

Introduction

Purpose

This manual provides instructions to convert the Universal Distribution Box (D-Box):

- From RS-422 to two-wire input for Passport® Point of Sale (POS) systems
- From two-wire to RS-422 for PAM™ 1000 systems

Intended Users

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

IMPORTANT INFORMATION

Do not install this equipment unless you have proper training for installing equipment in a hazardous location.

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Required Tools and Materials

Following are the tools and materials required for the conversion of the Universal D-Box:

- Multimeter
- Needle Nose Pliers
- Phillips® Screwdriver #2

Parts List

Following tables list the parts included in the Conversion Kits:

Conversion Kit Q13241-107

Item	Description	Part Number	Quantity
1	Assembly, Cable Two-wire J905/J102 D-Box	R18810-G1	2
2	Cable, Work Area	Q13850-100	2
3	Gender Mender Assembly, Modular Jack to D-Subminiature (D-Sub)	Q13180-11B	2
4	Assembly, Screw Lock (Connector D-Sub)	Q10437-07	4

Conversion Kit Q13241-118

Item	Description	Part Number	Quantity
1	Assembly, Cable Two-wire J905/J102 D-Box	R18810-G1	2
2	Cable, Work Area	Q13850-100	2
3	Gender Mender Assembly, Modular Jack to D-Sub	Q13180-11B	2
4	Assembly, Screw Lock (Connector D-Sub)	Q10437-07	4
5	Cables, PC	Q13240-09	1

Required Reading

WARNING

Where fuels are involved, you are working in a dangerous environment of gasoline, gasoline vapor, and electricity. Failure to install this equipment in accordance with National Fire Protection Association (NFPA) 30A and NFPA 70® could result in severe injury or death.



Before installing the kits, read, understand, and follow:

- This manual.
- The National Electrical Code [NEC® (NFPA 70)].
- The automotive and marine service code (NFPA 30A).
- Any national, state, and local codes that may apply.

Failure to install the equipment in accordance with NFPA 30A and NFPA 70 may adversely affect the safe use and operation of the system.

Related Documents

Document Number	Title	GOLD SM Library
MDE-2713	Universal Distribution Box (D-Box) Installation Manual	<ul style="list-style-type: none"> Advantage[®] and Legacy[®] POS Peripheral Devices
MDE-3804	Encore [®] and Eclipse [®] Start-up/Service Manual	<ul style="list-style-type: none"> Encore and Eclipse Service Manual
MDE-3816	Passport Hardware Start-up and Service Manual	<ul style="list-style-type: none"> Passport Service Manual
MDE-3839	Passport System Installation Addendum	Passport

Note: Ensure to read and understand the installation documentation for the dispensers being connected to the D-Box.

Abbreviations and Acronyms

Term	Description
CAT-5	Category 5
CRIND [®]	Card Reader in Dispenser
D-Box	Distribution Box
D-Sub	D-Subminiature
ESD	Electrostatic Discharge
GOLD	Gilbarco Online Distribution
NEC	The National Electrical Code
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
PAM	Pump Access Module
PCB	Printed Circuit Board
POS	Point of Sale
TAC	Technical Assistance Center
TWI	Two-wire Current Loop Interface

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 a Gilbarco Authorized Service Contractor or call the 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.

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

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.

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 lips, 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 contact 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.

Before You Begin

Before you begin, read and understand [“Important Safety Information”](#) on [page 4](#).

CAUTION



A properly grounded Electrostatic Discharge (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.

- 1 Inform the manager.
- 2 Barricade the unit to be worked on.
- 3 Remove power to the unit at the breaker panel. 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.

- 4 Match the parts received in the kit with [“Parts List”](#) on [page 2](#).

Converting D-Box from RS-422 to Two-wire

To convert a D-Box from RS-422 to two-wire, proceed as follows:

- 1 Loosen the two screws on the bottom front of the D-Box, and lift the lid.
- 2 Disconnect the cable(s) at ports P101 and P103 of T17651 Board and ports P101 and P103A/B of M14301 Board.

CAUTION

Working on Printed Circuit Boards (PCBs) without connecting to a ground or discharging static can damage electronic parts. Use a wrist strap and store parts in antistatic storage bags.

- 3 Remove the two screws that secure the 9-pin D-Sub connectors to the D-Box case; then, remove and discard the cable assembly.
- 4 Install the R18810-G1 Two-wire Cables at the D-Sub positions. Secure the cable with the standoffs.
- 5 Connect the other end of the R18810-G1 Cable(s) to port P102 (for T17651) and port P102A/B (for M14301) on the PCBs. Note the orientation of the cable.
- 6 Change and verify the jump jack settings.

Following table lists the correct jump jack configurations:

Configuration	8 Loops/1 Input	16 Loops/1 Input	16 Loops/2 Inputs
Two-wire Current Loop Interface (TWI): Dispensers or CRIND devices	Figure 1 on page 8 and Figure 2 on page 9	Figure 3 on page 10 and Figure 4 on page 11	Figure 5 on page 12 and Figure 6 on page 13

