SERVICE

2/Vista Series Blending and Non-Blending Remote Dispensers

Wayne DRESSER

DANGER

READ THIS MANUAL BEFORE YOU BEGIN

Dispensers have both electricity and a hazardous, flammable and potentially explosive liquid. Failure to follow the below precautions and the Warning and Caution instructions in this manual may result in serious injury. Follow all rules, codes and laws that apply to your area and installation.

SAFETY PRECAUTIONS - INSTALLATION AND MAINTENANCE

Always make sure ALL power to the dispenser is turned OFF before you open the dispenser cabinet for maintenance. Physically lock, restrict access to, or tag the circuit breakers you turn off when servicing the dispenser. Be sure to trip (close) the emergency valve(s) under the dispenser BEFORE beginning maintenance.

Make sure that you know how to turn OFF power to the dispenser and submersible pumps in an emergency. Have all leaks or defects repaired immediately.

EQUIPMENT PRECAUTIONS

Be sure to bleed all air from product lines of remote dispensers and prime suction pumps before dispensing product, otherwise, damage to the equipment may occur. Always use the approved method for lifting the dispenser. Never lift by the nozzle boot, sheet metal, valance, etc., otherwise equipment damage or personal injury may occur.

HOW TO CONTACT WAYNE

Trouble with the installation and operation of the dispenser should be referred to your authorized Wayne service personnel or Wayne Technical Support (1-800-926-3737).

INDICATORS AND NOTATIONS

DANGER	Danger indicates a hazard or unsafe practice which, if not avoided, will result in severe injury or possibly death.
WARNING	Warning indicates a hazard or unsafe practice which, if not avoided, may result in severe injury or possibly death.
CAUTION	Caution indicates a hazard or unsafe practice which, if not avoided, may result in minor injury.
NOTE:	Important information to consider, otherwise, improper installation and/or damage to components may occur.

2/Vista Series Blending and Non-Blending Remote Dispensers

Service

March 1999 Part No. 920364 Rev A

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1. INTRODUCTION

This manual describes the service of Wayne Vista series blending and non-blending dispensers that have a "2" in the prefix of the model number. For example, 2/V390D1/GQUY. Again, these dispensers can be identified by their model which begins with “2/V”, hereafter, referred to as 2/V or 2/Vista models. The basic troubleshooting methods and service theory will remain the same for all models of dispensers which satisfy the above definition. Any information which is specific to a particular model of dispenser will be shown as specific in the text.

2/Vista model dispensers contain the iMeter module, which is a complete hydraulics package designed and assembled around a modular concept. The iMeter module integrates the various hydraulic components of a dispenser into a single package where each primary component is interdependent on the other. An assembly view of a three product iMeter dispenser is shown in Figure 1-1.

The foundation of the iMeter module is the in-line duplex meter. Similar in design to Wayne's two-piston (2PM) meter, the iMeter is a positive displacement meter. The main differences between the two meter designs are 1) the iMeter houses two meters versus one for the 2PM, and 2) the pistons in the iMeter are in-line with respect to one another - one piston is 180° out of phase with the other.

The iMeter also uses a duplex Intelligent Pulser for measuring the volume of product dispensed. The Wayne Intelligent Pulser monitors the volumetic flow rate of each of the two meters in the iMeter module and provides a digital signal output for each meter in two separate A and B channels. The Intelligent Pulser interfaces with Duplex II computers running software Revision 11 or higher.

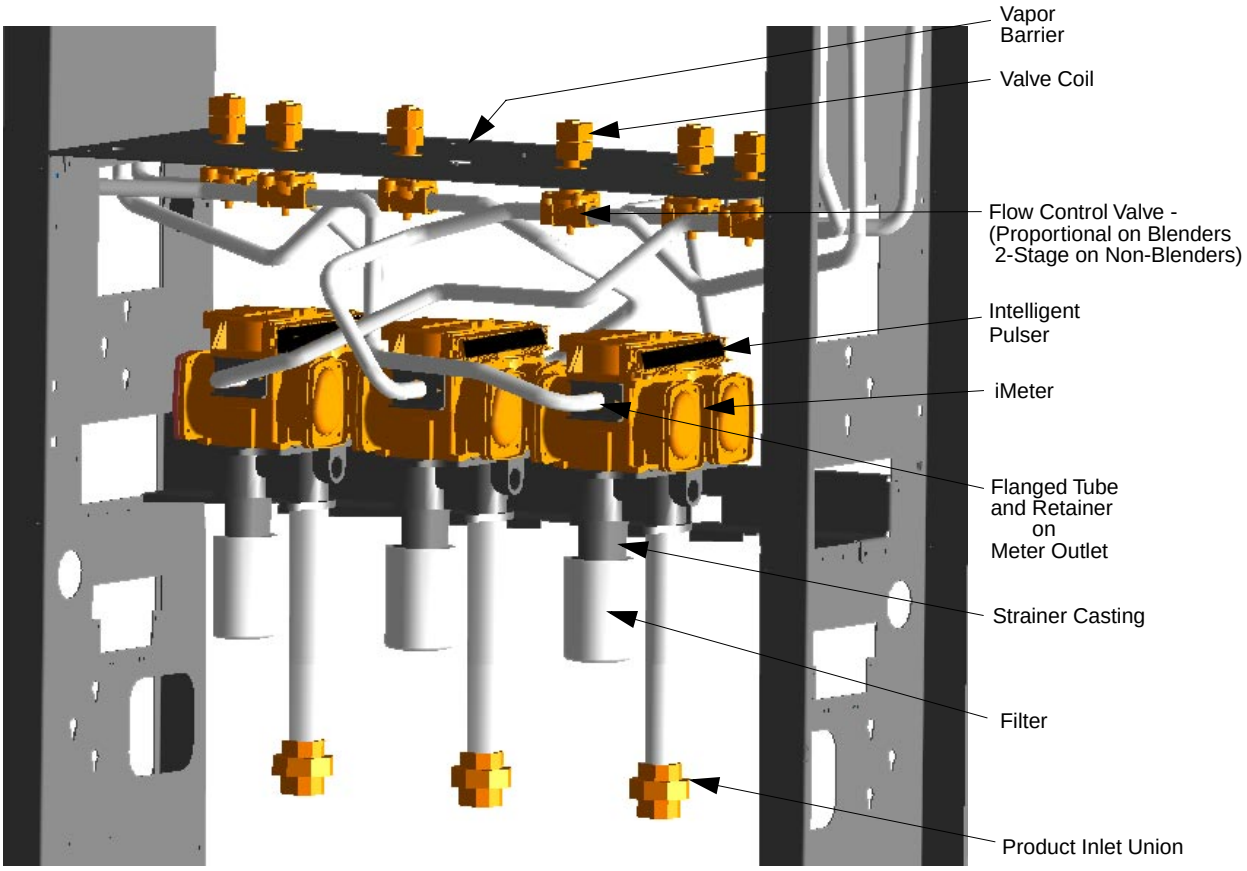

FIGURE 1-1. 3-PRODUCT iMETER DISPENSER. *There are 3 iMeter modules shown. Each module consists of the iMeter, Intelligent pulser, and associated hydraulics for a given product on* ***both*** *sides of the dispenser.*

1.1. REGIONAL SERVICE OFFICES

Any service problems that cannot be solved should be refered to Wayne Technical Support or to the appropriate regional service office.

Wayne Technical Support Austin, TX	1-800-926-3737 24 hours/7 days
Northeast Regional Service Office Salisbury, MD	410-546-6750 8:30AM-5:00 PM Eastern
Southeast Regional Service Office Atlanta, GA	770-926-6005 8:30AM-5:00PM Eastern
North Central Regional Service Office Chicago, IL	773-693-7404 8:30AM-5:00PM Central
South Central Regional Service Office Houston, TX	281-871-5442 8:30AM-5:00PM Central
Southwest Regional Service Office Cypress, CA	714-952-1137 8:30AM-5:00PM Pacific
Northwest Regional Service Office San Ramon, CA	510-328-0400 8:30AM-5:00PM Pacific
Mid-Atlantic Regional Service Office Baltimore, MD	410-691-2200 8:30AM-5:00PM Eastern

INTERNATIONAL OFFICES

Caribbean and Latin America Service Office Austin, TX USA	(Voice) 512-388-8624 (FAX) 512-388-8643
Mid-East and Africa Service Office United Kingdom	(Voice) 44-1635-874881 (FAX) 44-1635-876633
Far East Service Office Singapore	(Voice) 65-422-2397 (FAX) 65-225-6604

2. GENERAL OPERATION

The general operation is very similar for all dispensers with model numbers beginning with 2/V.

2.1. SEQUENCE OF THE DISPENSING CYCLE (NON-BLENDERS)

2.1.1. Lift-to-Start Models

- When the nozzle is removed from the nozzle boot and the lever is lifted, the constant +5 VDC that the computer supplies to the nozzle switch goes to ground. This signals the computer to begin its reset cycle.
- When the dispenser receives an **Authorization** signal either from the control system or from the Authorize switch in the dispenser, the correct submersible pump relay will be energized.*
- The computer performs a self test and flashes eights, blanks, then resets to zeros, on the main sale display.
- The slow valve coil is energized two to six seconds, depending on option programming settings, after the submersible pump relay is energized.
- After a small amount of fuel has been dispensed, the fast valve coil is switched on and both coils are now energized together.
- In preset sales the fast coil is de-energized just prior to the final shut-off amount. The slow valve coil is then de-energized when the final amount is reached.
- When the lever is lowered, the nozzle switch goes back to the constant +5 VDC, the sale is complete, and the nozzle is returned to the nozzle boot.

2.1.2. Push-to-Start Models

- When the nozzle is removed from the nozzle boot, the constant +5 VDC that the computer supplies to the nozzle switch goes to ground. At this point, one of the lighted buttons (grade select, cash/credit, or push-to-start, depending model) will flash indicating that one of the buttons must be pressed.
- When one of the lighted buttons is pressed the constant +5 VDC that is supplied to the switch goes to ground. This signals the computer to begin its reset cycle.
- When the dispenser receives an **Authorization** signal either from the control system or from the Authorize switch in the dispenser, the correct submersible pump relay will be energized.*
- The computer performs a self test and flashes eights, blanks, then resets to zeros, on the main sale display.

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* The submersible may have been energized in the previous step depending on the data setting in programming Option 36. Refer to the Option Programming Manual part number 920205 for more information.

2.1.2. **Push-to-Start Models,** continued

- The slow valve coil is energized two to six seconds, depending on option programming settings, after the submersible pump relay is energized.
- After a small amount of fuel has been dispensed, the fast valve coil is switched on and both coils are now energized together.
- In preset sales the fast coil is de-energized just prior to the final shut-off amount. The slow valve coil is then de-energized when the final amount is reached.
- When the nozzle is returned to the nozzle boot, the nozzle switch goes back to the constant +5 VDC and the sale is complete.

2.2. SEQUENCE OF THE DISPENSING CYCLE (BLENDERS ONLY)

- When the nozzle is removed from the nozzle boot or the Lift to Start lever is raised, the constant +5 VDC that the computer supplies to the nozzle switch goes to ground. At this point the lighted buttons (grade select or cash/credit, depending on the model) will flash indicating that one of the buttons must be pressed.
- When one of the lighted buttons is pressed, the constant +5 VDC that is supplied to the switch goes to ground. This signals the computer to begin its reset cycle.
- When the dispenser receives an **Authorization** signal either from the control system or from the Authorize switch in the dispenser, the correct submersible pump relay will be energized.*
- The computer performs a self test and flashes eights, blanks, then resets to zeros, on the main sale display.
- After the dispenser resets, the proportional flow control valve(s) is energized with just enough current to barely open the valve(s) and allow a slow flow.
  After a small amount of fuel has been dispensed, the valve(s) is energized with enough current to be in the fully open position and allow fast flow. During the sale, the valve(s) will be continuously controlled with the proper amount of current to provide the correct blend ratio and limit fuel flow rate to a maximum of 10 GPM.**
- In preset sales, the current received by the proportional flow control valve(s) is reduced to the barely open position just prior to the final shut-off amount. The valve(s) is then de-energized when the final amount is reached.
- When the nozzle is replaced in the nozzle boot, the nozzle switch goes back to the constant +5 VDC, and the sale is complete.

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* The submersible may have been energized in the previous step depending on the data setting in programming Option 36. Refer to the Option Programming Manual part number 920205 for more information.

** The maximum allowable flow rate in the United States is 10 gallons per minute.

2.3. UNIT PRICES/AUTHORIZATION

Before any Wayne dispenser will reset two things must happen. First, the dispenser must have unit prices set in it. Second, an authorization must be received from some source. Both the unit prices and the authorization can be manually set at the dispenser, or set from a control system. In order to manually set unit prices, set the authorize switch, or set the fueling point, you must gain access to the dispenser function switches that are located behind the bezel. See Figure 2-1.

In order to access the function switches complete the following steps:

- Loosen the two bezel lock screws using bezel key, part number 1-202022.
- Lower the hinged bezel by pulling down and outward on the top.

The function switches are: the Authorize (Self-Serve/Attend) switch, the Totals push-button, the Position Select push-button, the Price Jog push-button, and the DCPT power switch (if the dispenser is equipped with card processing - CATs).

2.3.1. Manually Setting Unit Prices

The following procedures need not be used if the dispenser is connected to a control system. Refer to the operating procedures provided with the control system for a complete description of unit price setting.

The operating levers must be OFF to set unit prices.

The Position Select push-button selects the position for which the unit price is to be changed. The Price Jog push-button changes the price of the position selected.

The first closure of the Position Select push-button selects position “X” unit price (credit price of Cash/Credit type dispenser) and will blank the Unit Price displays for the position “Y”, “Z”, and “AA”. See Figure 2-2.

The unit price for position “X” is set as follows:

The first closure of the Price Jog push-button causes the least significant digit or tenths of cents position of the unit price to cycle (see Figure 2-3). The digit will cycle 0 through 9 until the switch is released. Each successive closure of the Price Jog push-button will select and increment the next most significant digit.

Each Position Select switch closure is defined in Table 2-1.and Table 2-2. The unit price for each position may then be set as described previously.

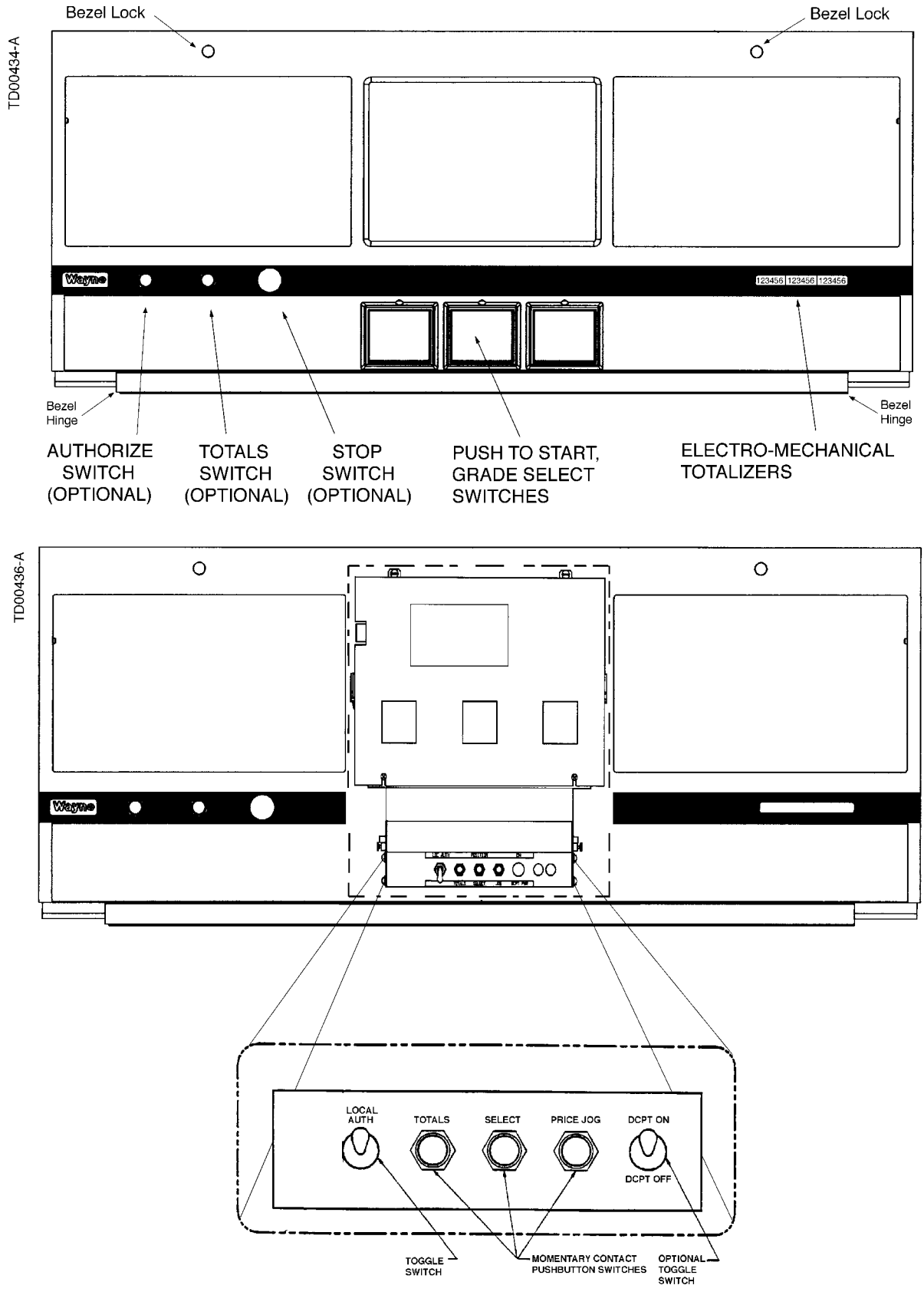

FIGURE 2-1. BEZEL AND FUNCTION SWITCHES - CUTAWAY VIEW. *The dispenser function switches are located behind the bezel. To access the switches, loosen the two bezel lock screws and lower the bezel.*

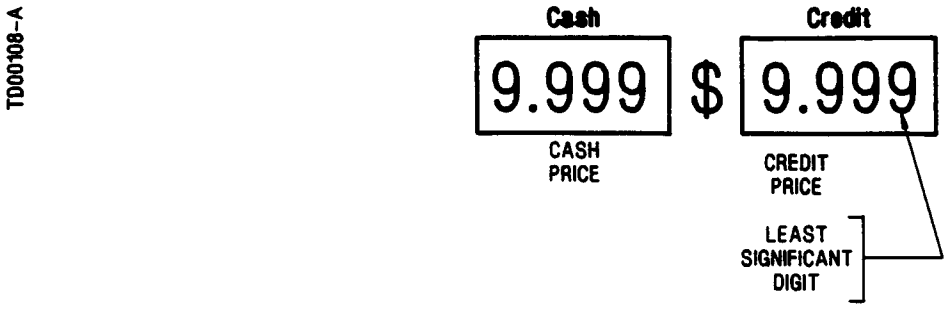

FIGURE 2-2. UNIT PRICE DISPLAY. *The first closure of the Price Jog push-button causes the least significant digit or tenths of cents position of the unit price to cycle.*

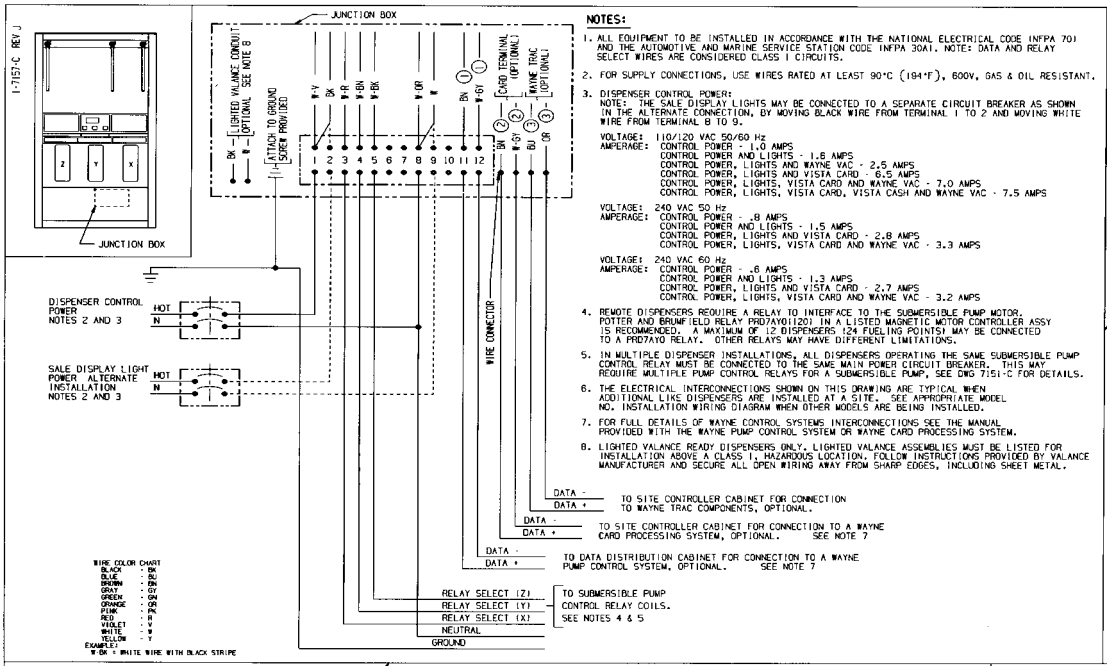

FIGURE 2-3. HOSE POSITION CODING FOR 2/V390 SERIES. *Hose positions are critical for unit price programming from a system. The product order, left to right, is identical on both sides. Position "AA" is to the left of "Z" for 2/V490 model dispensers.*

TABLE 2-1. UNIT PRICE SWITCH CLOSURE DEFINITIONS (BLENDERS)

The number of closures and unit price positions, and the order in which they appear may vary with each blender model.

Position Select Switch Closure	Position Selected (Single Price Posting Dispenser)	Position Selected (Cash/Credit Type Dispensers)
First Closure	Unit Price Position “HI”	Credit Price Position “HI”
Second Closure	Unit Price Position “BL”	Cash Price Position “HI”
Third Closure	Unit Price Position “LO”	Credit Price Position “BL”
Fourth Closure	Original Sale Display Returns	Cash Price Position “BL”
Fifth Closure	————————————	Credit Price Position “LO”
Sixth Closure	————————————	Cash Price Position “LO”
Seventh Closure	————————————	Original Sale Display Returns

TABLE 2-2. UNIT PRICE SWITCH CLOSURE DEFINITIONS (NON-BLENDERS)

Position Select Switch Closure	Position Selected (Single Price Posting Dispenser)	Position Selected Cash/Credit Type Dispensers
First Closure	Unit price position “X”	Credit unit price position “X”
Second Closure	Unit price position “Y”	Cash unit price position “X”
Third Closure	Unit price position “Z”	Credit unit price position “Y”
Fourth Closure	Unit price position “AA”*	Cash unit price position “Y”
Fifth Closure	Original sale display returns.	Credit unit price position “Z”
Sixth Closure	----------	Cash unit price position “Z”
Seventh Closure	----------	Credit unit price position “AA”*
Eighth Closure	----------	Cash unit price position “AA”*
Ninth Closure	----------	Original sale display returns.

* “AA” applies only to V490 models.

2.3.2. Authorize Switch

The Authorize switch permits dispenser operation with or without console control. In the self service position (toggle the switch down), the dispenser must be authorized by the control system before each use. In the full service position (toggle the switch up as shown in Figure 2-1.), the dispenser may be operated repeatedly without authorization from a control system.

- There is an Authorize switch for each fueling point.
- An optional Local Authorize keyswitch may be installed on the outside of the dispenser; this switch may be used as a one time authorize by moving it to the full service position and back to the self service position (operating levers must be OFF; turn the keyswitch clockwise then back counterclockwise). The dispenser will operate one time following this sequence.
- Programming in the control system will determine the use of the Authorize switch when the dispenser is under console control.

2.3.3. Setting A Fueling Point (Pump Number)

In order to set unit prices, or to authorize a dispenser, from a control system each fueling point must be assigned an individual I.D. number. A fueling point is defined as any location at which a customer can stop and dispense fuel. In general, each Duplex II Computer in a dispenser represents two fueling points. The fueling point number is set as follows:

- The Position Select push-button is used to enter the fueling point setting mode. The Totals push-button sets the fueling point number.
  See Figure 2-1. for switch location.
- Press and release the Position Select push-button.
- To read the fueling point number, press and release the Totals switch.
- To set the fueling point number, press and hold the Totals push-button. The least significant digit of the unit price display will cycle 0 through 9. Release the Totals push-button when the correct number is displayed. Press and hold the Totals push-button again and the next significant digit will cycle 0 through 9. Release the Totals push-button when the correct number is reached. Currently only the numbers 01 through 24 are valid fueling points. If any other number is entered the control system will not communicate with the dispenser computer.
- Press the Position Select push-button until the original sale display returns.

Note: In order for the dispenser to operate each fueling point must be set to a unique number other than zero.

2.4. THE BLENDING PROCESS

A blender has two grades of fuel (product) input to the dispenser. These two grades are the LO and HI product inputs referred to as “feedstocks.”

The **proportional blending dispenser** uses the feedstock input grades to deliver three to five grades (depending on model) outputs to the “nozzle.” Two of these grades are feedstock* and the other one to three (depending on model) are a blend mixture of some proportion of the feedstock inputs. All grades are dispensed through the **same** hose and nozzle, see Figure 2-4.

The **fixed ratio blending dispenser** uses the feedstock products to deliver three grade outputs to the “nozzles.” Again, two of these three grades are the feedstock products*, but unlike the proportional blender, the third grade or blended grade is delivered through a **separate** hose and nozzle. Also, the feedstock grades are each individually delivered through separate hoses and nozzles, see Figure 2-5.

In all blending dispensers, there are two separate sets of hydraulics. One for controlling the LO octane product input and one for controlling the HI octane product input. In all enhanced Vista blending dispensers (2/V models discussed in this manual), whether it’s a proportional or fixed ratio blender, the LO and HI product hydraulic systems each contain a **proportional flow control valve.**

When any grade (LO, HI or blend) is selected, the blend ratio programmed into the dispensers computer determines the percentage or proportion of HI product to be dispensed. When the LO grade product is selected, the proportion or percentage of HI product is 0%. When the HI grade product is selected, the percentage of HI product is 100%. When a blended grade is selected, a percentage of HI product (less than 100%) is mixed with the remaining percentage of LO product, and the combined total (100%) determines the octane rating of the blended grade.

Knowing the percentage or proportion of HI, and thus LO, product to dispense and by calculating the volume dispensed based on input signals from the pulsers, the computer signals the solenoid drive board which in turn controls the proportional flow control valves. Each proportional flow control valve continuously opens or closes, as directed by the solenoid drive board, to maintain the desired blend ratio and the maximum allowable flow rate.**

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* Some customer specific models may not dispense feedstocks. For example, one feedstock and four blended grades may be dispensed.

