labels installed on both sides of the dispenser.

Figure 76: Installed DEF Upgrade Labels



Completing Installation

(If installation includes optional crossover adapter, see "Appendix D: Crossover Adapter Installation" on page 84)

To complete installing the DEF Retrofit Kit in Encore 500/700/S units, proceed as follows:

1. Align and connect the inlet piping to the dispenser using Loctite 7649 primer and Loctite 567 thread sealant on NPT connections.
   Note: Inlet pipe can be located either at the base of the dispenser or through the side sheathing.

2. Knock out the prepunched piping knockout where the piping enters the cabinet from the side cover.

3. Modify the side Sheathing Insulation (M10263A012) to fit the incoming piping, if required. Insulation must be completely against the knockout opening of the side panel with no gap. Seal the mating surfaces neatly with silicon sealant or custom cut insulation to fit the side panel and piping insulation.

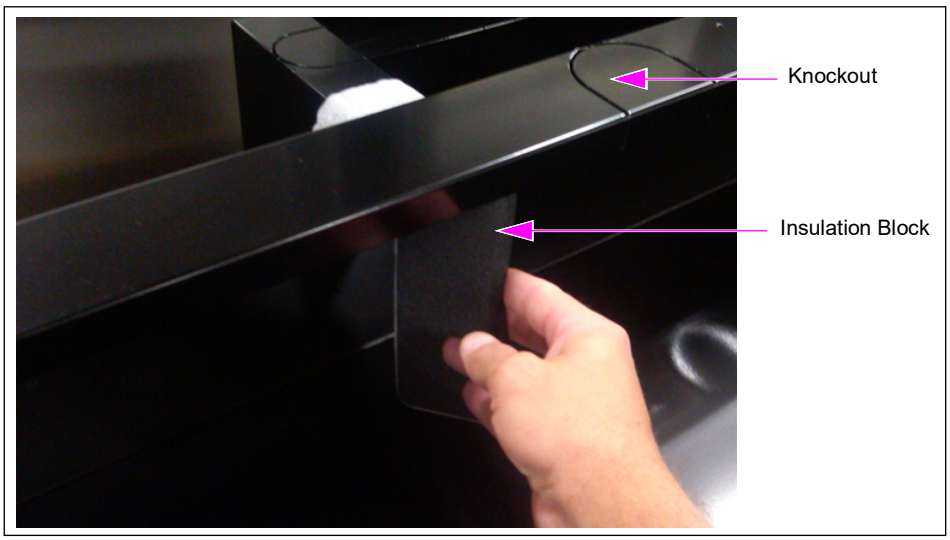
4. Install the side sheathing ensuring proper sealing over the sheathing gasket and pipes and secure the side sheathing to the DEF cabinet.

   Notes: 1) Failure to install the insulation properly may result in freezing of the pipe during cold weather.
   2) If heat tracing is used on the DEF inlet supply line, ensure that the cable is suitable for Underwriters Laboratories (UL) class 1 division 2 environment. If so, then the heat trace may run inside the DEF cabinet along the inlet hose. If not, the heat trace must be terminated outside the DEF cabinet.

5. Unpack the new upper housing cover.

6. Position the insulation blocks (using the adhesive stripe) on the DEF side near the knockouts for diesel hose outlet casting (see Figure 77).
   Note: Use one insulation part per side (front and rear).

Figure 77: Placing Insulation Block

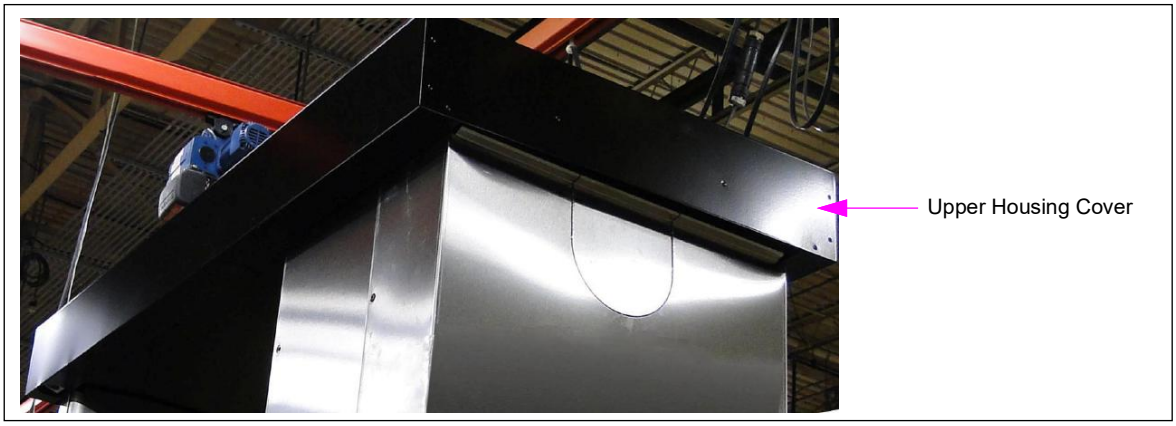


7 Position the upper housing cover on the unit using ladder.
Note: Ensure that the lifting lugs and shackle are removed, before performing this step.

CAUTION

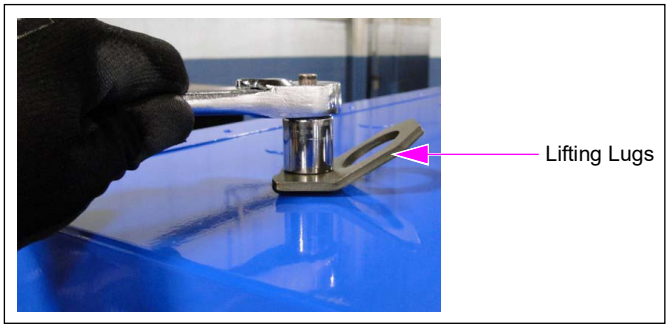
At least two ASCs are required to ensure safe installation of the top cover for the dual DEF NA4 unit.

Figure 78: Placing Upper Housing Cover



8 Replace the four lifting lugs removed in step 6 on page 11 using a 17-mm socket and ladder (see Figure 79).

Figure 79: Replacing Lifting Lugs



9 Turn on the power to the unit.
Note: Ensure that the commissioning ASC verifies the installation before applying power.

10 Ensure that the valve board is M08223A001. If it is not, temporarily remove the Intrinsic Safety (I.S.) Barrier Cable (M02279A001) from the I.S. barrier board to download the software.

CAUTION

Failure to isolate the I.S. barrier board may result in damage to the I.S. barrier board.

Do not position the laptop inside the dispenser electronic cabinet while downloading any software. In few Ultra-Hi models, short of the laptop case could ground out the system and cause permanent damage to the I.S. barrier board. Keep the laptop outside the dispenser.

11 Download the software. **The minimum software version to be used is V1.8.54 pump node software**.

12 Reprogram the unit. The following table lists command/function codes and their required programming settings:

Command/ Function Codes	Programming Setting	
	(DEF)+1 Units	Dual DEF (NA4) Units
CC80	High (Typically Same Value as Diesel Hose)	High
CC83, FC 1	Option 4	Option 3 (DEF Unit Only)
CC90	Option 2	Option 1 (Grade One)
CC91, FC 12	-	Option 2 (W&M Requirement)
CC92	-	Option 1 (Two-sided Unit)

13 Program the calibration can size to 5 gallons (20 liters) [that is, set CC82 to 5 gallons (20 liters)].

IMPORTANT INFORMATION

Before calibrating, you must change the prover can size (CC82) for the DEF product to 5 GPM (20 liters) or the unit will calibrate inaccurately. Similarly, the prover can size must be programmed for 50 gallons (or liter can size) or the Ultra-Hi calibration will be in error. Always ensure that calibration at fast and slow flow. Air in the system will typically cause repetitive calibration readings to vary by more than 1-1/2 cubic inches.

14 Purge and calibrate the unit in field. Use the same purge steps that are used for standard gasoline dispensers, except that you must use a standard pulser hand turned instead of DEF meter pulser for the first unit purged (typically the farthest from the supply pump).

Note: Before purging, program a price into the unit to prevent issues with continual stop and start of flow.

If overhead lines are not purged properly, issues will occur during calibration (meters will have poor repeatability with successive verification varying by more than 1-1/2 cubic inches). If no bleed provisions are provided for high spots in the plumbing, a very large number of gallons must be purged through the system to obtain repeatable prover can readings. Some units may not hold proper calibration if air is not properly removed or enters the system from pump action.

Note: All strainers must be cleaned after purging and calibrating the entire system.

An error occurs for units with the DEF meter if too much air passes through the meter during purging/calibration. Therefore, use of a standard pulser for purging is recommended for purging the first dispenser (typically, the farthest one from the supply pump).

Note: Magmeter must have fluid. If no fluid is present you will get an error code 20.

For units using the Magmeter, excessive air (as in initial startup for each meter) will induce an EC20. The EC20 must be cleared with the manager's keypad.

a Turn off the power to the dispenser and connect a standard Encore Pulser (M04012B001) temporarily in position of the DEF meter connection to the pump node.

b Hand spin the pulser to avoid slow flow during purging.

c After the excess air is out, turn off the power, reconnect the DEF meter, and restore power to complete purging.

d Check for leaks during purging and correct, if required.

Notes: 1) Some DEF nozzle types require a Magnetic Ring (M10656B001) to be placed over the nozzle spout to allow flow through the nozzle. Ensure that the magnetic nozzle adapter is available for purging and calibration, when required.

2) You must calibrate the DEF side ONLY. Follow steps for standard gallonage electronic calibration of an Encore 500 meter. For more calibration considerations, refer to Launch Package for DEF Phase 1 and MDE-3985 Encore Installation Manual.

15 For overhead piping with a high-point air-bleed valve, bleed the system as follows:

a Dispense 10 gallons in the farthest dispenser.

b Bleed air by opening the 1/4-inch valve only enough to get air and not liquid. Bleed with the pump on with no dispensing occurring.

c After liquid appears, bleed 2 gallons.

d Moving toward the tank, purge 10 gallons from each additional dispenser.

e If you get a little or no air initially, the bleed valve is likely not at the highest point of the overhead plumbing. Do not bleed unused liquid drops, as gravity will fill these pipes (provided there is no trap for each of those lines or near or at the trunk line).

f After purging all lines, bleed the system again to get rid of any residual air by repeating steps b and c.

16 Test the unit for proper functioning of DEF and diesel. Ensure that there is no leak in the unit.
Note: After testing, remove and position the nozzle lock key in the electronics cabinet or give it to the station manager.

Figure 80: Completed DEF Retrofit Installation

(i)
Right DEF

(ii)
Left DEF

(iii)
Dual DEF

The kit must be registered for warranty to commence. A checklist *[MDE-4995 Warranty Registration Checklist for Diesel Exhaust Fluid (DEF) Kits]* must be completed and submitted to Gilbarco as per the instructions in the checklist.

IMPORTANT INFORMATION
Notify the station manager about any labels that were removed from the dispenser bezel when changing the graphics.

Note: The Point of Sale (POS) system may have to be reprogrammed to send 2-grade (DEF) prices. This depends on the type of POS at the site.

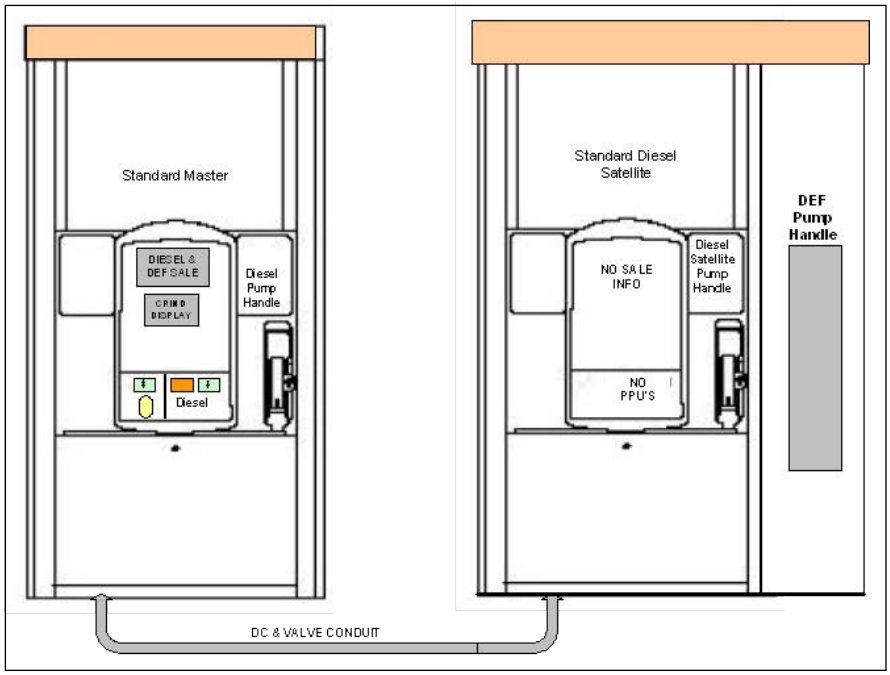
17 Reprogram the prover can size to the initial prover can size for the diesel hose.

Installing the Ultra-Hi DEF+1 Retrofit Kit in Encore 500/500 S units is now complete.

Appendix A: Installing a DEF Cabinet to an Encore Satellite

Note: Gilbarco does not offer a kit to install a DEF cabinet onto an Encore satellite. However, this page outlines the minimum requirements to complete this installation.

Figure 81: Installing a DEF Cabinet



⚠ WARNING

Inform the manager that the power must be removed and remove all power supplied to the unit at the breaker located in the building. Block off the unit from customers. Follow OSHA lockout/tagout procedures.

Failure to turn off the unit during the installation of the kit may cause injury or bodily harm from electrical shock. Ensure that all power to the unit is switched off before opening the door to the unit and during kit installation.

⚠ CAUTION

A properly grounded ESD wrist strap must be worn while servicing any electronic devices or components. Failure to use electrostatic precautions may damage electronic components and void warranty.

Materials Required

The following materials are required for this configuration:

- New Conduit
- Multi-conductor Wire
- AC Wiring
- Wiring
- DEF Heater
- Shielding

New Conduit

There must be a new conduit from the master to the satellite. This conduit must be large enough to run the multi-conductor cable plus the three wires for the DEF valve.

Multi-conductor Wire

Gilbarco recommends that you run all DC signals to the satellite with shielded multi-conductor cable. The preferred cable is

- Manufacturer: Alpha Wire.
- Manufacturer part numbers: 6347 SL001 (1000 feet), 6347 SL002 (500 feet) or 6347 SL005 (100 feet).

This is 15-conductor multi-conductor cable, 22 AWG, and is shielded with a braided foil covering.

AC Wiring

Three 18 AWG wires to the satellite are required to power the valve.

Wiring

Cut into the DEF conduits inside of the Satellite cabinet. Using the wire diagram on page 62, insert the conduit wiring inline with the conduit, thus allowing the conduit to reach to the Ultra-High master's cabinet.

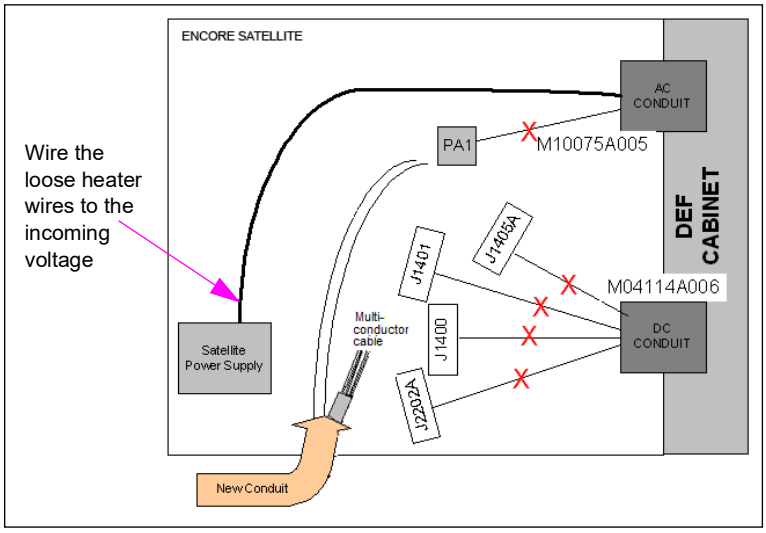
DEF Heater

The heater must receive its power from the incoming power to the satellite power supply. The DEF heater must on a separate 15 Amp breaker from any other heater. It is important that the heater power is not in the same conduit as the DC signals and valve wiring.