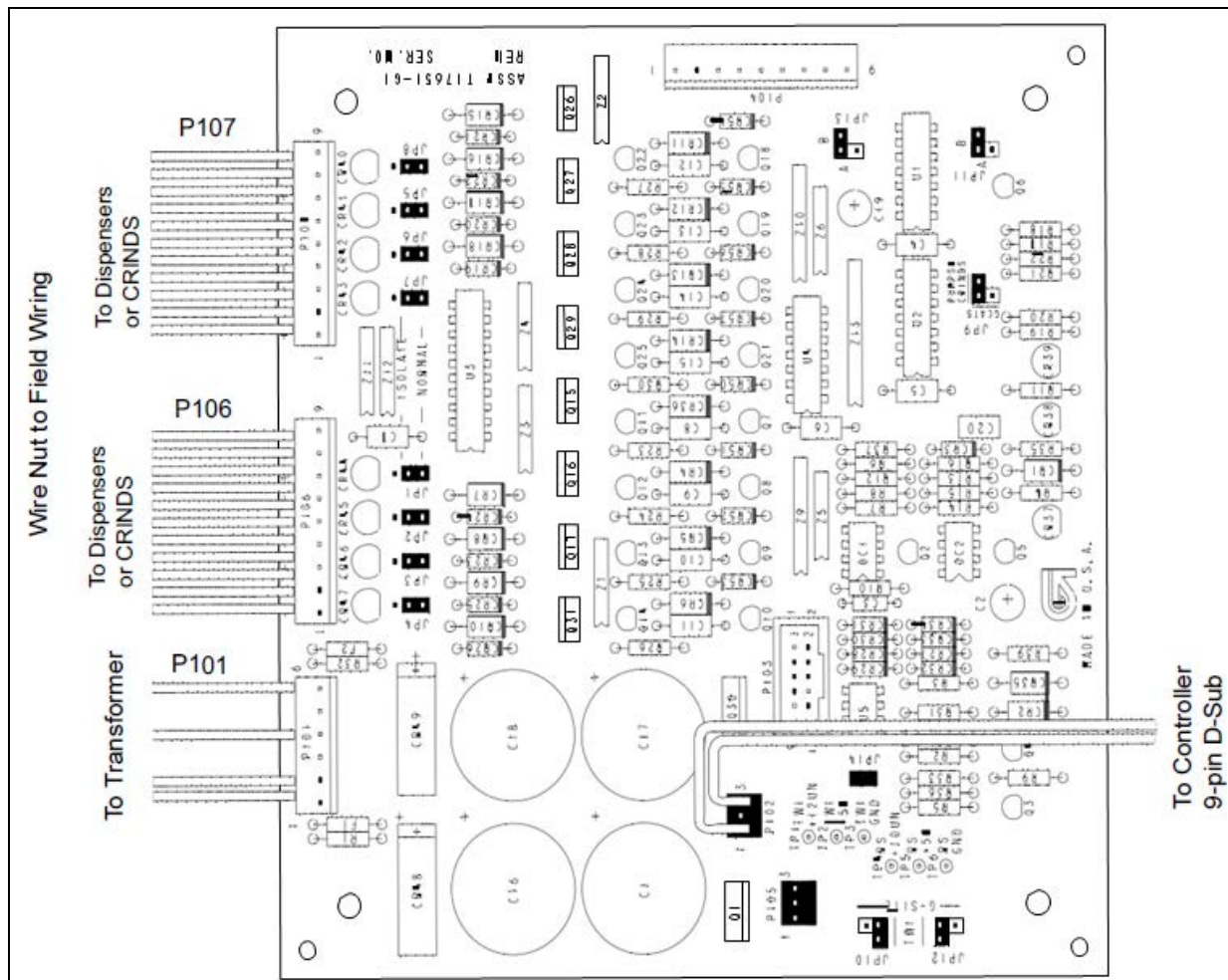
- 7 Reconnect the cable at the port P101.
- 8 Connect the Q13850-100 Data Cables and Q13180-11B Gender Menders from the Passport CPU or Passport Dispenser Hub.
Note: In case of D-Box with M14301 Board, Q13850-100 Cable can be directly connected to RJ-45 input connectors P1 and P2 of the board so steps 4 to 6 are not required. An additional step is to open the knockouts of box for P1 and P2, if they are not opened already.
- 9 Plug in the AC power cord.
- 10 Replace the D-Box cover, and secure with screws.
- 11 Verify the operation of card readers and/or dispensing units.

Converting the D-Box from RS-422 to two-wire is now complete.

Jumper Settings

Following are the diagrams for jumper settings for T17651 and M14301 Boards:

Figure 1: Jumper Settings - TWI, Single T17651 Board, Single Input, 8 Loops



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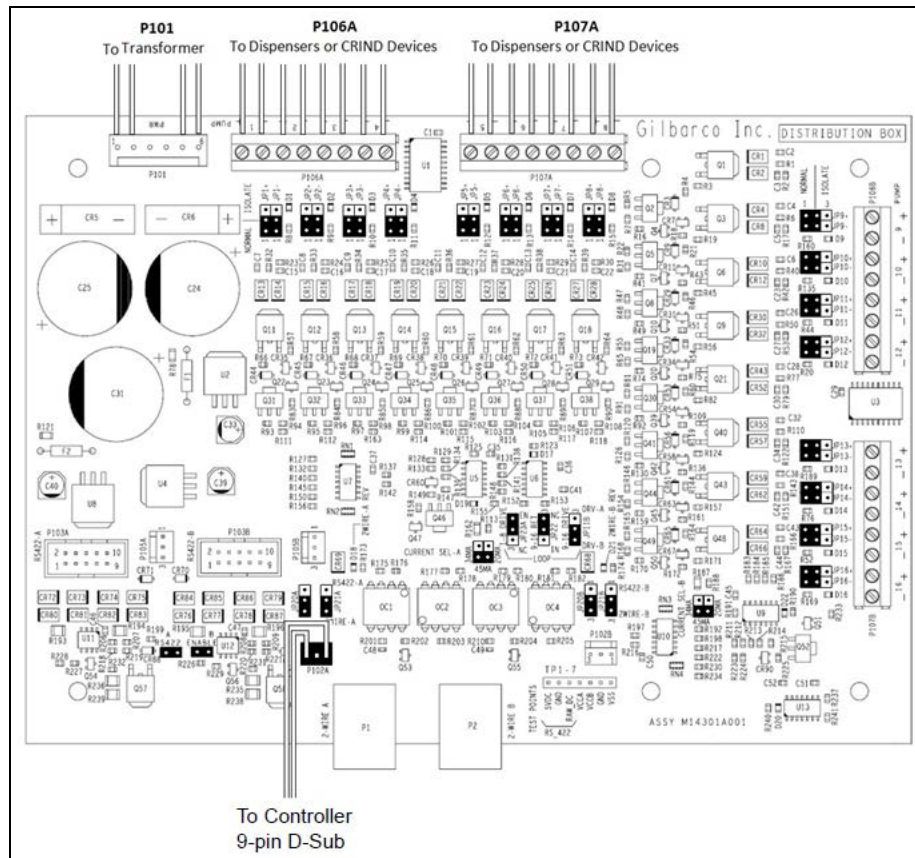