** The maximum allowable flow rate in the United States is 10 gallons per minute.

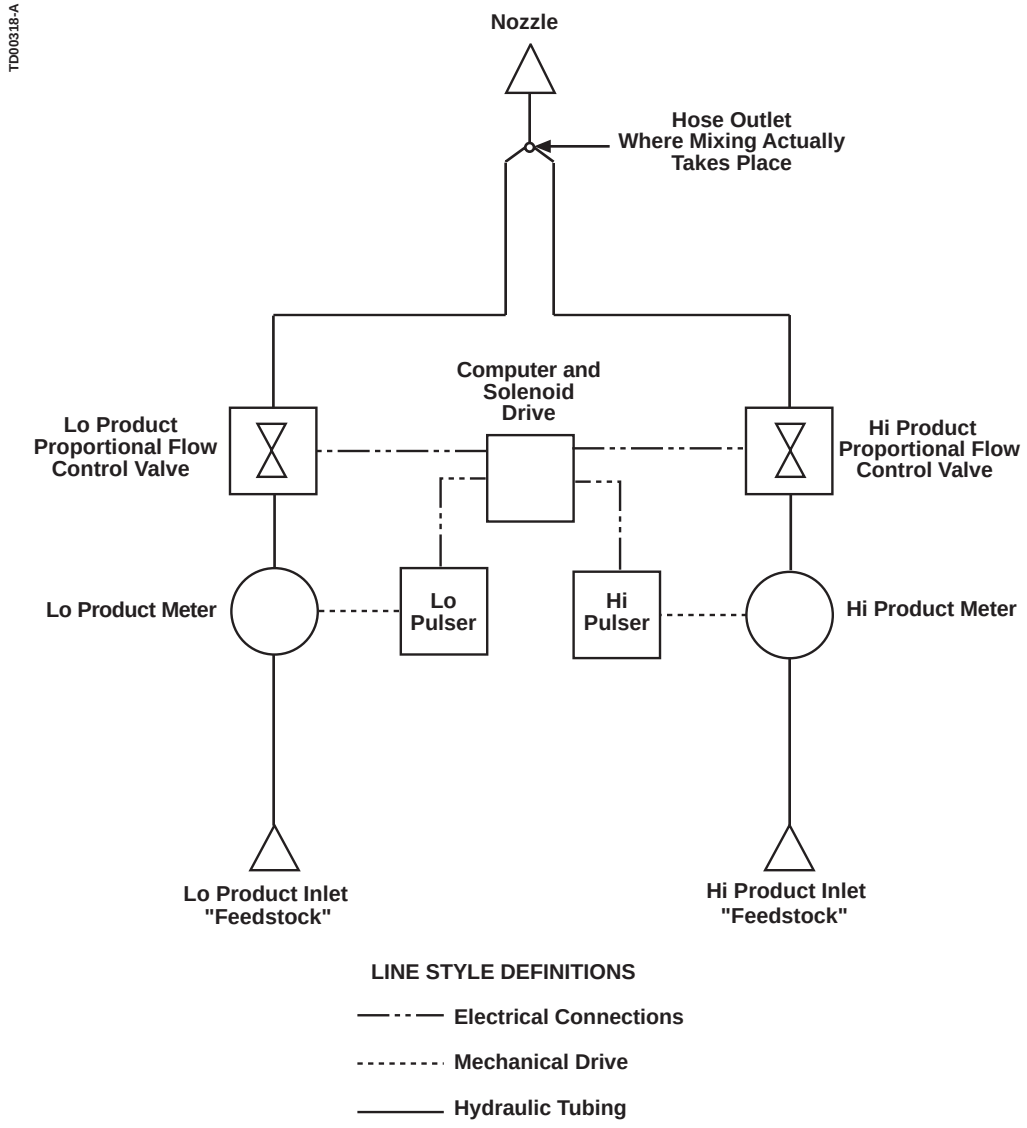


FIGURE 2-4. PROPORTIONAL BLENDING. *The proportional blending dispenser uses the feedstocks to create three to five end grades to be dispensed through the nozzle.*

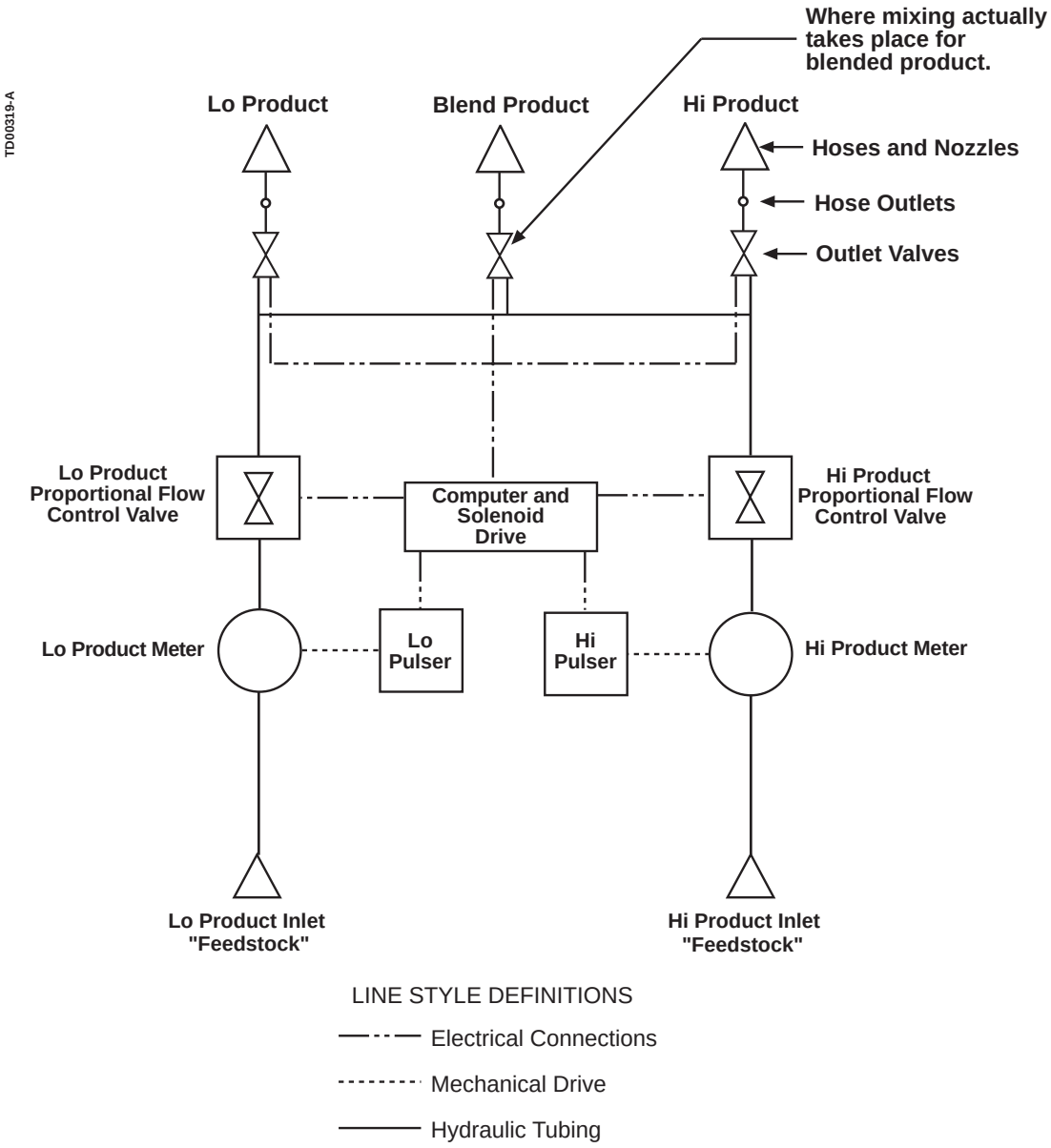


FIGURE 2-5. FIXED RATIO BLENDING. *Each end grade is dispensed through a separate hose & nozzle.*

3. ELECTRONIC PARTS

There are five types of electronic components in the head of the dispenser:

- Display Board
- Lighted Cash/Credit Interface Board
- Solenoid Drive Board
- Computer Assembly
- Intrinsic Safe Barrier Assembly

The hydraulics cabinet contains one or more of the following electronic or electrical components.

- Intelligent Pulser
- 2-Stage Solenoid Valve (In Non-Blenders only) (See Section 5.)
- Proportional Flow Control Valve (In Blenders only) (See Section 5.)

3.1. DISPLAY BOARDS

The display boards are self-contained units which provide a visual display of sales information (i.e., dollar amount, volume amount, unit prices). The actual display elements are seven segment Liquid Crystal Displays (LCD's). These elements are back lit with two 7W, field replaceable, fluorescent lamps to improve their visibility in low lighting conditions. The LCD's are soldered to their printed circuit boards; therefore, they are not replaceable in the field.

The display board receives its data from the computer assembly. The decoding circuits, and the drivers for the LCD's, are located on the display board.

3.2. LIGHTED CASH/CREDIT INTERFACE BOARD

The lighted cash/credit interface board performs three functions. First, is the switch interface; that is all of the function and operational switch closures are sensed by this board and then transmitted to the computer. Second, it supplies power to the lighted buttons on the dispenser that require them (push to start, cash/credit and grade select). The transformer on the board converts 110 VAC input to approximately 18 VRMS in order to power the switch lamps. Third, the cash/credit Interface Board provides the drive circuits to increment the Electro-mechanical Totalizer.

3.2. LIGHTED CASH/CREDIT INTERFACE BOARD, continued

Located on this board is a fuse which fuses the AC input to the select board. If this fuse should open, the push to start or cash/credit select switches will go blank; and the push to start (or cash/credit or grade select) and function switches will not work. If the dispenser requires that a push to start, cash/credit or a grade select switch be pressed it will not reset.

Once the select switch has been pressed the push-to-start signal must be received at the push-to-start input connector J5 at nozzle on, if Pin 1 and Pin 2 are both open either must be grounded and opened again for the dispenser to operate.

This board usually comes with a fixed address, however, it contains provisions to add a four position DIP switch which must be set correctly in order for the display to operate.

Position 1	Open or off
Position 2	Closed or on
Position 3	Open or off
Position 4	Closed or on

3.3. SOLENOID DRIVE BOARD

The solenoid drive board primarily serves as an AC switching board. By utilizing solid state relays, it controls AC power to the pump motor relays, and (in non-blenders) the two stage actuator valves. Also, the solenoid drive board enables the correct pulser assembly by switching the pulser select lines. In addition (in blenders), the blender solenoid drive board provides DC pulse modulated signals to operated the proportional flow control valves.

Located on the solenoid drive board is a fuse (F1). This fuse controls all AC voltage supplied to the solenoid drive board. If the fuse opens the dispenser will reset, but the AC valves and relays will not be energized.

Blender solenoid drive boards have two additional protection devices: PF1 and PF2. These are poly fuses that supply 24VDC power to the proportional flow control valves for side 1 and side 2, respectively. If one of the valve lines is overloaded, the poly fuse will open. When the overload is removed, the poly fuse will close, and the circuit will reset and return to normal operation. Blender solenoid drive boards contain a micro-processor and two additional troubleshooting aids: two LEDs that indicate the state of communications to the computer and to the valves. The LED labeled DS1 is the “Valve Enable” indicator and will light steadily as soon as a grade is selected upon nozzle removal. This indicates that the computer base Pump processor has enabled one or more valves on either side of the dispenser. The other LED labeled DS2 is the activity indicator for the solenoid drive board (SDB) micro-processor and will blink about every 2 seconds to indicate that, the processor is functioning properly, and that communications have been established between the solenoid drive board processor and the computer base Pump processor. At power up, this lamp will blink at a faster rate, and then pause, until the communications are established. A steady On or a steady Off indicates that the SDB processor is not functioning properly.

3.4. COMPUTER ASSEMBLY

The computer is a complete self-contained unit with a built in power supply and memory retention device, see Figure 3-1. It is responsible for performing the following functions:

- Provides 5 VDC to, and monitors the return from, the handle switches.
- Monitors the two output lines from each pulser.
- Converts the data received from the pulsers into a volume amount.
- Calculates the sale dollar amount based on the selected unit price.
- Controls the solenoid drive board to switch on the correct submersible pump relays and solenoid valves. It also switches the pulser select lines to enable the correct pulser(s) by controlling the solenoid drive board.
- Maintains electronic product totals.
- Sends sale and product totals data to the control system via a two wire data loop.
- Monitors all dispenser functions, and when a problem is found, generates and stores error codes.

The Duplex Computers is fused to protect itself from overvoltages and shorts. There are two fuses on the computer:

- F1 fuses the input to the 5 VDC regulator on the computer board. If this fuse opens the dispenser will look like it has been powered down.
- F3 fuses the main AC input to the computer; all power to the computer, solenoid drive board, and the displays passes through the F3 fuse. If this fuse opens the dispenser will look as if it has been powered down.

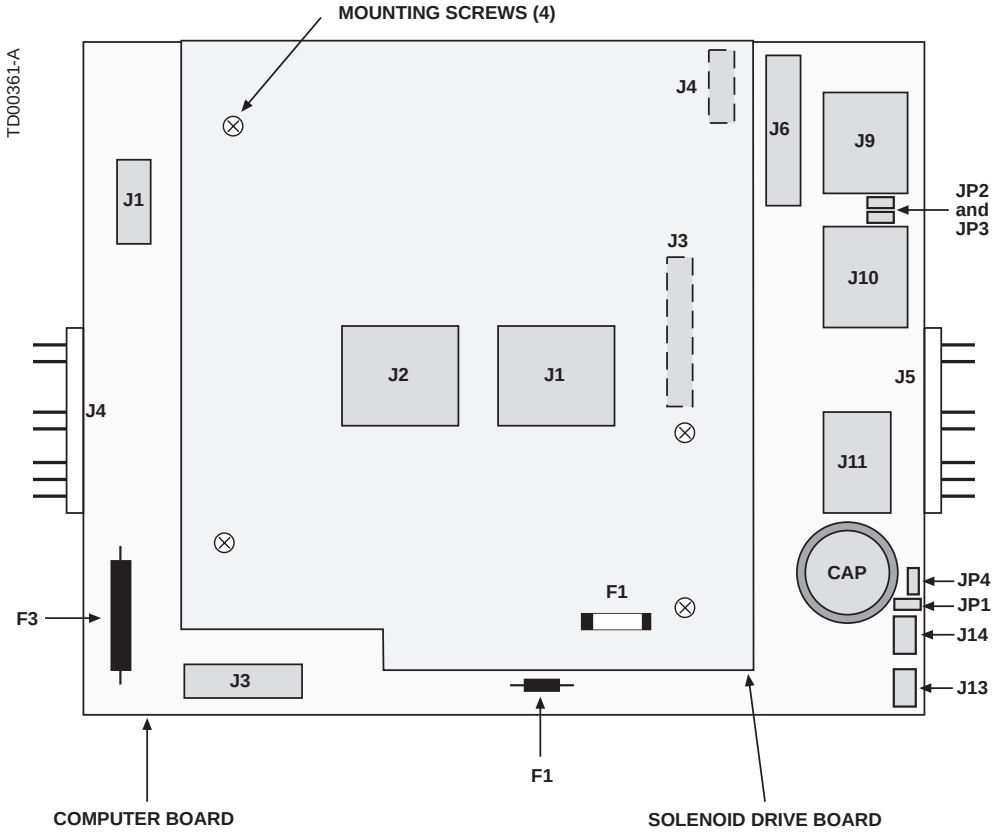
Note: F1 is a pico fuse. It physically looks very similar to a small resistor and is mounted in a socket.

F3 is the more visible glass enclosed type fuse, however, it is insulated with heat shrink tubing as required by UL.

On the Duplex II computer there are two option jumpers which are be configured for proper operation. These are labeled JP2 and JP3. A jumper is on the two pins closest to the edge of the board on each connector for blending and single hose MGD applications.)

In addition to the jumper settings, there are programming options which must be set in order for the Duplex II computer to operate correctly. For programming information refer to the manual: *"Duplex II Computer Option Programming for 1/ and 2/Vista Model Dispensers"*, part number 920205.

Note: 2/Vista models require Revision 11 or higher Duplex II computer software.



COMPUTER CONNECTOR DESCRIPTIONS

J1 -- Data Loop Both Sides
J3 -- AC Input
J4 -- Displays Side-1
J5 -- Displays Side-2
J6 -- Provides For RAM Clear
J8 -- (Not Shown) AC Output to Solenoid Drive Board
J9 -- Pulser Control Side-1
J10--Pulser Control Side-2
J11--Nozzle Switches Both Sides
J13--Annunciator Connection
J14--Annunciator Connection
JP1 --
JP2 & JP3 -- Shunts Located Near Edge of Board for Blender and Uni-Hose.
Shunts Located Toward Inside of Board for MGD's.
JP4 --

FUSES

F1--Fuses the input to the 5 VDC regulator (LCD Displays)
F3--Fuses the AC input to the computer

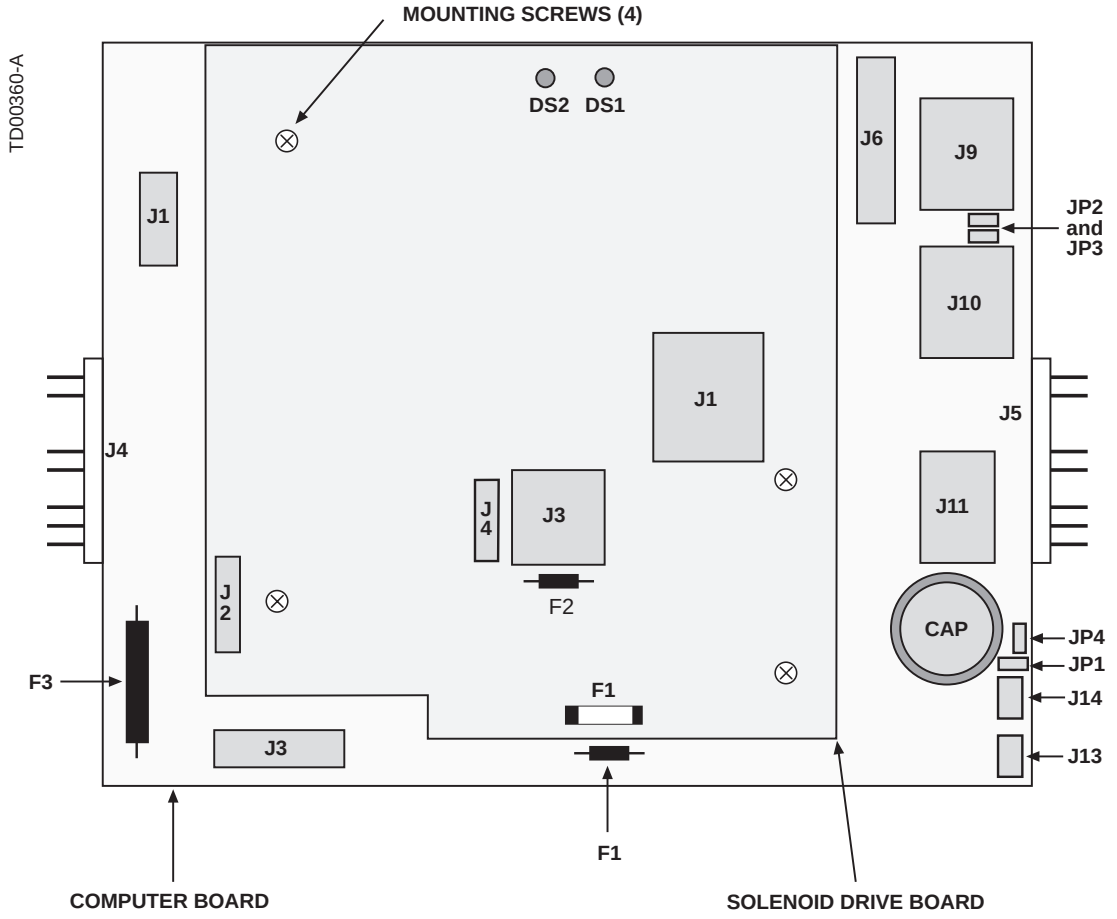
SOLENOID DRIVE BOARD CONNECTOR DESCRIPTIONS

J1 --Relay Select Side 1 (There is also a J1 Located on the computer; it is the data connector for both sides.)
J2 --Relay Select Side 2
J3 --Nozzle and Pulser Control Side-1 (1/V490 ONLY)
J4 --Nozzle and Pulser Control Side-2 (1/V490 ONLY)

FUSES

F1 -- Solenoid Valves and Relay Selects

FIGURE 3-1. COMPUTER AND SOLENOID DRIVE BOARD (NON-BLENDER). *The computer is a complete self-contained unit with a built in power supply and memory retention device.*



COMPUTER CONNECTOR DESCRIPTIONS

J1 -- Data Loop Both Sides
J3 -- AC Input
J4 -- Displays Side-1
J5 -- Displays Side-2
J6 -- Provides For RAM Clear
J8 -- (Not Shown) AC Output to Solenoid Drive Board
J9 -- Nozzle Switch and Pulser Control Side-1
J10--Nozzle Switch and Pulser Control Side-2
J11--Nozzle Switches Both Sides
J13--Annunciator Connection Side 1
J14--Annunciator Connection Side 2
JP1 --
JP2 & JP3 -- Shunts Located Near Edge of Board for Blender and Uni-Hose.
Shunts Located Toward Inside of Board for MGD's.
JP4 --

FUSES

F1--Fuses the input to the 5 VDC regulator (LCD Displays)
F3--Fuses the AC input to the computer

SOLENOID DRIVE BOARD CONNECTOR DESCRIPTIONS

J1 --Relay Select (There is also a J1 Located on the computer; it is the data connector for both sides.)
J2 --Pulser Select
J3 --Porportional Valve Control 24 VDC Output
J4 --Porportional Valve Power 24 VDC Input

DS1-Valve Enable
DS2-MPU Activity

FUSES

F1 -- Relay Selects (AC Line Voltage)
F2 -- Porportional Valves (+24 VDC)

FIGURE 3-2. COMPUTER AND SOLENOID DRIVE BOARD (BLENDER). *Blender Solenoid Drive Boards also contain two LED's which indicate the state of communications to the computer and to the valves.*

3.4.1. Fault Codes

The fault codes generated by the Duplex II Computer are assigned a "status." There are four types or Status as follows: Error codes, Hydraulic codes, Service codes and Disable codes. The definitions of each of these types are as follows:

- Error codes (**Status 1**) shut down the entire side of the dispenser until the error is cleared by cycling power to the computer or entering Option 99. Error codes **are displayed** on the next reset attempt and in Option 01.

- Hydraulic codes (**Status 2**) shut down the hydraulic position that was affected by the error until the error is cleared by cycling power to the computer or by entering Option 99.
  Hydraulic codes **are displayed** on the next reset attempt and in Option 01.

- Service codes (**Status 3**) generally do not affect the operation of the dispenser unless another error occurs.
  Service codes **are not displayed** on the next reset attempt, however, they are displayed in Option 01.

- Disable codes (**Status 4**) are similar to service codes in that they do not affect the operation of the dispenser, **are not displayed** on the next reset, and are not displayed in Option 01.
  Disable Codes are Service Codes that have been disabled by the computer program or by the Option 98 setting in option programming.

Note: Error and Hydraulic fault codes (Status 1 and Status 2) that have not been cleared via Option 99 or a power cycle will continue to be displayed at the end of the reset cycle until the problem which caused them is remedied.

Error and Hydraulic codes are displayed every time the affected portion of the dispenser is restarted by removing the nozzle from the nozzle boot and lifting a lever or by pressing a start, grade select or cash/credit switch.

The format of the displayed fault codes is shown in Figure 3-3., Figure 3-4. and Figure 3-5. The fault codes, their status, and descriptions are shown in Table 3-1. When more than one number is shown in the Fault Code Status column, it indicates that the Fault Code can be assigned either status. An asterisk(*) next to a number in this column indicates the default status.

As explained by the status definitions above, the effect an error (fault) has on the dispenser depends on the status of the fault code. Table 3-2. details the effect of the error.

3.4.2. Fault Reporting

When the computer detects a fault, the sale currently in progress may be shut down. Depending on the fault code status, the sale may not be shut down and, on the next reset, a fault code will be displayed. The fault code is displayed only for the affected side of the dispenser. In addition to the displayed fault code, a transaction counter number is also displayed. The transaction counter number can be used as a troubleshooting aid to determine on which sale an error occurred and if that particular error is related to the reported problem. This fault code, along with the new transaction counter number, will have a format similar to that in Figure 3-3.

The transaction counter has a range of 00000 - 59999 and then rolls over to 00001. Each side of the dispenser has a transaction counter. When Option 01 is entered the current transaction number for side 1 is shown in the Sale Money Display. The value of side 2 transaction counter (if two fueling points) is shown in the Sale Volume Display. See Figure 3-4. for an example. Pushing the Totals button while the transaction values are displayed causes entry into the Fault Code History Display Mode. See Figure 3-5. for an example. As shown the transaction number is displayed for each side along with the fault code for that transaction number. The first fault code displayed is the most recent.

Pushing the Totals button cycles through the fault codes. This mode will display the last 16 fault codes detected by the dispenser's computer since the last RAM clear (not 16 per side but 16 total for that computer).

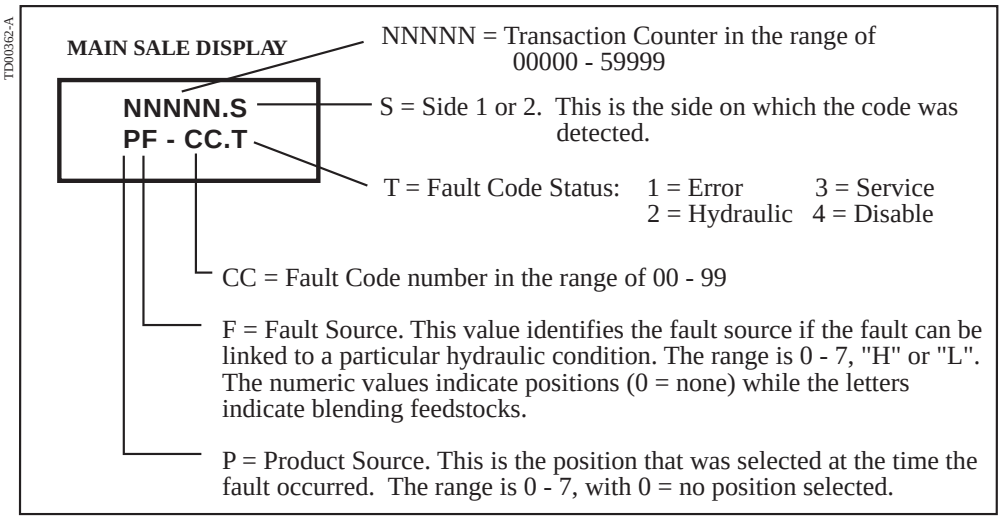


FIGURE 3-3. FAULT CODE DISPLAY. *The fault code will have a format similar to that shown.*

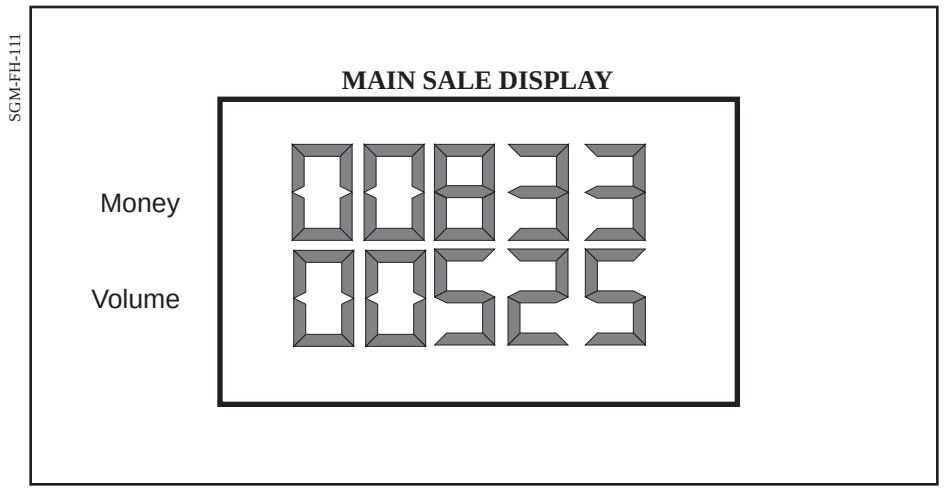


FIGURE 3-4. MAIN SALE DISPLAY SHOWING TRANSACTION COUNTERS. *The transaction number for Side 1 of the dispenser is shown in the Money Display and the transaction number for Side 2 is shown in the Volume Display.*

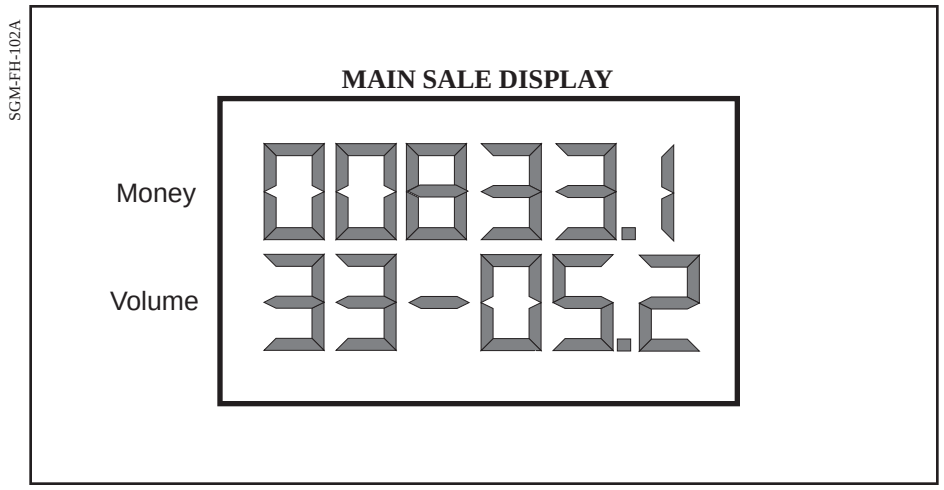


FIGURE 3-5. MAIN SALE DISPLAY SHOWING TRANSACTION COUNTER AND FAULT CODE. *In this example Fault Code 05 occurred on transaction number 00833 on side 1 of the dispenser.*

3.4.2. **Fault Reporting**, continued

TABLE 3-1. FAULT CODES, STATUS, AND DESCRIPTION

Fault Code	Fault Code Status	Description
01	1/3*	Push-to-start open but configured for push-to-start, or push-to-start switch shorted.
02	1*	Push-to-start jumper shorted but not configured for push-to-start.
03	1/2/3*	Unit has overrun prepay/preset amount.
04	1*	ROM checksum error.
05	1/2/3*	Pulser error or Wayne Vac error. (Set if jitter count exceeds limit)
06	1/3*	Illegal current sensed in valve or relay output circuit.
08	1/2/3*	Time out limit has been exceeded.
09	1*	5 consecutive no pulse timeouts.
10	1/2/3*	Reverse pulse limit has been exceeded.
11	1*	Corrupted option data. The pump will not restart until Option 99 is set to 03. Cycling power will not reset this error.
12	3*	Corrupted totals data; the totals were reset to zero.
13	3*	Corrupted unit price data; the unit prices were reset to zero.
14	1/2/3*	Forward pulses from illegal pulser exceeds limit.**
15	1/2/3*	Jitter pulses from illegal pulser exceeds limit.**
16	1/2/3*	Reverse pulses from illegal pulser exceeds limit.**
20	3/4*	Jitter count exceeds logging limit (blenders only).***
21	3/4*	Reverse count exceeds logging limit (blenders only).***
30	3*	Corrupted Electro-mechanical totalizer data. Totalizer fractional amounts stored in memory after each sale have been reset to 0.
31	3*	Electro-mechanical totalizer overflow. The computer missed incrementing at least one volume unit on the EM totalizer.
51	1/2/3*	Blend ratio has exceeded error limits in Option 52.
54	1/2/3*	Communication failure between computer and blender solenoid drive board.
55	1*	Computer did not configure iMeter module due to communication problems with blender solenoid drive board at power-up. (Applicable only at power-up.)

* Indicates the default status of the fault code.

** Illegal pulsers are defined as follows: In Blending dispensers -- pulses received from a feedstock product that is not selected. In single hose MGD dispensers -- pulses received from unselected product.

*** Jitter pulse count exceeds logging limit. Fault code is displayed in the following special format:

NNNNN.S	Sale Money
PF.20.BB	Sale Volume

NNNNN:	Transaction Counter
S:	Side 1 or 2
P:	Product Source (0-7)
F:	Fault Source (0-7, “H” or “L”)
20:	Fault Code 20 (Jitter pulse logging error)
BB:	Maximum jitter count allowed

3.4.2. **Fault Reporting**, continued

The effect an error (fault) has on the dispenser depends on the status of the fault code. See Table 3-2. below.

TABLE 3-2. FAULT CODE STATUS EFFECT ON DISPENSER

	STATUS 1	STATUS 2	STATUS 3
Current sale is interrupted	X	X	X
The next reset attempt is normal			X
The next reset attempt displays the error code	X	X	
The error code is stored in Option 01	X	X	X
The entire side is out of service until the error is cleared	X		
The hydraulic position is out of service until the error is cleared		X	
The dispenser will operate normally unless another error occurs			X

3.5. INTRINSIC SAFE BARRIER ASSEMBLY

The Intrinsic Safe Barrier (ISB) assembly is located in the electronic head of the dispenser. Its function is to ensure that the amount of electrical energy introduced into the hydraulics cabinet is within acceptable limits. This barrier uses resistors, fuses, transistors and zener diodes to limit energy out of the barrier. In the dispensing cycle, when the operating lever is lifted, the nozzle switch moves to the closed position. This causes the nozzle signal on the computer base to go from a +5 VDC potential to zero or ground potential, which alerts the microprocessor to begin a new sale if the dispenser has been authorized and the push-to-start, cash/credit or grade select switch has been pressed. In addition to the nozzle switch circuits, the pulser selects are also protected by the ISB assembly.