Shielding

The drain and shielding of the multi-conductor cable must be attached to the frame on the master side. Do not tie the drain/shielding to the frame at the satellite.

Figure 82: Attaching the Multi-Conductor Cable to the Frame



Cable Connections

To attach the multi-conductor cable to the frame, proceed as follows:

1 Plug PA1 to BA1 plug of valve cable.

Satellite Design	Description	18 AWG. Wire Color	Plug into
PA1-1	Slowdown	BLUE	B1-1
PA1-2	Main valve	YELLOW	B1-2
PA1-3	Neutral	RED	B1-3

2 Plug J1400, J1401, and J1405A onto the M10030A001 Interface board.

Satellite Design	Description	Multi-Conductor Wire Color	Plug onto
J1405A-1	24V Gnd	RED	P1405A-1
J1405A-2	24 Volts +	RED/WHITE	P1405A-2
J1405A-3	Data	RED/BLACK	P1405A-3
J1405A-4	Data Gnd	BLACK	P1405A-4
J1405A-5	Data	BLUE/BLACK	P1405A-5
J1405A-6	Data Gnd	WHITE/BLACK	P1405A-6
J1400-1	Pump Frozen	ORANGE	P1400-1
J1400-3	VCC	ORANGE/BLACK	P1400-3
J1400-4	GND	GREEN/BLACK	P1400-4
J1401-1	VCC	GREEN	P1401-1
J1401-3	DC Gnd	GREEN/WHITE	P1401-3

3 Plug J2202A onto the PPU board.

Satellite Design	Description	Multi-Conductor Wire Color	Plug onto
J2202A-1	PH Feed	BLUE	P2202A-1
J2202A-2	PH Return	BLUE/WHITE	P2202A-2
SATELLITE	UNUSED	WHITE/GREY	MASTER
	UNUSED	WHITE	

Appendix B: Block Diagrams

Notes: 1) Refer to instructions for more information on cable connections.
2) The satellite indicator connections are not on the block diagram, for more information refer to instructions from step 4 on page 20.

Figure 83: Standard DEF (Ultra-Hi + 1)

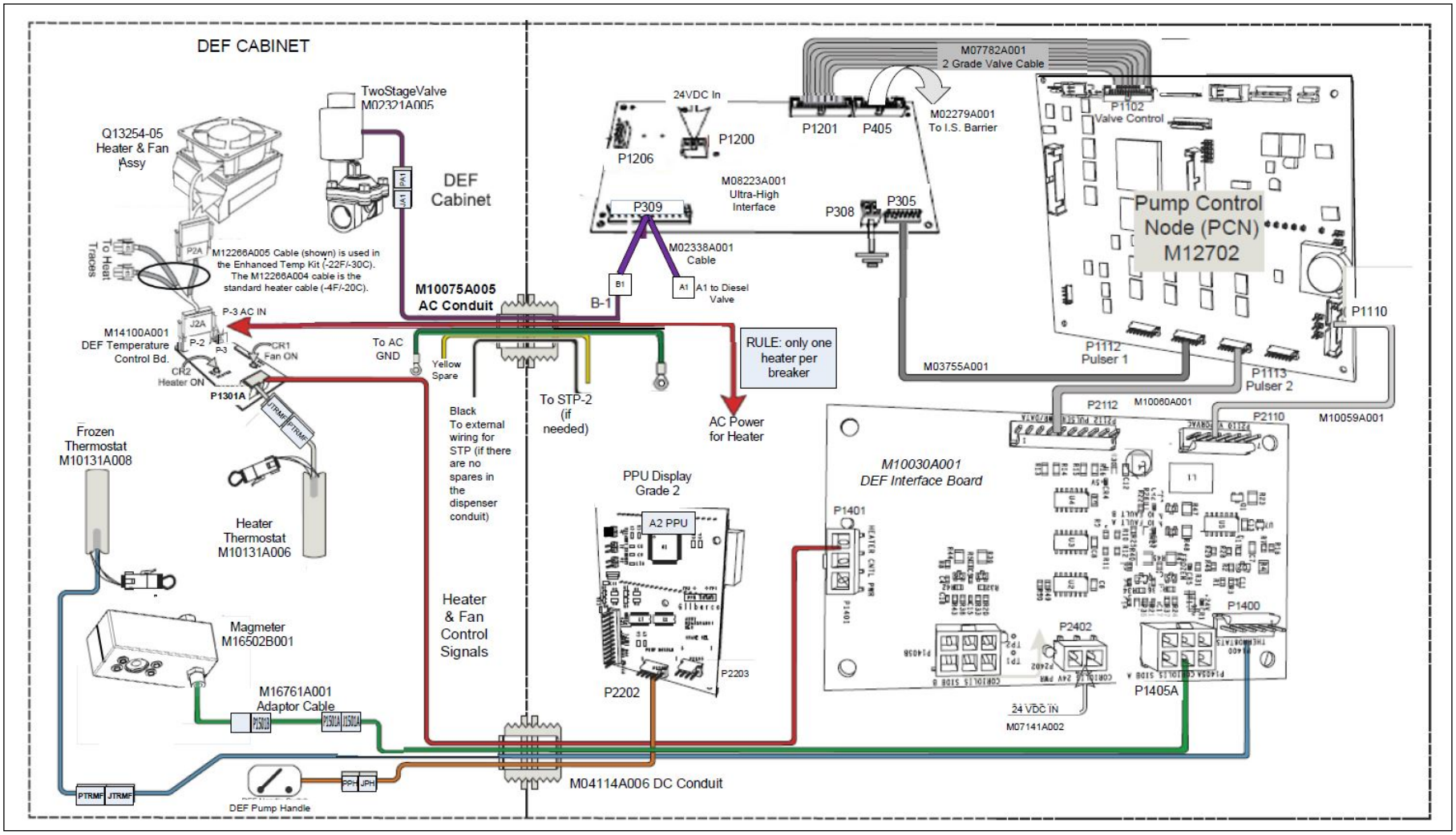


Figure 84: NA4 with Dual DEF (No Diesel)

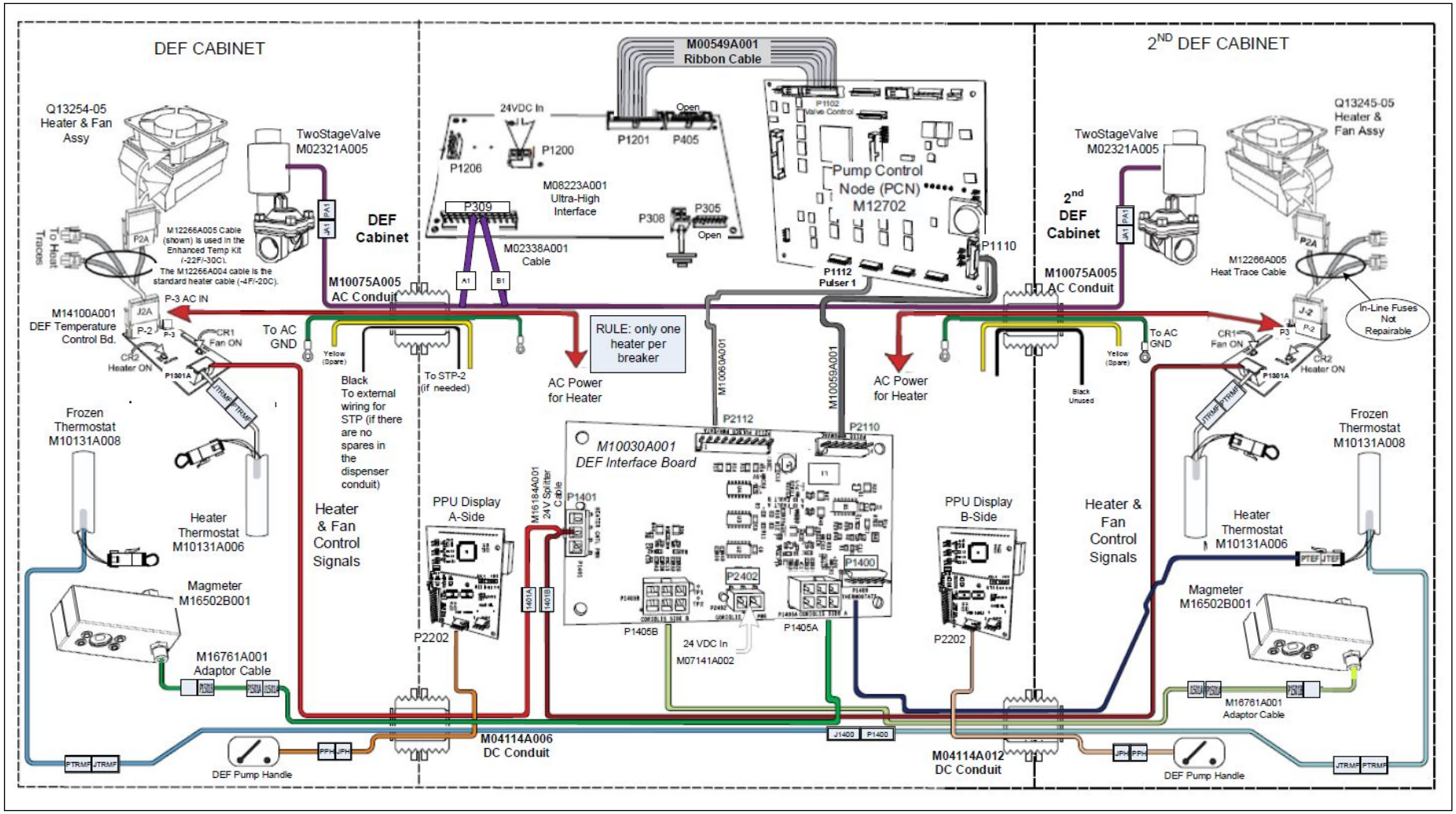


Figure 85: NPA with Dual Diesel and Dual DEF

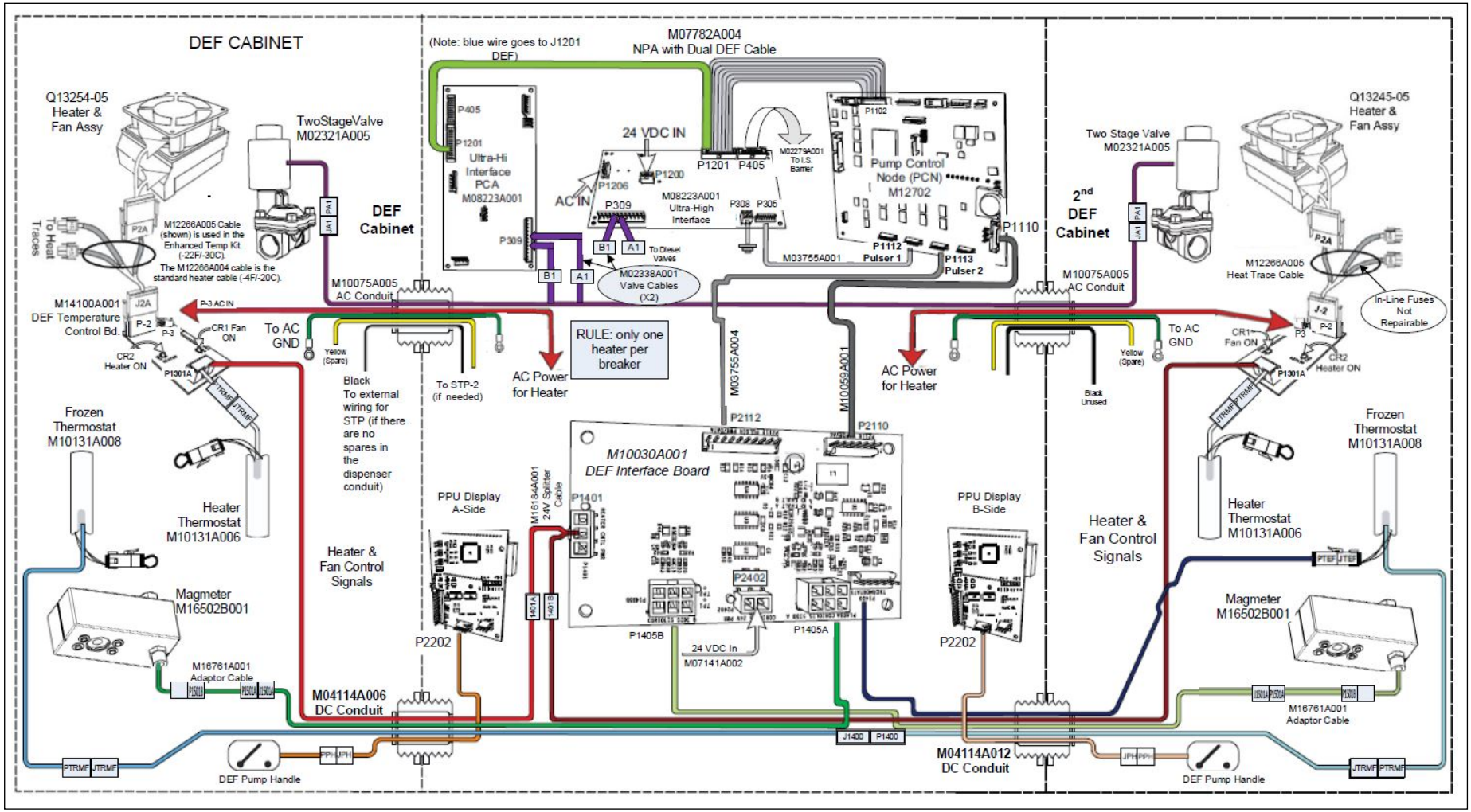


Figure 86: NP3 with Single Diesel and Single DEF (Ultra-High + 1)