Figure 3: Jumper Settings -TWI, Dual T17651 Boards, Single Input, 16 Loops Total

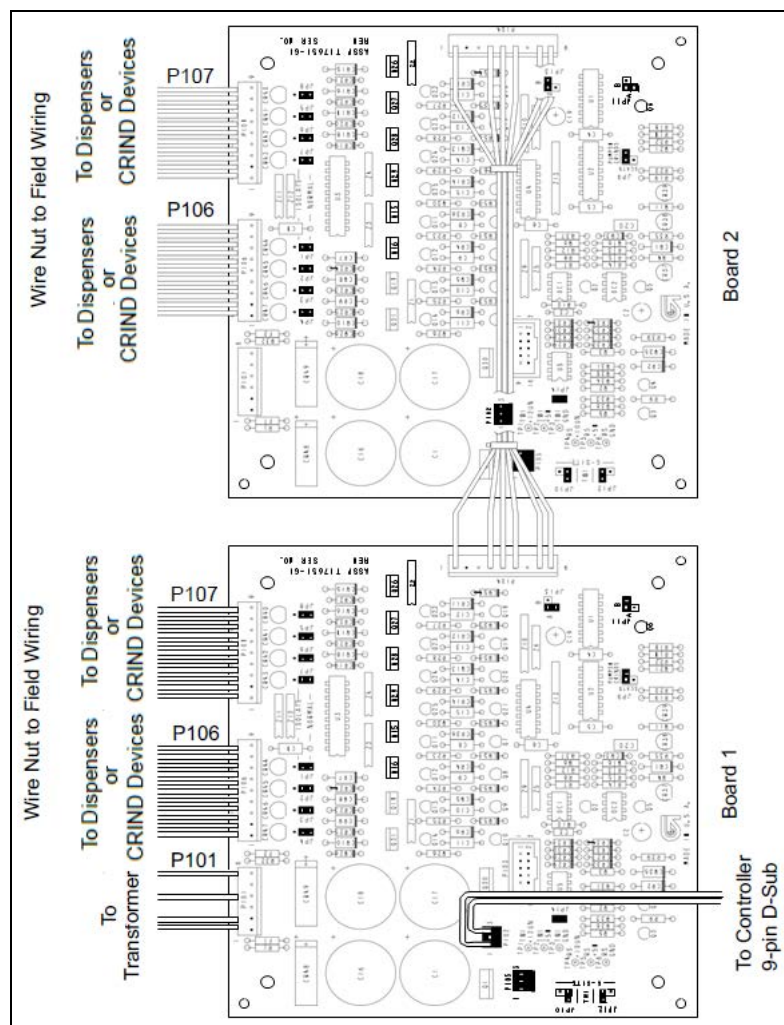


Figure 4: Jumper settings - TWI, M14301 Board, Single Input, 16 Loops Total

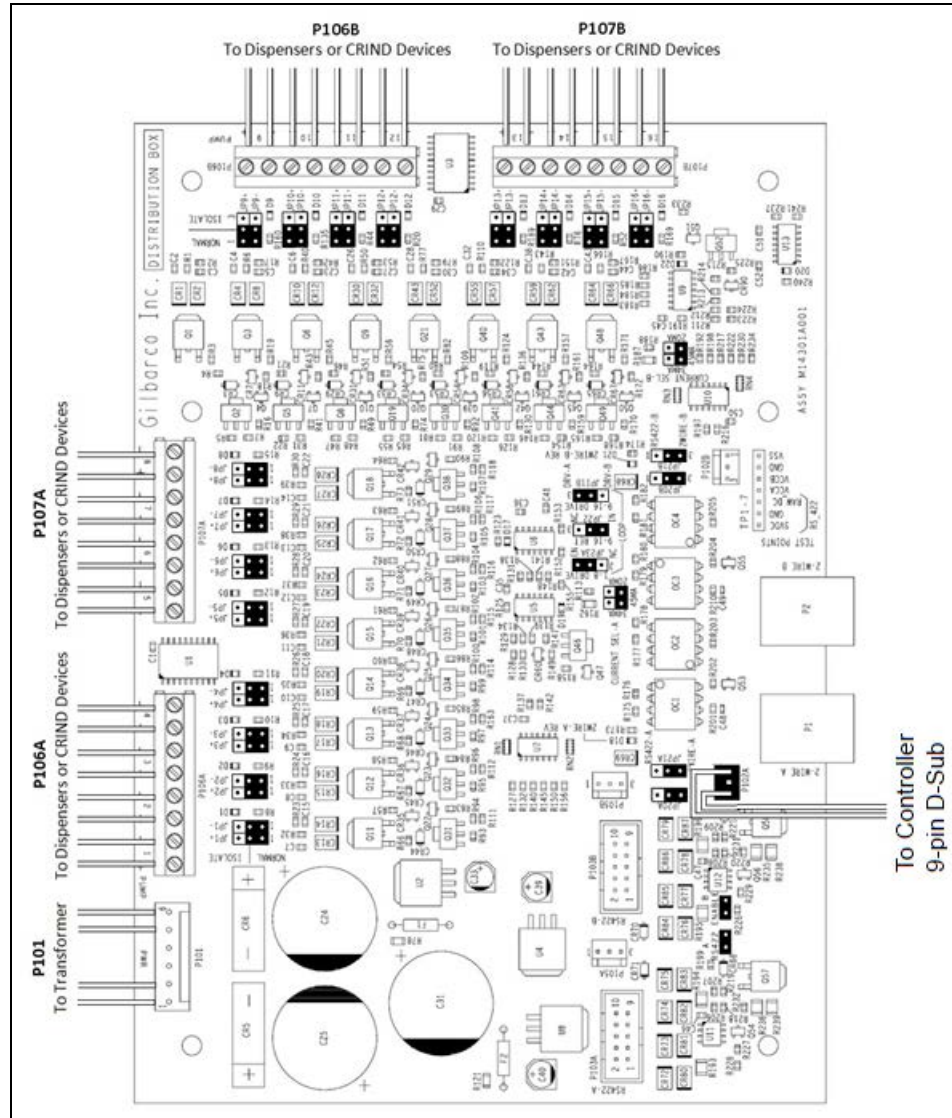


Figure 5: Jumper Settings - TWI, Dual T17651 Boards, Two Inputs, 8 Loops Each

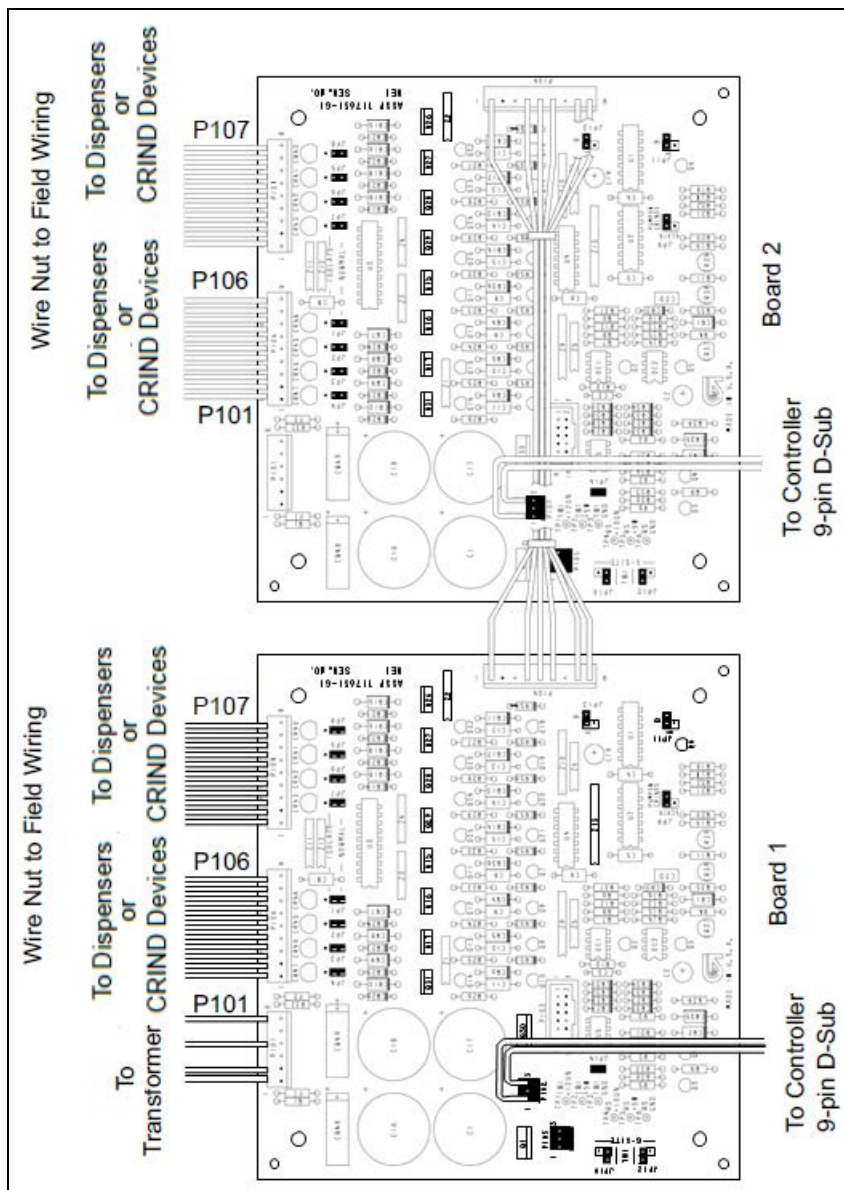
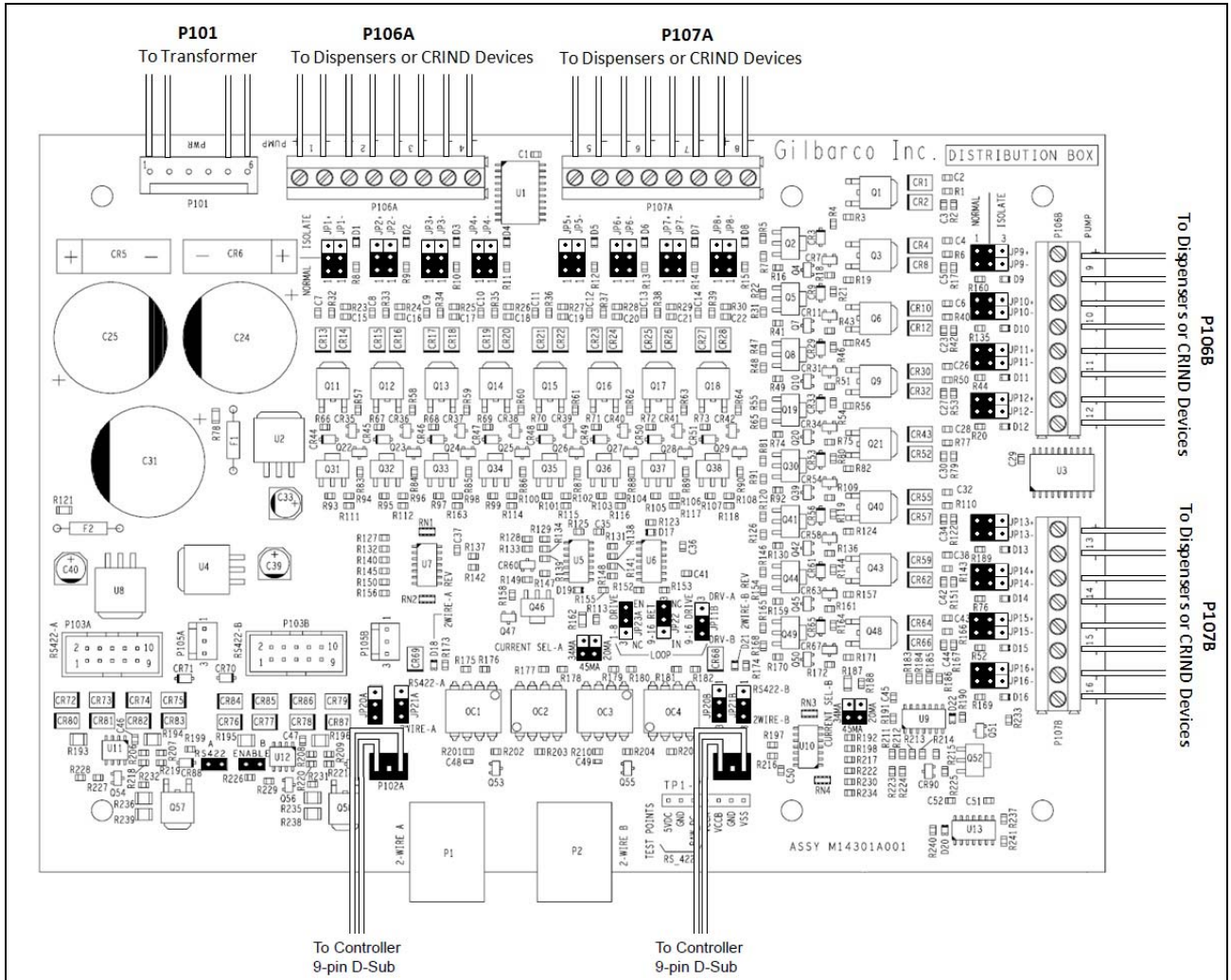


Figure 6: Jumper Settings - TWI, M14301 Board, Two Inputs, 8 Loops Each



Converting D-Box from Two-wire to RS-422

To convert a D-Box from two-wire to RS-422, proceed as follows:

- 1 Loosen the two screws on the bottom front of D-Box, and lift the lid.
- 2 Disconnect the cables at ports P101 and P102 of T17651 Board and ports P102A/B of M14301 Board.