The ISB circuit board (see Figure 3-6.) contains current limiting resistors and voltage limiting redundant (2 in parallel) zener diodes which will limit voltage potential to approximately 6.2 VDC. This energy limiting circuit eliminates the possibility of arcs in the hydraulic area of the dispenser.

The ISB assembly is a sealed assembly and must be repaired at the factory. The ISB circuit board in the assembly is not replaceable in the field. The complete assembly shown in Figure 3-6. must be replaced if the ISB board becomes inoperative. See Section 7 for replacement procedures.

The circuit board mounted on the outside top of the ISB assembly is the ISB Interface board. The ISB Interface board is a separately replaceable board and is not part of the ISB assembly, therefore, it is not shown in Figure 3-6. See Appendix B for pinouts and Section 7 for replacement procedures.

The ISB Interface board, functionality wise, has one purpose - to regulate the DC voltage for powering the Intelligent pulsers. The Interface board takes the $VCAP^{+}$ voltage from the pump computer assembly and creates a regulated 8 VDC which is then supplied to the pulsers. Wiring for the pulser selects, A and B pulse channels, and nozzle switches pass through the Interface board, but these circuits are not actively affected by the board, other than the supply voltage as described.

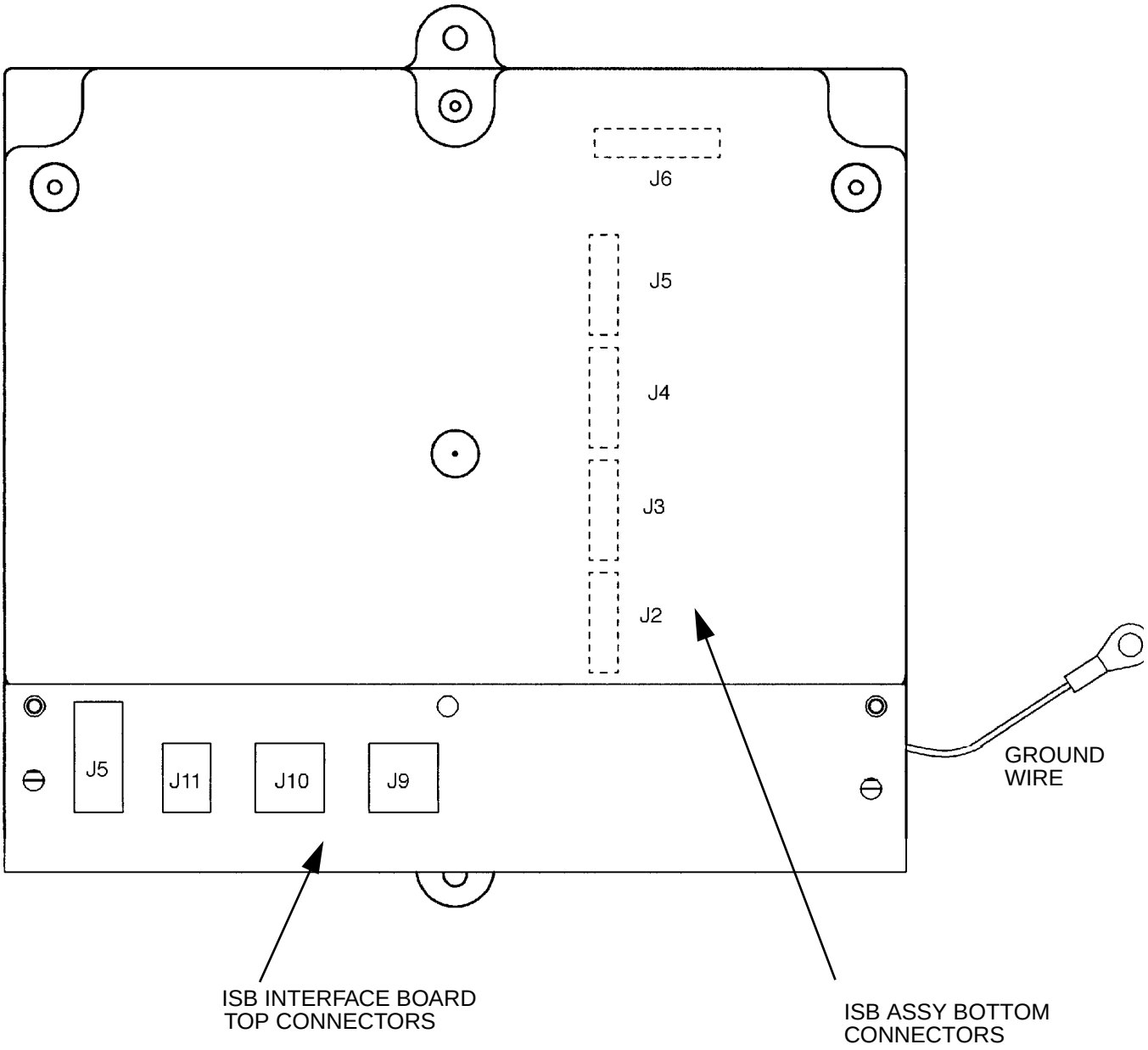


FIGURE 3-6. INTRINSIC SAFE BARRIER ASSEMBLY. *The ISB ground lug shown must be connected directly to the dispenser chassis at the electronic head base angle with no other wires terminated at this location. The components of the ISB assembly are not separately replaceable. If failure occurs, replace the whole ISB assembly. Note that the ISB Interface board, which mounts on top of the ISB assy, is not shown here since it is not part of the assembly.*

The ISB Interface Board mounted on top of the ISB Assembly is a separately replaceable from the ISB Assembly.

3.6. INTELLIGENT PULSER

The Intelligent Pulser contains two sets of hall effect (magnetic) sensors - one set for each meter. Inside the meter dome, a rotating magnetic disk generates a changing magnetic field. The sensors detect changes in the magnetic field which the pulser converts to digital pulses. The pulses are adjusted to meter output with a calibration factor that is stored in the pulser memory. See Figures 3-7 and 3-8.

The Intelligent Pulser has three Operational Modes:

U.S. Mode - - - - - - Calibration is done with a 5 gallon measure.
Continental Mode - Calibration is done with a 20 liter measure.
Euro Mode - - - - - - Factory Default (for factory diagnostics).

Note: Intelligent pulsers must be set to U.S. or Continental Mode for proper operation in dispensers equipped with Duplex computers.

The procedure to set the Operational Mode is as follows:

1. Power up the dispenser.
2. Enter option programming and confirm that Option 04 is set to 4 = (US Mode - gallons) or to 5 = (Continental Mode - liters).
4. Advance to Option 99 and save the settings (set to 3). Exit Option Programming.
5. Open both calibration doors on all pulsers in the dispenser.
6. Cycle power to the dispenser.
7. Close the calibration doors on all pulsers.

3.7. iMETER CALIBRATION

All iMeters are tested, calibrated and sealed at the factory before a dispenser is shipped. Local codes and regulations may require verification of meter accuracy at Start-up. If verification or calibration is required, sufficient product must be run through each meter to thoroughly flush out all air and completely fill the system prior to the calibration process.

Prior to calibrating, the Intelligent pulser **must be set to the proper Operational Mode**. This allows the pulser to identify the size test can used in the calibration process. If the incorrect mode is set, the pulser will not accept the new calibration factor. This calibration factor is essential for calibrating the meter to spec. See Section 3.6. above for mode setting instructions.

Each iMeter module contains two meters. The Intelligent pulser contains two sets of sensors, one set for each meter. On the front of the pulser, there are two calibration doors, one for each meter in the iMeter module. The door closest to the front of the dispenser

controls calibration of the front meter and the other door controls calibration of the rear meter. It is important to verify the product grade for each module to assure the correct door is opened during the calibration process.

3.7.1. Verification Accuracy:

1. Dispense Product into test measure and empty to wet container.
2. Dispense product into test measure until exactly 5 gallons (20 liters for Continental mode) are shown on dispenser display. See Note 1.
3. Compare reading on site glass of test measure to dispenser display. Volume in test measure should be within +/- 3 cu. in. (+/- 50 ml, Continental mode). See Note 2.
4. If values are out of range, calibrate as described below.

3.7.2. Calibration:

1. Identify calibration door for meter in need of calibration.
2. Remove seal wire and pin to allow access to door.
3. Dispense product into test measure and empty to wet container.
4. Open calibration door of meter to be calibrated. (Only one door can be opened at a time during the calibration process).
5. Dispense exactly 5 gallons (20 liters Continental mode) into the test measure exactly to the “0” mark on the sight glass.
6. Close the calibration door. (This now redefines the calibration factor in the pulser).
7. Empty test measure (drain for 10 seconds) and verify accuracy as described above.
8. Seal calibration door.

Note 1: In the Continental mode, in addition to 20 liters, a 10 liter or 5 liter test measure may be used if required by the application. However, you should check with your jurisdiction on Weights & Measures tolerance requirements.

Note 2: For the U.S. and Canada, acceptance tolerance of ±3 cu.in. for a 5 gallon measurement and ± 50 ml for a 20 liter measurement is only required for newly installed, newly placed in service devices for 30 days. After 30 days, the tolerance is increased to ±6 cu.in. for 5 gallons and ±100 ml for 20 liters.

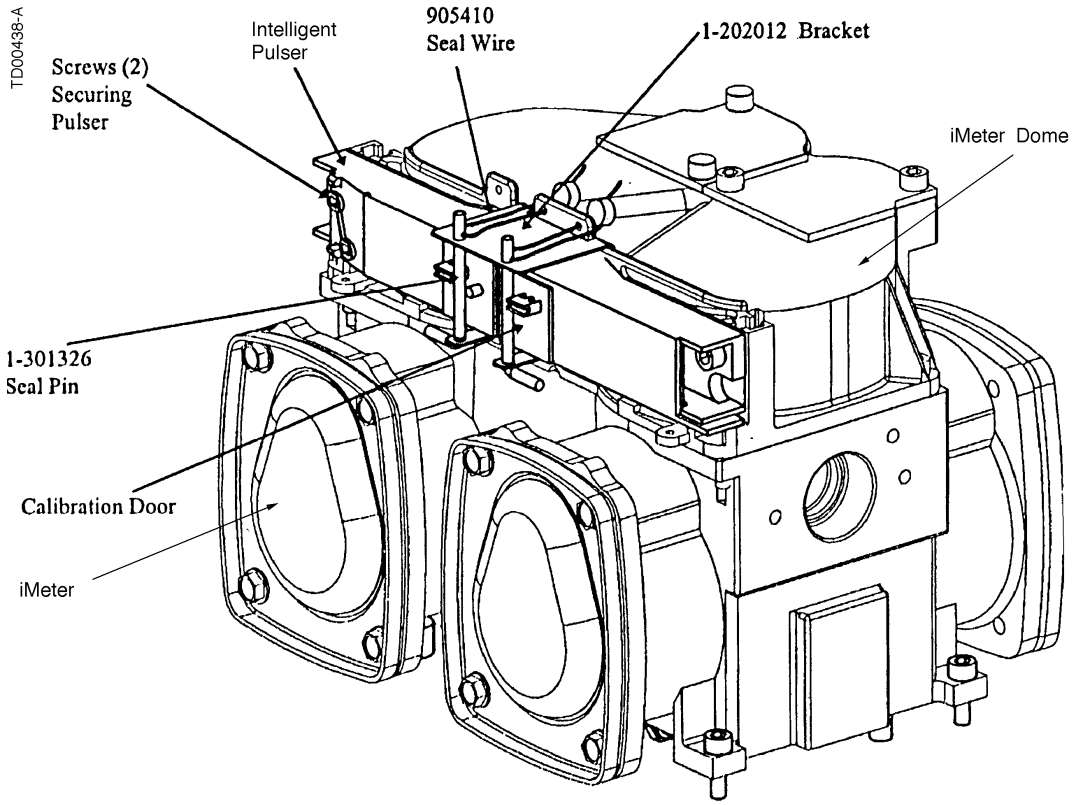


FIGURE 3-7. INTELLIGENT PULSER LOCATION ON THE iMETER MODULE. *The Intelligent Pulser controls the pulse count for Side 1 and Side 2 meters.*

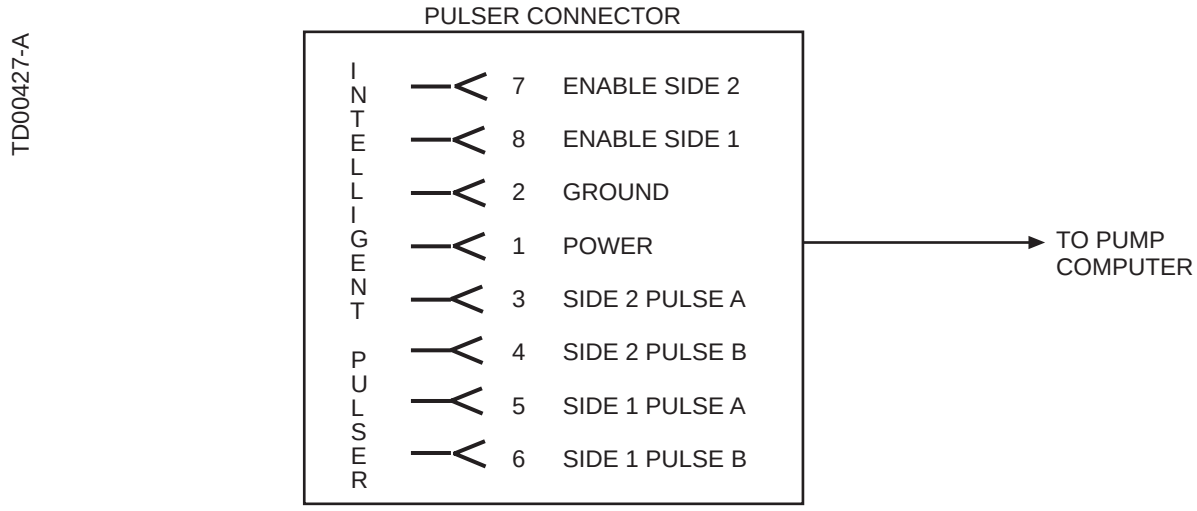


FIGURE 3-8. INTELLIGENT PULSER. *The pulser evaluates the state of the two enable lines which are set by the pump computer to determine the correct mode of operation.*

4. MECHANICAL PARTS

4.1. NOZZLE BOOT (PROXIMITY "REED" SWITCH STYLE BOOT)

The nozzle boot assembly, used on the dispenser models covered in this manual, uses a proximity "Reed" switch and magnet for ON/OFF dispenser activation. The nozzle boot can be assembled in either the Lift-to-Start or the Push-to-Start configuration.

4.1.1. Lift-to-Start Version

The nozzle boot switch assembly (see Figure 7-8.) consists of a proximity reed switch attached to the rear of the nozzle boot casting. A magnet is contained in the Lift-to-Start lever and when the lever is lifted to the ON position the magnet is brought into alignment with the proximity switch, turning the switch ON. There is no adjustment for the switch.

Check the operation of the nozzle switch as follows:

1. Authorize the dispenser and remove the nozzle from the nozzle boot. Lift the nozzle hook lever fully upward to make sure the switch turns ON. An ON switch will be indicated by the unit price displays of the unselected products going OFF or displaying dashes.
2. Lower the Lift-to-Start lever to the down position and check that the switch turns OFF. An OFF switch is indicated by the unit price displays of the unselected products coming back ON.

4.1.2. Push-to-Start Version

The nozzle boot switch assembly (see Figure 7-9.) consists of a proximity reed switch attached to the side of the nozzle boot casting and a magnetic actuator shaft inserted into a spring-loaded flipper within the nozzle boot. When the nozzle is removed, the flipper rotates and aligns the magnetic shaft with the proximity switch, turning the switch ON. There is no adjustment for the switch.

Check the operation of the nozzle switch as follows:

1. Authorize the dispenser and remove the nozzle from the nozzle boot to make sure the switch turns ON. An ON switch will be indicated by the lighted Push-to-Start buttons and the unit price displays blinking.
2. Insert nozzle slowly into the nozzle boot and check that the switch turns OFF. An OFF switch is indicated by the lighted Push-to-Start buttons turning OFF and the unit price displays stop blinking.

5. HYDRAULIC PARTS

The following section describes the operation of those hydraulic parts in Wayne dispensers which perform some “act”. Simple flow tubes will not be discussed.

There are four basic hydraulic parts in the dispenser:

- Strainer and Filter
- Two stage Solenoid Valve (Non-Blenders only)
- Proportional Flow Control Valve (Blenders only) with Single stage Valve (multi-hose Blenders only)
- iMeter
- Check & Pressure Relief Valve

5.1. STRAINER AND FILTER

The strainer and filter (see Figure 5-1) are mentioned in this document because they may cause the dispenser to deliver slowly. In some cases this may appear to be a service problem. In reality the filter should be changed and the strainer cleaned on a regular basis.

Before removing the strainer or filter assembly, trip the impact valve and turn OFF the circuit breaker for the associated submersible pump.

5.1.1. Strainer

If the underground installation is new, it may be necessary to clean the strainer screen two or three times the first few days of operation to remove debris and pipe dope. After this, occasional cleaning of the strainer is all that should be required. The fuel filter should be changed whenever the strainer is cleaned.

The strainer is located above, and held in place by, the filter. After removing the filter, again place suitable container below filter/strainer casting to catch product and sediment, gently pull the strainer downward to remove it from the filter/ strainer casting. Replace or clean strainer screen of any debris and reinstall.

5.1.2. Filter

Like the strainer, in new installations it may be necessary to change the filter frequently in the first few days of operation in order to ensure proper operation.

The fuel filter is removed the same way an oil filter is removed from a car engine. Place a container under the filter to catch the fuel. To install the new filter, first apply a film of oil to the gasket and hand turn until the gasket contacts the base. Then tighten one half turn. Open the emergency shear valve, turn the submersible circuit breaker ON and check for leaks.

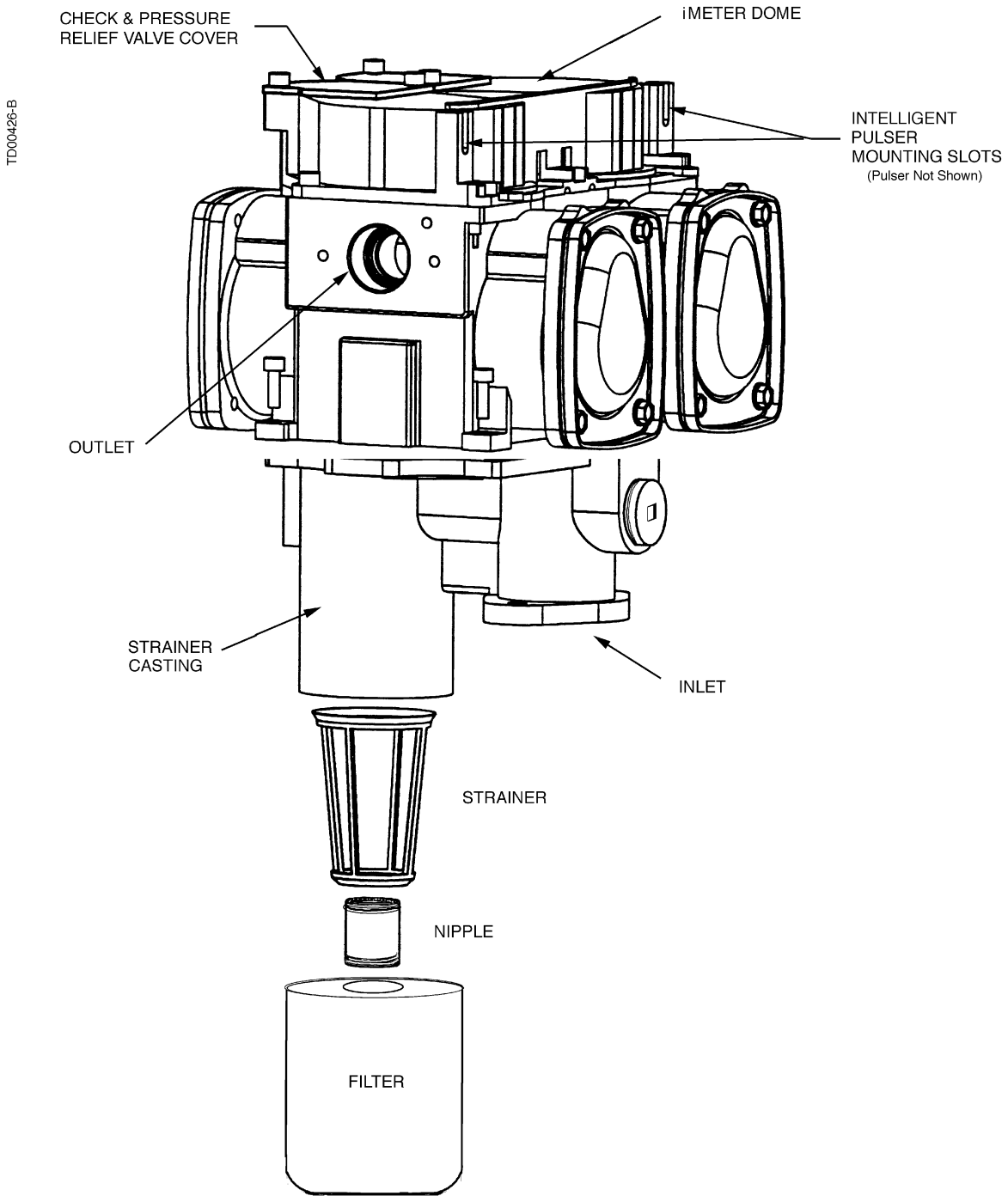


FIGURE 5-1. STRAINER AND FILTER. *The strainer should be cleaned as needed to remove any debris it has captured. The filter should be UL recognized.*

5.2. TWO STAGE SOLENOID VALVE (NON-BLENDERS ONLY)

The two stage AC voltage operated solenoid valve (see Figure 5-2 below) has two basic functions. It controls all flow through the dispenser and acts as a positive shutoff valve.

The two stage valve itself consists of two main parts:

- The valve body (not field serviceable)
- The valve actuator coils (not field serviceable)

The diaphragm inside the valve body is the main flow valve. It controls the full flow through the dispenser.

The actuator coils control the actuator in the valve body. The actuator is an electrically (AC voltage) operated solenoid valve. It controls the diaphragm valve by switching the diaphragm into and out of full flow and allowing a slower bypass flow around the diaphragm.

In all Wayne non-blending dispensers using the two stage solenoid operated diaphragm valve, the general order of operation is the same. At the outset of a sale, the slow flow coil only is energized causing slow product flow to start. After a small amount of product is delivered both coils are energized. This initiates full flow. For preset sales the dispenser will switch back to slow flow at a pre-determined point.

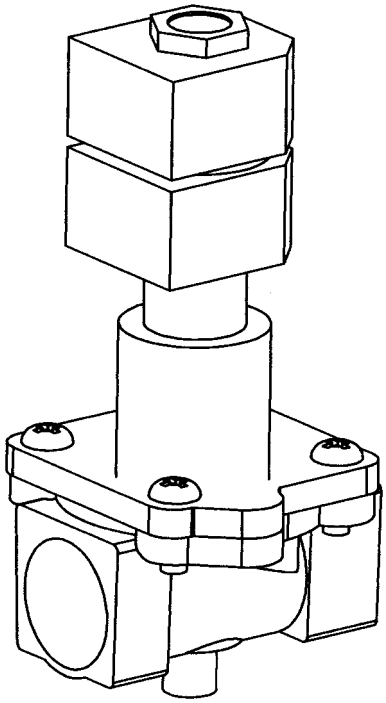


FIGURE 5-2. 2-STAGE VALVE. *In 2/Vista non-blending dispensers, the 2-stage valve has an extended sleeve. This allows the actuator coils to be located in the electronic head while the valve body remains just below the vapor barrier in the hydraulics cabinet.*

5.3. PROPORTIONAL FLOW CONTROL VALVE (BLENDERS ONLY)

(Blenders only) The proportional flow control valve (see Figure 5-3) is a pilot-operated, diaphragm solenoid valve. It has three main functions in the dispenser:

- Positive shutoff
- Blend ratio control
- Flow rate regulation

Located between the meter and the hose outlet, the valve is controlled by a 24 VDC pulse width modulated signal from the solenoid drive board. Normally closed, the pilot opens by an amount proportional to the amount of current sent to the valve coil. As the pilot raises off its seat, it reduces the pressure to the back side of the diaphragm causing it to lift off of its seat as well. The same applies to the valve closing; the diaphragm follows the pilot back to the closed position as the current to the coil is reduced. The computer continually adjusts the current to the valves during a sale based on the desired blend ratio of the two feedstocks and maximum allowable flow rate. The high and low products remain separate until they are mixed at the hose outlet in proportional blenders or at the outlet valve in fixed ratio blenders.

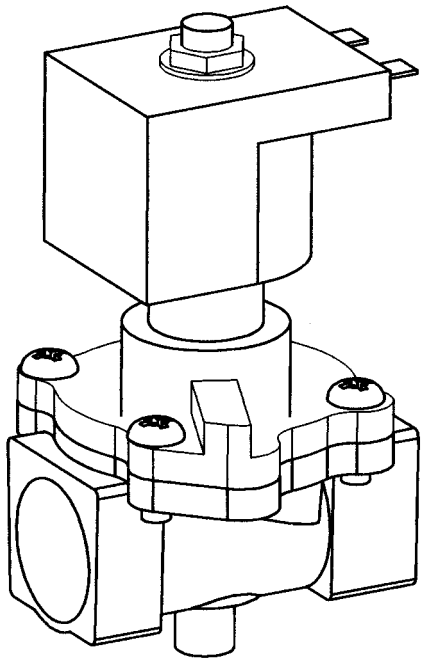


FIGURE 5-3. PROPORTIONAL FLOW CONTROL VALVE. *In 2/Vista blending dispensers, the Proportional valve has an extended sleeve. This allows the valve coil to be located in the electronic head while the valve body remains just below the vapor barrier in the hydraulics cabinet.*

The pilot operated proportional solenoid valve performs three basic functions in the dispenser. It provides positive shutoff, regulates the ratio of blended feedstocks, and controls the flow rate through the hydraulic path by limiting the maximum flow rate through a given hose.

The pilot operated proportional flow control valve consists of two main parts:

- The proportional valve
- The valve coil

The proportional valve is an electrically operated solenoid made up of a body and an operator. It controls all flow through the dispenser.

The valve coil controls the operator of the valve. The coil is energized with a pulse width modulated (PWM) signal that sends discrete “bursts” of current at a set frequency level. When the coil receives this signal, the pilot inside the operator reacts to the changing magnetic field and moves up and down depending on the amount of current through the coil. The position of the pilot relative to the pilot orifice in the diaphragm controls the amount of flow.

In all Wayne blending dispensers using this valve, the general order of operation is the same. At the beginning of a sale, the coil is energized with a minimum current level, allowing slow product flow to start. After a small amount of product is delivered, the coil is energized with more current to initiate full regulated flow. For preset sales, the dispenser will switch back to slow flow at a pre-determined point.

5.3.1. Flow Control Valve “Off” No Flow

Flow control valve “Off” or no flow occurs when the inlet to the valve is charged. But there is no flow required from the particular valve as in the instance where a submersible pump motor is running because another fueling point is being used. The pilot stays closed allowing pump pressure to build on the back side of the diaphragm, closing the outlet port.

5.3.2. Flow Control Valve “On” Slow Flow

Flow control valve “On” slow flow occurs at the beginning of all sales, and again at the end of preset sales. In this case the coil is energized with current bursts of shorter duration. This allows the pilot to slightly move off its seat, allowing slow flow through the pilot orifice leading to the valve outlet, but not relieving enough pressure to cause the diaphragm to open.

5.3.3. Flow Control Valve "On" Full Regulated Flow

Flow control valve "On" full regulated flow occurs during the main portion of all sales. At this time, the coil is energized with bursts of current of longer duration, pulling the pilot further off it's seat, relieving the pressure balance, and allowing the diaphragm to open by an amount relative to the distance between pilot and the pilot orifice. The position of the pilot is constantly moving in very small increments based on the signals sent from the computer relative to controlling a specific blend ratio and/or maintaining a maximum flow rate of 10 GPM through a hose. As the computer senses the need to increase or decrease the amount of a particular feedstock, it will send signals to the coil of longer (to open) or shorter (to close) duration. As a result, the pilot moves up or down causing the diaphragm to follow its movement and achieve the proper amount of flow.

When the delivery is complete, the coil is de-energized, allowing the pilot to return to its closed position. This allows pressure to build on the back side of the diaphragm, forcing it to close and seal the outlet port thereby stopping flow.

5.4. SINGLE STAGE VALVE (FIXED RATIO BLENDERS ONLY)

Fixed ratio blending dispensers, such as the 2/V590 (6 hose) and 2/V591 (8 hose), use the single stage valve (see Figure 5-4), in addition to the proportional valve discussed in the previous section. The single stage AC operated valve is used at each hose outlet, in the top of the dispenser (see Figure 2-4), to either allow or block (on/off) product to that hose outlet.