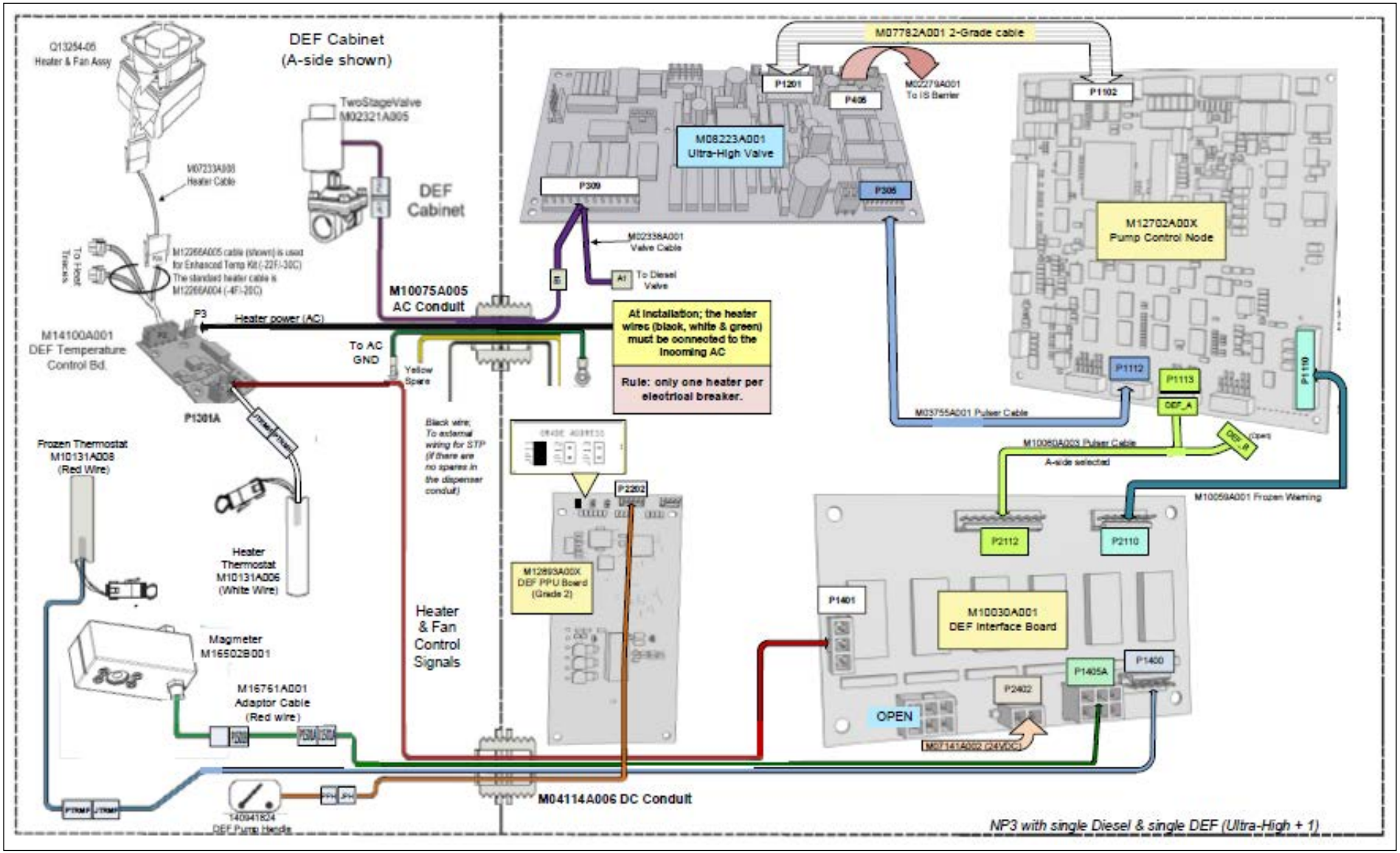


Figure 87: NA4 with Dual DEF (No Diesel)

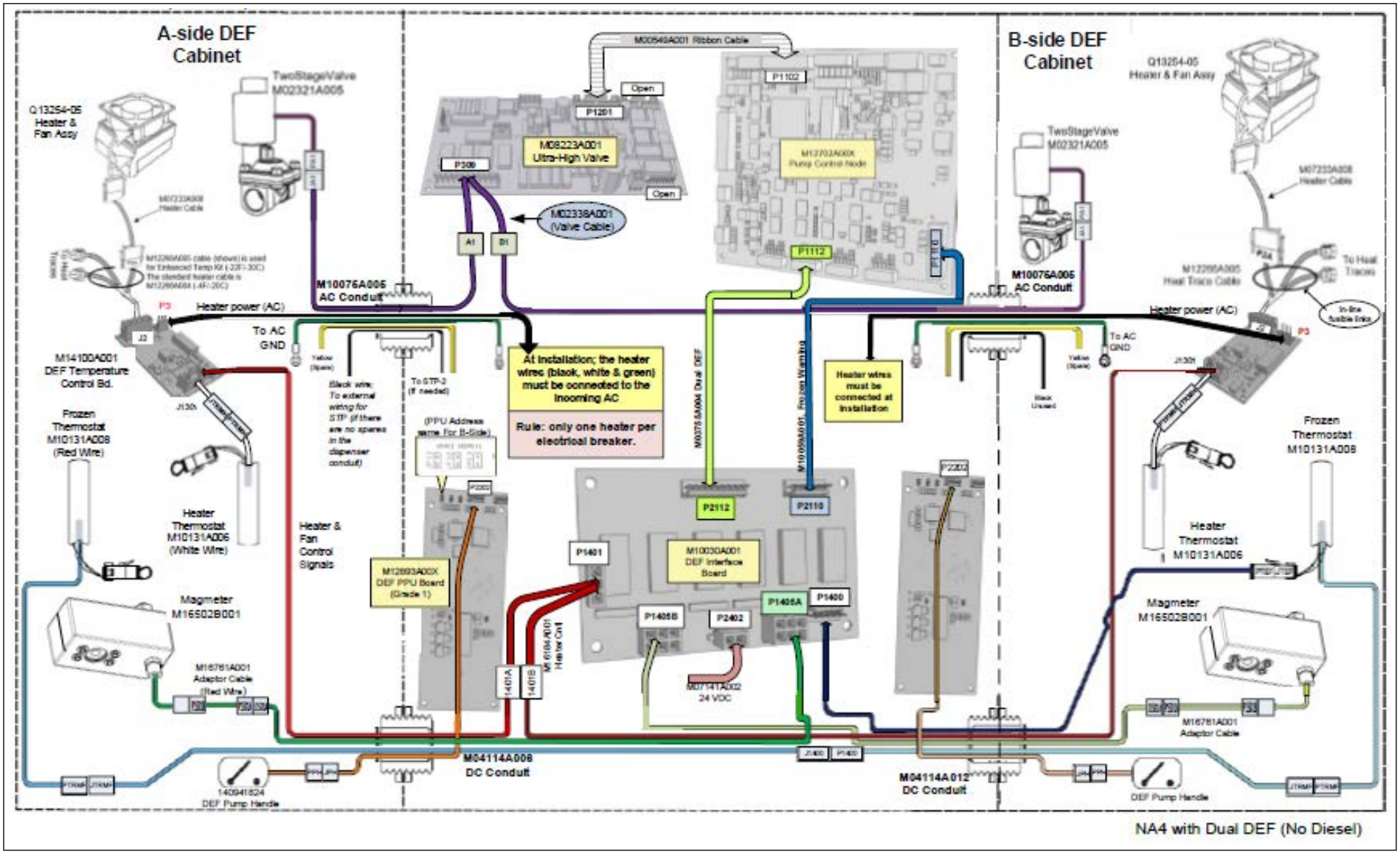
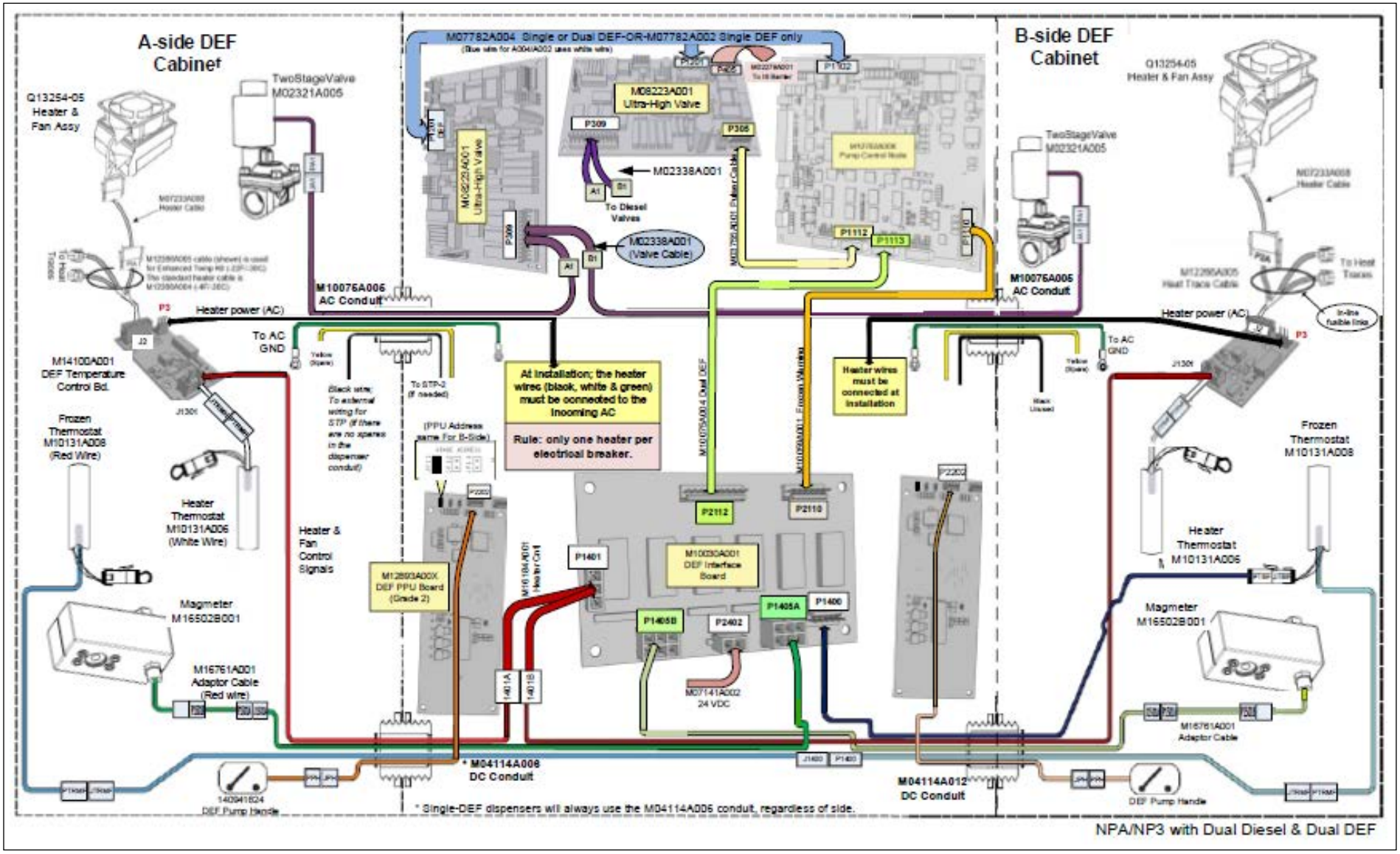


Figure 88: NPA/NP3 with Dual Diesel and Dual DEF



Appendix C: DEF Retrofit Kit Wiring Diagrams

Note: For proper wiring for independent or simultaneous operation, refer to FE-363 Field Wiring Diagram Encore Series.