CAUTION

Working on PCBs without connecting to a ground or discharging static can damage electronic parts. Use a wrist strap and store parts in antistatic storage bags.

- 3 Remove the two screws that secure the 9-pin D-Sub connector(s) to the D-Box case; then, remove and discard the cable assembly.
- 4 For T17651 Board, install the R19249-G1 Two-wire Cables at the D-Sub position(s). For M14301 Board, install shorter R19249-G1 Cable near the board at D-Sub position and longer R19249-G2 Cable at D-Sub position away from board. Secure the cable with standoffs.
- 5 For T17651 Board, connect the other end of the R19249-G1 Cable(s) to port P103. For M14301 Board, connect R19249-G1 Cable to port P103A and R19249-G2 Cable to port P103B. Note the orientation of the cable.
- 6 Change and verify the jump jack settings.

Following table lists the correct jump jack configurations:

Configuration	8 Loops/1 input	16 Loops/1 Input	16 Loops/2 Inputs
RS-422: Dispensers or CRIND Devices	Figure 7 on page 15 and Figure 8 on page 16	Figure 9 on page 17 and Figure 10 on page 18	Figure 11 on page 19 and Figure 12 on page 20

- 7 Reconnect the cable at the port P101.
- 8 Connect the Q13850-100 Data Cables and Q13180-11B Gender Menders from the Passport dispenser hub.
- 9 Plug in the AC power cord.
- 10 Replace the D-Box cover, and secure with screws.
- 11 Verify the operation of card readers and/or dispensing units.