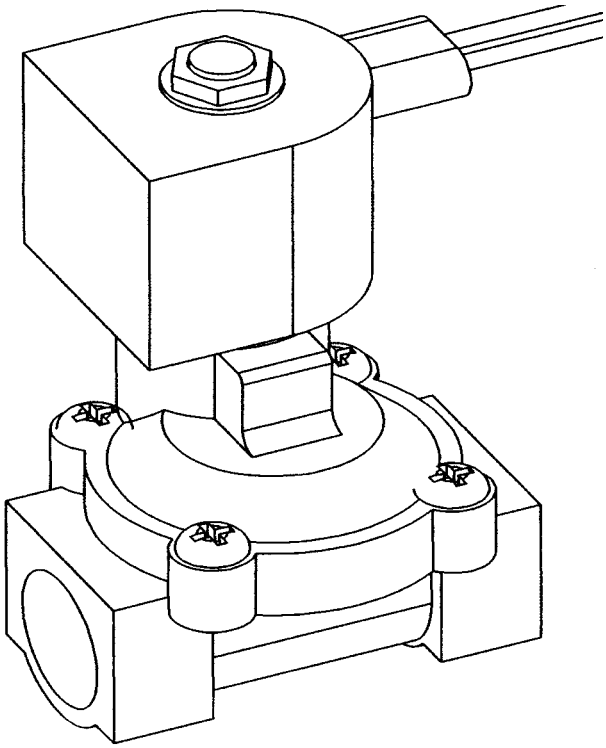


FIGURE 5-4. SINGLE STAGE VALVE. *The single stage valve is an AC operated normally closed solenoid valve. It is only used in multi-hose blenders and is located near each hose outlet in the top of the dispenser.*

5.5. iMETER

The iMeter is designed and assembled around a modular type concept using fewer parts and allowing easier access for service. The iMeter module (Figure 5-5.) contains two meters in one assembly and the Intelligent Pulser. Each of the two meters in the iMeter module is a positive displacement meter. The pistons in the meter are in-line with respect to one another - one piston is 180° out of phase with the other. In remote dispensers, the bottom of the iMeter body is attached to the filter/strainer casting as shown in Figure 5-1. In suction pumps, the bottom of the iMeter body is attached to the top cover of the compact pumping unit. There are no external moving parts on the iMeter. Calibration is accomplished electronically. A procedure for iMeter calibration and Intelligent Pulser operation is found in Section 3.

5.5.1. Check and Pressure Relief Valve

There are two Check & Pressure Relief (C&PR) valves located atop the iMeter module under removable covers, as shown in Figure 5-5. The top mounted location allows for check valve replacement without draining the meter body. Once a delivery is complete and the diaphragm valve is closed, the product pressure between the check valve and the nozzle will be held at the pressure of the last delivery. If the pressure should build up due to temperature rise in the hose or a car runs over the hose, the relief function of the C&PR valve would relieve the pressure buildup. The relief valve is set to relieve pressure between 30-50 psi.

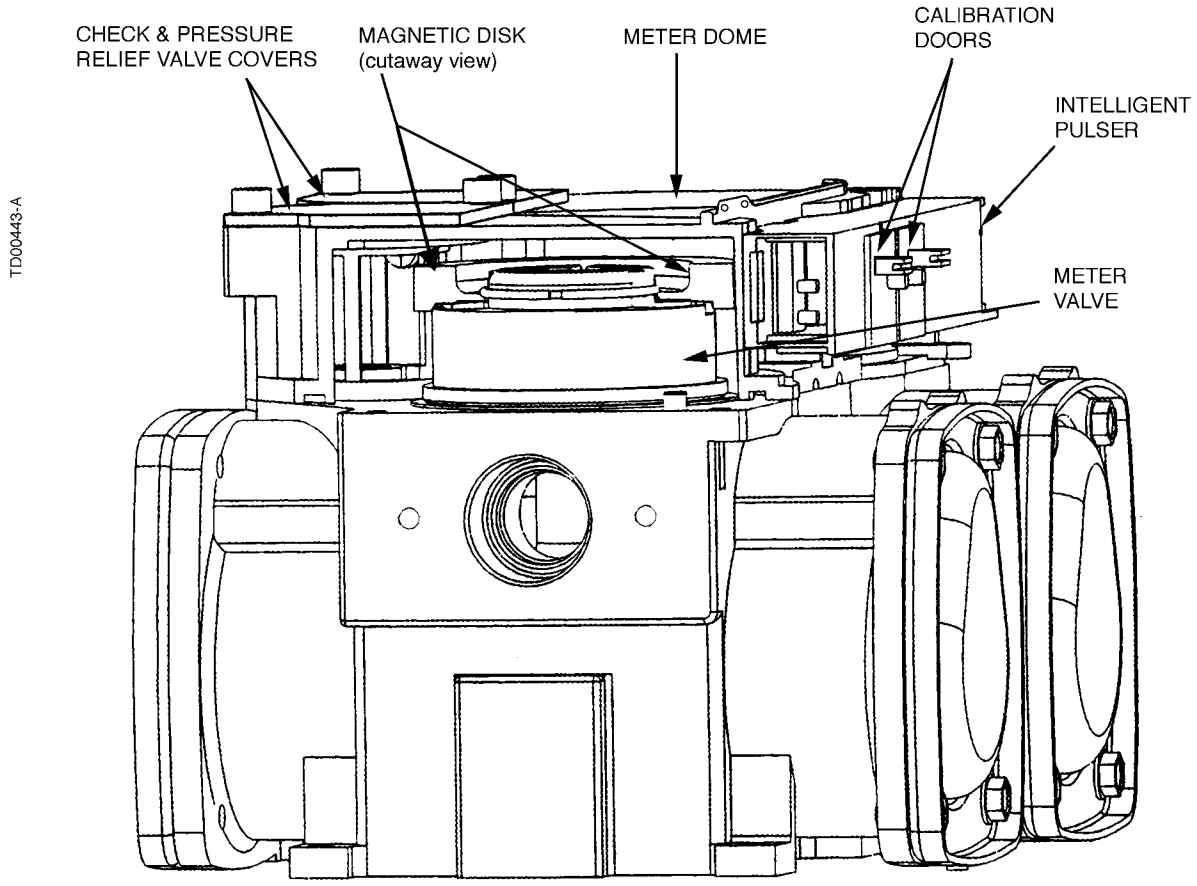


FIGURE 5-5. iMETER CUTAWAY. *The magnetic disk affixed to the top of the meter valve is rotated by the meter crank shaft. As the disk rotates, the pulser converts the changing magnetic field into digital pulses.*

6. TROUBLESHOOTING GUIDE

Many problems that appear to be the result of a defective computer are really caused by contamination of the computer memory. Prior to replacing the computer for a first occurrence of a particular problem, a RAM clear should be initiated and the computer retested. If the computer functions, it should not be replaced unless a second occurrence of the same problem results.
NOTE: Service Codes (Fault Codes with Status 3) are displayed in Option 01 Code History, rather than on the next reset.

⚠ WARNING

Electric Shock Hazard!
The above and following actions in this Section require that the electrical power to the equipment be ON. Use wiring diagrams, connector drawings and other information in this manual to identify the electrical connections and AVOID contact with the electrical power. Failure to do so may result in severe injury or death.

To clear the RAM on the Duplex II computer use the following procedure:

1. Record all totals and all option programming.
2. **Remove power** from the board by removing connector **J3**.
3. **Locate** connector **J6** and bridge (jumper) pins 3 & 5. Use jumper part number 129930. Pin 1 of J6 is located closest to the center of the board.
4. **Apply power** to the board by re-installing connector **J3**. The unit price display will show "OP01" to indicate the option programming mode has been entered and Option 01 has been selected.
5. Press the **Price Jog** push-button **to go to** Option 97 where the sale money display will show XAB; AB being the right hand two digits.
6. Use the **Totals** push-button **to change** the value in the volume display to XBA. For example, if the money display shows 06 in the right hand two digits, enter 60 in the right hand two digits in the volume display.
7. Press the **Price Jog** push-button; a **RAM clear** will occur in a few seconds and the computer will immediately enter Option 01.
8. Use the **Price Jog** and **Totals** push-buttons **to reset** the options as necessary and Save the new settings with Option 99 set to 03.
9. Remove the security jumper.
10. Press the **Price Jog** and then the **Position Select** push-button to return the dispenser to the normal operating mode.

Note: Reset the fueling point number and unit prices as necessary after performing this procedure.

TABLE 6-1. SALE AND UNIT PRICE DISPLAYS ARE BLANK.

	Probable Cause	Corrective Action
1.	No power to computer.	Check control power circuit breaker Check for AC between pins 1 and 2 of J3 connector. If not present check in J-box. If not present in J-box problem is in site wiring. If 110 VAC is present in the J-box the problem is in the dispenser internal wiring. Check F1 and F3 on computer board and replace as necessary.
2.	Defective display.	Replace the display board.
3.	Defective computer.	Replace.

TABLE 6-2. DISPLAY SEGMENTS FAIL TO OPERATE DURING RESET CYCLE .

	Probable Cause	Corrective Action
1.	Defective display assembly.	Replace the faulty display assembly.
2.	Defective data cable.	Replace data cable.
3.	Defective computer.	Replace computer assembly.

TABLE 6-3. UNIT PRICE DISPLAYING 0.000.

	Probable Cause	Corrective Action
1.	Control system unit price set at 0.000.	Set correct unit price in control system. Refer to the control system operation manual.
2.	Unit price not set at dispenser. If a control system is connected go to Step 4.	Set correct price using price jog switch.
3.	Data was corrupted then cleared by the computer. Check option 01 to verify. See programming manual part number 920205 for details.	Reset prices and or option programming. If problem continues to occur replace computer assembly.
4.	Fueling point # not set. If a control system is not connected go to Step 5.	Set fueling point.
5.	Defective computer.	Replace computer assembly.

TABLE 6-4. UNIT PRICE NOT CORRECTLY DISPLAYED.

	Probable Cause	Corrective Action
1.	Loose or defective data cable.	Re-seat or replace data cable.
2.	Defective computer.	Replace computer assembly.

TABLE 6-5. UNIT WILL NOT RESPOND TO ANY FUNCTION SWITCHES.

	Probable Cause	Corrective Action
1.	Loose or defective wiring to switches.	Check and reseat connector J6 on cash/credit interface board. Check continuity of cable. Replace if defective.
2.	Blown fuse on the lighted Cash/Credit Interface board.	Check F1 on the interface board and replace the board if the fuse is blown. If no fuse on board, replace board.
3.	Defective switch interface circuitry on Cash/Credit interface board.	Replace the Cash/Credit Interface board.
4.	Defective computer assembly.	Replace computer assembly.
5.	Defective display board or cable.	Replace display board or cable to J1 on display board.

TABLE 6-6. UNIT WILL NOT RESPOND TO AN INDIVIDUAL FUNCTION SWITCH.

	Probable Cause	Corrective Action
1.	Defective Switch.	Check for +5VDC OFF; zero volts ON, replace switch if voltage is constant at either 5 or 0 volts.
2.	Defective wiring to switch.	Check all wiring to defective function switch.

TABLE 6-7. COMPUTER WILL NOT RESET.

	Probable Cause	Corrective Action
1.	Unit prices 0.00.	See Table 6-3.
2.	No authorize to dispenser computer.	Refer to control system operation manual or if stand-alone dispenser, check Self-Serve/Attend switch.
3.	Nozzle switch defective.	Refer to Section 4. to check operation. Replace if necessary per Section 7.1.10 or 7.1.11
4.	Defective push to start switch assembly.	Check push to start switch by testing it on another fueling point. Replace if defective.
5.	Bad or loose wire harness.	Check wire harness and connectors between switch assembly and Cash/Credit Interface board.

TABLE 6-7. COMPUTER WILL NOT RESET. (continued)

	Probable Cause	Corrective Action
6.	Defective Cash/Credit Interface board.	Check for signals to Cash/Credit Interface board. Replace board as necessary. Refer to the appropriate drawing in APPENDIX A.
7.	If blender, Blend ratios may not agree with console.	Set blend ratios to agree.
8.	Defective computer.	Replace computer assembly.

TABLE 6-8. COMPUTER RESETS BUT SUBMERSIBLE PUMP DOES NOT COME ON.

	Probable Cause	Corrective Action
1.	Solenoid drive board not turning on relay.	Check F1 fuse on drive board. Replace as necessary.
2.	Defective solenoid drive board. Check for 110 VAC output from board.	Replace board if no output.
3.	Defective relay.	Replace relay.
4.	Faulty station wiring.	Correct wiring.
5.	If 110 VAC is present at drive board and in dispenser j-box, but not at relay panel, problem is in station wiring.	
6.	Defective computer assembly.	Replace computer assembly.

TABLE 6-9. COMPUTER RESETS BUT DOES NOT DISPENSE PRODUCT.

	Probable Cause	Corrective Action
1.	F1 on Solenoid drive board.	Replace if it is open.
2.	**Non-Blenders** - Solenoid drive board or Computer Assembly defective. Check for 110 VAC output. **Blenders** - Check for 24VDC output from solenoid drive board. **All dispensers** - Also see Table 6-8.	**Non-Blenders** - replace solenoid drive board if there is no 110 volt output. **Blenders** - if there is no 24 VDC output at J3, but there is 24 VDC input at J4, replace Solenoid Drive Board. If there is no 24 VDC input at J4, check F1 fuse on 24VDC power supply board. If fuse is open replace it if not soldered in, otherwise, replace computer assembly.
3.	**Non-Blender** - Defective actuator coil. **Blender** - Defective proportional valve.	**Non-Blender** - Check coils for continuity; if open circuit replace coil. **Blender** - Check coils for continuity; if open circuit replace defective proportional valve.
4.	**Non-Blender** - Defective/stuck actuator or diaphragm.	Check both valves. Replace or rebuild as necessary.

TABLE 6-10. ELECTRO-MECHANICAL TOTALIZER NOT COUNTING.

	Probable Cause	Corrective Action
1.	Defective Electro-Mechanical totalizer	Replace.
2.	Defective cash/credit interface board.	Replace cash/credit interface board.
3.	Defective computer.	Replace the computer assembly.
4.	Defective wiring to totalizer.	Replace harness to J7 on the cash/credit interface board.
4.	Defective wiring between cash/credit interface board and computer.	Replace harness between J2 on cash/credit interface board and J4 (J5) on computer.

TABLE 6-11. FAULT CODE 01.

	Probable Cause	Corrective Action
	Push to start switch open or cash/credit switch shorted.	
1.	Defective push to start or cash/credit switch assembly.	Check the switch assembly and replace as necessary. See Table 6-7., item #4.
2.	Defective switch wiring.	Check wiring harness and connectors between the suspect switch assembly to the lighted cash/credit interface board. Replace the wiring as necessary.
3.	Defective lighted cash/credit interface board.	Replace the cash/credit interface board.
4.	Defective computer.	Replace the computer assembly.

TABLE 6-12. FAULT CODE 02 [A].

	Probable Cause	Corrective Action
	Push-button start option disabled but switch detected.	
1.	Defective wiring.	Check the two wires in the DEM which are connected to the two wire connector at the lower left corner of the DEM (where the push to start switch normally is connected). Repair or replace the wiring as necessary.
2.	Defective lighted cash/credit interface board.	Replace the cash/credit interface board.
3.	Defective computer.	Replace the computer assembly.

A. To clear the error message it is necessary to either cycle the power to the Duplex Computer or enter option 99, change the data to 3 and exit option programming. Even if the problem is corrected the fault code will continue to be displayed until one of these procedures is executed.

TABLE 6-13. FAULT CODE 03.

	Probable Cause	Corrective Action
	Unit has run over preset/prepay amount.	
1.	Solid state relay on solenoid drive board shorted.	Check for 110VAC output (24VDC for blenders) to valve(s) with handle off. If 110VAC (24VDC for blenders) is present, replace solenoid drive board.
2.	Debris in flow control valve.	Check/clean all valves.
3.	Defective 2-stage valve (non-blender only).	Replace 2-stage valve.
4.	Defective computer.	Replace computer assembly.
5.	Defective proportional flow control valve (Blenders only).	Replace proportional flow control valve.

TABLE 6-14. FAULT CODE 04. [A]

	Probable Cause	Corrective Action
	ROM error.	
1.	Computer found defective ROM chip during self test.	Clear error. If problem reoccurs replace computer assembly.

A. To clear the error message it is necessary to either cycle the power to the Duplex Computer or enter option 99, change the data to 3 and exit option programming. Even if the problem is corrected the fault code will continue to be displayed until one of these procedures is executed.

TABLE 6-15. FAULT CODE 05 OR 20.

	Probable Cause	Corrective Action
	Could be a Wayne Vac error . If dispenser is equipped with Wayne Vac see corrective action, otherwise, proceed with probable cause Pulse Jitter.	Check LED on Wayne Vac Control board. LED should flash at power up and go OFF. If blinking see Wayne Vac service manual part number 920023 for corrective action. If OFF proceed with probable cause Pulse Jitter.
	Pulser jitter.	
1.	Intelligent Pulser not properly secured to iMeter.	Check the two screws on the pulser and verify that pulser is properly mounted to the iMeter.
2.	Defective Intelligent Pulser	Replace Intelligent Pulser
3.	Air in system causing severe hydraulic shock.	Repair or replace faulty piping and purge all air from system.
4.	Loose plug or wire connection to ISB assembly ISB Interface board.	Verify connection to ISB assembly and ISB Interface board.
5.	Defective ISB Interface board	Replace ISB Interface board.
6.	Defective ISB assembly.	Replace complete ISB assembly (board inside black box is not separately replaceable).
7.	Defective solenoid drive board.	Replace solenoid drive board.
8.	Defective computer.	Replace computer.

TABLE 6-16. FAULT CODE 06.

	Probable Cause	Corrective Action
	Illegal current sensed in valve or relay circuit.	
1.	Solenoid drive board has defective solid state relay.	Replace solenoid drive board.
2.	Computer is holding solid state relay on.	Replace computer assembly.

TABLE 6-17. FAULT CODE 08.

	Probable Cause	Corrective Action
	Operational error. No-pulse time out limit exceeded. The dispenser was turned on but no product was dispensed for more than the programmed time limit (see programming manual, part number 920205, Option 12).	

TABLE 6-18. FAULT CODE 09. [A]

	Probable Cause	Corrective Action
	There were Fault Code 08 errors on five consecutive sales.	
1.	Operational error.	If the dispenser presently transitions to fast flow and displays volume, verify that Option 12 is set to appropriate time period. Refer to programming manual, part number 920205
2.	Defective computer assembly, ISB Interface board or ISB assembly.	If problem occurs on all grades, replace computer assembly, ISB Interface board or ISB assembly.
3.	Defective Intelligent Pulser, ISB assembly or ISB Interface board.	If problem does not occur on all grades, check/replace pulser, ISB assembly or ISB Interface board.
4.	Defective wiring.	Check wiring harness: ISB to pulsers and ISB Interface board to computer. Replace wiring harness necessary.

A. To clear the error message it is necessary to either cycle the power to the Duplex Computer or enter option 99, change the data to 3 and exit option programming. Even if the problem is corrected the fault code will continue to be displayed until one of these procedures is executed.

TABLE 6-19. FAULT CODE 10 OR 21.

	Probable Cause	Corrective Action
	Reverse pulse.	
1.	Defective diaphragm or other defective part of flow control valve.	Replace flow control valve. (2-Stage valve in non-blenders, proportional valve in blenders).

TABLE 6-20. FAULT CODE 11.

	Probable Cause	Corrective Action
	Corrupted option programming.	
1.	Computer found scrambled data in option programming.	Check all option programming and set Option 99 to Data 03 to clear error. Cycling power will not clear this error.

TABLE 6-21. FAULT CODE 12.

	Probable Cause	Corrective Action
	Totals data was found corrupted and reset to zero.	
1.	If error reoccurs, computer is defective.	Replace computer assembly.

TABLE 6-22. FAULT CODE 13.

	Probable Cause	Corrective Action
	Unit price data was found corrupted and reset to zero.	
1.	If error reoccurs, computer is defective.	Replace computer assembly.

TABLE 6-23. FAULT CODE 14, 15 OR 16.

	Probable Cause	Corrective Action
	Illegal pulse - a pulse was received from a **"grade not selected."**	
1.	Defective diaphragm or other defective part of flow control valve.	Replace flow control valve (2-Stage valve in non-blenders, proportional valve in blenders).
2.	Shorted relay on solenoid drive board. Check for AC output with dispenser off (or DC output for blenders).	If voltage is present (the same voltage as AC or DC input) replace solenoid drive board.
3.	Defective computer.	Replace computer.

TABLE 6-24. FAULT CODE 30.

	Probable Cause	Corrective Action
	Electro-mechanical totalizer and electronic totals checksum don't match.	
1.	Totalizer fractional amounts that are stored in memory after each sale have been corrupted and reset to zero.	Run additional product and monitor totals.
2.	Computer failure.	Replace computer assembly.

TABLE 6-25. FAULT CODE 31.

	Probable Cause	Corrective Action
	Electro-mechanical totalizer overflow.	
1.	Computer missed incrementing at least one volume unit on the electro-mechanical totalizer.	Run additional product and monitor totals.
2.	Computer failure.	Replace computer assembly.

TABLE 6-26. FAULT CODE 51.

	Probable Cause	Corrective Action
	Blend ratio error exceeded programmed limits.	Programming Option 52 should be set at 2% and Option 53 should be set at 1.2 gallons. Reset if necessary.
1.	Flow restricted on one end grade.	Verify any blend inaccuracy using electronic totals. Check all flow control valves, c & p relief valve, and flow tubing for obstructions. Check/clean strainer and change filter.
2.	Defective solenoid drive board.	Check that the DS1 LED on the drive board stays lit during the sale and the DS2 LED blinks about every two seconds. If either of these conditions fails, replace the Solenoid Drive Board.
3.	Faulty wire harness connected to coil.	Check the wire harness connections to the valve coil wires and the harness into J3 on the solenoid drive board. Verify the voltage to the valve coils at 24 VDC when enabled. Replace wire harness as necessary.
4.	Defective proportional flow control valve.	Replace proportional flow control valve.
5.	Defective computer.	Replace computer assembly.

TABLE 6-27. FAULT CODE 54.

	Probable Cause	Corrective Action
	(Blender Only) Communication failure between computer and blender solenoid drive board.	
1.	Defective Solenoid Drive Board.	Cycle power to dispenser. Replace solenoid drive board if error continues to occur.
2.	Defective Computer assembly.	Replace computer assembly.

TABLE 6-28. FAULT CODE 55.

	Probable Cause	Corrective Action
	(Blender Only) Intelligent pulser was not configured due to Communication failure between computer and blender solenoid drive board, at power up.	
1.	Defective Solenoid Drive Board.	Cycle power to dispenser. Replace solenoid drive board if error continues to occur.
2.	Defective Computer assembly.	Replace computer assembly.

7. COMPONENT REPLACEMENT

This section describes the procedures necessary to replace the major components in Wayne dispensers.

7.1 ELECTRONIC COMPONENT REPLACEMENT

⚠ WARNING

ELECTRIC SHOCK HAZARD!
Before removing any components as described in the following sections, electrical power should be removed from the dispenser. More than one disconnect may be required to remove power. Use a voltmeter to ensure AC power has been removed. Failure to remove the power may result in severe injury or death.

Note: Before power is removed, totals should be read and recorded in case of memory alteration.

When removing or installing one of the electronic components within the computer housing, take care not to contact one component with another. Contact between components might cause damage to the circuit board coating, circuit board tracks, or circuit components.

Before replacing any components, servicing personnel should wear a static guard wrist strap (Dresser part number 916962 or equivalent) securely attached to an earth grounding point in order to prevent damage to electronic components due to static electricity.

Always keep replacement components in their anti-static shipping bags until they are installed. Put replaced suspect components in the anti-static bags for return to the factory in original packaging and fill out a return parts tag.

After having replaced a component, make a thorough visual inspection of your work to ensure that:

1. All connections are secure.
2. All mounting hardware is secure.
3. There are no loose washers, screws, tools, etc., lying around which might cause a failure.

7.1.1 Removing the Bezel From Vista Dispensers

In order to access any of the electronic components the bezel must be removed; to remove the bezel perform the following steps:

1. Lower the ad panel holder frame by pulling the holder frame out and down from the top.
2. Lowering the ad panel down toward you, exposes the function switch access door and the thumbscrews or bezel locks which secure the bezel to the dispenser.
3. Unscrew the thumbscrews, or unlock the bezel locks.
4. Pull the bottom portion of the bezel out toward you, then pull the bezel down clear of the drip edge.
5. Use the reverse procedure to install the bezel.

7.1.2 DEM In Service Position

To gain access to the electronic components in the dispenser, put the DEM in the service position by following the instructions in Figures A-1 and A-2 in Appendix A.

7.1.3 Solenoid Drive Board Replacement

⚠ WARNING

ELECTRIC SHOCK HAZARD!
Even though the dispenser control power is turned off voltage may still be present at the solenoid drive board, this condition will continue until both J1 and J2 connectors are removed from the solenoid drive board. For blenders the J1 connector must be removed. Failure to remove the power may result in severe injury or death.

Replacing the solenoid drive board (see Figure 7-1.) requires the following steps**:**

1. Turn the power to the dispenser OFF, and lock and/or tag the circuit breaker in the OFF position.
2. Remove the bezel from the dispenser.
3. Place the DEM in the service position.
4. Disconnect all of the wiring harnesses (see Figure 7-1.) from the solenoid drive board.
5. Remove the four (4) screws which secure the solenoid drive board to the Duplex II computer.

7.1.3. Solenoid Drive Board Replacement, continued

6. Pull the solenoid drive board straight off of the computer.
7. Install the new board using the reverse of the procedure described above.
8. Test the dispenser for proper operation.

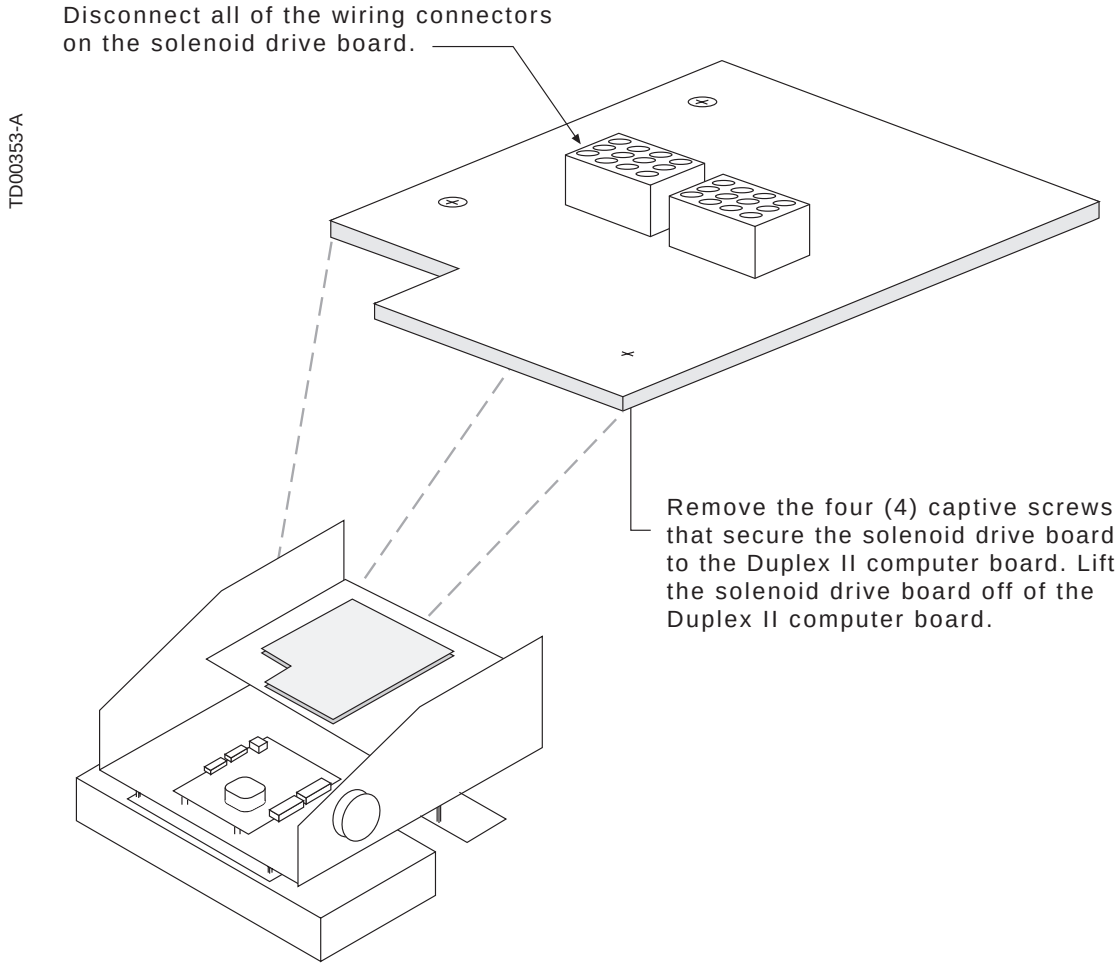


FIGURE 7-1. REPLACING THE SOLENOID DRIVE BOARD (NON-BLENDER SHOWN). *Even though the dispenser control power is turned off voltage may still be present at the solenoid drive board. This condition will continue until both J1 and J2 connectors are removed from the solenoid drive board.*

7.1.4 Computer Assembly Replacement

Note: The computer assembly and displays contain circuitry which is sensitive to static discharge. Keep the replacement computer assembly in the anti-static shipping bag until ready for use. Always place the suspect computer base in the anti-static shipping bag after replacement and return to the original packaging.

When installing a Duplex II computer in a non-blending dispenser JP2 and JP3 must have jumpers installed on the two pins closest to the center of the computer board.

1. Record the totalizer readings if the totalizer is functional.
2. Turn OFF the control power.
3. Put the appropriate switch in the data distribution box to bypass.
4. The computer is located behind and below the consolidated display on the junction box side of the dispenser. To access the computer (see Figure 7-1.), or solenoid drive board, disengage the two quarter turn screws located above the left and right corners of the display. The Dispenser Electronic Module (DEM) will then tilt out toward you to provide access to the internal electronic components of the dispenser.
5. Disconnect all cables before removing the computer assembly. (The connectors have two latches which must be squeezed to disengage them from the board.)
6. Remove the screws securing the computer base assembly to the housing.
7. Lift the computer assembly out of the chassis.
8. Remove the solenoid drive board and install on the new computer assembly.
9. Install the new computer assembly and secure with hardware removed in Step 6.
10. Connect all cables to the computer assembly.
11. Set the switches in the data distribution box back to auto.
12. Replace the DEM in its original position and turn the control power ON.
13. Program the dispenser as follows:
    a. Set the macro and all option programming.
    b. Set the unit prices, if stand-alone, (or) Set the fueling point number.
14. Reinstall the bezel.
15. Record totals a second time and give both sets of totals to the dealer/ manager for his or her records.