Figure 89: DEF Retrofit Kit Wiring Diagram 1

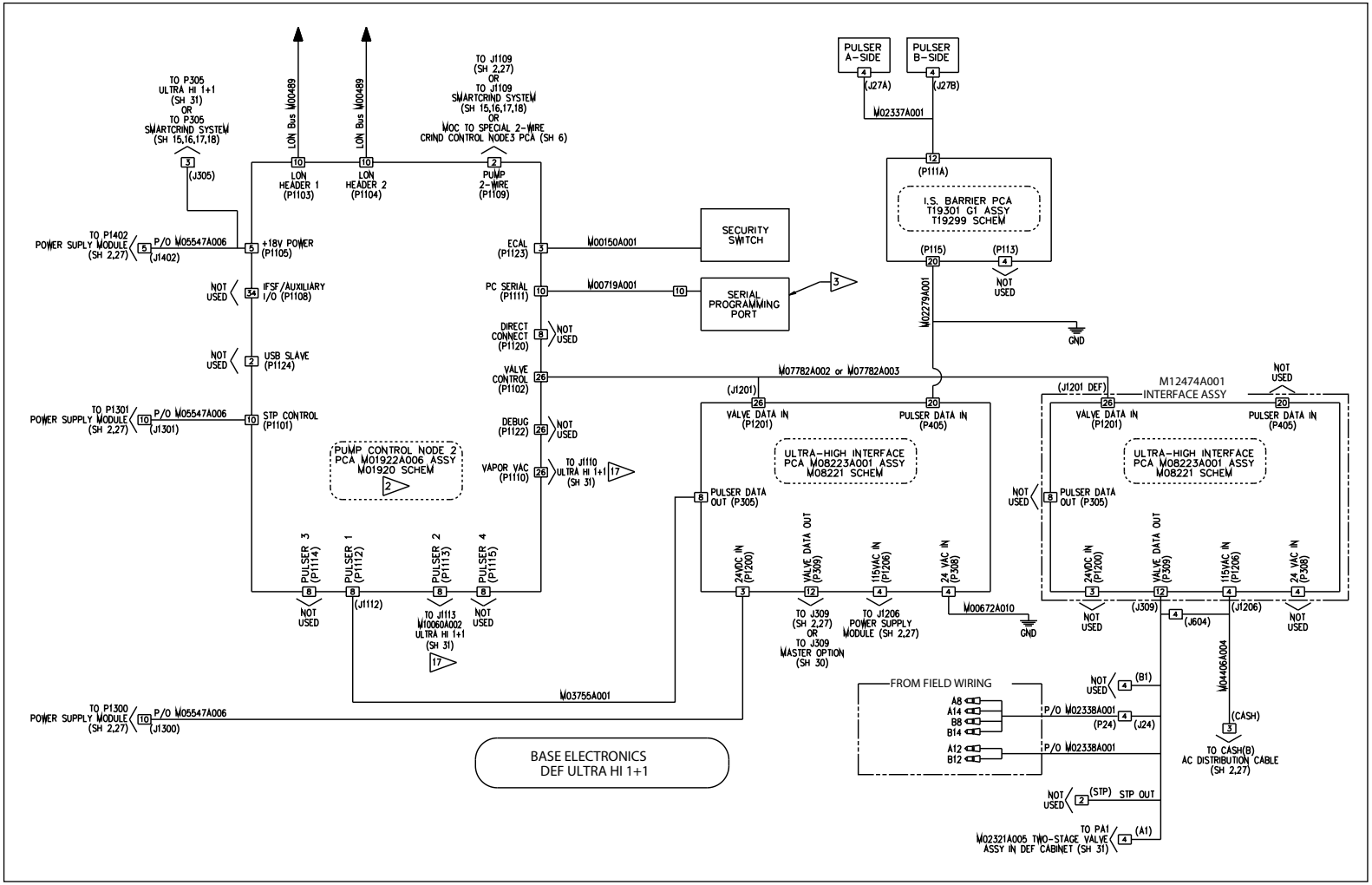


Figure 90: DEF Retrofit Kit Wiring Diagram 2

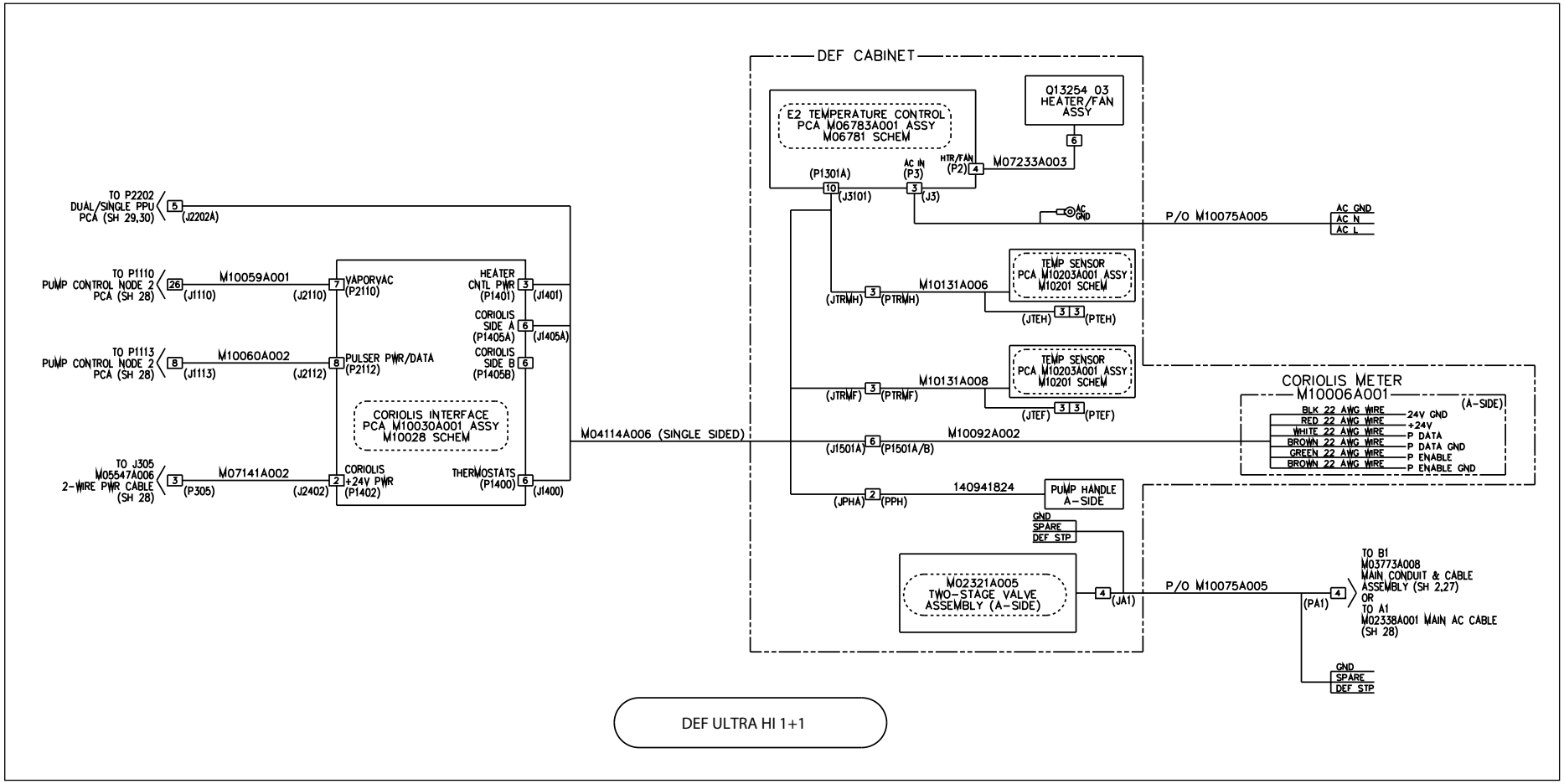


Figure 91: DEF Retrofit Kit Wiring Diagram 3

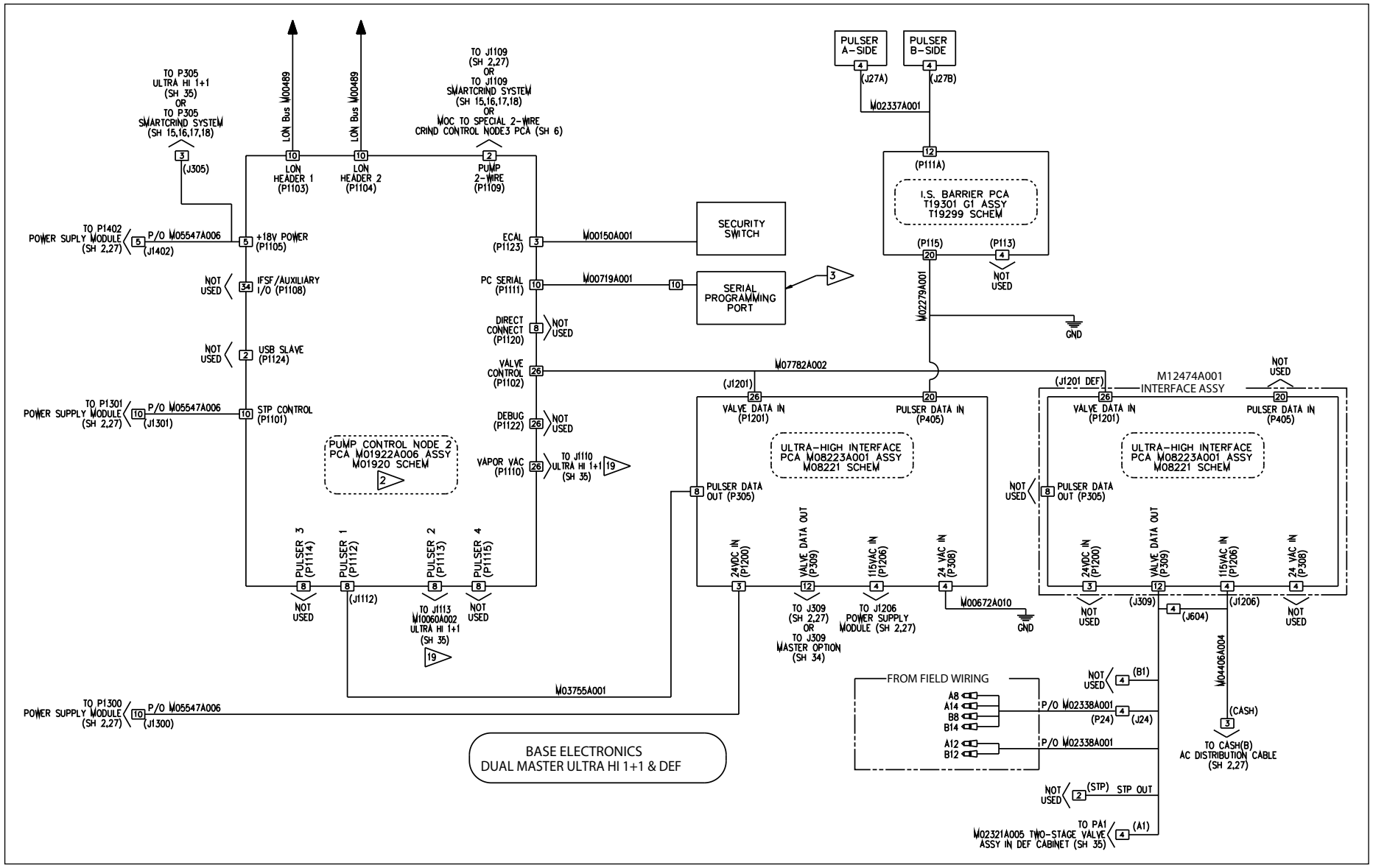


Figure 92: DEF Retrofit Kit Wiring Diagram 4

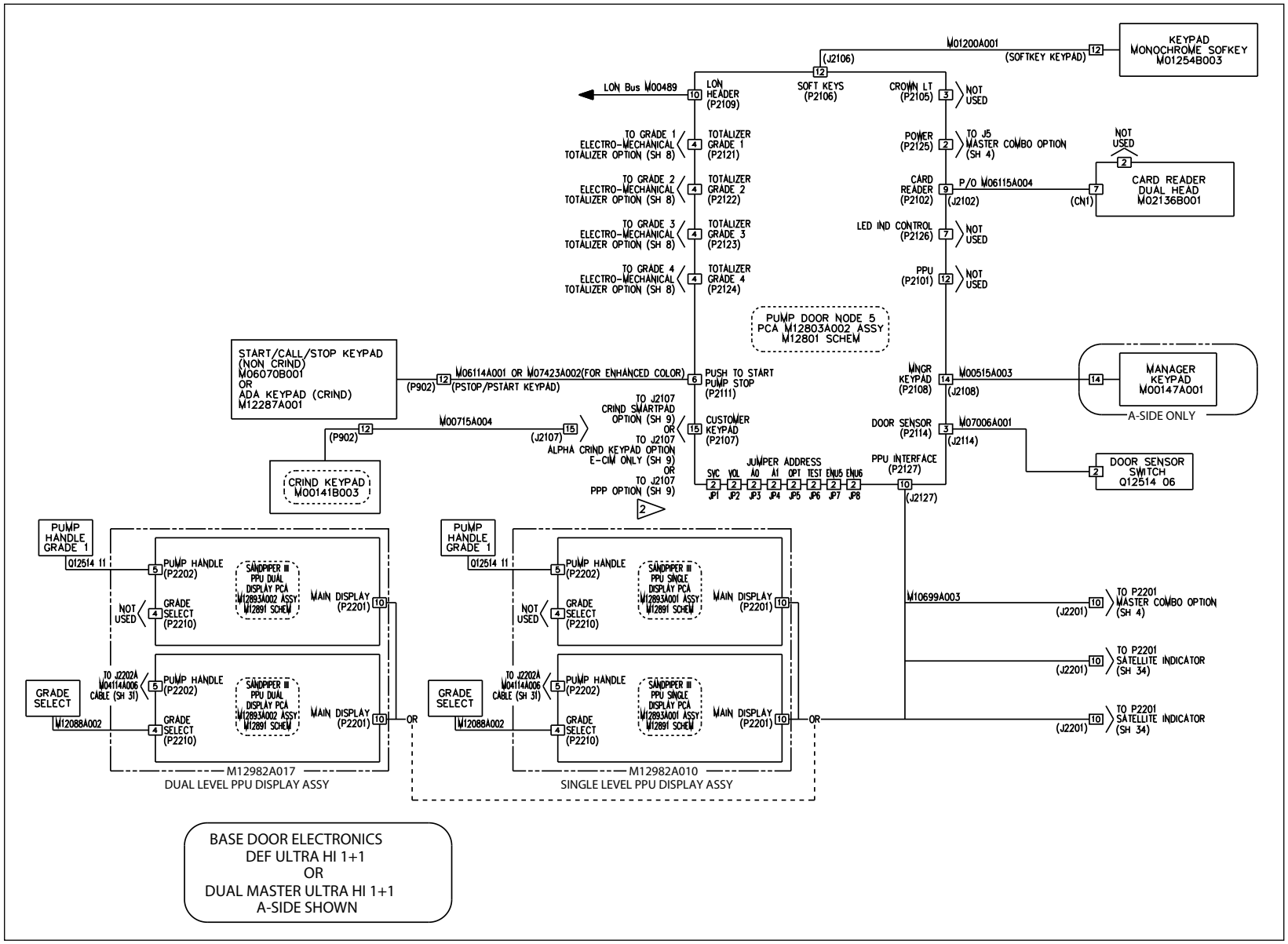


Figure 93: DEF Retrofit Kit Wiring Diagram 5

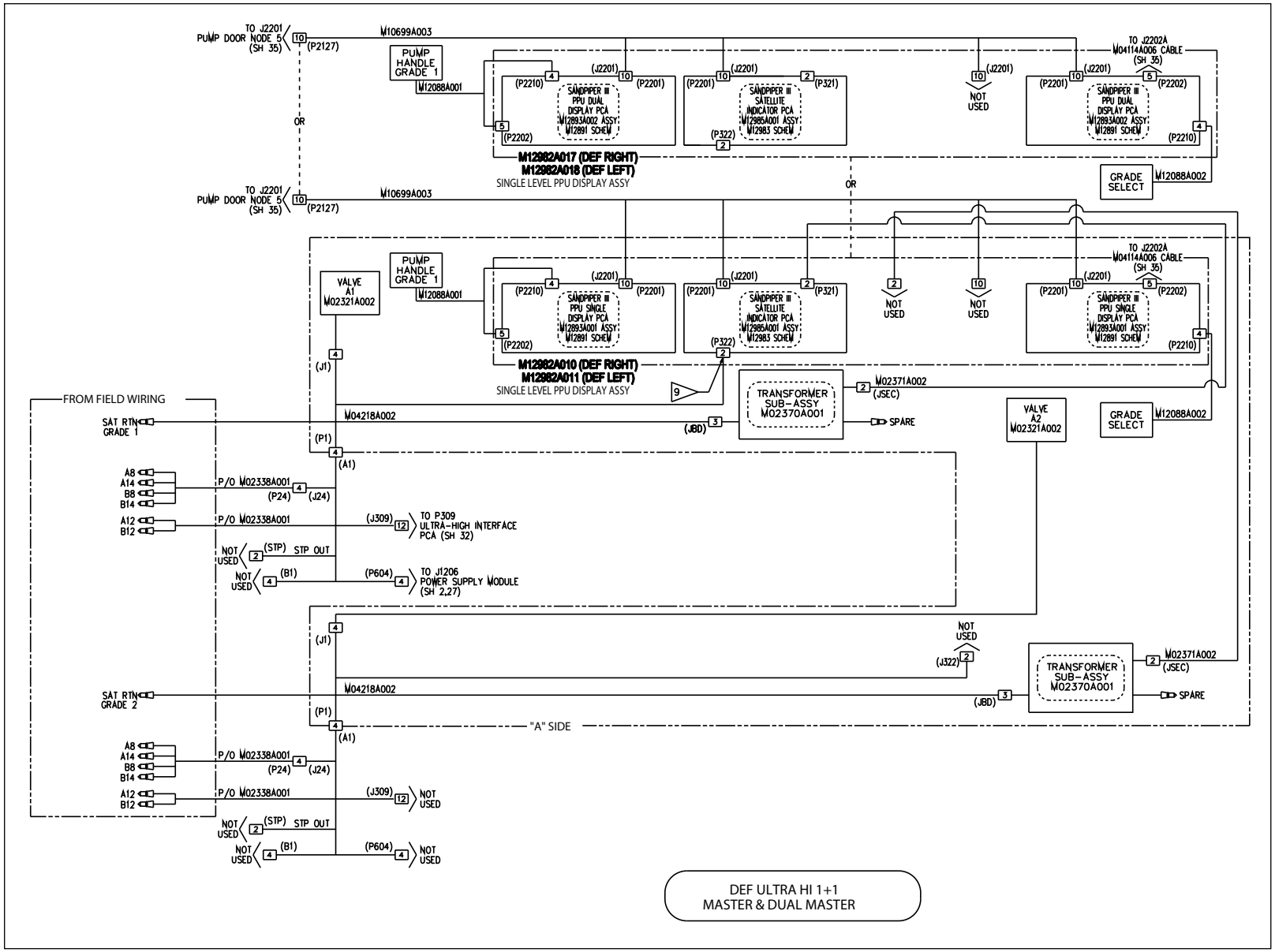


Figure 94: DEF Retrofit Kit Wiring Diagram 6

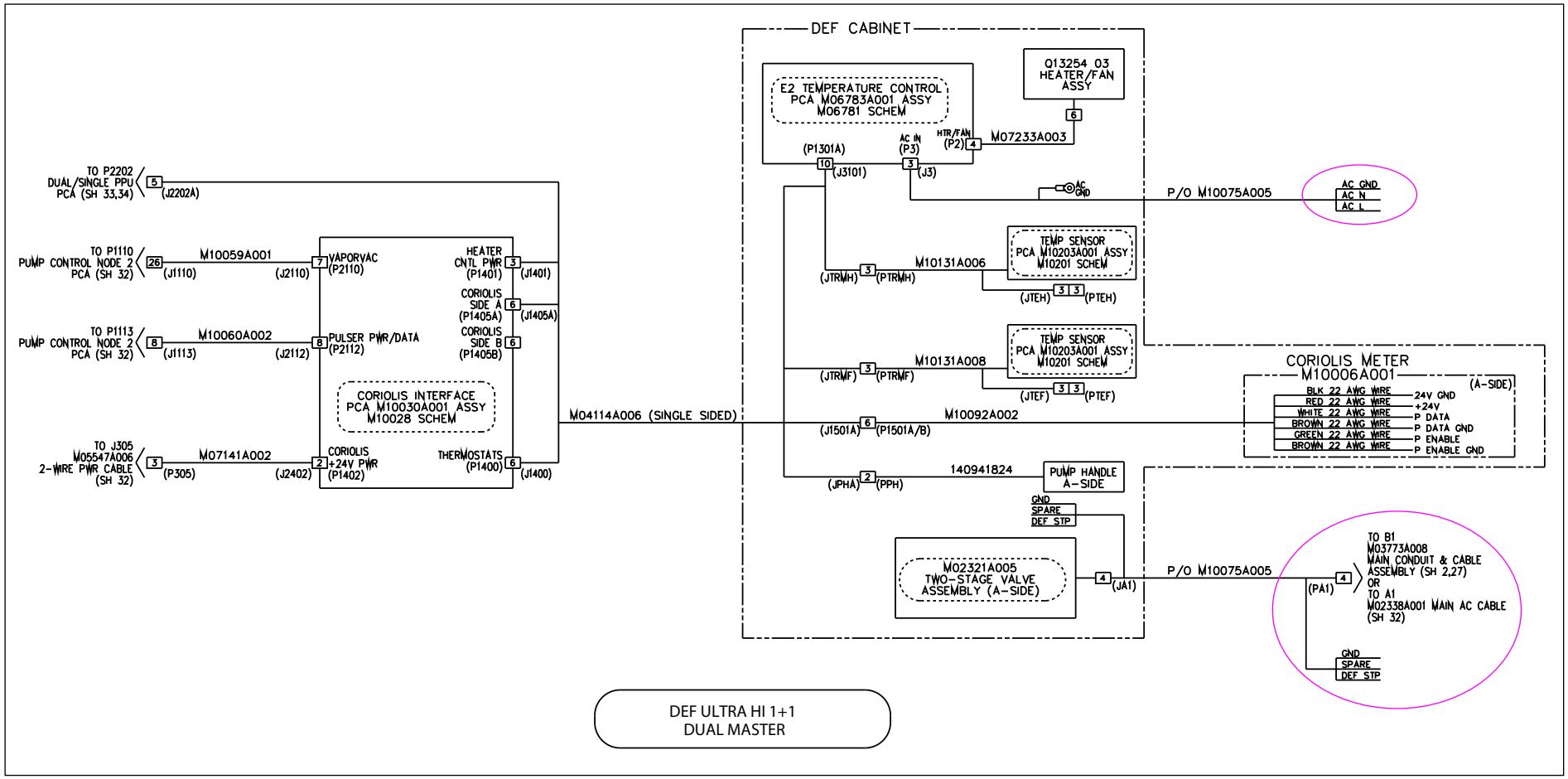


Figure 95: DEF Retrofit Kit Wiring Diagram 7

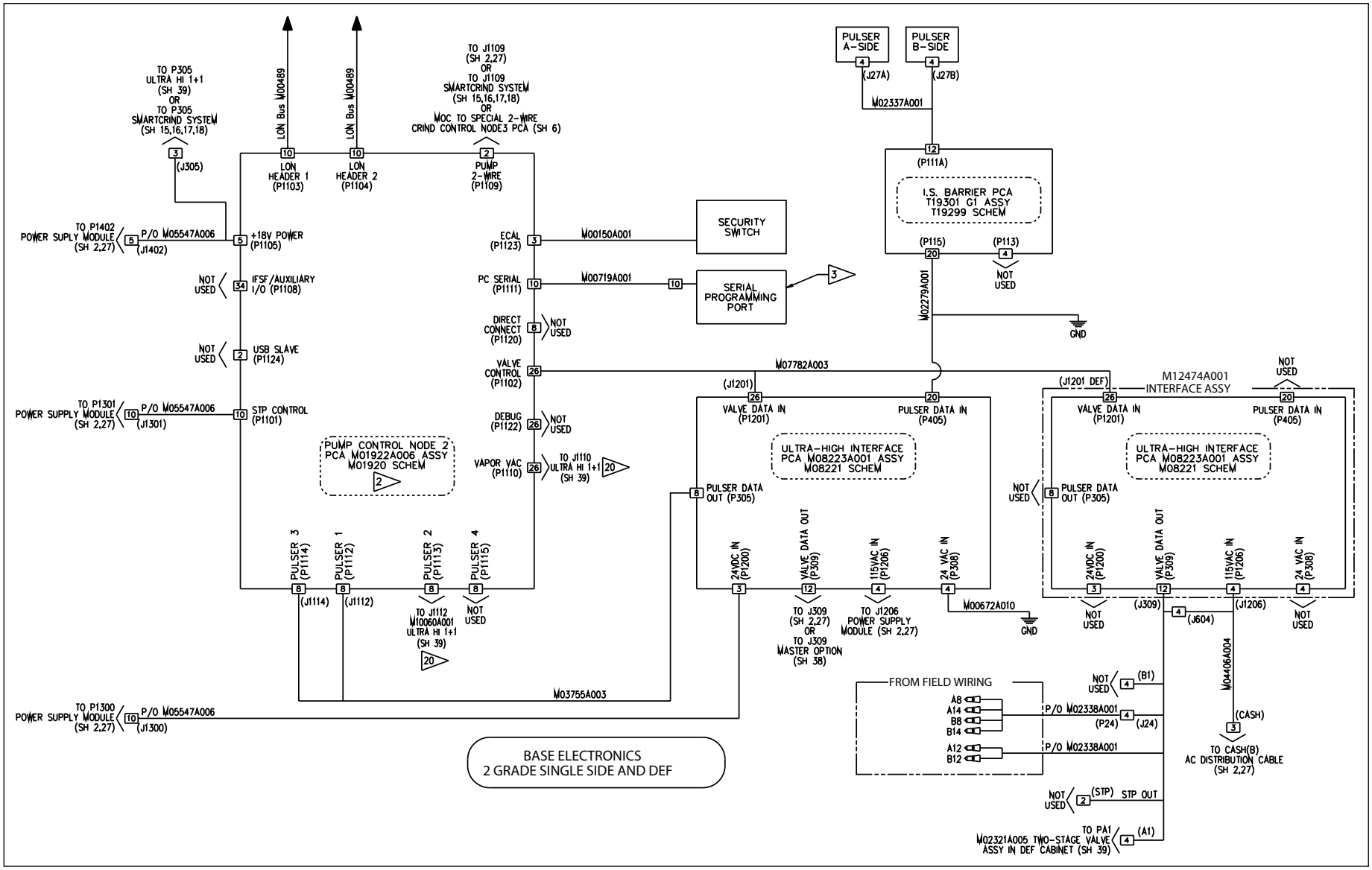


Figure 96: DEF Retrofit Kit Wiring Diagram 8