Converting the D-Box from two-wire to RS-422 is now complete.

Jumper Settings

Following are the diagrams for jumper settings for T17651 and M14301 Boards:

Figure 7: Jumper Settings - RS-422 Interface, Single T17651 Board, Single Input, 8 Loops

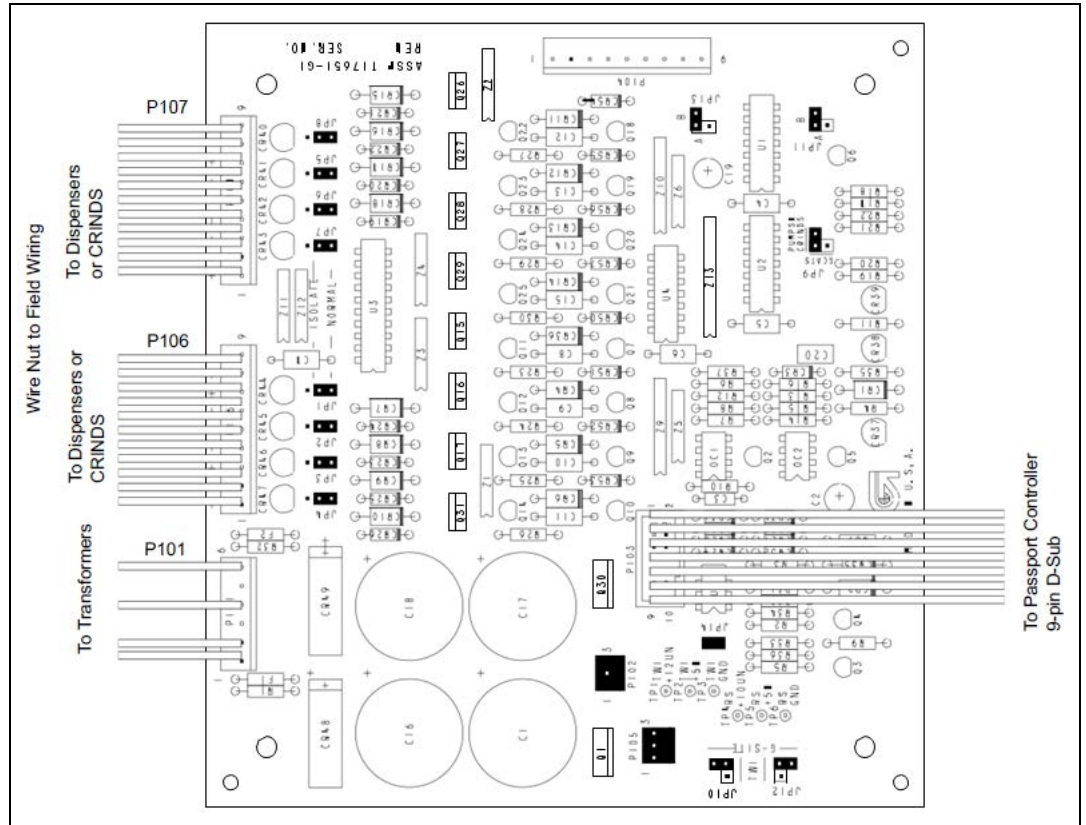


Figure 8: Jumper Settings - RS-422 Interface, M14301 Board, Single Input, 8 Loops