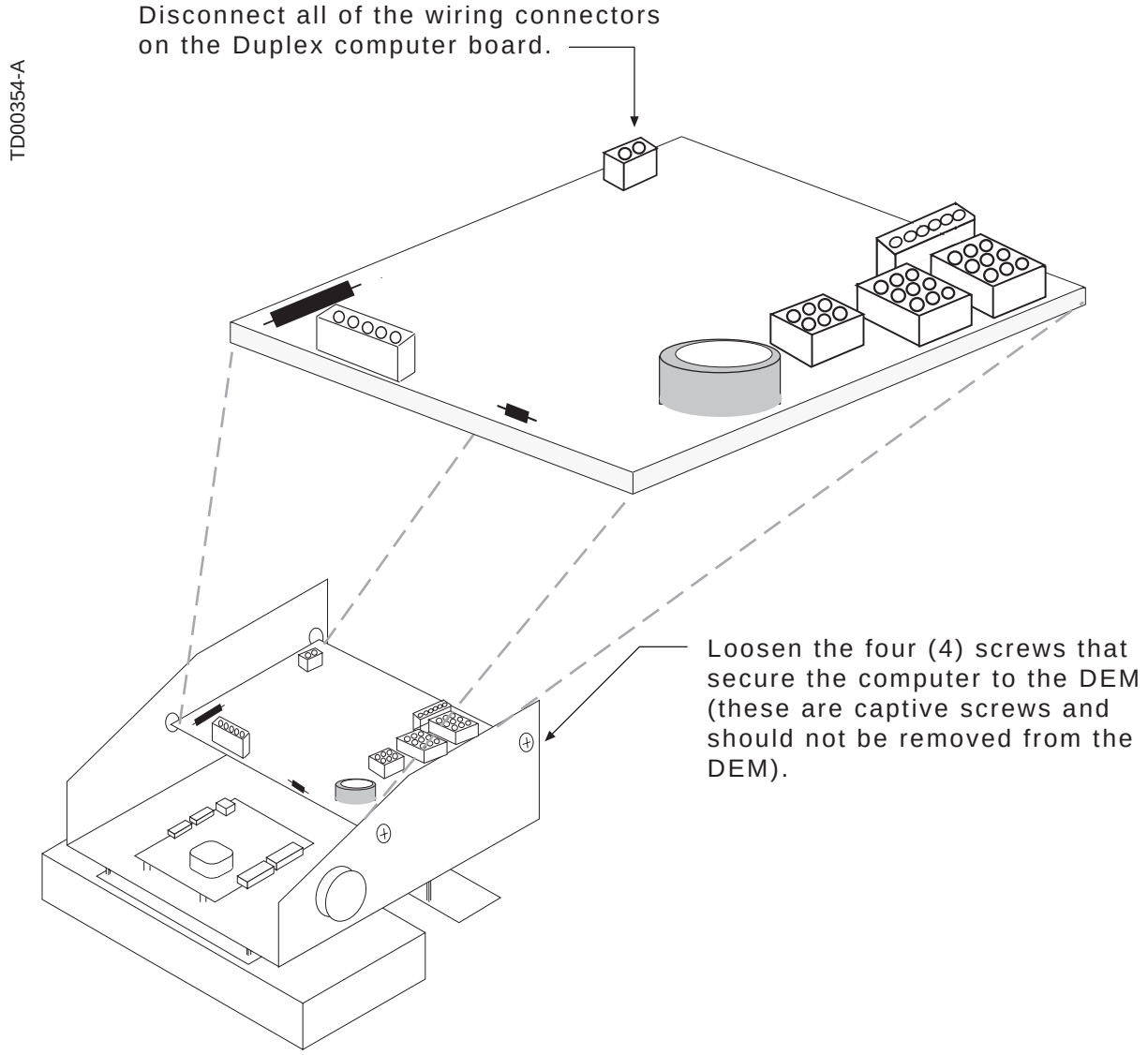


FIGURE 7-2. REPLACING THE DUPLEX II COMPUTER. *The Dispenser Electronic Module (DEM) will tilt out toward you to provide access to the internal electronic components of the dispenser.*

7.1.5 Intrinsic Safe Barrier (ISB) Assembly Replacement

The Intrinsic Safe Barrier circuit board is mounted to the bottom of the plastic cover (see Figure 7-3. and Figure 7-4.). The circuit board is not separately replaceable; the complete ISB assembly (the black plastic box) must be replaced. See next Section for replacing the Interface board on top of assembly.

1. Lower both bezels and place DEMs in Service position.
2. From the dispenser junction box side, unplug connectors from the Inter face board, which is mounted on top of the ISB assembly.
3. Remove the (2) screws that secure the Interface board to the ISB assembly.
4. Lift the Interface board upward to unplug and save board for re-installing on new ISB assembly.
5. Disconnect the ISB assembly ground wire from chassis.
6. Remove the (1) front and (2) rear mounting screws from the assembly.
7. Tilt the ISB assembly up and unplug the bottom connectors and remove.
8. Replace with new ISB assembly using reverse procedure and ensure that the ground wire is re-connected.

7.1.6 ISB Interface Board Replacement

1. Lower bezel on the junction box side and place DEM in Service position.
2. Unplug connectors from the Inter face board.
3. Remove the (2) screws that secure the Interface board to the ISB assembly.
4. Lift the Interface board upward to unplug and remove.
5. Replace with new Interface board using reverse procedure.

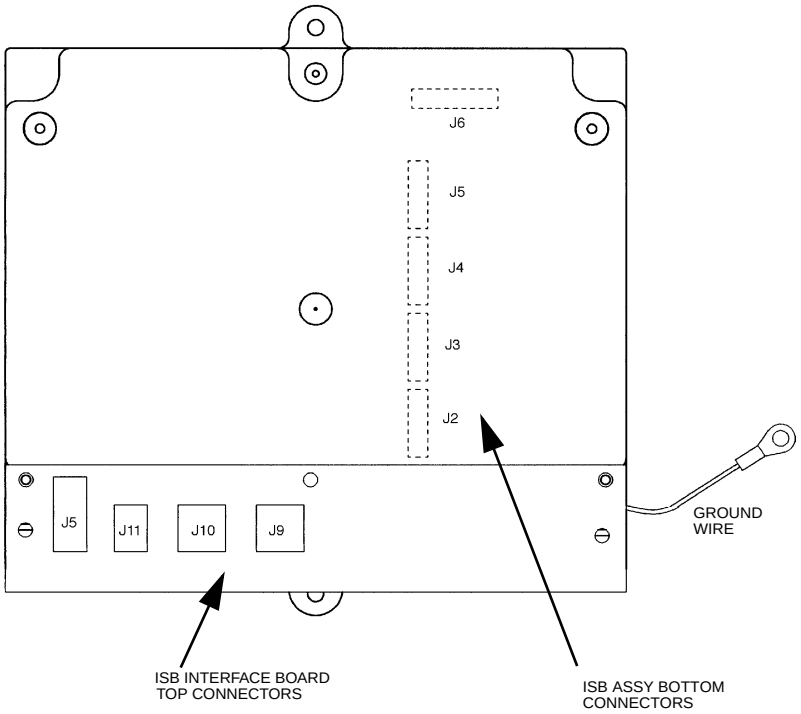


FIGURE 7-3. INTRINSIC SAFE BARRIER ASSEMBLY. *The ISB ground connection shown must be made directly to the dispenser chassis.*

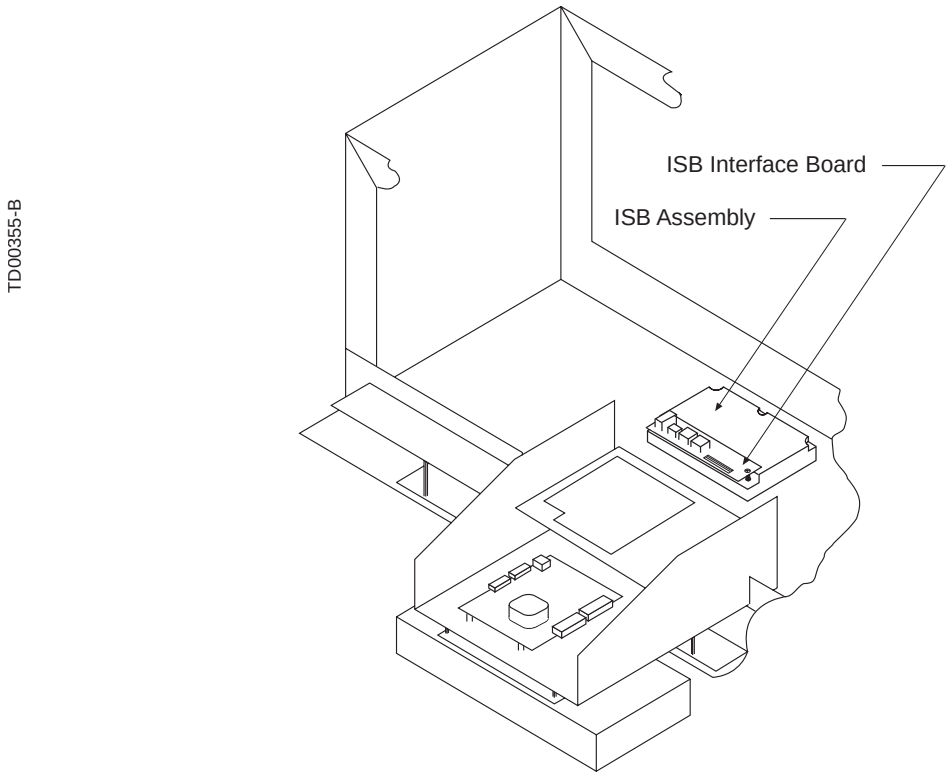


FIGURE 7-4. REPLACING THE INTRINSIC SAFE BARRIER ASSEMBLY. *Placing both DEMs in the service position allows for easy access to the Intrinsic Safe Barrier Assembly.*

7.1.7 Display Board Replacement

1. Remove the bezel from the dispenser.
2. Remove the dial face from the display by loosening the four screws in the corners of the dial face and then slipping it up and off of the display (see Figure 7-5.).
3. Disconnect the data cable(s) from the sale display.
4. Remove the screws securing the display assembly. Remove the sale display.
5. Install the new display and secure it with hardware removed in Step 4.
6. Reconnect the data cable(s) from the sale display
7. Reinstall the dial face and bezel.

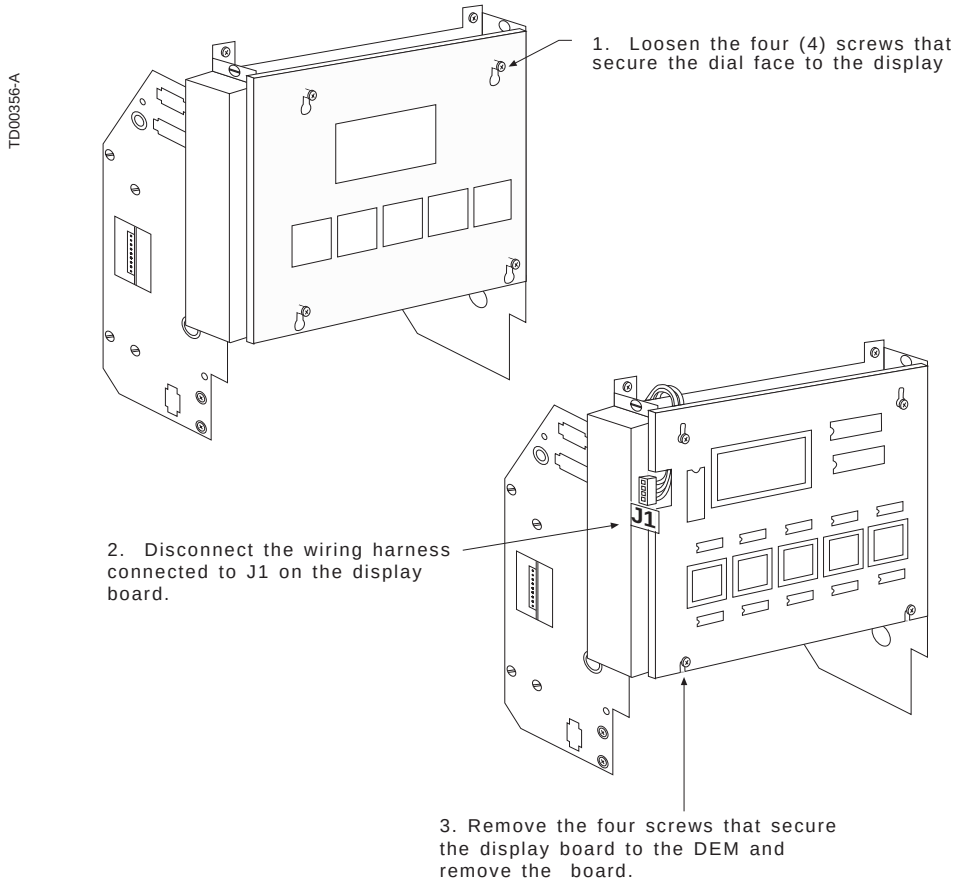


FIGURE 7-5. REPLACING THE INTEGRATED DISPLAY BOARD. *Remove the dial face from the display by loosening the four screws in the corners of the dial face.*

7.1.8 Cash/Credit Interface Board Replacement

1. In order to access the cash/credit interface board remove the bezel from the dispenser and disengage the two quarter turn screws located above the display (see Figure 7-6.). This will allow the DEM to tilt out toward you allowing access to all internal electronic components in the dispenser.
2. Disconnect all wiring harnesses from the interface board.
3. Remove the screws which secure the board to the frame of the DEM.
4. Remove the cash/credit interface board.
5. Install the new board using the hardware removed in step 3.
6. Reattach all wiring harnesses to the new board.
7. Replace the DEM in its original position and reinstall the bezel.

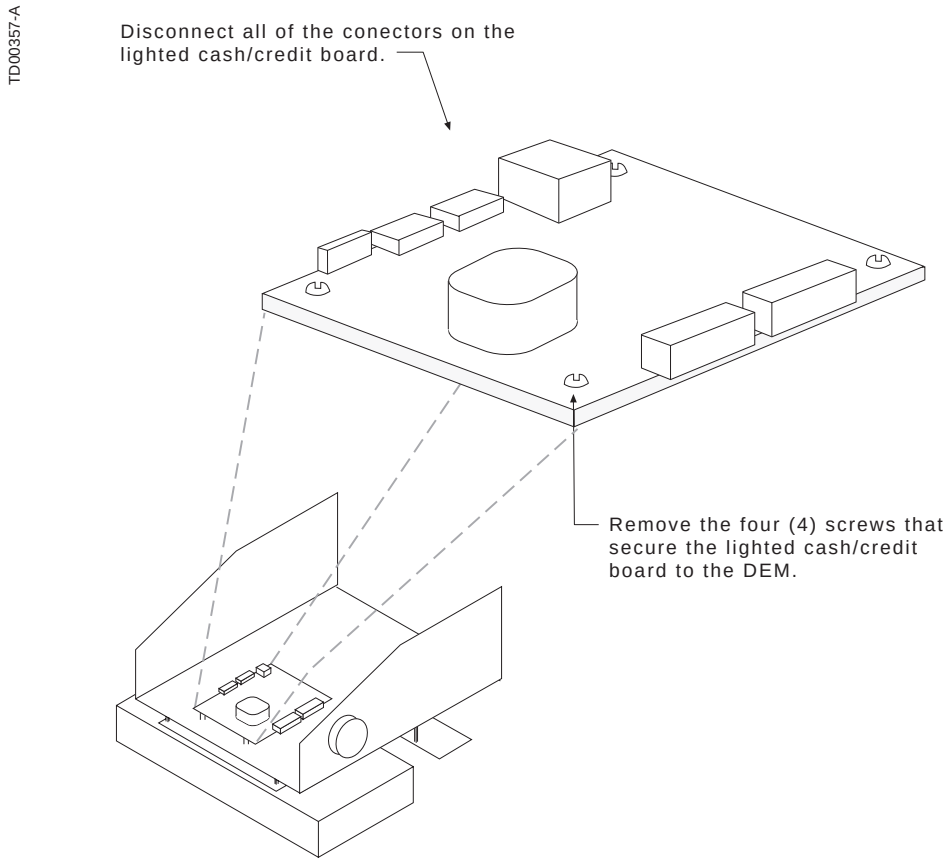


FIGURE 7-6. REPLACING THE LIGHTED CASH CREDIT INTERFACE BOARD. *When servicing this area, wire harnesses must be carefully placed to ensure proper operation.*

7.1.9 Pulser Replacement (Intelligent Pulser)

Note: The Intelligent Pulser calibration doors on earlier production dispensers are sealed by pins that are installed through a bracket; see Figure 7-10. Later production iMeter dispenser models will have pulsers with calibration doors that contain a built-in latch, thus, eliminating the need for the separate bracket and pins. Pulsers on these later models will also have a built-in 8-pin connector, eliminating the connector and cable extruding from the pulser on eariler models.

1. Disconnect the cable from the pulser.
2. Cut and remove the seal wires on both calibration doors on the pulser.
3. Remove and save the calibration pins.
4. Remove the pulser by removing the (2) screws that secure the pulser to the meter dome. See Figure 7-7.
5. Install the new pulser and secure with the (2) screws removed above. Do not replace the seal wires at this time.
6. Reconnect the cable to the pulser.
7. Follow the Operational Mode setting procedure in Section 3.6 and calibrate the meter/pulser assembly as per the instructions under iMeter Calibration in Section 3.7.
8. Replace the seal wires when calibration is complete.

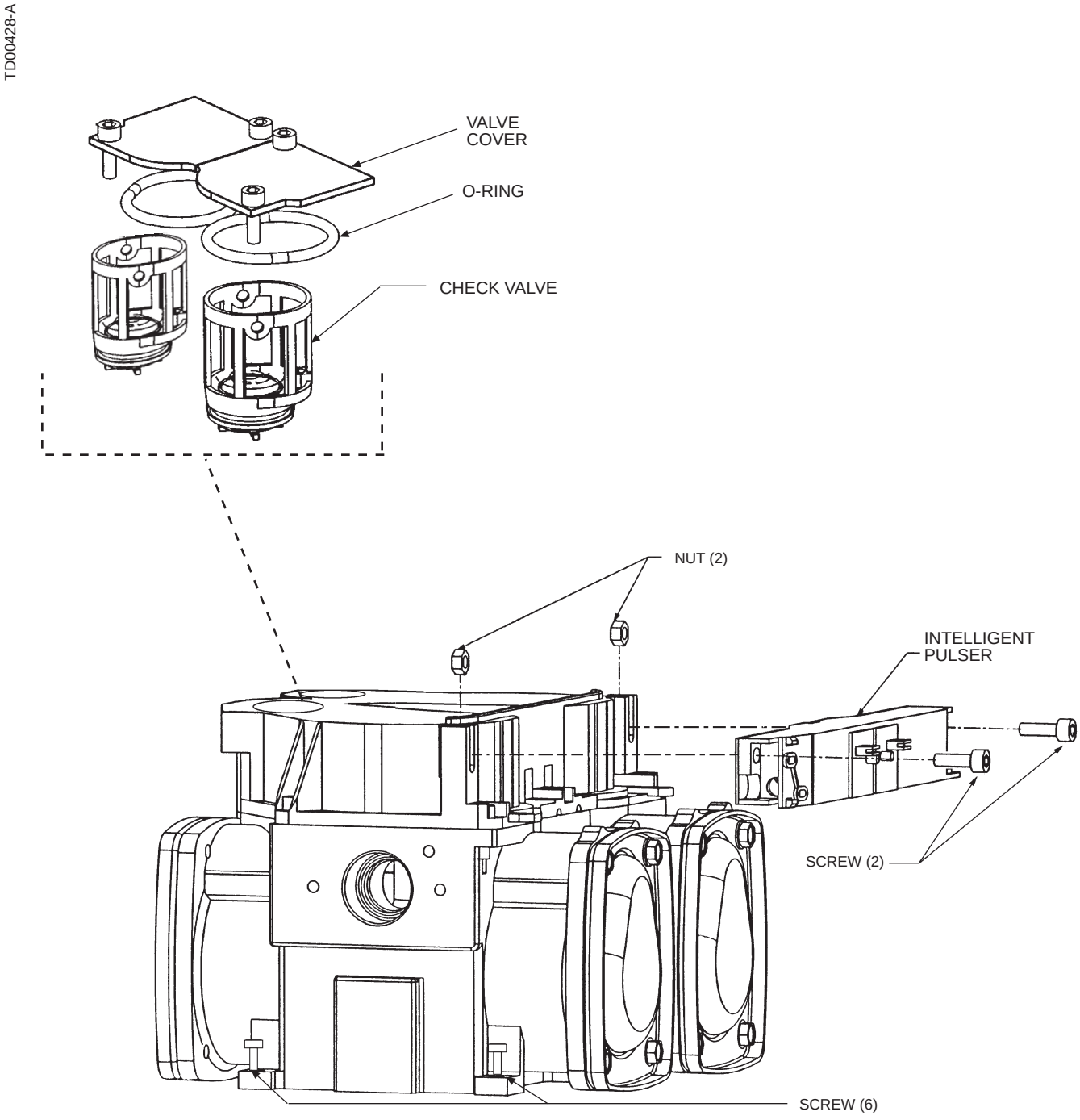


FIGURE 7-7. IMETER MODULE SERVICEABLE COMPONENTS. *The replaceable parts on the iMeter module are the pulser, check & pressure relief valves, o-rings and valve covers as identified above.*

7.1.10 Lift-to-Start Nozzle Boot Component Replacement

Note: After replacing nozzle boot components, refer to Section 4 to check for proper operation.

To replace the nozzle switch (see Figure 7-8.):

1. Disconnect the nozzle switch connector and, if necessary, cut the wire tie securing the switch wiring to the dispenser.
2. Remove the nozzle boot by removing the (2) lower hex screws that secure the boot to the dispenser; removing the nozzle boot collar, and loosening the (2) upper allen screws.
3. Remove the retainer clip that secures the switch to the back of the boot casting and remove the switch.
4. Install the new switch and secure with a new retainer clip making sure that the right hand edge of
   the switch aligns with the right hand edge of the casting flat mounting surface as viewed from the
   back of the boot.
5. Re-install nozzle boot and connect nozzle switch connector securing wires with wire tie if applicable.

To replace the magnet or spring (see Figure 7-8.):

6. Disconnect the nozzle switch connector and, if necessary, cut the wire tie securing the switch wiring to the dispenser.
7. Remove the nozzle boot by removing the (2) lower hex screws that secure the boot to the dispenser; removing the nozzle boot collar, and loosening the (2) upper allen screws.
8. Raise the nozzle hook to the up position.
9. Remove the (2) 1/4-20 x 7/8 hex screws under the nozzle hook.
10. Remove the (2) #10 x 3/4 plascrews that screw into the back of the filler guide from the back of the nozzle boot.
11. Remove the filler guide assembly containing the nozzle hook from the nozzle boot.
12. Remove the spring by unclipping it from the back of the filler guide.
13. Replace the magnet and/or spring as necessary.
14. Reassemble nozzle boot in reverse order.
15. Re-install nozzle boot and connect nozzle switch connector securing wires with wire tie if applicable.

7.1.11 Push-to-Start Nozzle Boot Component Replacement

To replace the nozzle switch (see Figure 7-9.):

1. Disconnect the nozzle switch connector and, if necessary, cut the wire tie securing the switch wiring to the dispenser.
2. Remove the nozzle boot by removing the (2) lower hex screws that secure the boot to the dispenser; removing the nozzle boot collar, and loosening the (2) upper allen screws.
3. Remove the retainer clip that secures the switch to the side of the boot casting and remove the switch. **Note:** Some units, for a temporary period, will have the switch secured, with (2) #4 screws, to a bracket mounted to the side of the dispenser.
4. Install the new switch and secure with a new retainer clip.
5. Re-install nozzle boot and connect nozzle switch connector securing wires with wire tie if applicable.

To replace the switch actuator assy (see Figure 7-9.):

1. If the boot is located to the right side of the dispenser, proceed with Step 2 below. If not, go to Step 4.
2. Disconnect the nozzle switch connector and, if necessary, cut the wire tie securing the switch wiring to the dispenser.
3. Remove the nozzle boot by removing the (2) lower hex screws that secure the boot to the dispenser; removing the nozzle boot collar, and loosening the (2) upper allen screws.
4. Remove the lower part of the spring from the #10 -24 x 1/2 washer head screw on the post on the side of the nozzle boot and remove the spring from the switch actuator assy.
5. Pull the switch actuator assy out of the nozzle boot while holding the flipper.
6. Install new switch actuator assy by pushing into the nozzle boot, through the flipper, until the switch actuator assy snaps into place.
7. Re-install spring to switch actuator assy and then to the post on the side of the nozzle boot.
8. If applicable, re-install nozzle boot and connect nozzle switch connector securing wires with wire tie if applicable.

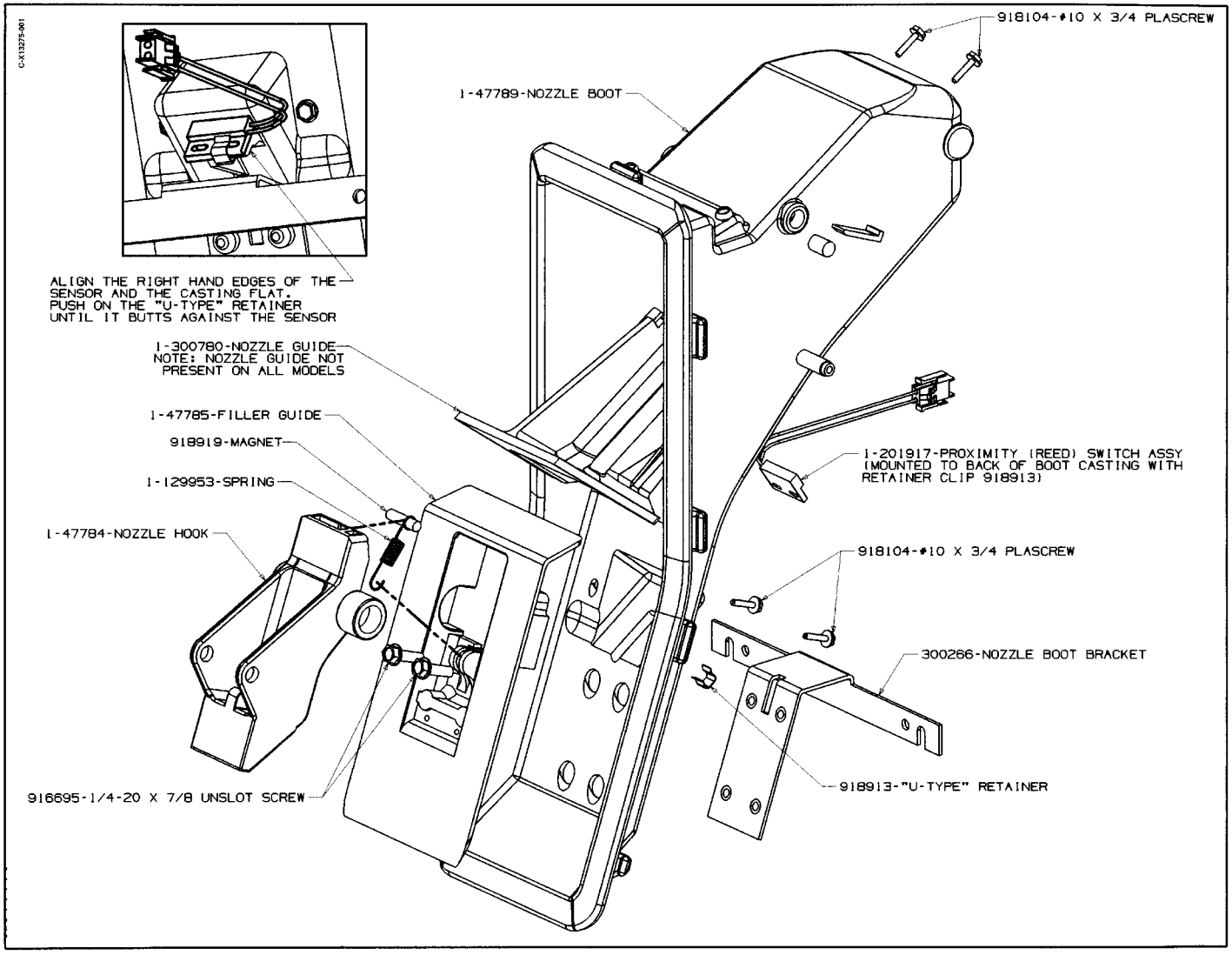


FIGURE 7-8. NOZZLE BOOT ASSEMBLY (LIFT-TO-START).