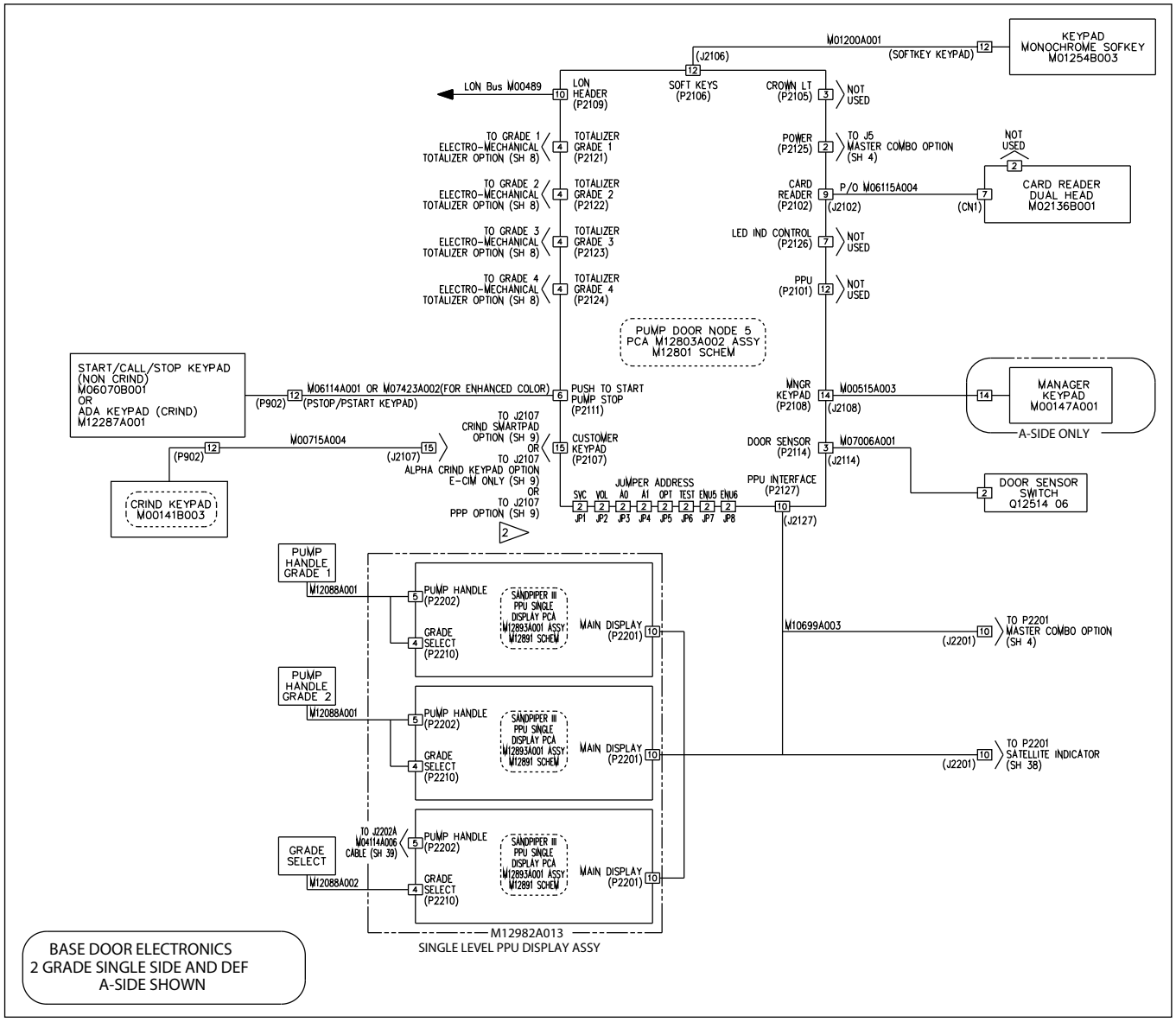


Figure 97: DEF Retrofit Kit Wiring Diagram 9

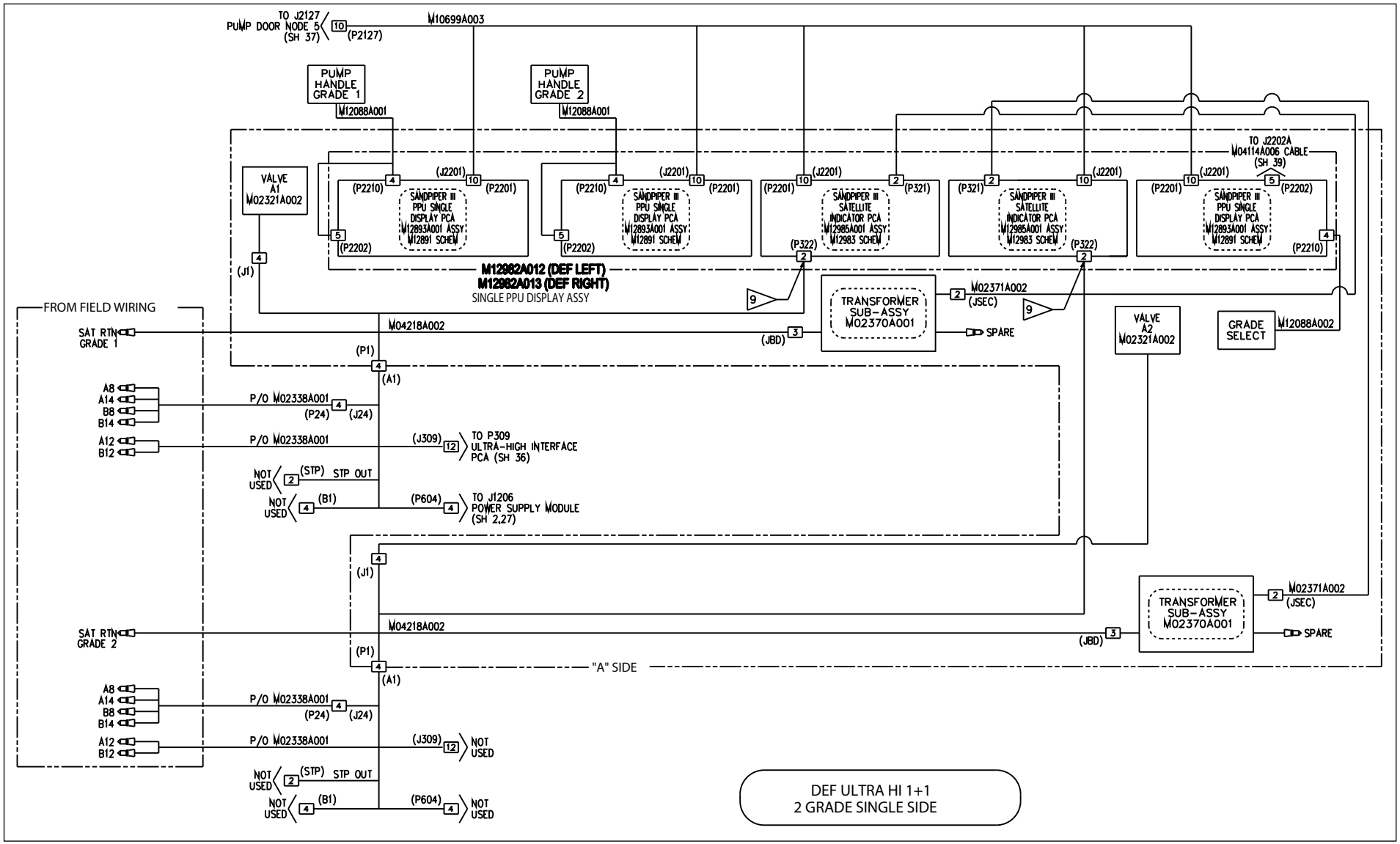


Figure 98: DEF Retrofit Kit Wiring Diagram 10

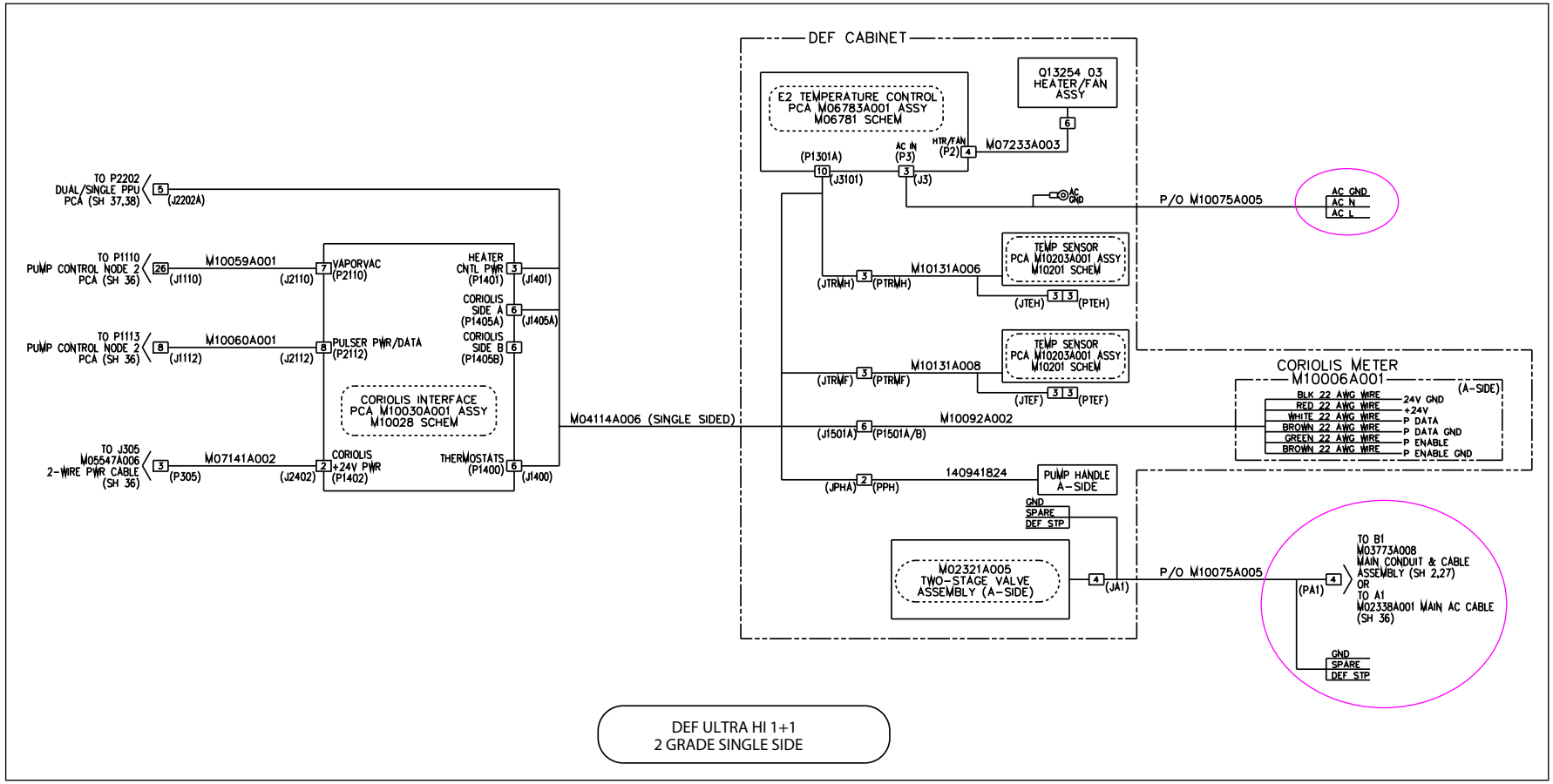


Figure 99: DEF Retrofit Kit Wiring Diagram 11

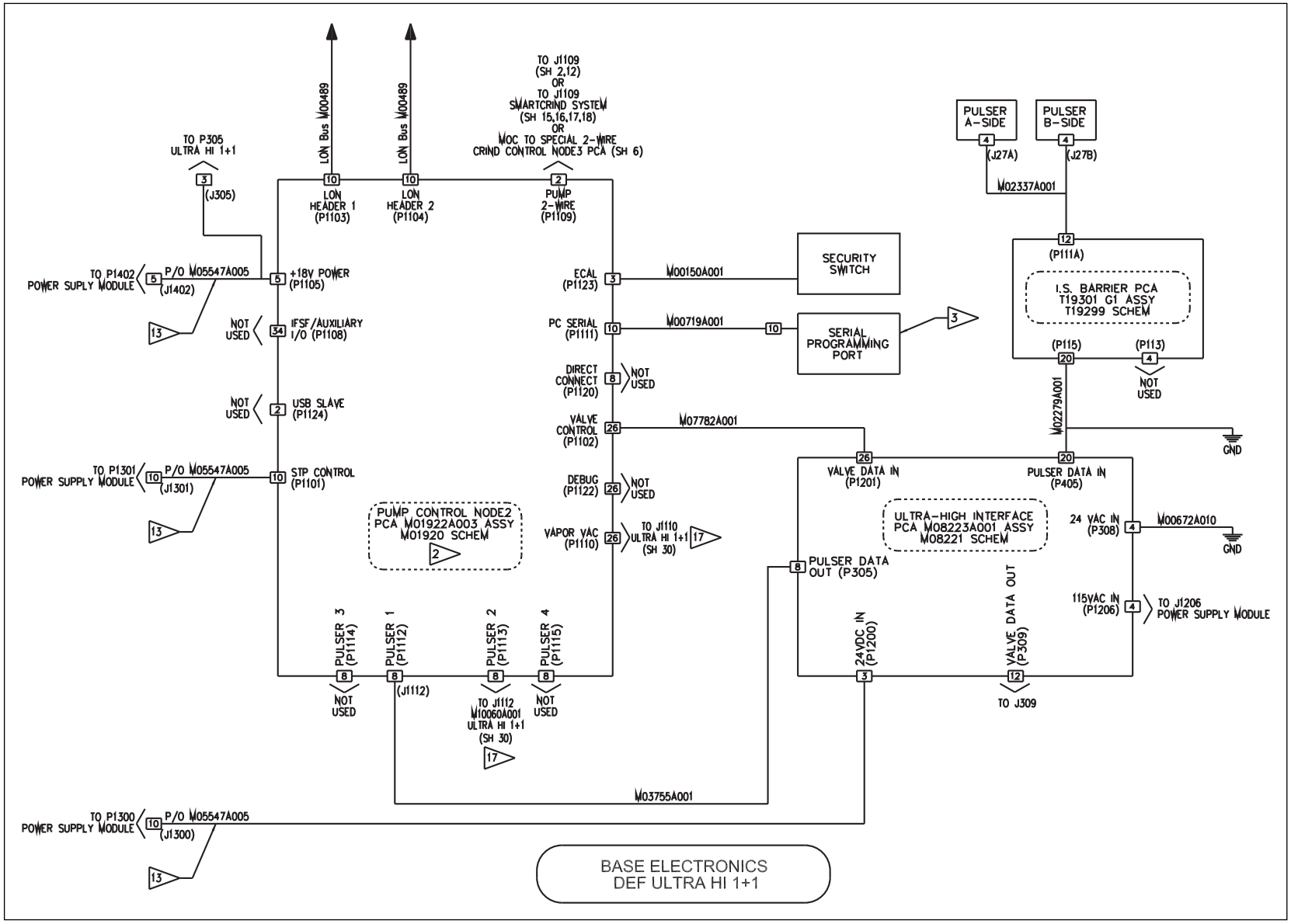


Figure 100: DEF Retrofit Kit Wiring Diagram 12

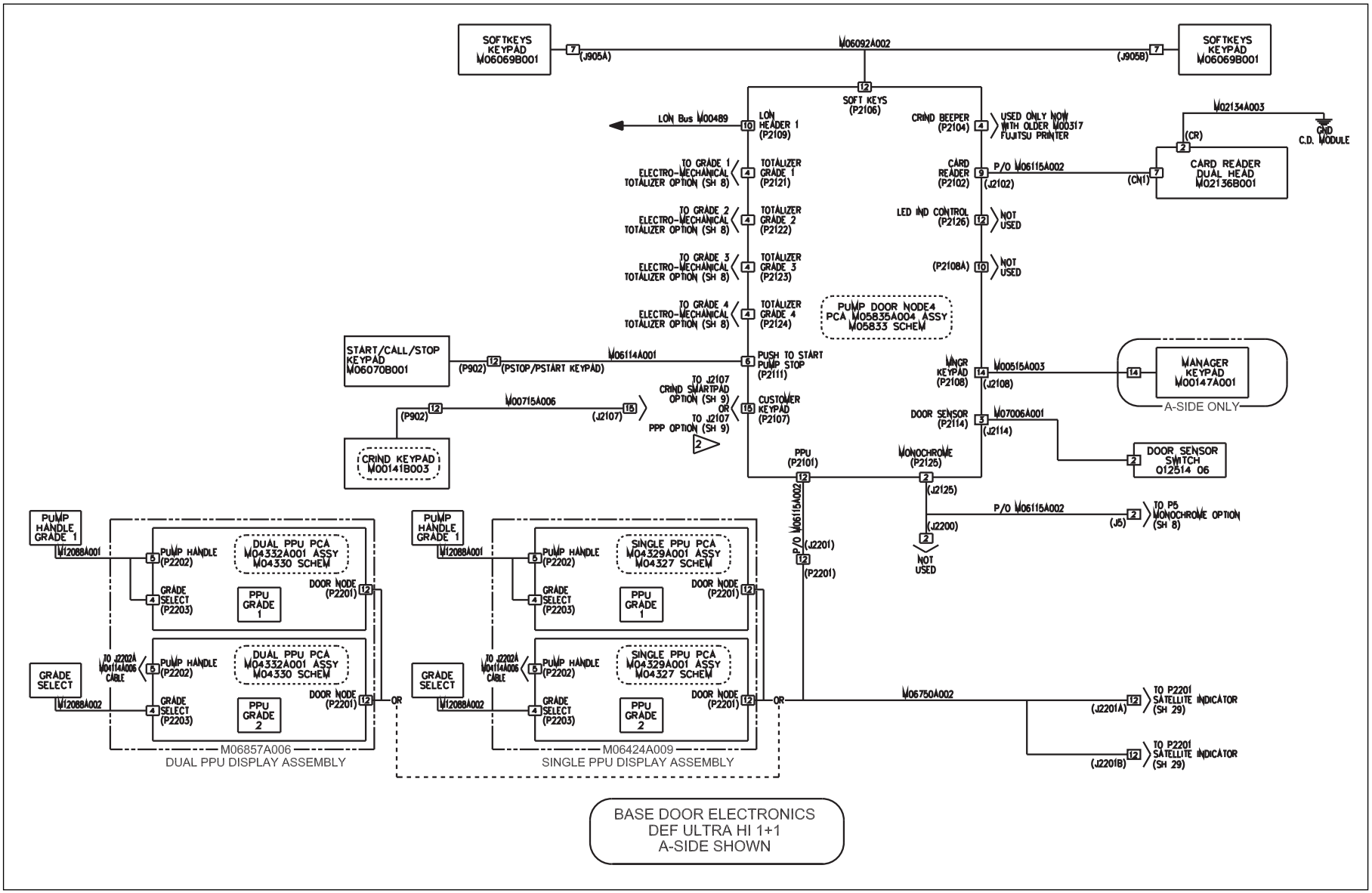


Figure 101: DEF Retrofit Kit Wiring Diagram 13

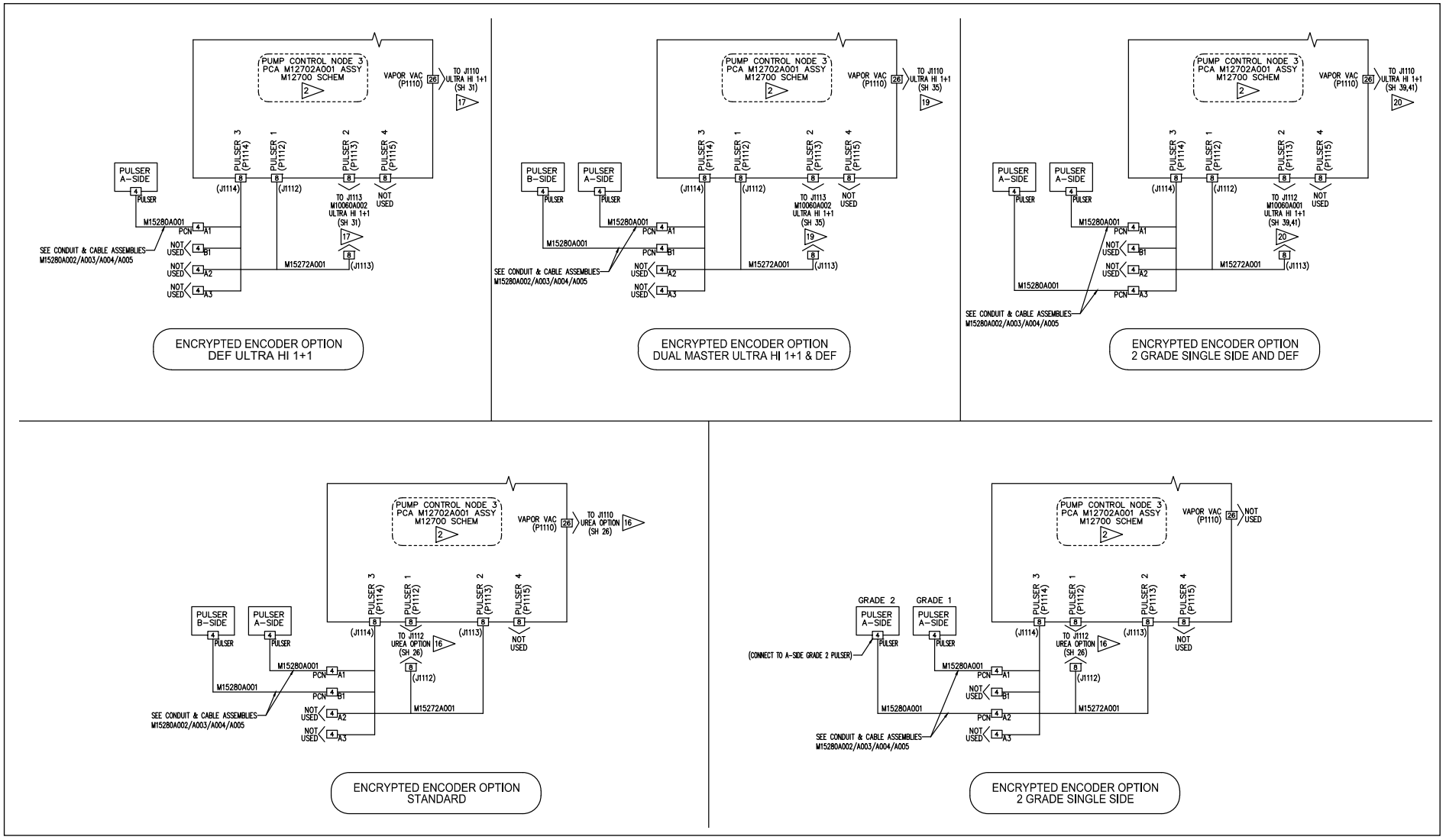
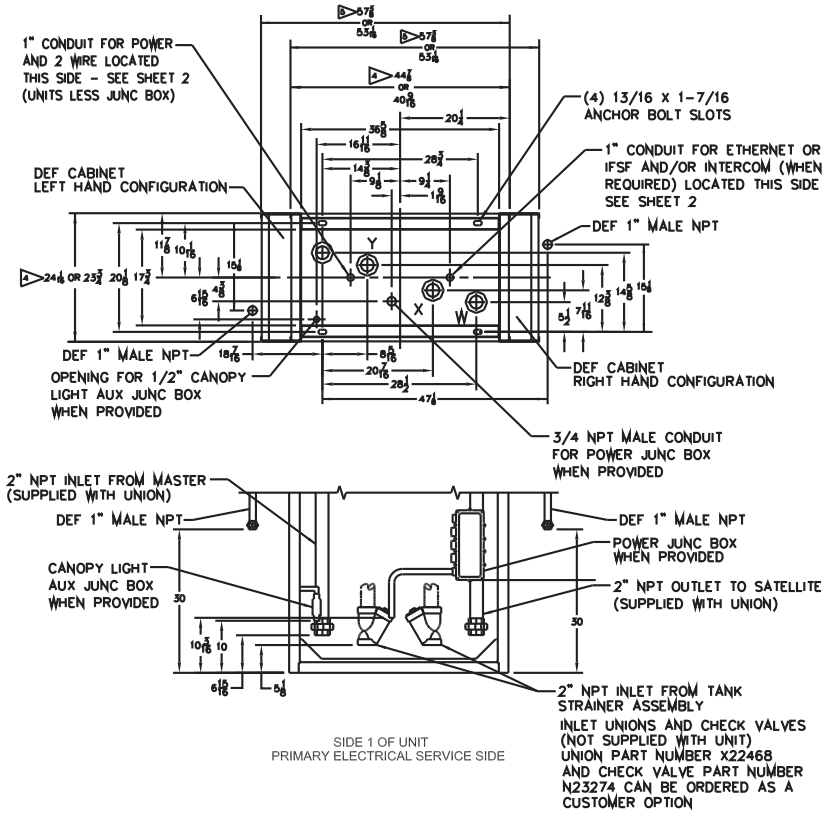
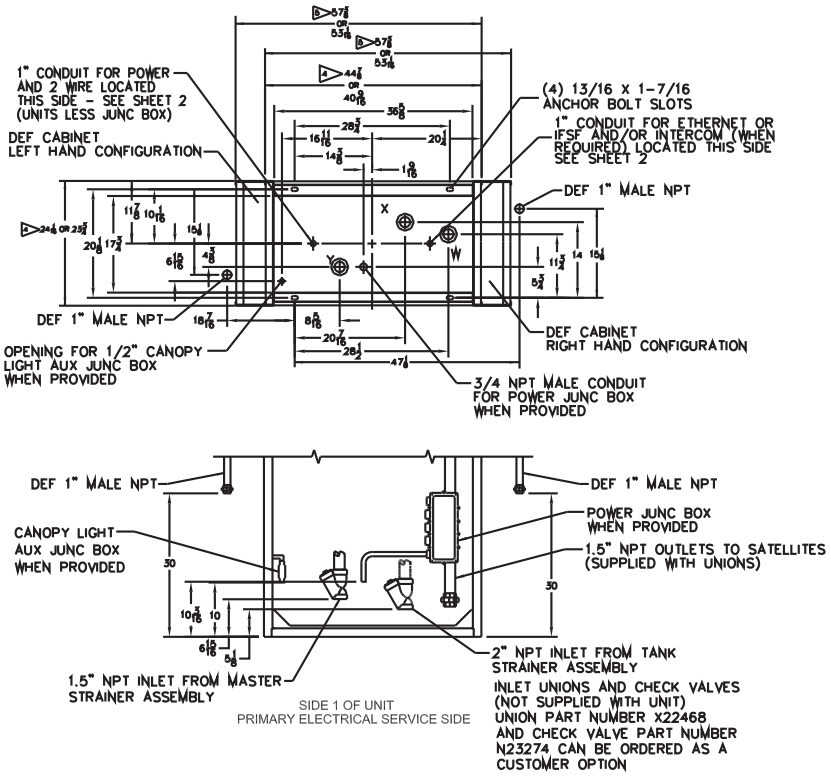


Figure 102: DEF Retrofit Kit Wiring Diagram 14



STANDARD FOOTPRINT

POSITION	1 GRADE 1 HOSE SINGLE MASTER	1 GRADE 2 HOSE DUAL MASTER
W	OUTLET TO SATELLITE - SIDE 1	OUTLET TO SATELLITE - SIDE 1
X	INLET FROM TANK - SIDE 1	INLET FROM TANK - SIDE 1
Y	NOT USED	INLET FROM TANK - SIDE 2
Z	NOT USED	OUTLET TO SATELLITE - SIDE 2



NEW FOOTPRINT

POSITION	1 GRADE 1 HOSE SINGLE MASTER
W	OUTLET TO SATELLITE - SIDE 1
X	INLET FROM TANK - SIDE 1
Y	NOT USED
Z	NOT USED

ULTRA HI MASTER - MODEL NO. NPA & NA4

(DIMENSIONS ARE IN INCHES)

Appendix D: Crossover Adapter Installation

Crossover adapter system allows single inlet per dual DEF unit. System works for either ground entry (per foundation drawing) or for overhead entry.