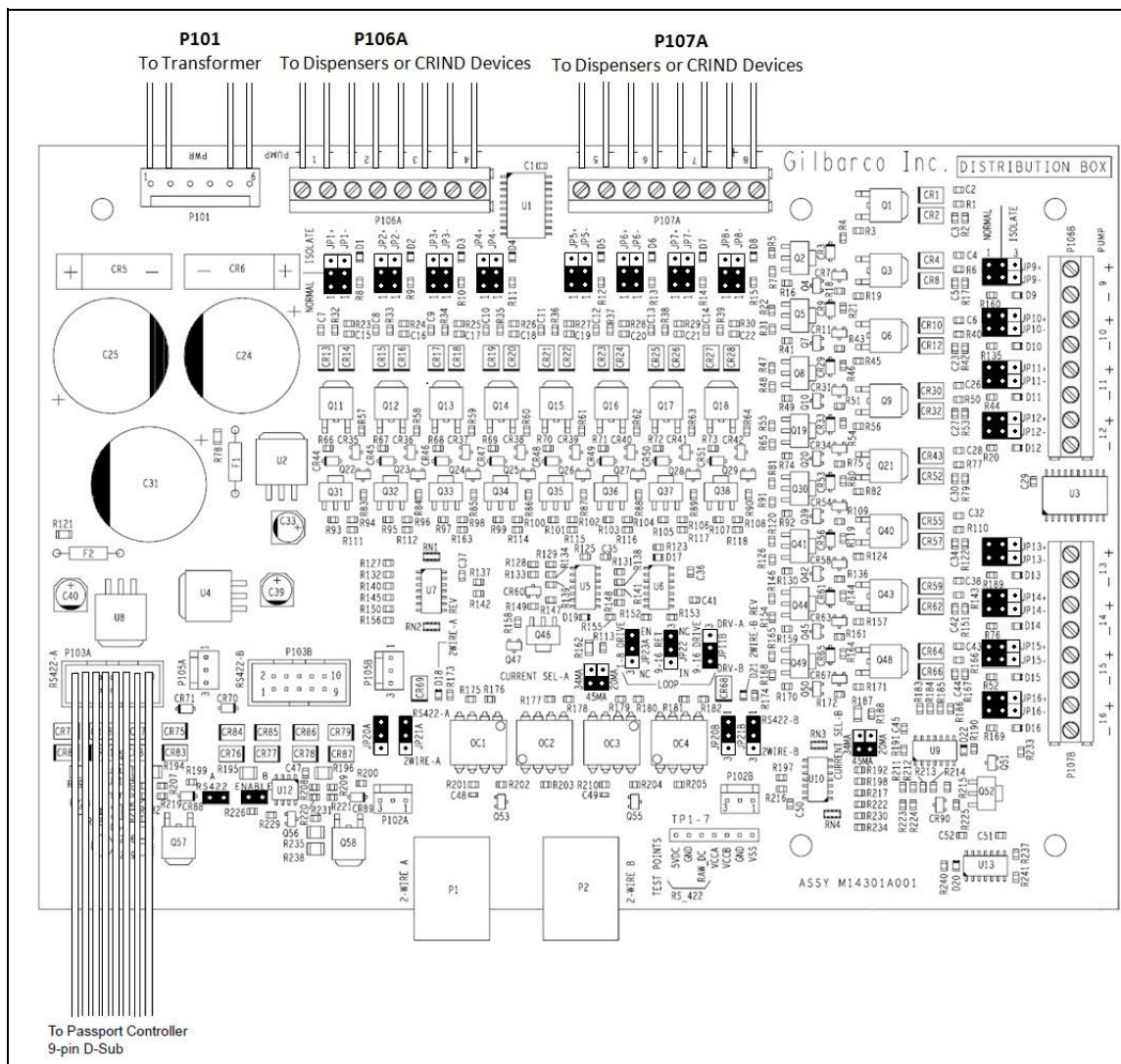


Figure 9: Jumper Settings - RS-422 Interface, Dual T17651 Board, Single Input, 16 Loops Total

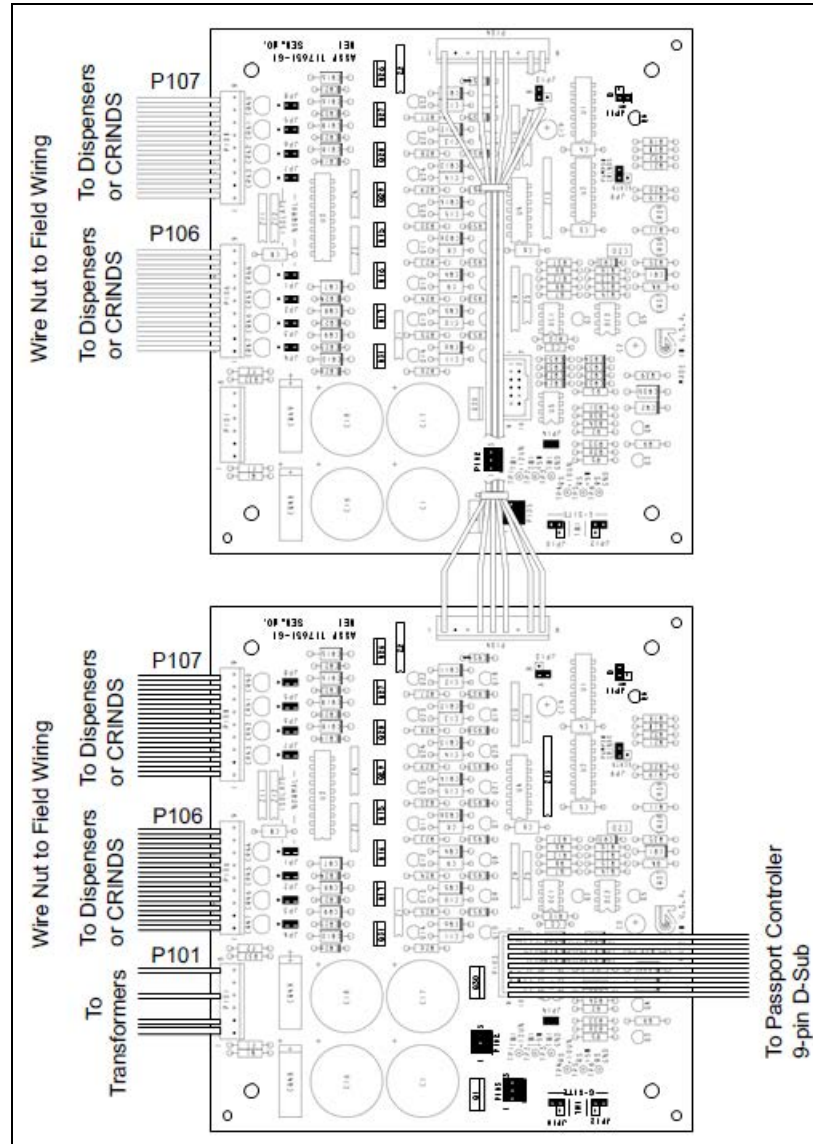


Figure 10: Jumper Settings - RS-422 Interface, M14301 Board, Single Input, 16 Loops Total