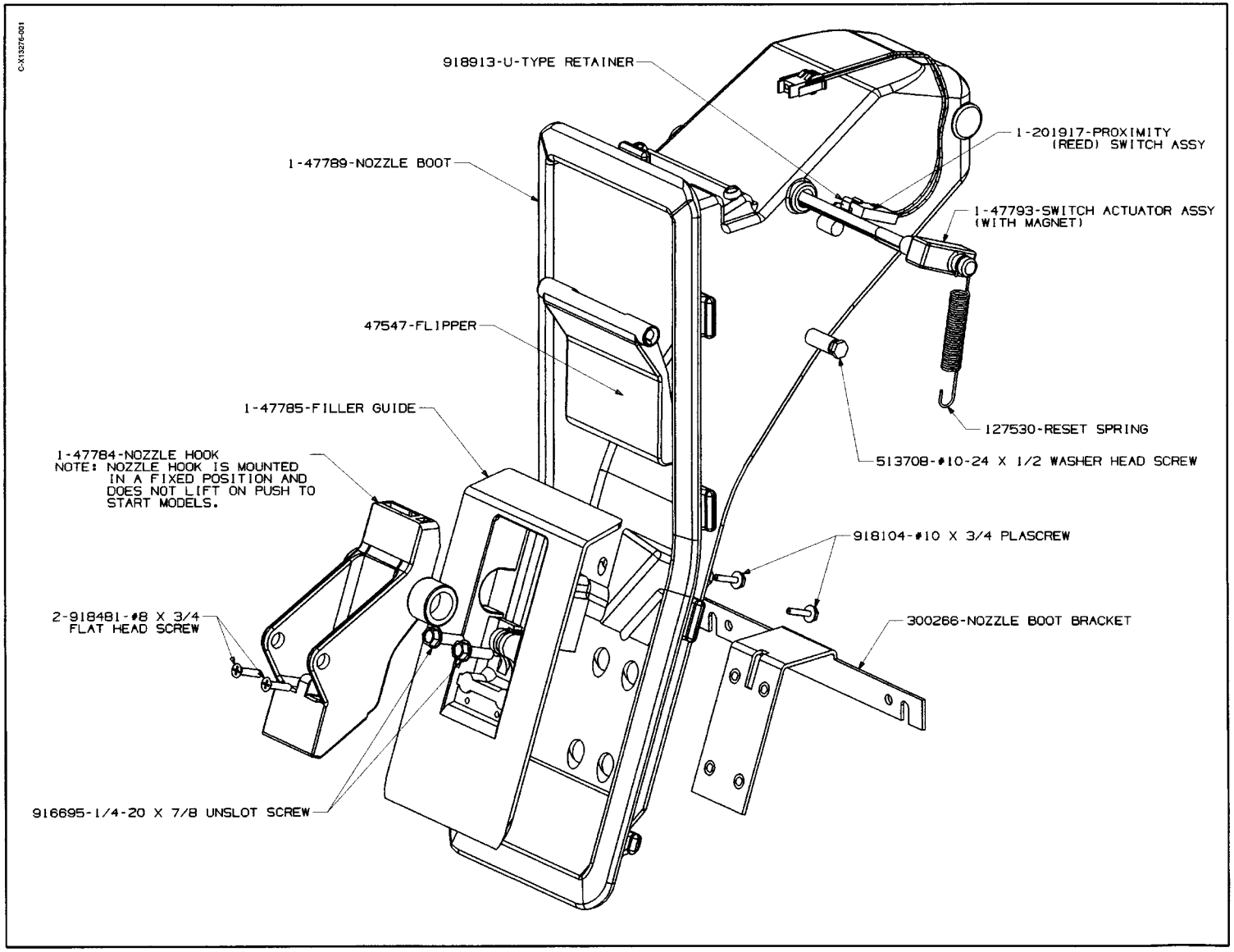


FIGURE 7-9. NOZZLE BOOT ASSEMBLY (PUSH-TO-START).

7.1.12 Push-to-Start Membrane Switch Assembly Replacement

The Push-to-Start, Cash/Credit, Grade Select switches, and associated LEDs are not separately replaceable.

1. Remove the bezel and disconnect the wire harness connector from the membrane switch assembly.
2. Remove the switch assembly cover on the front of the bezel by prying up one end of the cover using a flat blade screwdriver.
3. Remove the switch assembly by unscrewing the eight (8) hex head screws retaining the assembly on the back side of the bezel.
4. Install the new switch assembly using the hex head screws previously removed.
5. Reinstall the switch assembly cover on the front of the bezel.
6. Reconnect the wire harness connector and replace the bezel.
7. Test for proper operation.

7.1.13 Back Lit Display Lamp Replacement

1. Remove the bezel from the dispenser.
2. Tilt the DEM down to its service position by disengaging the two quarter turn screws located above the left and right corners of the display.
3. Disengage the finger lock screw that is now facing upward from behind the display on either side of the DEM chassis.
4. Remove the bracket containing the lamp holder and lamp.
5. Install the new fluorescent lamp and reinstall the bracket.
6. Secure the DEM back in its original position.
7. Reinstall the bezel.

7.1.14 Electro-Mechanical Totalizer Replacement

1. Remove Bezel.
2. Remove the two (2) pin connector from Electro-Mechanical totalizer.
3. Remove the two (2) phillips head screws that secure the Electro-Mechanical totalizer PCB to the bracket and remove the Electro-Mechanical totalizer.
4. Install new Electro-Mechanical totalizer using the two (2) screws previously removed in Step 3.
5. Reconnect the two (2) pin connector.
6. Reinstall the bezel.

7.2 HYDRAULIC COMPONENT REPLACEMENT

WARNING

Before removing any components as discussed in the following sections, trip the impact valve, and remove power to the submersible pump for the product in question to prevent fuel spillage. Failure to do so could cause a possible fire hazard that may result in serious injury or death.

WARNING

Drain the fuel into an appropriate container and pour it into an underground tank to prevent fuel drainage under and around the dispenser. Failure to do so could cause a possible fire hazard that may result in serious injury or death.

7.2.1 iMeter Replacement

1. Remove the nozzle boot(s) and bracket(s) as necessary to gain access to the iMeter assembly from both sides of the dispenser.
2. Disconnect the cable from the pulser.
3. Cut and remove the seal wires on the calibration doors. Remove the calibration pins if applicable. See Figure 7-10.
4. Loosen the (2) screws that secure the pulser to the old imeter assembly, see Figure 7-7. Remove the pulser.
5. To disconnect the tube from the imeter outlet on each side of the assembly:
   A) Loosen the nut at the top of the meter outlet tube.
   B) Remove the (2 ea) hex head metric screws that secure the flanged tube retainer plate on the meter outlet.
   C) Slide the retainer plate back and pull the tube out of the meter outlet.
6. Remove the (6) Allen head metric screws (see Figure 7-7.) that secure the imeter assembly to the bottom (strainer) casting.
7. Remove the imeter assembly. Remove from the non-junction box side of the dispenser.
8. Install new o-rings in the grooves on the bottom side of the new imeter assembly (install by turning assembly bottom side up, and applying a white lithium grease or Vaseline in the o-ring groves on the assembly).
   Note: The grease, in addition to a lubricant, acts as an adhesive to help keep the o-rings seated in the grooves when turning the assembly back over.
9. Install the new imeter assembly and secure to the strainer casting with the (6) screws removed in Step 6.
   Note: Do not pinch the o-rings. Do not over tighten screws. If meter leaks, remove and replace o-rings. If screws are tightened to stop leak, threads in the strainer casting will be damaged.
10. Re-insert the tubes into the imeter outlets and re-install the flanged tube retainer plates with the (2 ea) screws removed in Step 5B**. Note:** You **must grease the o-ring** on each tube prior to inserting the tube in the imeter outlet.
11. Tighten the nuts at the top of the imeter outlet tubes.
12. Install the pulser on the new imeter assembly.
13. Re-connect the cable to the pulser.
14. Re-install the nozzle boot bracket(s) and nozzle boot(s).
15. Power up the dispenser and check for leaks.
16. Calibrate the meter/pulser assembly as per the instructions under iMeter Calibration in Section 3 of this manual.

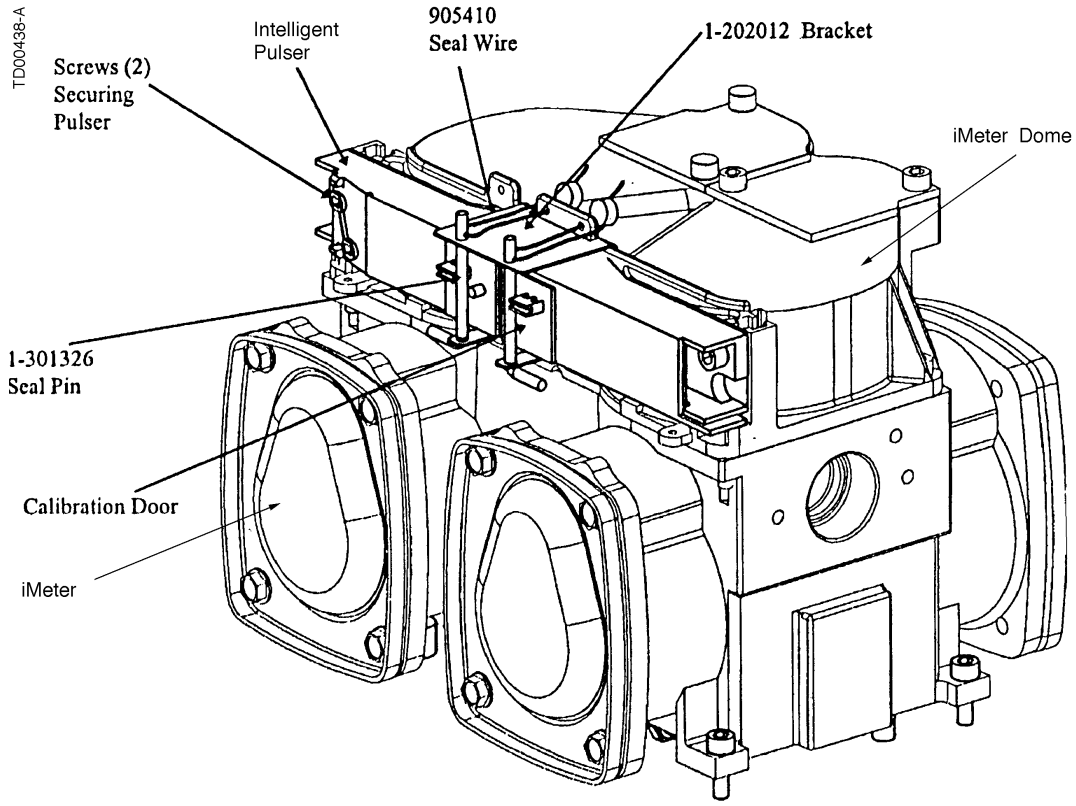


FIGURE 7-10. IMETER MODULE. *Earlier production iMeter modules will have seal pins and bracket.*

7.2.2 Check and Pressure Relief Valve Replacement

There are two check and pressure relief valves in the imeter module (one for each meter). The valves are located at the top of the meter, in the meter dome, under removable cover plates. See Figure 7-7.

The check and pressure relief valve is a non-serviceable part. If a new valve fails, replace it. Failure Symptoms are: computer jump, crossflow or Error Code 16.

Replacement Procedures:

1. Remove the (2) screws that secure the valve cover to the meter dome and remove the valve cover.
2. Remove the check valve (and o-ring) from the meter. Discard the o-ring.
3. Install new valve and new o-ring.
   Note: Seat valve fully by hand before re-installing the valve cover. Do not pinch the o-ring against the meter.
4. Re-install the valve cover with the (2) screws removed in Step 1.

7.2.3 Flow Control Valve Replacement

1. Disconnect the wire harness plug to the specific valve coil in the electronic head.
2. Loosen the inlet and outlet tube connections to the valve. In some cases, it may be helpful to loosen the inlet tube at its meter outlet connection.
3. Remove and save the nut and washer holding the vavle coil (located in the electronic head) to top of valve body.
4. Remove the coil and save.
5. Remove the hex nut and washer holding the valve body to the top of the vapor barrier.
6. Remove the valve assembly from dispenser.
7. Install new valve assembly in dispenser using the reverse procedure. Be sure to use new plastic flare washers in the valve ports.
8. Purge all air from dispenser and check for proper operation.

APPENDIX A. BOARD AND CONNECTOR PINOUTS

A.1. DISPENSER ELECTRONIC MODULE (DEM)

To move the DEM into the service position, preform the steps shown in Figure A-1. and Figure A-2.

Once the DEM in tilted into the service position you will have access to all of the electronic components in the dispenser. It may or may not be necessary to remove the bezel from the rear of the dispenser to access the electronics on that side.

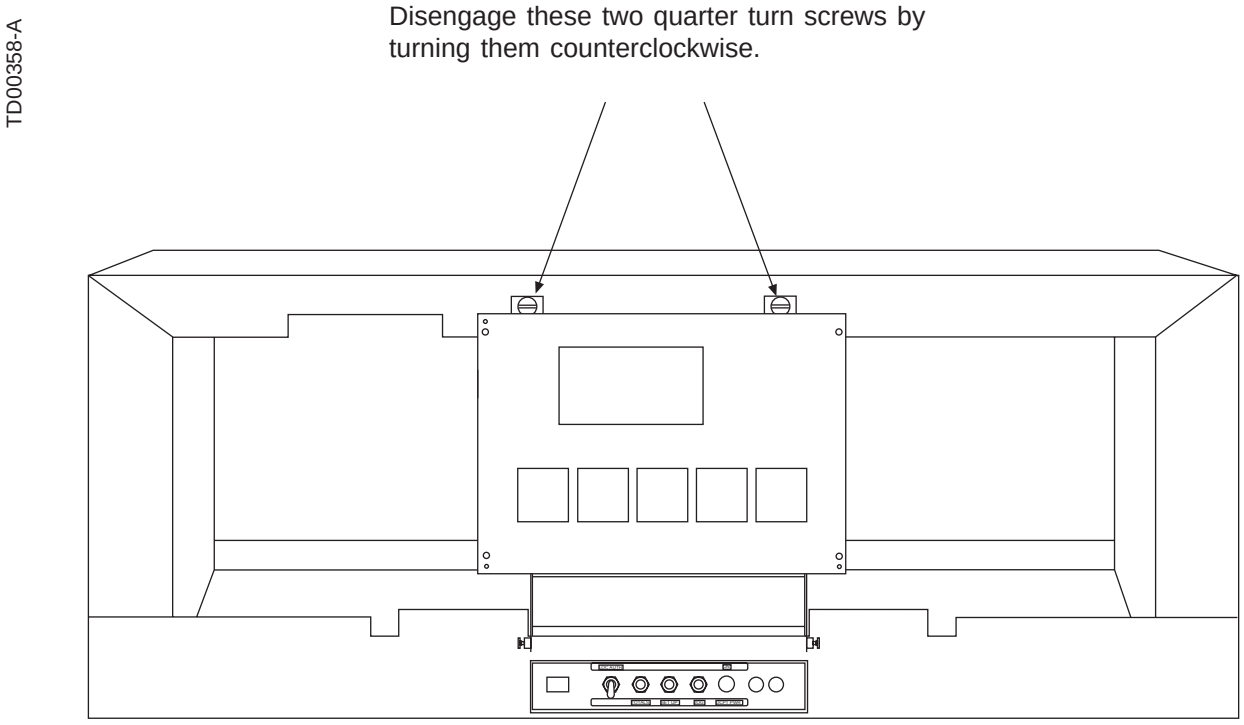
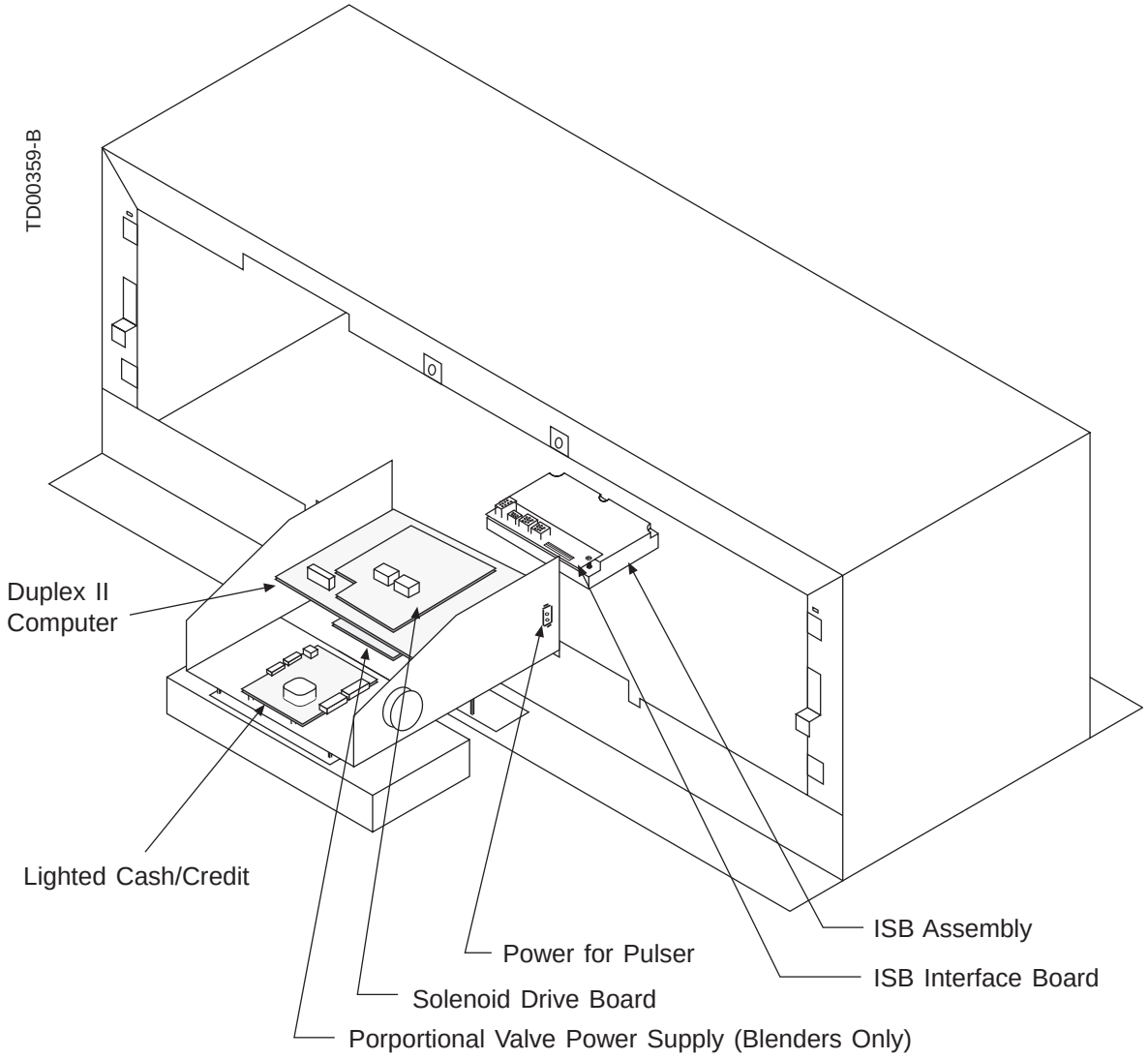


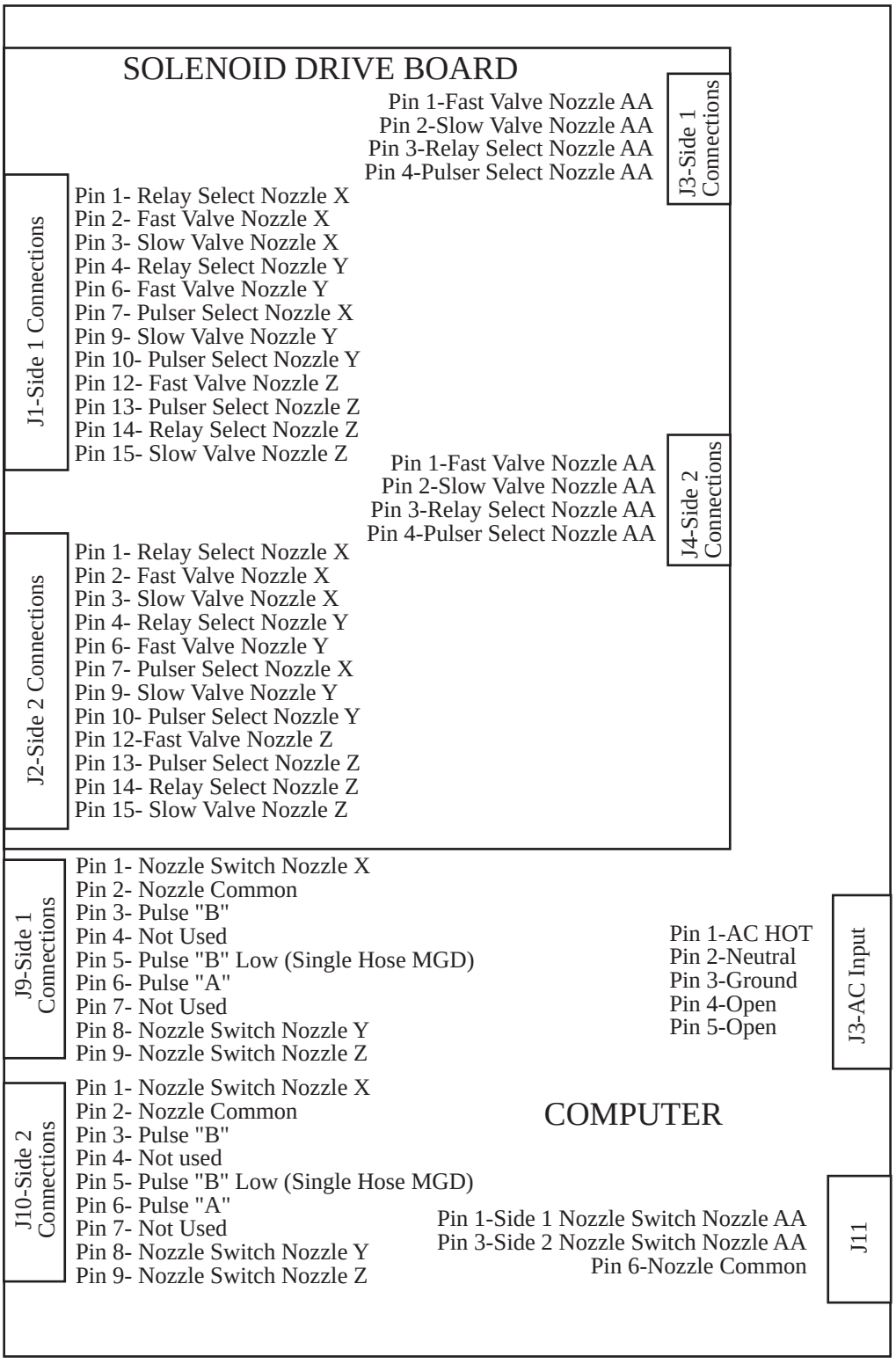
FIGURE A-1. DEM REMOVAL. *To move the DEM into service position preform the steps shown.*



Tilt the upper edge of the DEM out toward you to expose the electronic components.

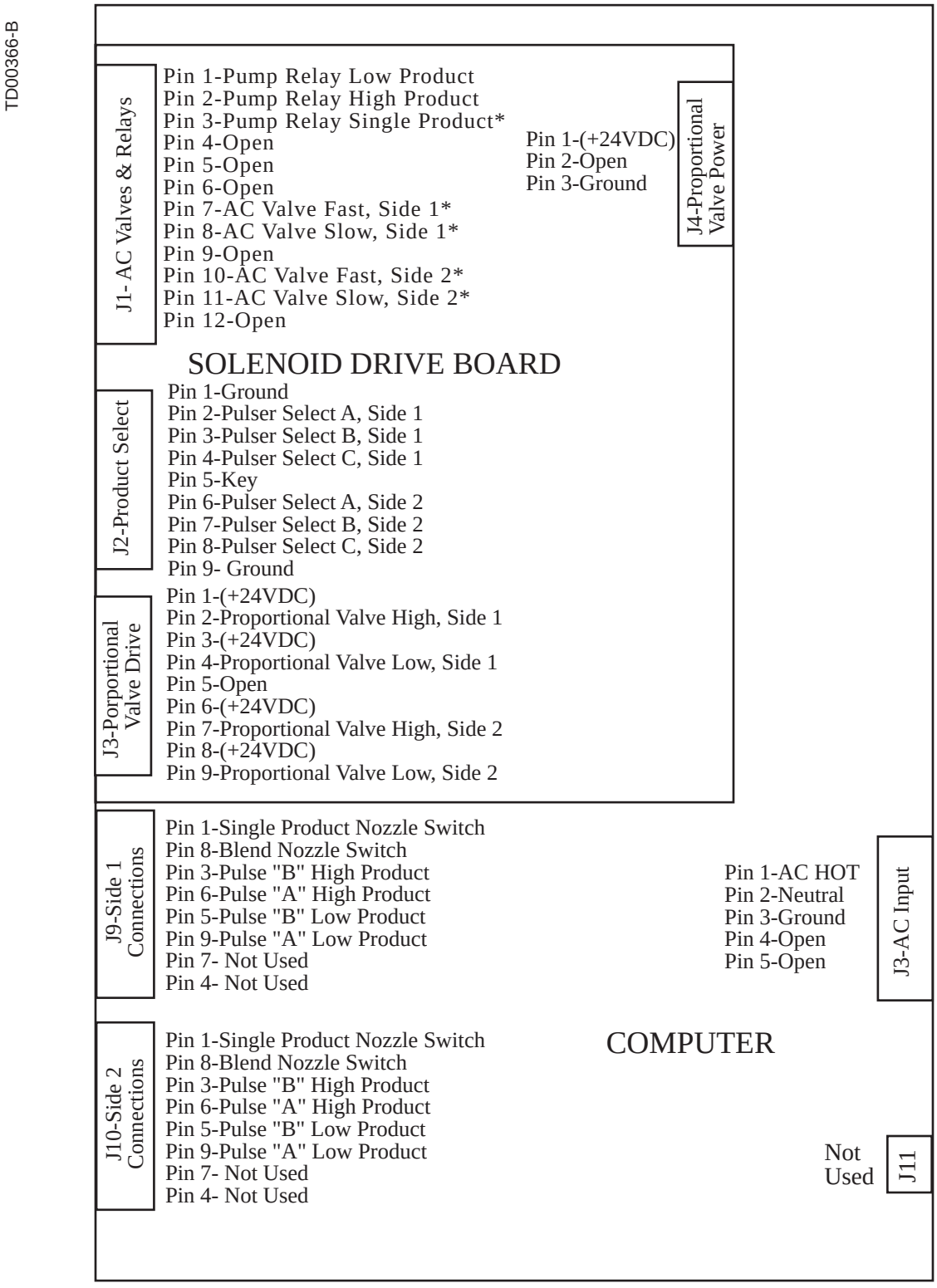
FIGURE A-2. DEM IN THE SERVICE POSITION. *Once the DEM in tilted into the service position you will have access to all of the electronic components in the dispenser.*

TD00365-B



NOTE: Pin connections that are not needed in a particular model of dispenser will have no wire in that location. For example, the nozzle Z switch in a V387 dispenser.

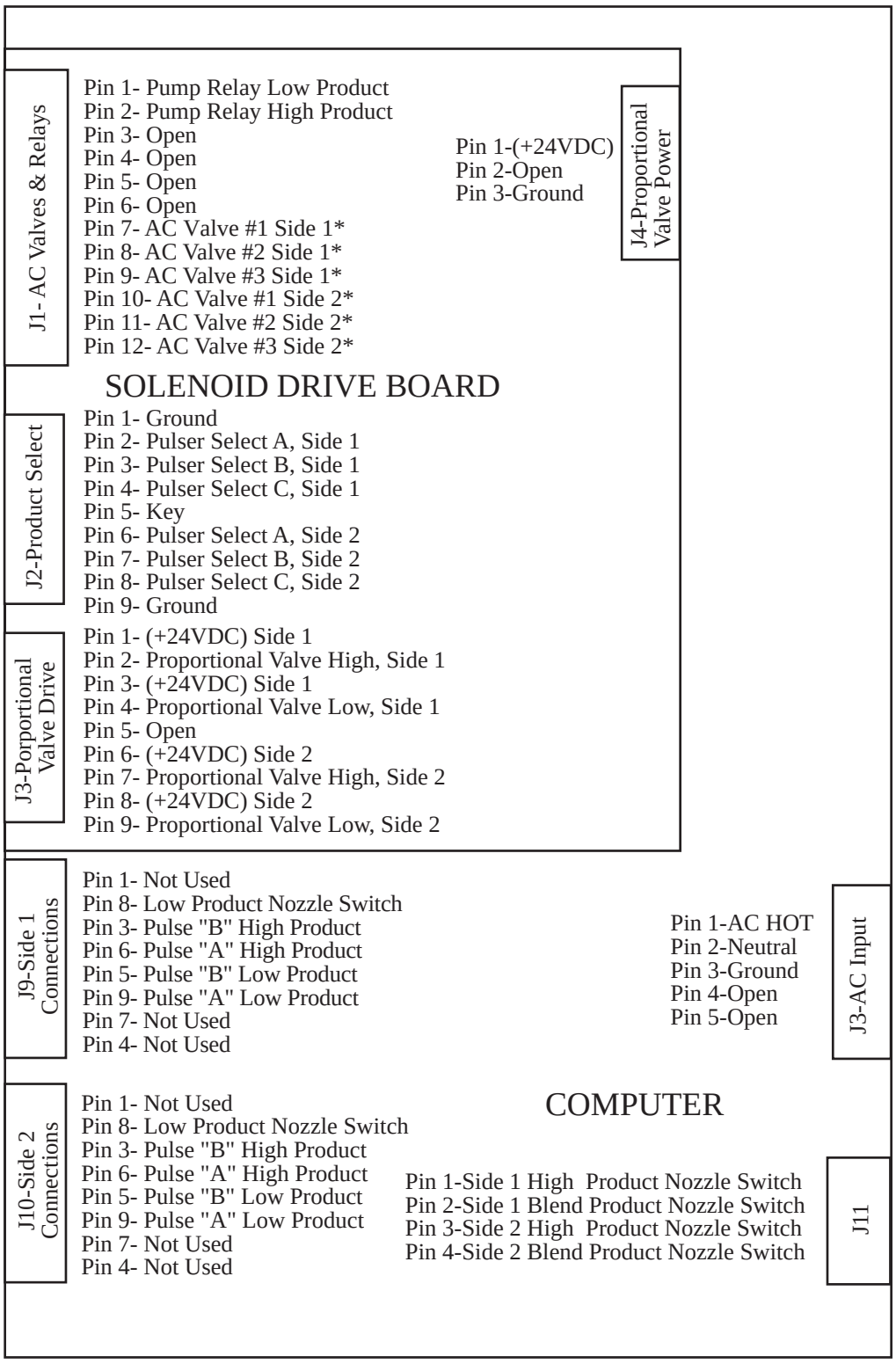
FIGURE A-3. COMPUTER AND SOLENOID DRIVE BOARD CONNECTOR PINOUTS (NON-BLENDER).



* Only used on 2/V595D (was V395D) model series with additional "single product" hose.

FIGURE A-4. COMPUTER AND SOLENOID DRIVE BOARD CONNECTOR PINOUTS (PROPORTIONAL BLENDER ONLY).

TD00367-B



*Only used on 1/V590D 6 Hose Model Series

FIGURE A-5. COMPUTER AND SOLENOID DRIVE BOARD CONNECTOR PINOUTS (FIXED RATIO BLENDERS).