Each 2-sided DEF system includes the following kit parts:

- M17478K001
- KIT
- DEF
- Crossover Adapter

Number	Name	Quantity
M10226B101	Hose, Outlet, DEF Encore	1
M10263B032	Inlet Hose Insulation	3
M12321A004	Cable Heater Hose	1
Q10178-10	Tie Cable Nylon	50

System includes heated insulated hose adapter assembly that is installed inside the upper housing to provide DEF supply from one end of unit to the second DEF hydraulic.

Notes: 1) The Pit Box DEF supply is not approved, until the release date of the document. Connections within the Pit Box are subjected to approval from the local Fire Marshal.

2) Use connections supplied at the end of the unit. Ensure not to drill through barrier between lower cabinet and DEF hydraulic area.

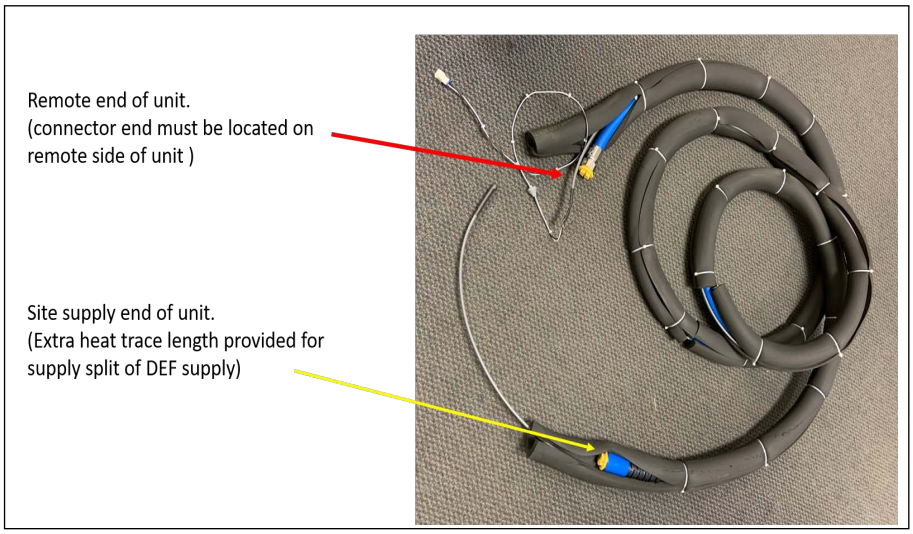
3) Approvals are underway to use DEF-rated flex hose from Pit Box, up column, and connect within DEF hydraulics (no drilling required).

4) DEF heat trace is to be used from the DEF hydraulic area, down the supply hose to under cabinet area (no connections allowed, below 48-inches height within columns or below cabinet area).

To complete installing the DEF Crossover Adapter in Encore 500/700/S units, proceed as follows:

1 If not already opened, remove the top cover of the unit and end sheathing.

Figure 101: Crossover Adapter

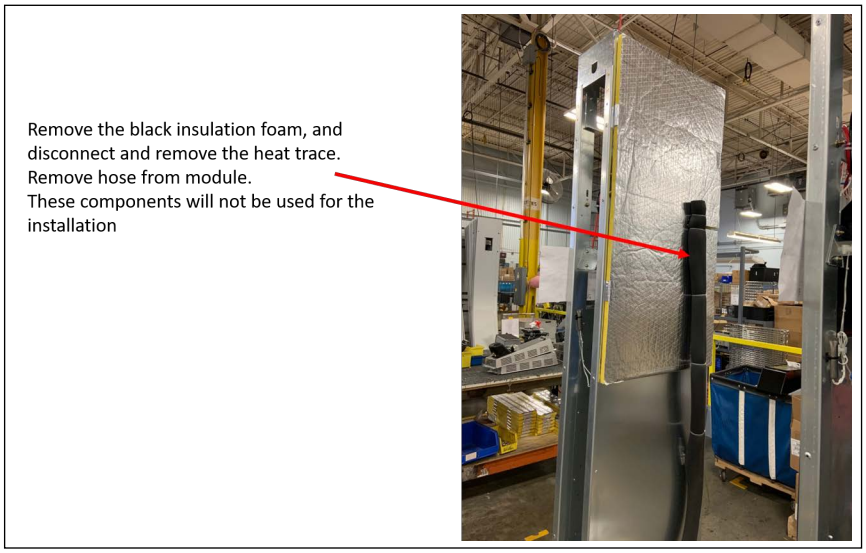


2 Create a pipe split on the incoming DEF supply line. It is recommended to utilize separate ball valves for each line after the split. This is the supply side of the unit; the other end of the unit is the remote end DEF unit.

3 Connect the supply side inlet hose to one end of the incoming supply-line split.

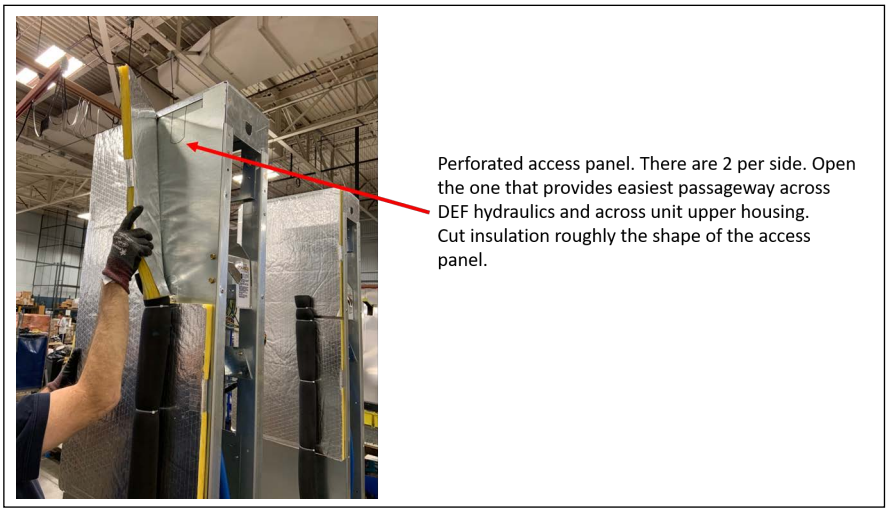
4 On the remote end, remove the black hose insulation, the heat trace (disconnect plug), and the DEF hose. The parts are no longer required for this installation.

Figure 102: Remote Side of Dual DEF Module



5 For both ends of the unit. Open one access panel per end of unit. Select from the 2 perforated access panels that allow easiest pathway across top of DEF module and the Encore upper housing.

Figure 103: Access for Crossover Adapter for both ends of unit



6 Starting from the remote end of the unit, feed the supplied DEF hose through the opened access panel, run across the top of the DEF module, through to the upper housing of the unit and across to the supply side DEF cabinet. The line should run through the supply end DEF cabinet access panel opening. Allow crossover hose to lay across upper housing. Connect both ends to the fittings. (remote DEF inlet and the second connector on the split supply line).

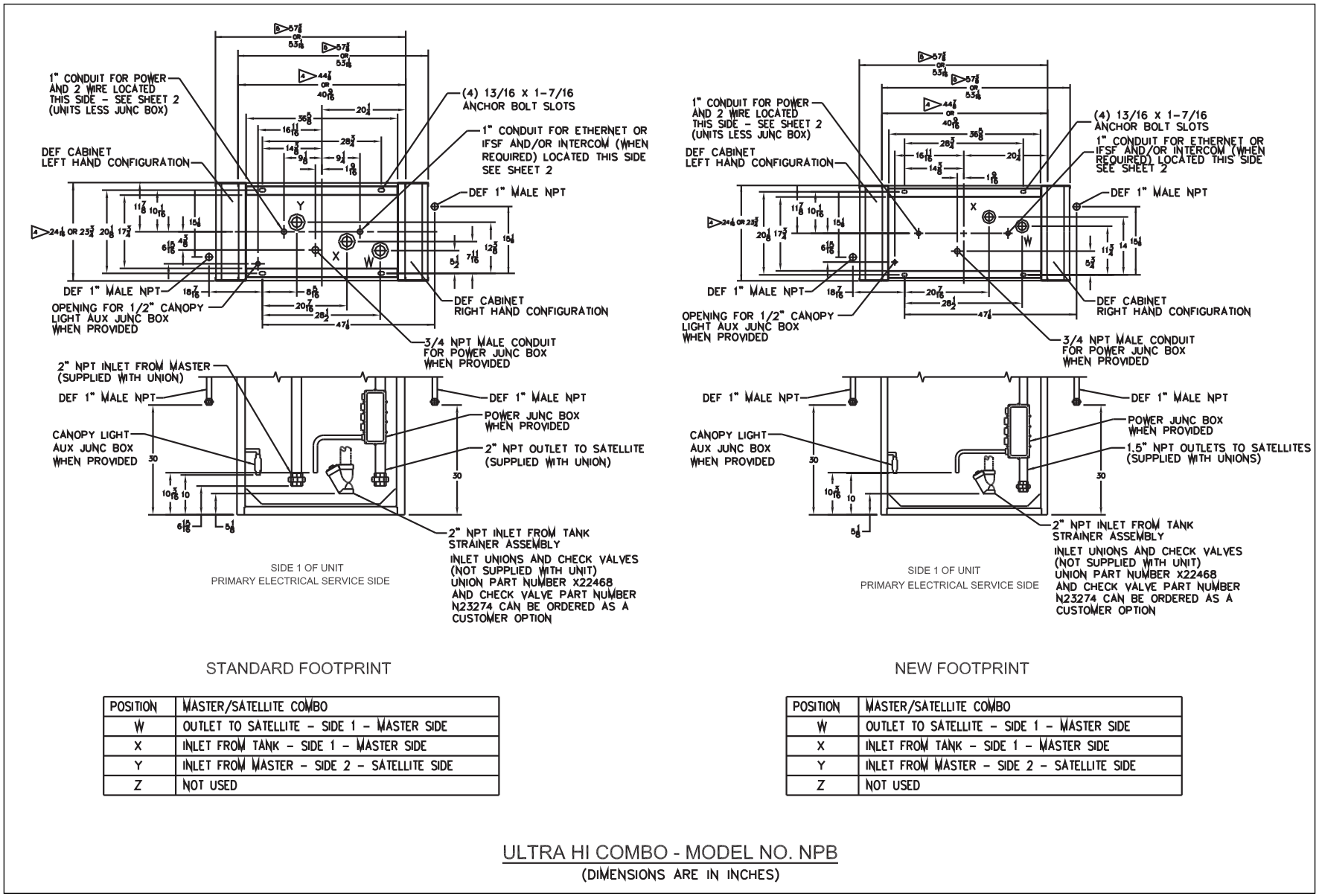
7 Connect the supplied heat trace into the remote DEF cabinet where the original (short) heat trace cable was connected. Feed the electrical connector of the heat trace through the panel and connect where the original heat trace was removed. Verify that the splitter cable in the remote DEF cabinet is the M12266A005 for enhanced heat. For standard heat (2 way splitter cable) the M12266A004 should be Rev F or later for proper fuse amperage levels.

8 Starting at the remote DEF inlet connection, zip tie the heat trace every 6-8” to the hose all the way across the unit to the split inlet connection. Loop extra heat trace around inlet split and valves. Zip tie tightly to piping, but allow valve functionality.

9 Using the black hose insulation, start at the remote DEF cabinet inlet and cover with the insulation and zip tie every 6-8”. Use additional hose insulation pieces to cover the whole hose to the supply end inlet splitter. Make sure there are no gaps between hose insulation pieces.

To complete assembly, zip tie Crossover Adapter hose assembly to bent over access panel on both ends of the DEF modules. Cover all exposed openings and piping with insulation. Unit is now ready to be completed.

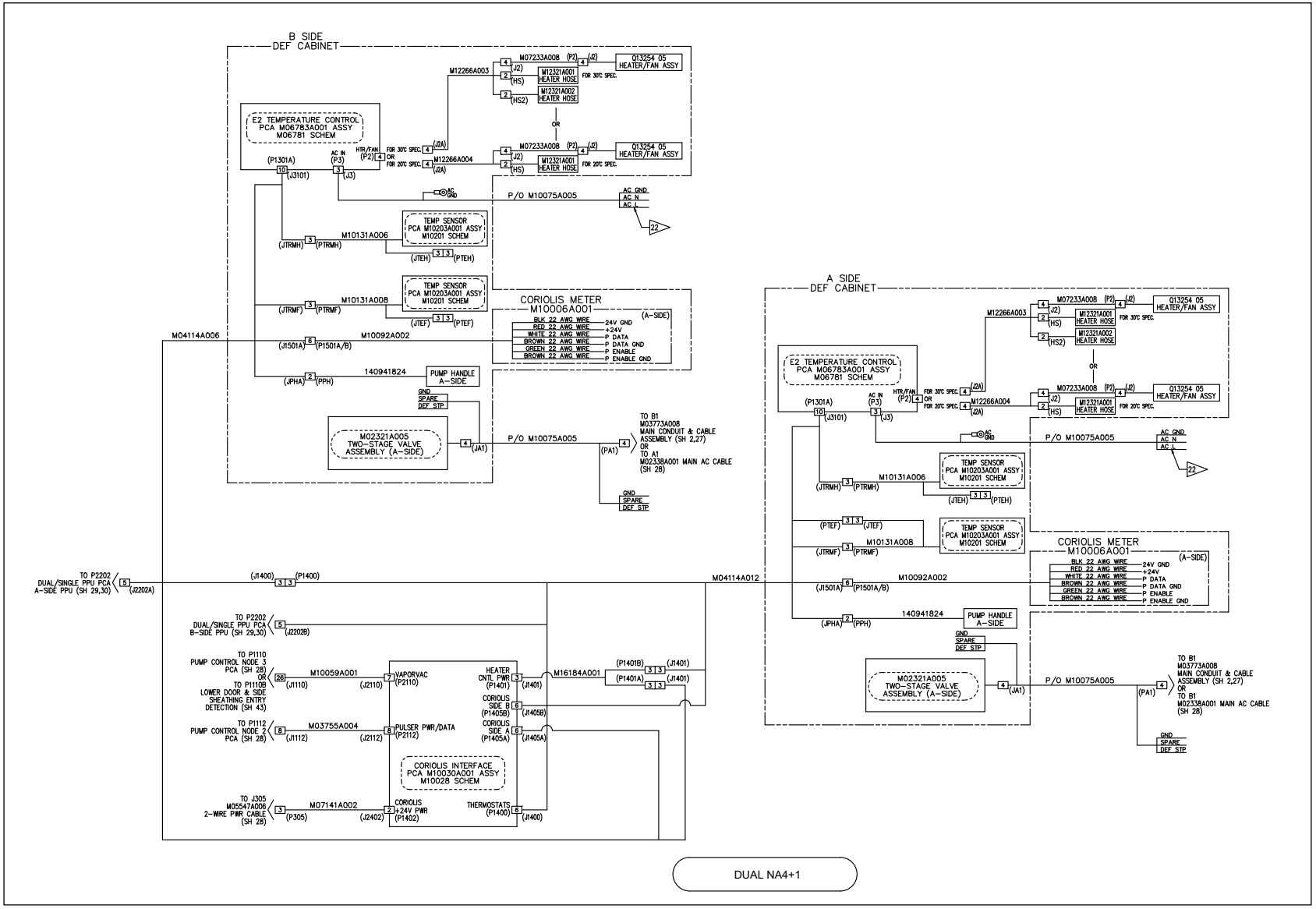
Figure 103: Ultra-Hi Combo - Model NPB



POSITION	MASTER/SATELLITE COMBO
W	OUTLET TO SATELLITE - SIDE 1 - MASTER SIDE
X	INLET FROM TANK - SIDE 1 - MASTER SIDE
Y	INLET FROM MASTER - SIDE 2 - SATELLITE SIDE
Z	NOT USED