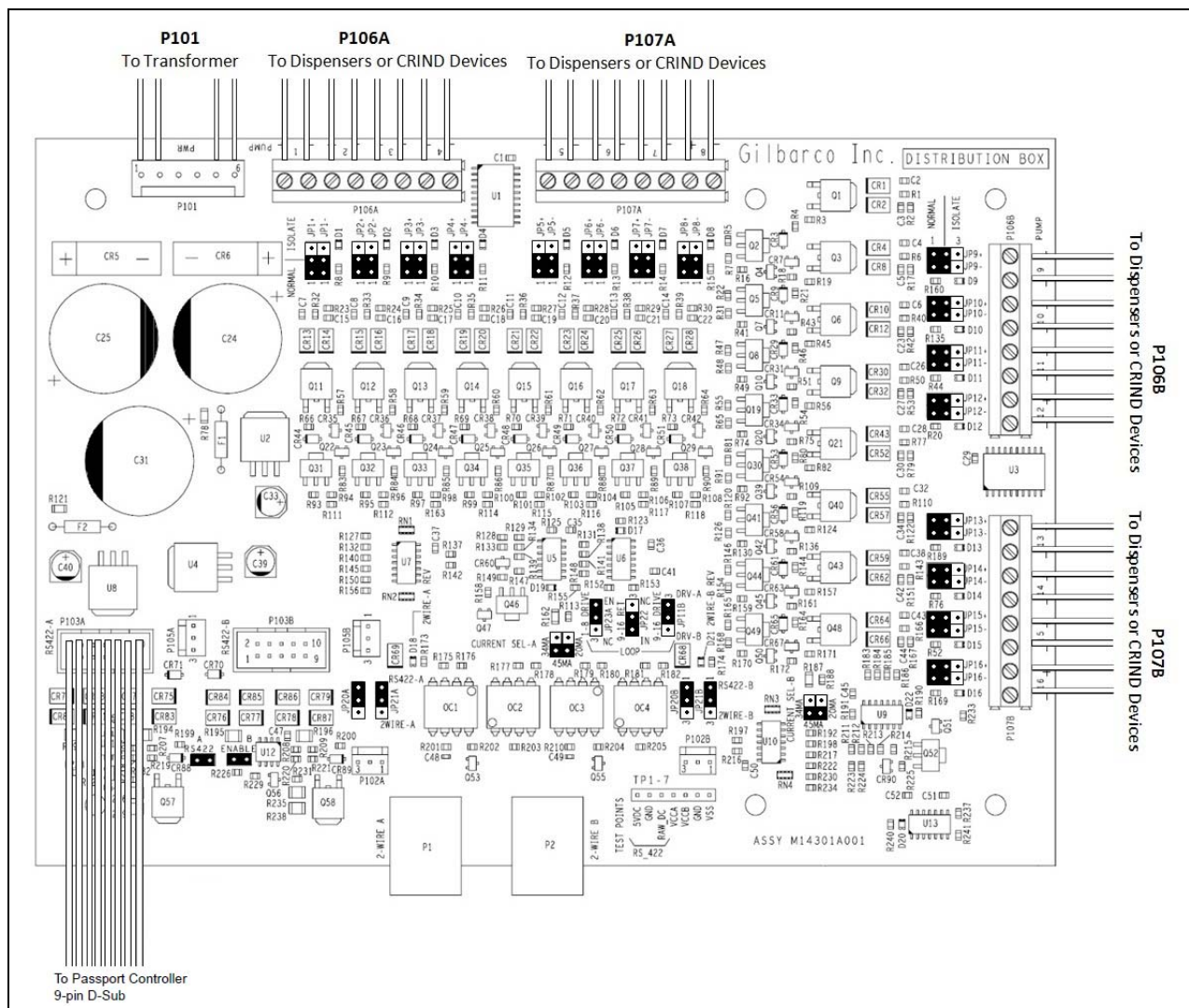
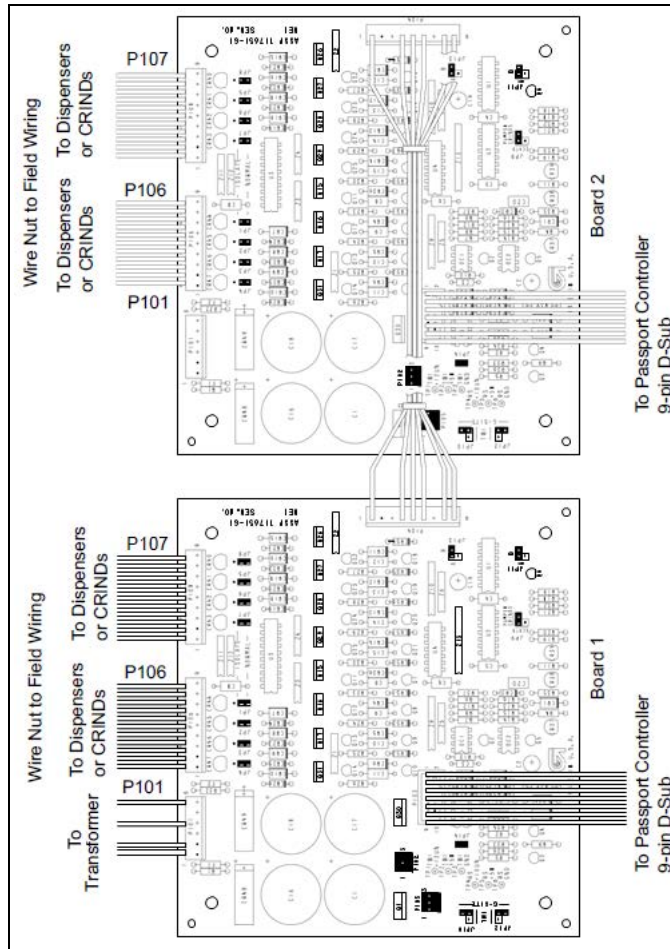
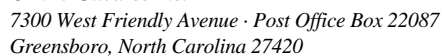


Figure 11: Jumper Settings - RS-422 Interface, Dual T17651 Board, Two Inputs of 8 Loops Each



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