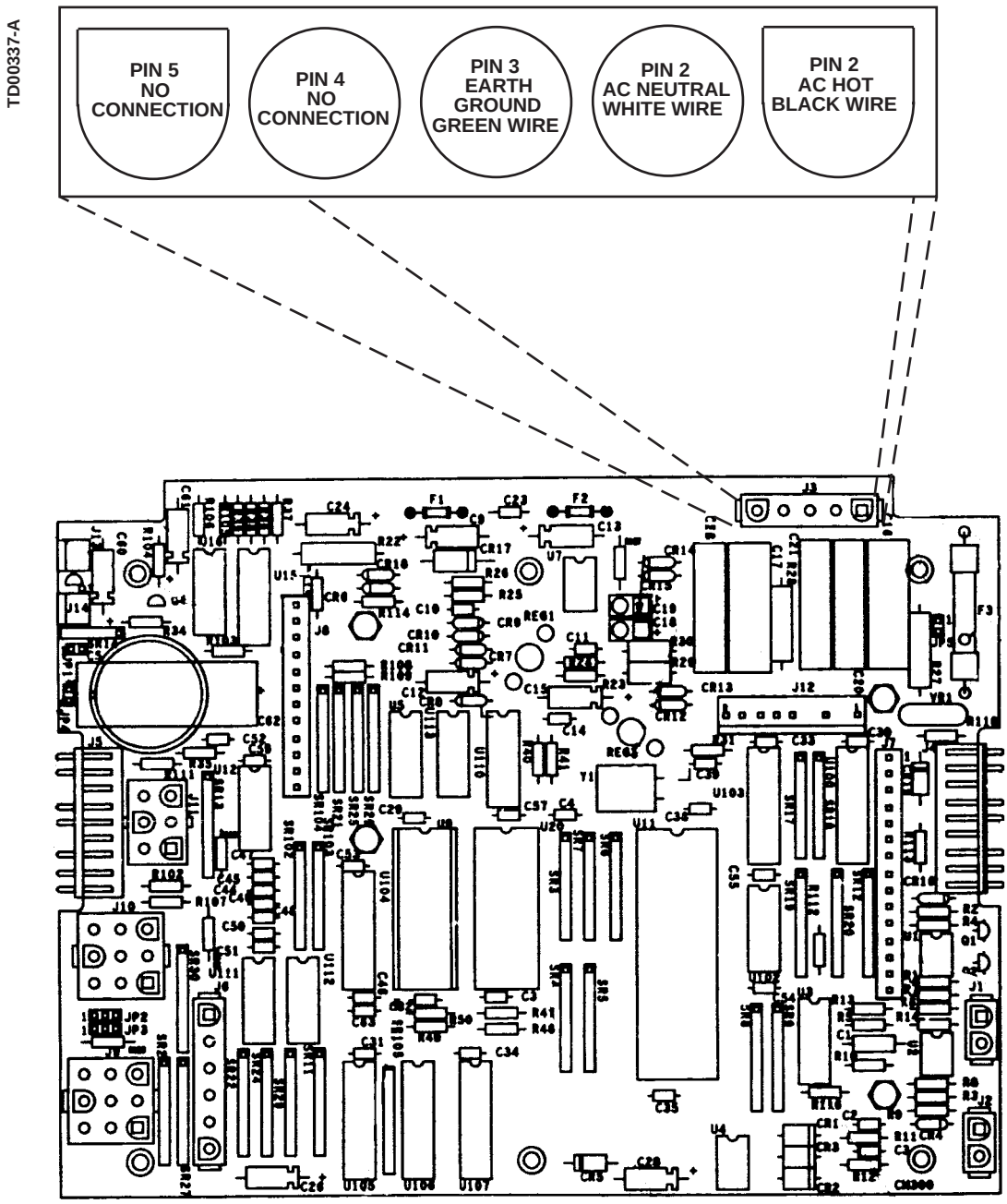


FIGURE A-6. PINOUT CONNECTIONS TO DUPLEX COMPUTER BOARD - J3.

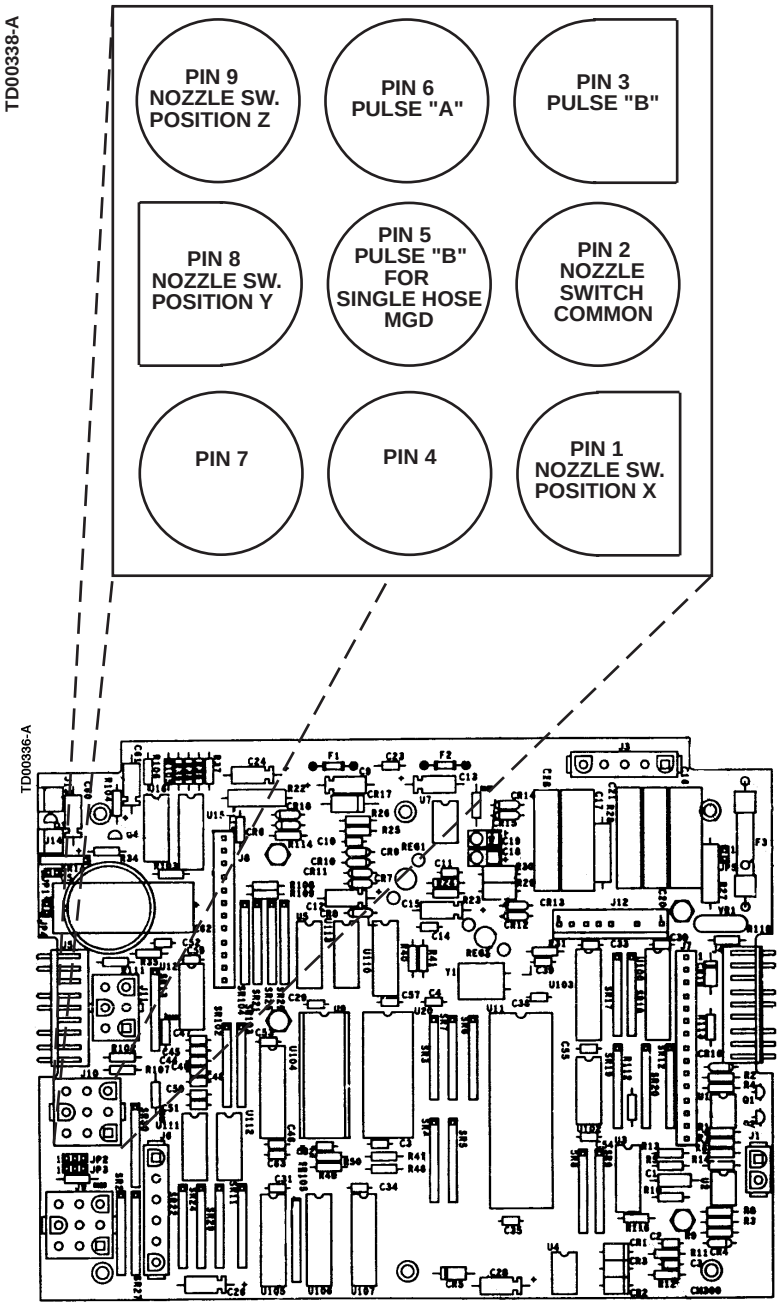


FIGURE A-7. PINOUT CONNECTIONS TO DUPLEX COMPUTER BOARD - J9 AND J10.

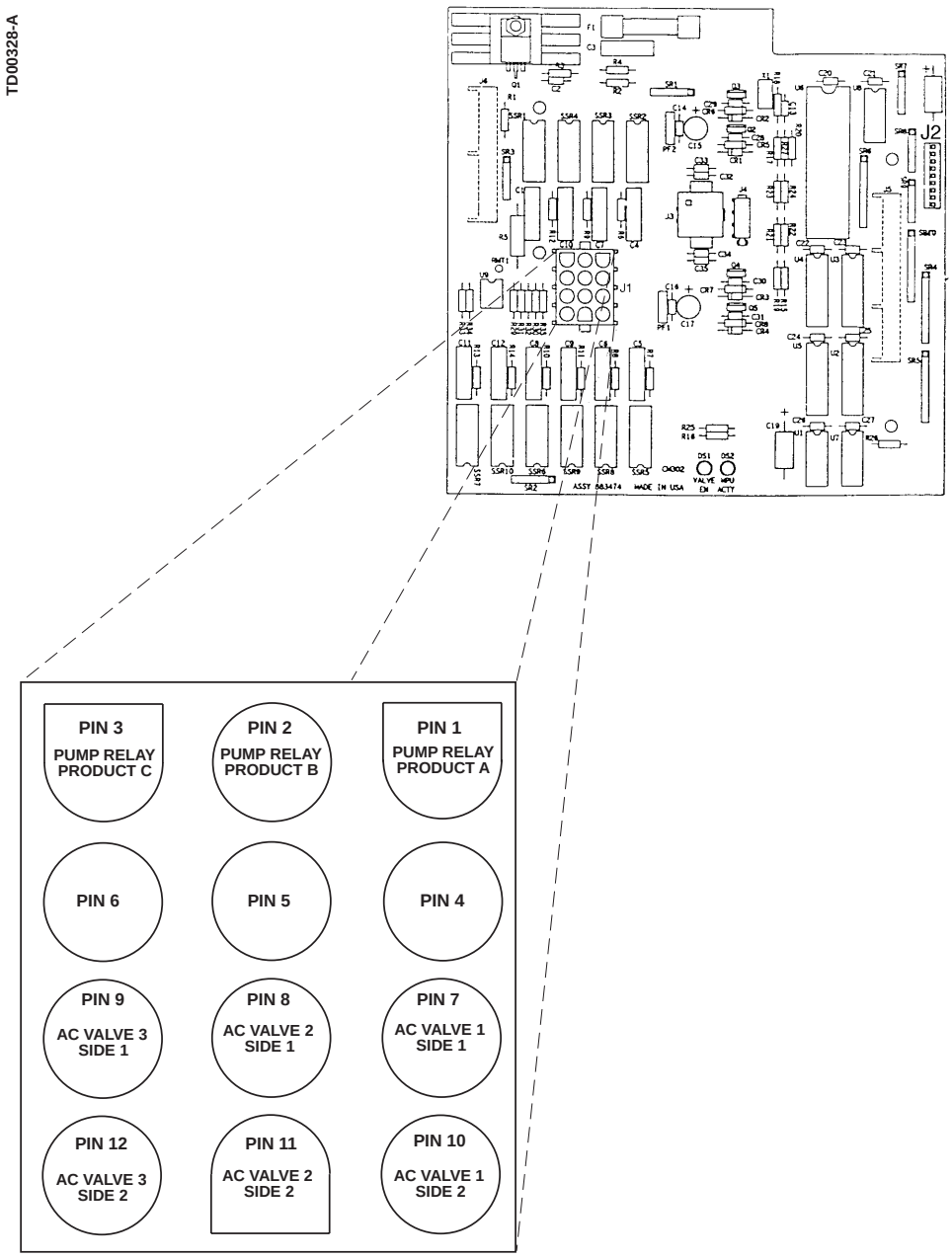


FIGURE A-8. PINOUT CONNECTIONS TO BLENDER SOLENOID DRIVE BOARD - J1.

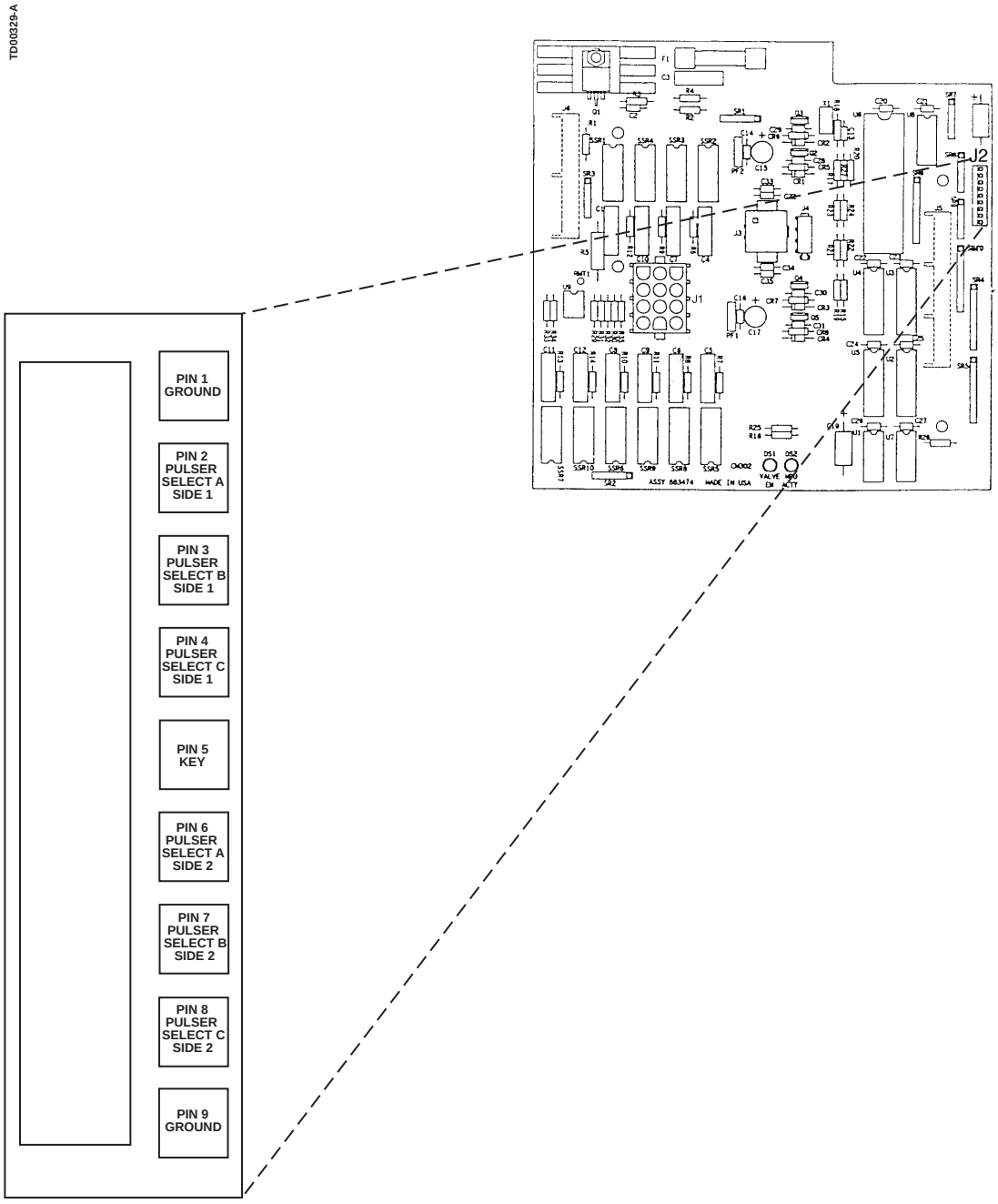


FIGURE A-9. PINOUT CONNECTIONS TO BLENDER SOLENOID DRIVE BOARD - J2.

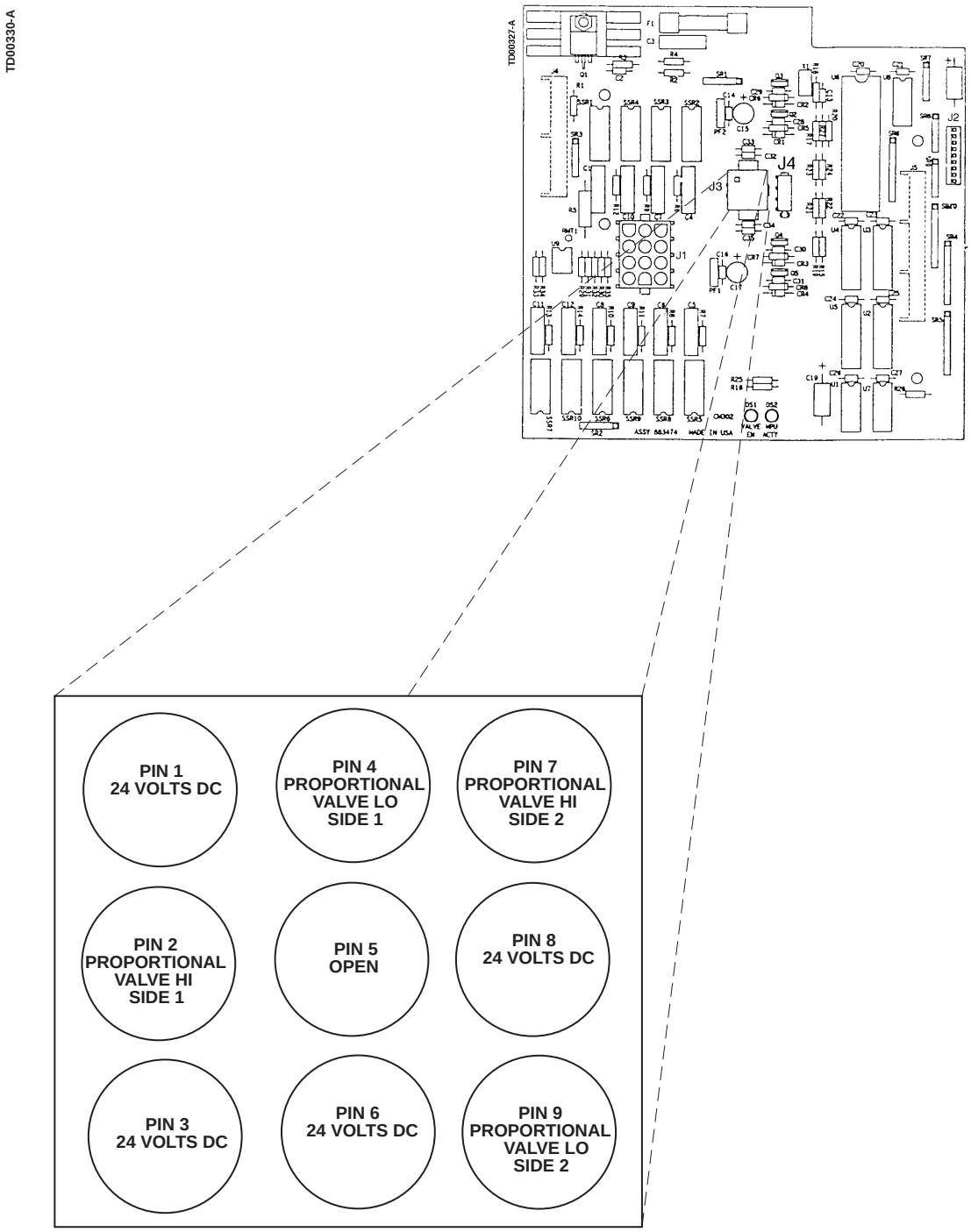


FIGURE A-10. PINOUT CONNECTIONS TO BLENDER SOLENOID DRIVE BOARD - J3.

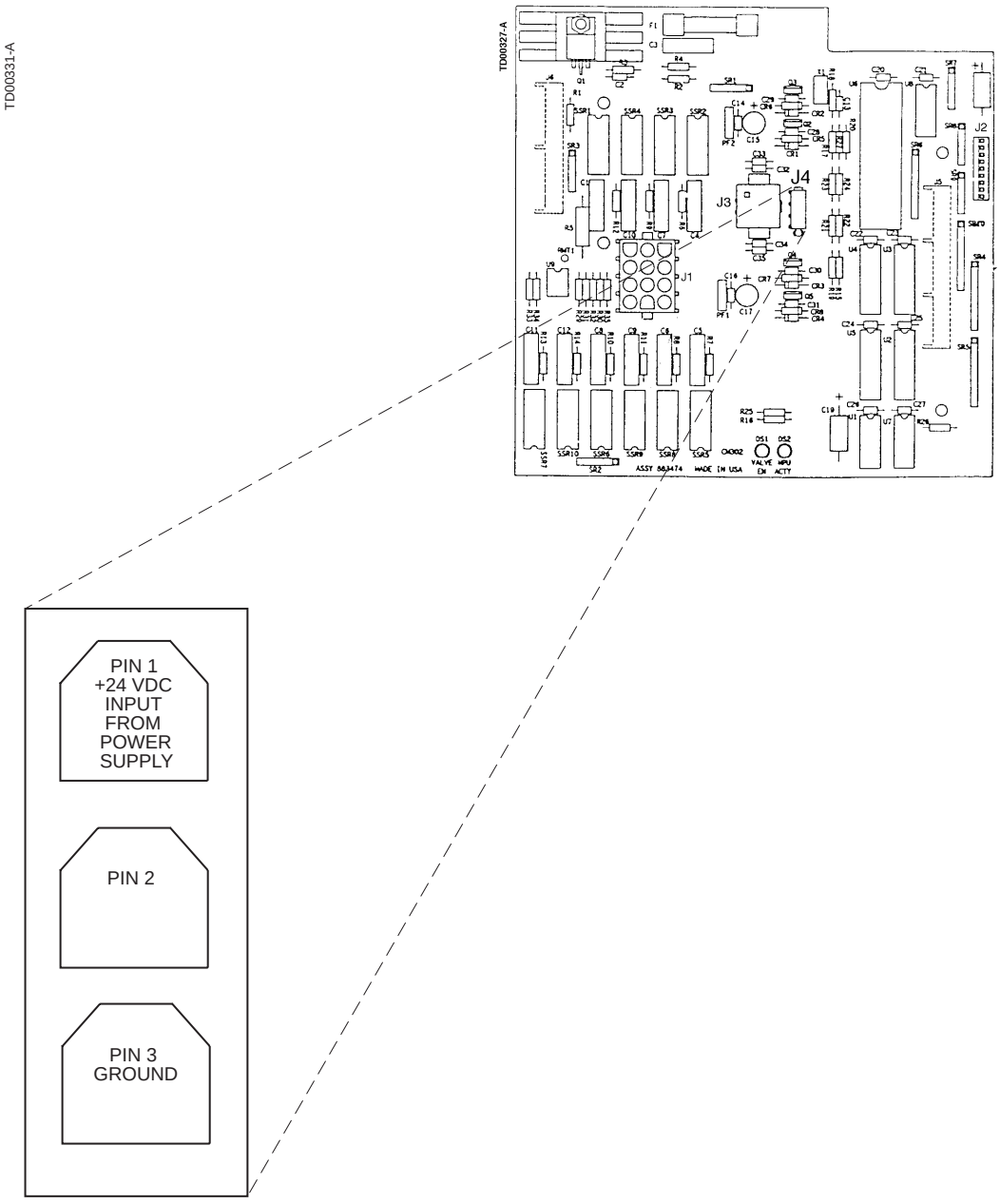


FIGURE A-11. PINOUT CONNECTIONS TO BLENDER SOLENOID DRIVE BOARD - J4.

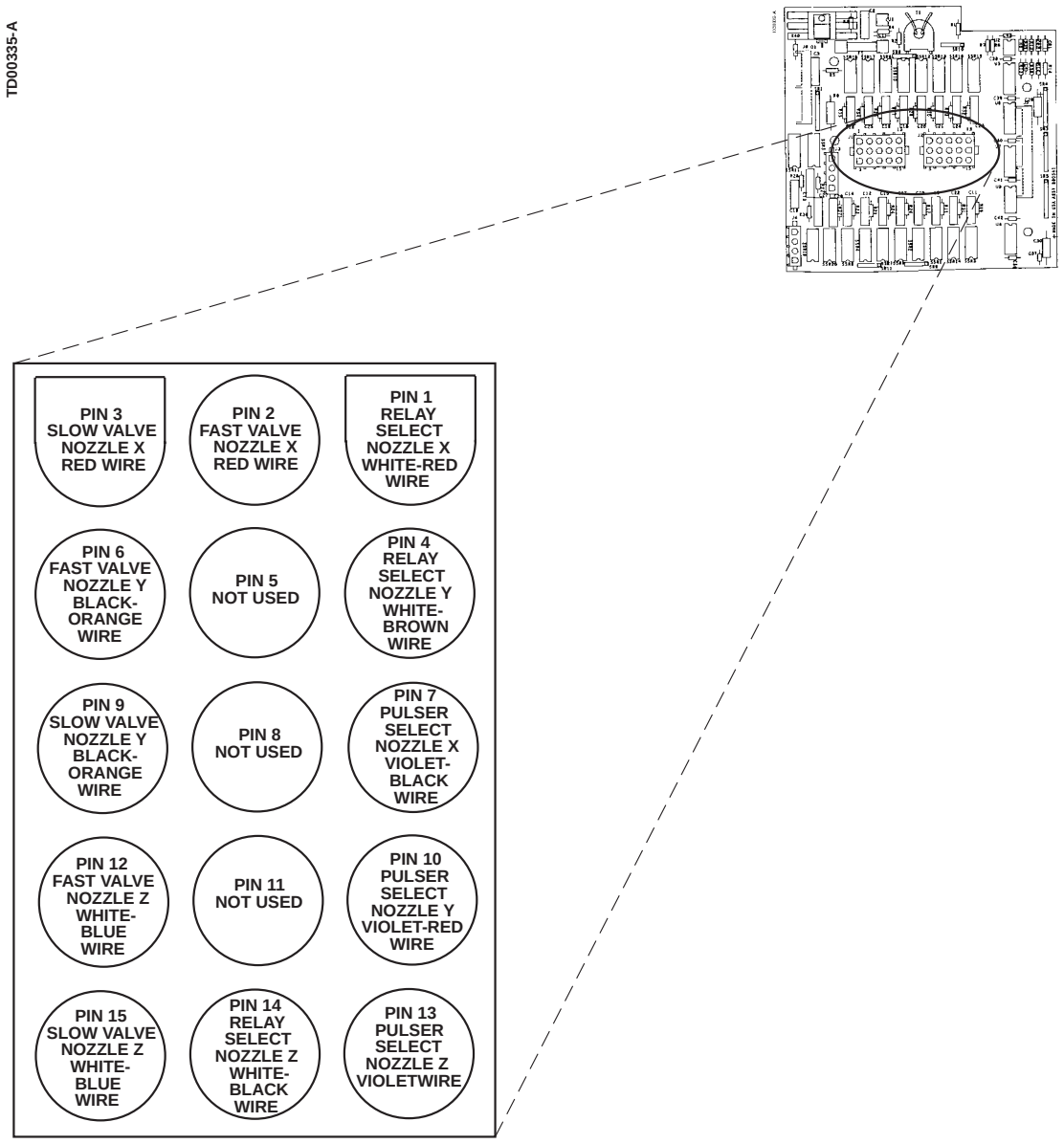
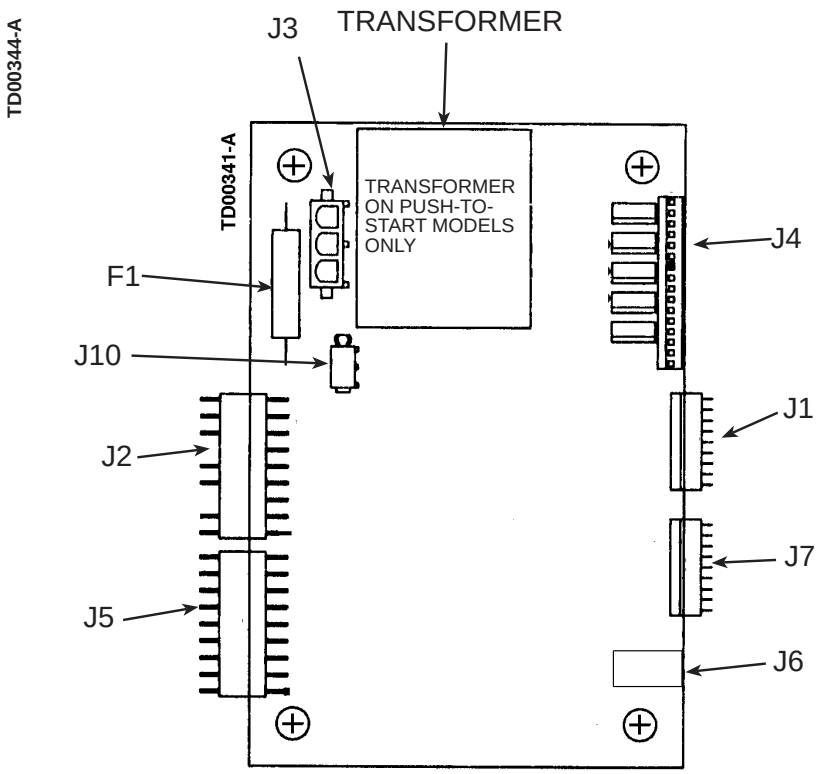


FIGURE A-12. PINOUT CONNECTIONS TO NON- BLENDER SOLENOID DRIVE BOARD - J1 AND J2.



J1 - CONNECTION TO MAIN SALE DISPLAY.

J2 - DATA CONNECTIONS FOR THE DISPLAY CIRCUITRY FROM DUPLEX COMPUTER CONNECTIONS J4/J5.

J3 - AC INPUT TO THE LIGHTED CASH/CREDIT INTERFACE BOARD.

J4 - 20 VDC OUTPUT TO THE PUSH TO START SWITCH ASSEMBLY LEDS.

J5 - CONNECTION FOR THE OPERATIONAL SWITCH INPUTS.

J6 - CONNECTION FOR THE FUNCTION SWITCH INPUTS

J7 - ELECTRO-MECHANICAL TOTALIZER CONNECTION

J10 - 5VDC CONNECTION TO ISB ASSEMBLY; BOTH PINS 5 VDC.

F1 - AC INPUT FUSE (NOT FIELD REPLACEABLE)

FIGURE A-13. CONNECTOR AND FUSE LOCATIONS ON LIGHTED CASH/CREDIT INTERFACE BOARD.

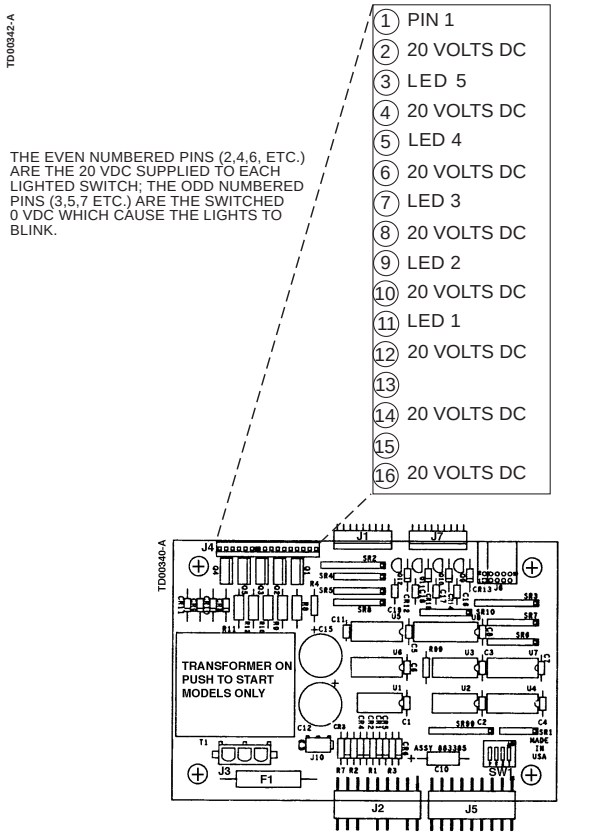


FIGURE A-14. PINOUT CONNECTIONS TO LIGHTED CASH/CREDIT INTERFACE BOARD - J4.