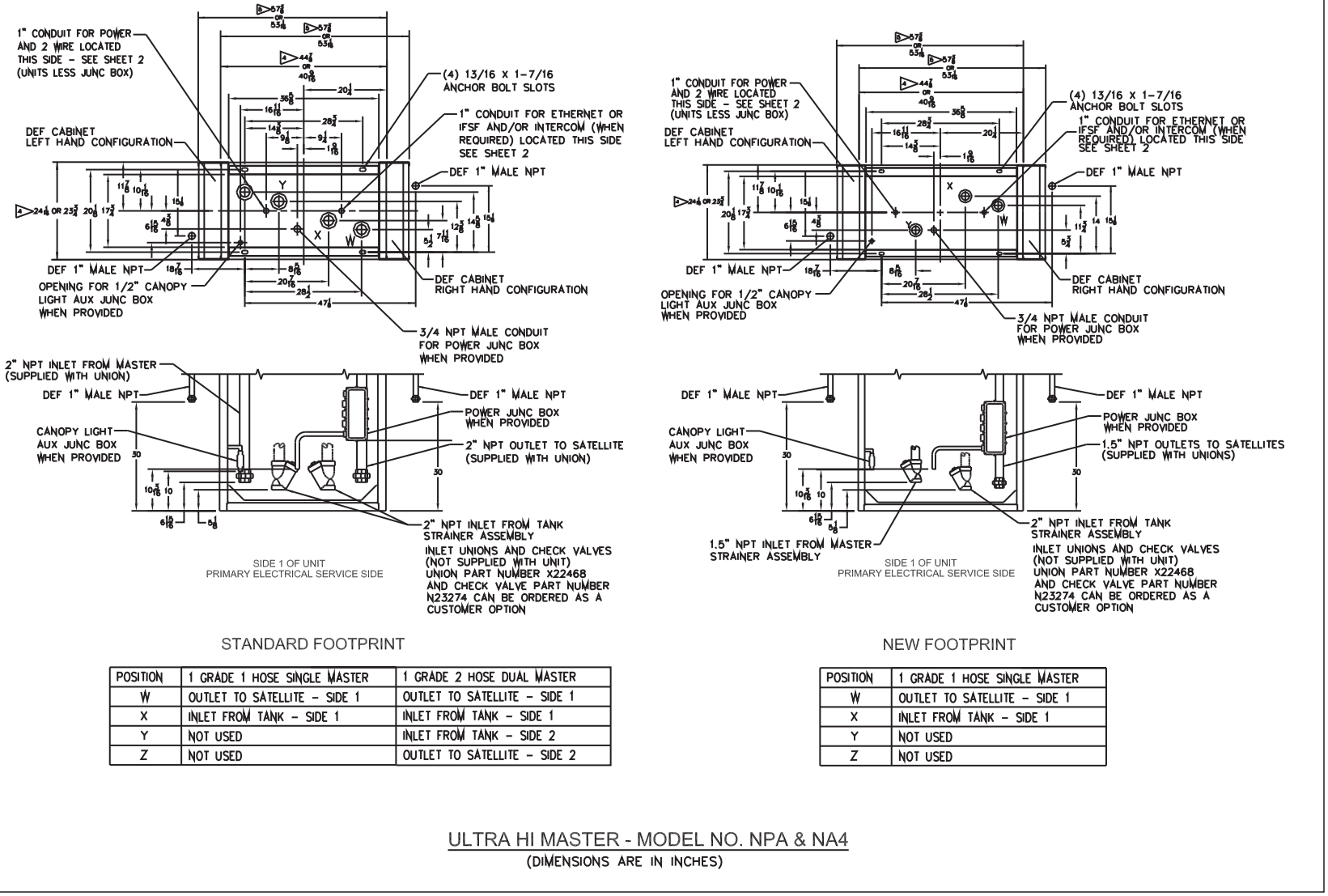
POSITION	MASTER/SATELLITE COMBO
W	OUTLET TO SATELLITE - SIDE 1 - MASTER SIDE
X	INLET FROM TANK - SIDE 1 - MASTER SIDE
Y	INLET FROM MASTER - SIDE 2 - SATELLITE SIDE
Z	NOT USED

Figure 104: Ultra-Hi Combo - Dual NA4+1



Appendix E: Ultra-Hi DEF+1 Foundation Diagrams

Figure 105: Ultra-Hi Master - Model NPA and NA4



POSITION	1 GRADE 1 HOSE SINGLE MASTER	1 GRADE 2 HOSE DUAL MASTER
W	OUTLET TO SATELLITE - SIDE 1	OUTLET TO SATELLITE - SIDE 1
X	INLET FROM TANK - SIDE 1	INLET FROM TANK - SIDE 1
Y	NOT USED	INLET FROM TANK - SIDE 2
Z	NOT USED	OUTLET TO SATELLITE - SIDE 2

POSITION	1 GRADE 1 HOSE SINGLE MASTER
W	OUTLET TO SATELLITE - SIDE 1
X	INLET FROM TANK - SIDE 1
Y	NOT USED
Z	NOT USED

Appendix F: Encore-Dual Ultra-Hi Flow (UHF) DEF

Figure 106: DEF Basic Dimensions

TABLE OF DEF BASIC DIMENSIONS

		BASE OF UNIT			TOP OF UNIT
MODEL	FEATURE	NO SHEATHING	SQUARE SHEATHING	'S' CURVE / TUXEDO	UPPER COVER
NON DEF (STD AND UHF)	LENGTH	40 3/8	40 11/16	44 13/16	45 1/8
	WIDTH	23 3/4	23 15/16	24 3/32	29 5/16
SINGLE DEF (STD AND UHF)	LENGTH	56 9/32	56 1/2	58 15/32	60 3/16
	WIDTH	23 15/16	24 1/32	24 3/32	29 5/16
DUAL DEF (STD AND UHF)	LENGTH	61 3/8	72 3/16	72 3/16	73 27/32
	WIDTH	23 3/4	24 1/32	24 1/32	29 5/16

DO NOT SCALE 1023197 SHT NO. 6 OF 21 M01432 REV AC

Figure 107: Encore 2 Sided DEF, Standard Flow or UHF Encore Models

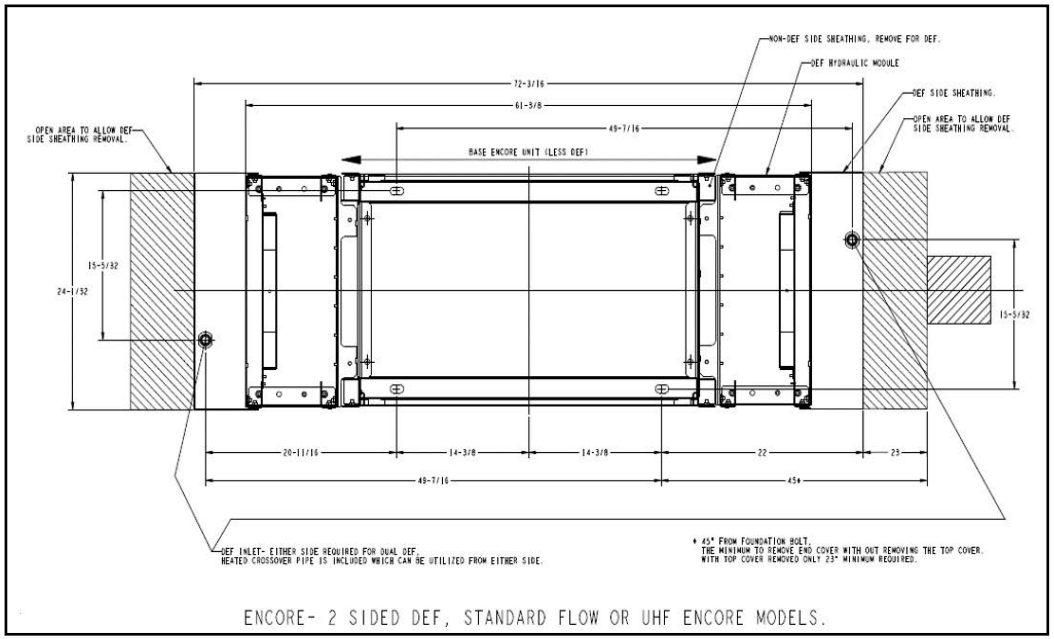
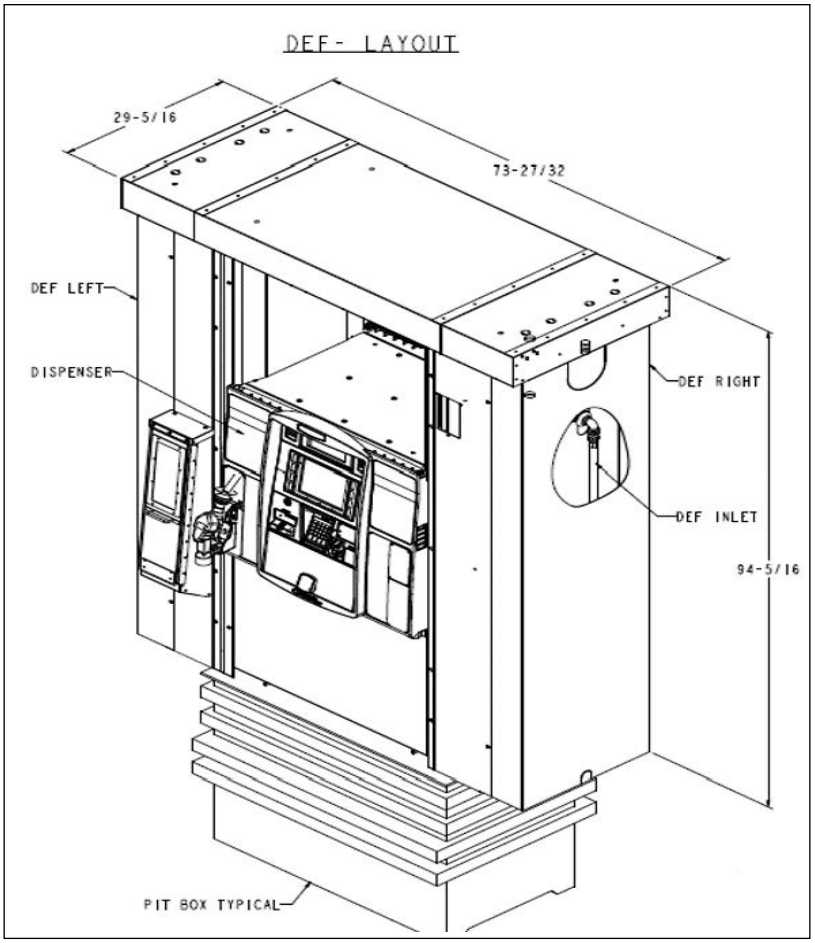


Figure 108: DEF Layout

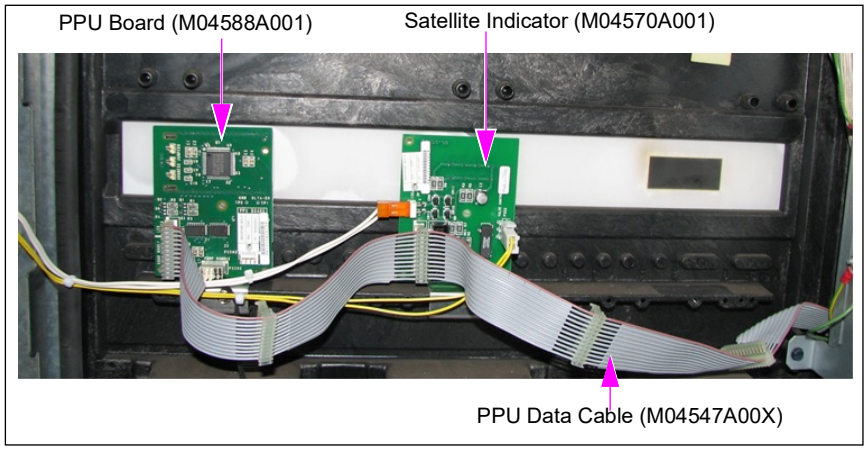


Appendix G: Installing PPU Board

Notes: 1) DEF installation requires a new PPU for the DEF grade. However, the PPU Board (M04588A001) is no longer available. The M04588A001 PPU Board will be replaced by M12855A001 PPU Board and the SP III Door Node 5 PCA (M13170A001).

2) The old PPU Board (M04588A001) and the new PPU Board (M12855A001) are not interchangeable and cannot be used on the same door. The M04588A001 PPU Board must be replaced on the door which has the new DEF PPU. However, the M04570A001 Satellite Indicator Board and its data cable will still be used.

Figure 109: PPU Board Before DEF Installation



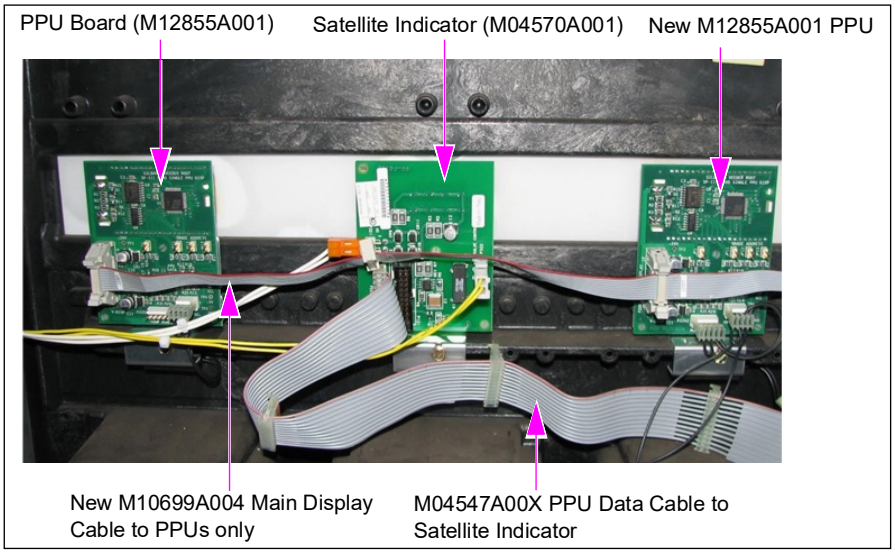
To install the M12855A001 PPU board, proceed as follows:

1 Remove the PPU data cable and pump handle sensor cable from the diesel PPU.

2 Replace the PPU board for the diesel grade and add the M12855A001 PPU Board for the DEF grade. The satellite indicator will be unchanged.

3 Attach the Main Display to PPU Cable (M10699A004) to each PPU, but do not connect to the M04570A001 Satellite Indicator Board.

Figure 110: PPU Board After DEF Installation



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