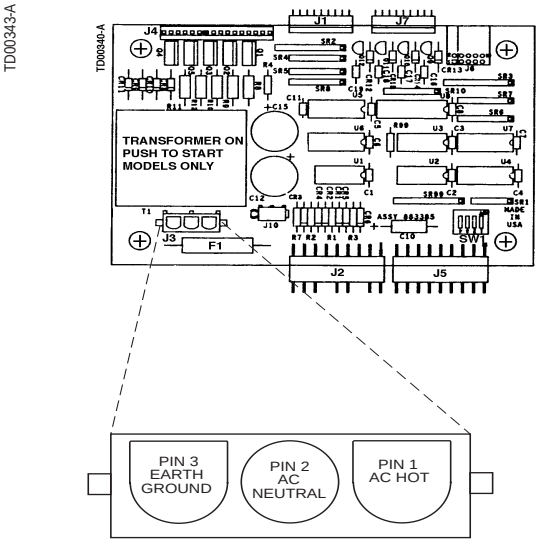


FIGURE A-15. PINOUT CONNECTIONS TO LIGHTED CASH/CREDIT INTERFACE BOARD - J3.

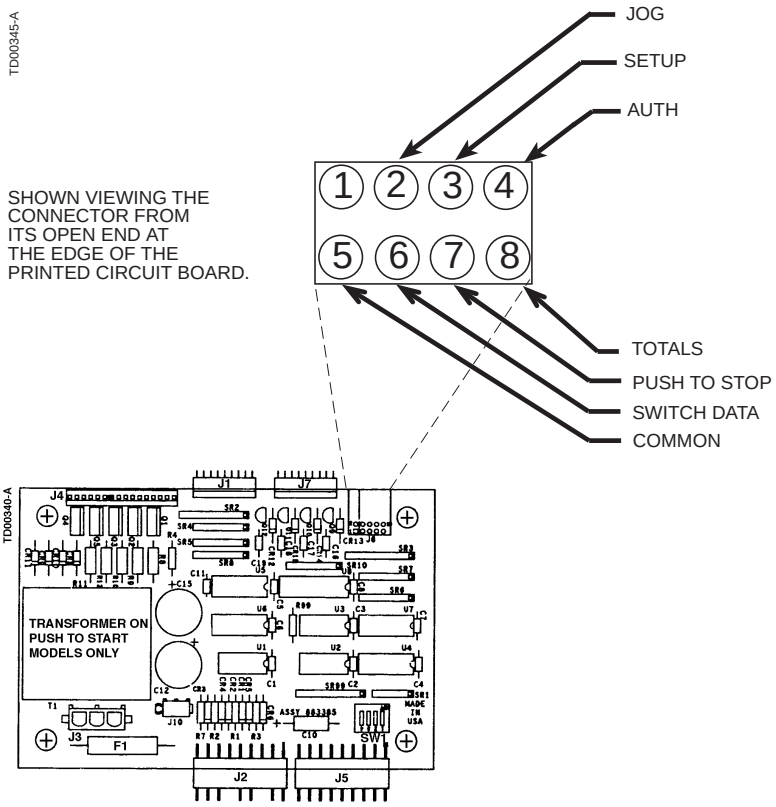


FIGURE A-16. PINOUT CONNECTIONS TO LIGHTED CASH/CREDIT INTERFACE BOARD - J6.

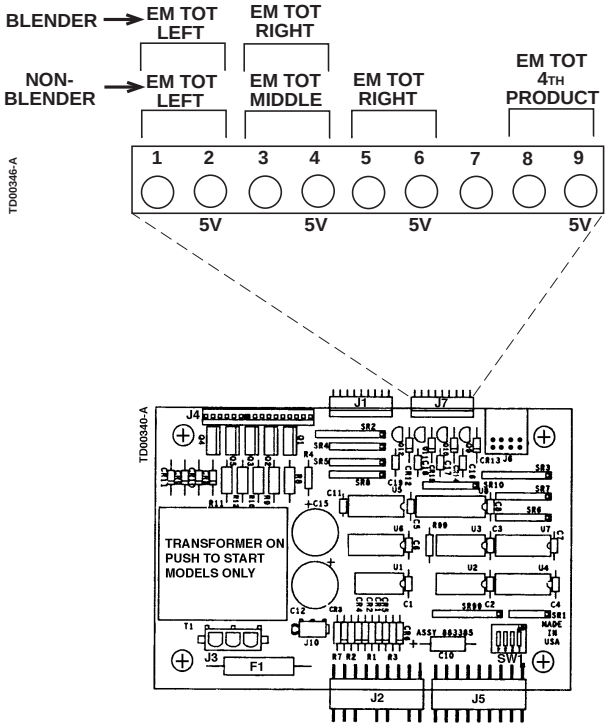


FIGURE A-17. PINOUT CONNECTIONS TO LIGHTED CASH/CREDIT INTERFACE BOARD - J7.

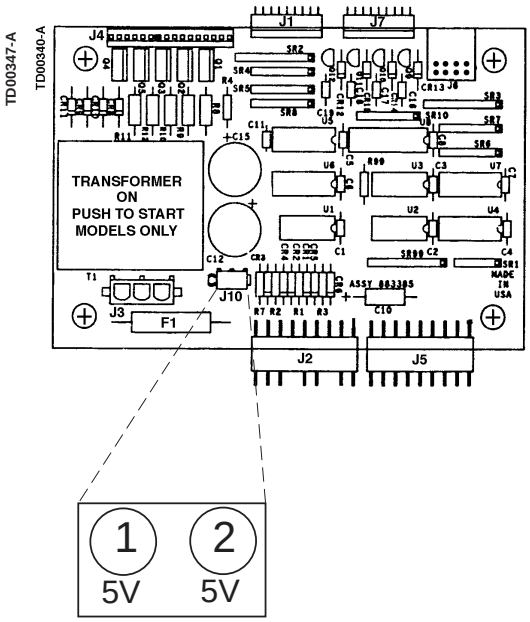


FIGURE A-18. PINOUT CONNECTIONS TO LIGHTED CASH/CREDIT INTERFACE BOARD - J10.

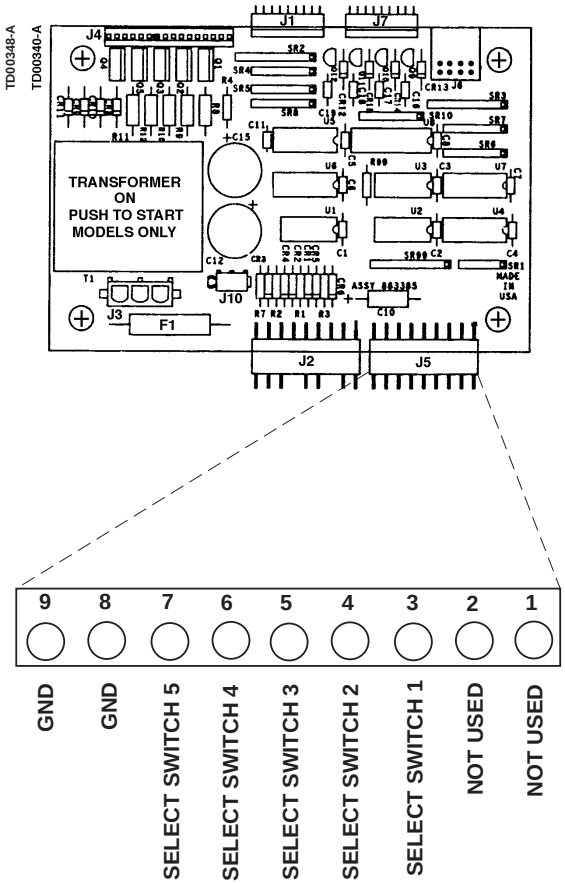


FIGURE A-19. PINOUT CONNECTIONS TO LIGHTED CASH/CREDIT INTERFACE BOARD - J5.

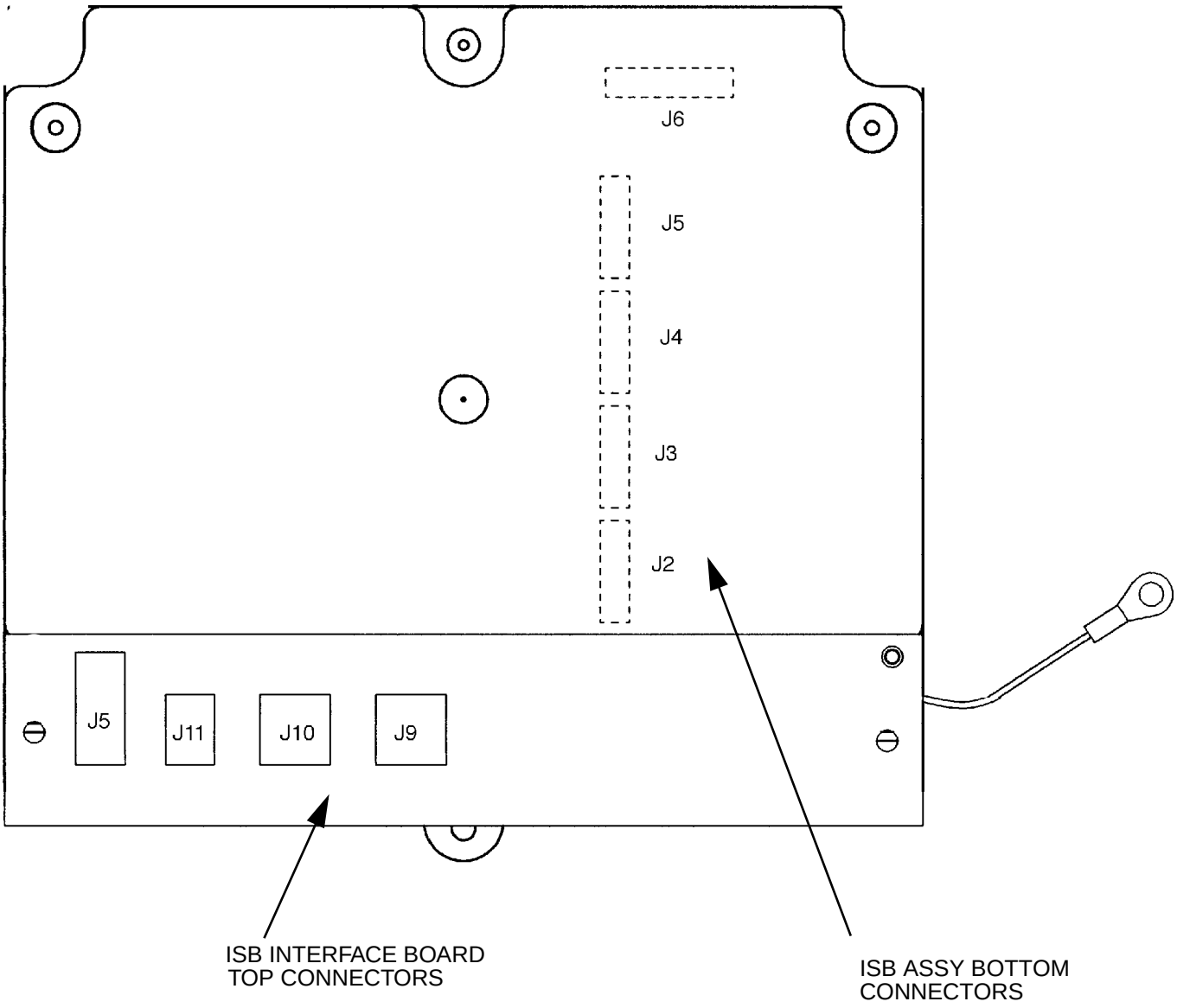


FIGURE A-20. ISB ASSEMBLY BOTTOM CONNECTOR PINOUTS . *Refer to Table A-1.*

TABLE A-1. ISB ASSEMBLY CONNECTOR PINOUTS (ALL MODELS)

Connectors J2, J3, J4, J5 and J6, on the bottom of the ISB assembly, connect to wiring below the vapor barrier. Pinouts for these connectors are listed below. The bottom view of the ISB assembly is shown in Figure A-20.

J2		**J3**		**J4**		**J5**	
Pin	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	
1	Side 1 Enable	1	Side 1 Enable	1	Side 1 Enable	1	Side 1 Enable
2	Side 2 Enable	2	Side 2 Enable	2	Side 2 Enable	2	Side 2 Enable
3	Ground	3	Ground	3	Ground	3	Ground
4	Power	4	Power	4	Power	4	Power
5	Side 1 Pulse B	5	Side 1 Pulse B	5	Side 1 Pulse B	5	Side 1 Pulse B
6	Side 1 Pulse A	6	Side 1 Pulse A	6	Side 1 Pulse A	6	Side 1 Pulse A
7	Side 2 Pulse B	7	Side 2 Pulse B	7	Side 2 Pulse B	7	Side 2 Pulse B
8	Side 2 Pulse A	8	Side 2 Pulse A	8	Side 2 Pulse A	8	Side 2 Pulse A
J6	For 2/V Models: 389, 390, 399, 490	**J6**	For 2/V Models: 387, 390/U	**J6**	For 2/V Models: 580, 590/U, 595, 595/U	**J6**	For 2/V Models: 590, 591
Pin	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**
1	Side 1 Nozzle X	1	Side 1 Nozzle	1	Side 1 Single Nozz	1	Side 1 Single Noz*
2	Side 1 Nozzle Y	2		2	Side 1 Blend Nozz	2	Side 1 Lo Noz
3	Side 1 Nozzle Z	3		3		3	Side 1 Blend Noz
4	Side 1 Nozzle AA	4		4		4	Side 1 Hi Noz
5	Ground	5	Ground	5	Ground	5	Ground
6	Side 2 Nozzle X	6	Side 2 Nozzle	6	Side 2 Single Nozz	6	Side 2 Single Noz*
7	Side 2 Nozzle Y	7		7	Side 2 Blend Nozz	7	Side 2 Lo Noz
8	Side 2 Nozzle Z	8		8		8	Side 2 Blend Noz
9	Side 2 Nozzle AA	9		9		9	Side 2 Hi Noz
10	Ground	10		10		10	Ground
							* 591 only

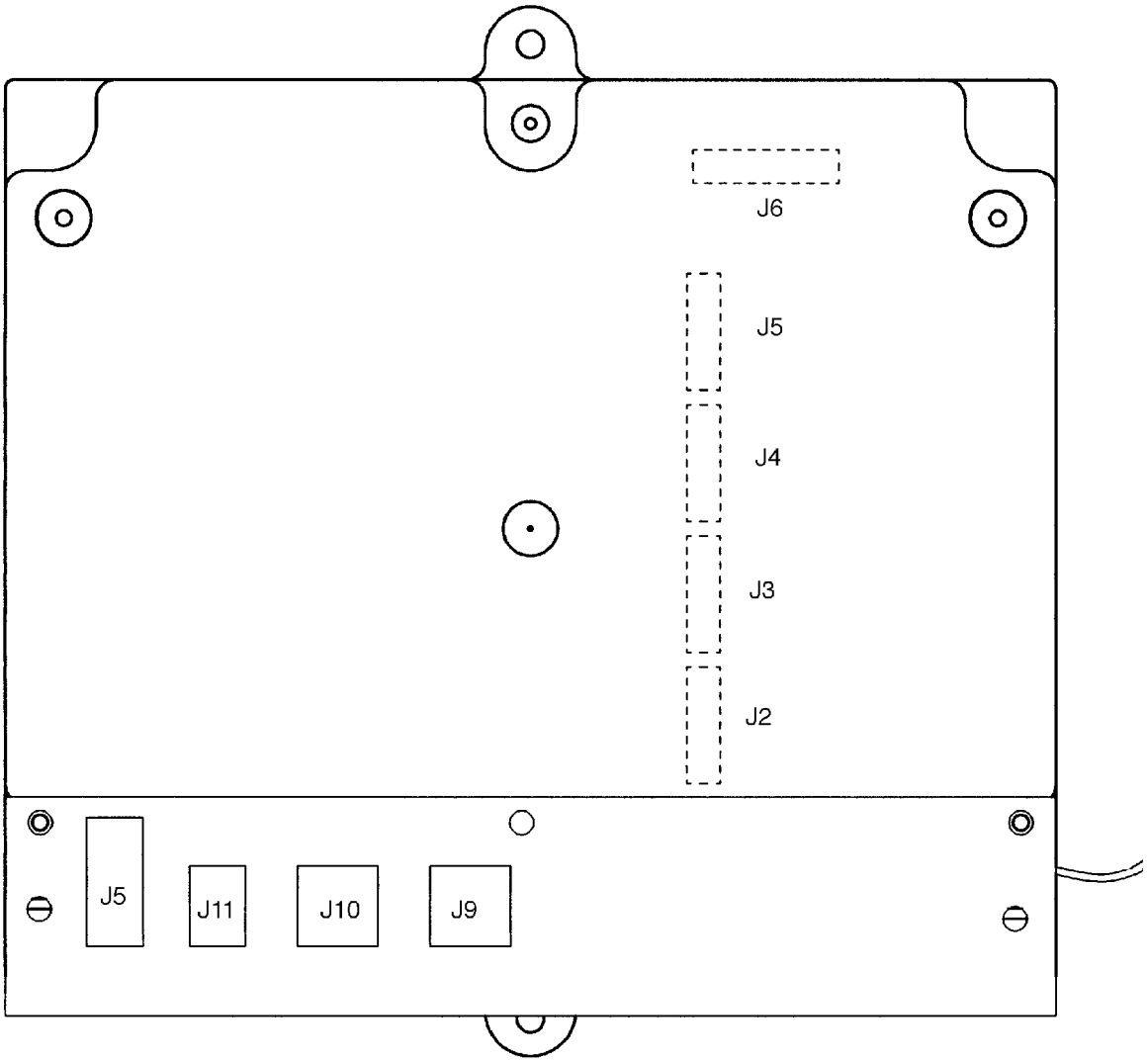


FIGURE A-21. ISB INTERFACE BOARD CONNECTOR PINOUTS FOR MGD. *Refer to Table A-2.*

TABLE A-2. ISB INTERFACE BOARD CONNECTOR PINOUTS FOR MGD

Connectors J5, J9, J10 and J11 on the ISB Interface Board (mounted on top of the ISB Assembly) connect wiring to the pump computer. Pinouts for these connectors are listed below. The ISB Interface Board is shown in Figure A-21.

J5	MGD's	J9		J10		J11	490 MGD only
Pin	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	
1	Common	1	Side 1 Nozzle X	1	Side 2 Nozzle X	1	Side 1 Nozzle AA
2	Side 1 Select X	2	Common	2	Common	2	
3	Side 1 Select Y	3	Side 1 Pulse B	3	Side 2 Pulse B	3	Side 2 Nozzle AA
4	Side 1 Select Z	4	n/a	4	Power for Pulser	4	
5	Side 1 Select AA	5	Side 1 Pulse B*	5	Side 2 Pulse B*	5	
6	Side 2 Select X	6	Side 1 Pulse A	6	Side 2 Pulse A	6	Common
7	Side 2 Select Y	7	n/a	7	Power for Pulser		
8	Side 2 Select Z	8	Side 1 Nozz Y	8	Side 2 Nozzle Y		
9	Common	9	Side 1 Nozz Z	9	Side 2 Nozzle Z		
10	Side 2 Select AA						

* (Single Hose MGD only)

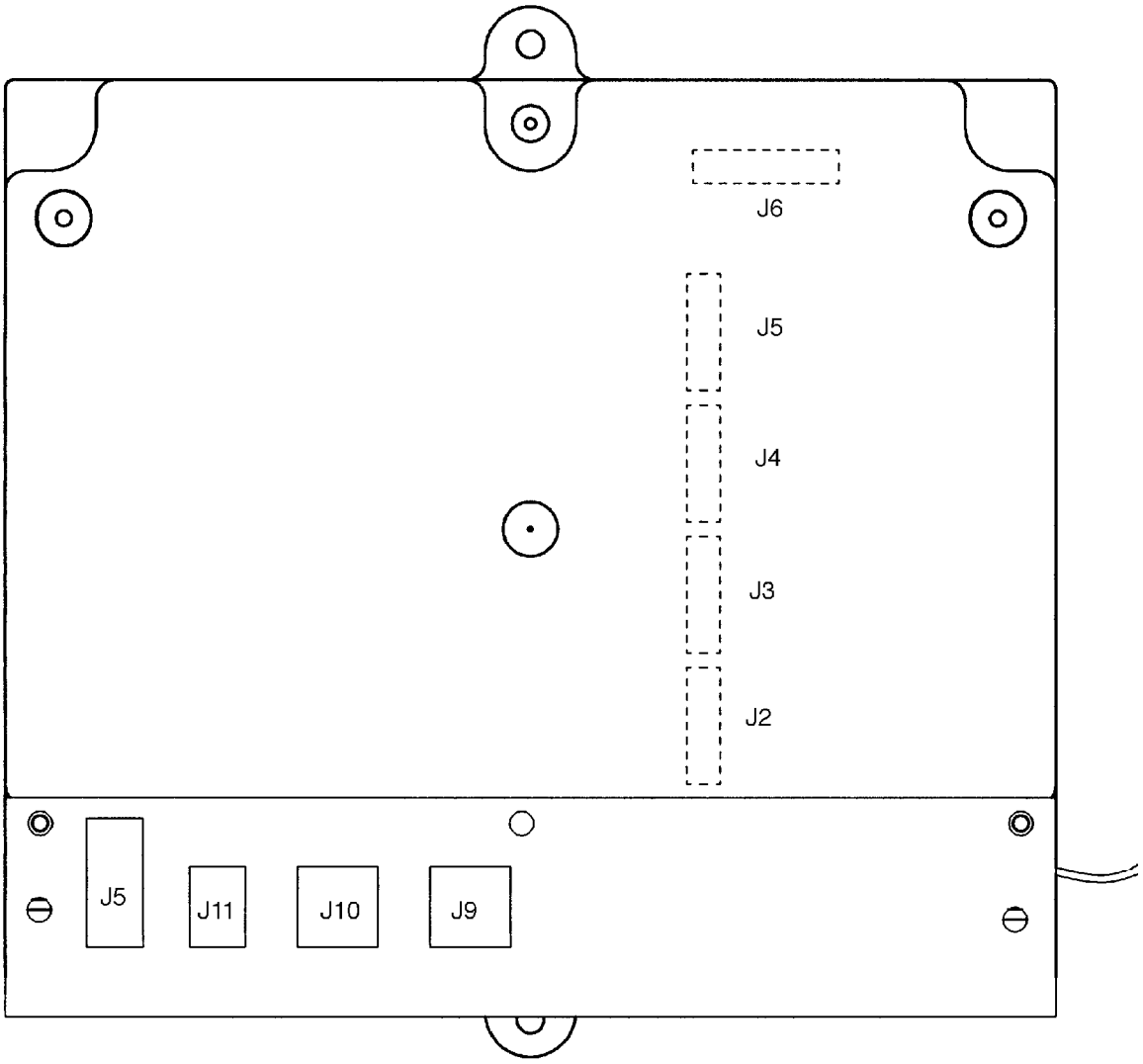


FIGURE A-22. ISB INTERFACE BOARD CONNECTOR PINOUTS FOR BLENDER. *Refer to Table A-3.*

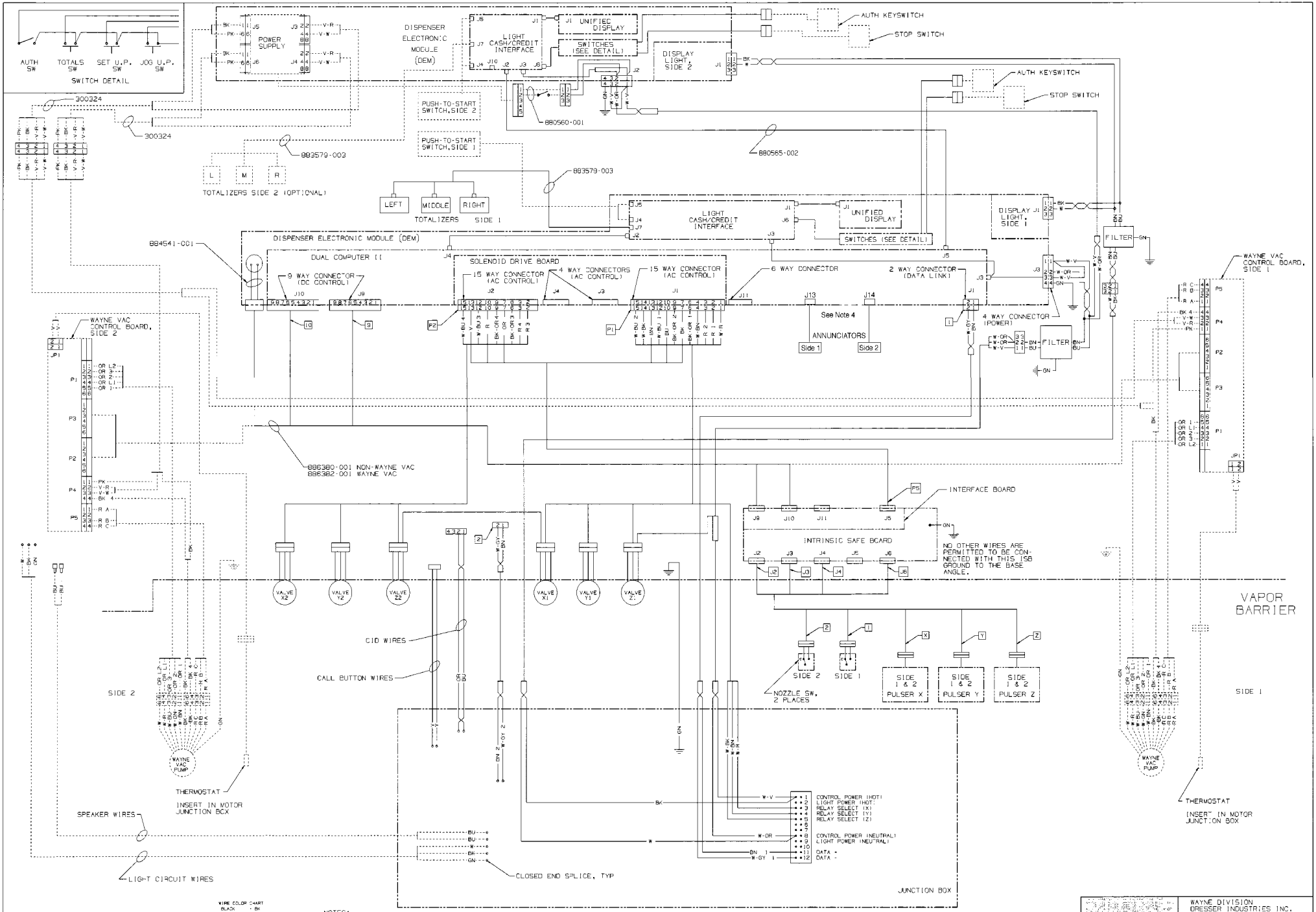
TABLE A-3. ISB INTERFACE BOARD CONNECTOR PINOUTS FOR BLENDER

Connectors J5, J9, J10 and J11 on the ISB Interface Board (mounted on top of the ISB Assembly) connect wiring to the pump computer. Pinouts for these connectors are listed below. The ISB Interface Board is shown in Figure A-22.

J5 MGD's		J9		J10	
Pin	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**
1	Common	1	Side 1 Single Prod Nozz	1	Side 2 Single Prod Nozz
2	Side 1 Select Hi/Lo	2	Common	2	Common
3	Open	3	Side 1 Pulse B Hi	3	Side 2 Pulse B Hi
4	Open	4	n/a	4	Power for Pulser
5	Open	5	Side 1 Pulse B Lo	5	Side 2 Pulse B Lo
6	Side 2 Select Hi/Lo	6	Side 1 Pulse A Hi	6	Side 2 Pulse A Hi
7	Open	7	n/a	7	Power for Pulser
8	Open	8	Side 1 Blend Nozz	8	Side 2 Blend Nozz
9	Common	9	Side 1 Pulse A Lo	9	Side 2 Pulse A Lo
10	Open				

APPENDIX B. WIRING DIAGRAMS

Model Number	Drawing Number
2/V390D/U	1-6620-D
2/V595D/U, 2/V590D/U	2-6620-D
2/V580D, 2/V585D	2-6620-D
2/V490D	3-6620-D
2/V390D	4-6620-D
2/V389D, 2/V399D	5-6620-D
2/V387D	6-6620-D
2/V590D	7-6620-D
2/V591D	8-6620-D
2/V595D	9-6620-D



WIRE COLOR CHART	
BLACK	BK
BLUE	BU
BROWN	BN
GRAY	GY
GREEN	GN
ORANGE	OR
PINK	PK
RED	R
VIOLET	V
WHITE	W
YELLOW	Y

EXAMPLE: W-BK = WHITE WIRE WITH BLACK STRIPE

NOTES:

1. ☒ IDENTIFIES HARNESS CABLE MARKER
2. DASHED LINES (- - - -) INDICATE VARIOUS OPTIONS.
3. USE SIDE 1 CONNECTIONS FOR SINGLE SIDED DISPENSER.
4. FOR CAT EQUIPPED DISPENSERS, SEE CAT WIRING FOR ANNUNCIATOR CONNECTIONS.

LETTER	NO.	DATE	CHANGE	REV BY
B	1376	19MAR99	ADDED NOTE 3 & TOT. ON SIDE 2	NAR
A	0062	17JUN98	"CID WIRE" #1 OR WAS BU, #2 BU WAS OR	NAR

ER314C REVISIONS

SH MET UNFOLD NA | REF SET NA | REV | DATE | INITIALS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
.X = ±.050 .XX = ±.025 .XXX = ±.010 ANGLES ±1°
DO NOT SCALE DRAWING

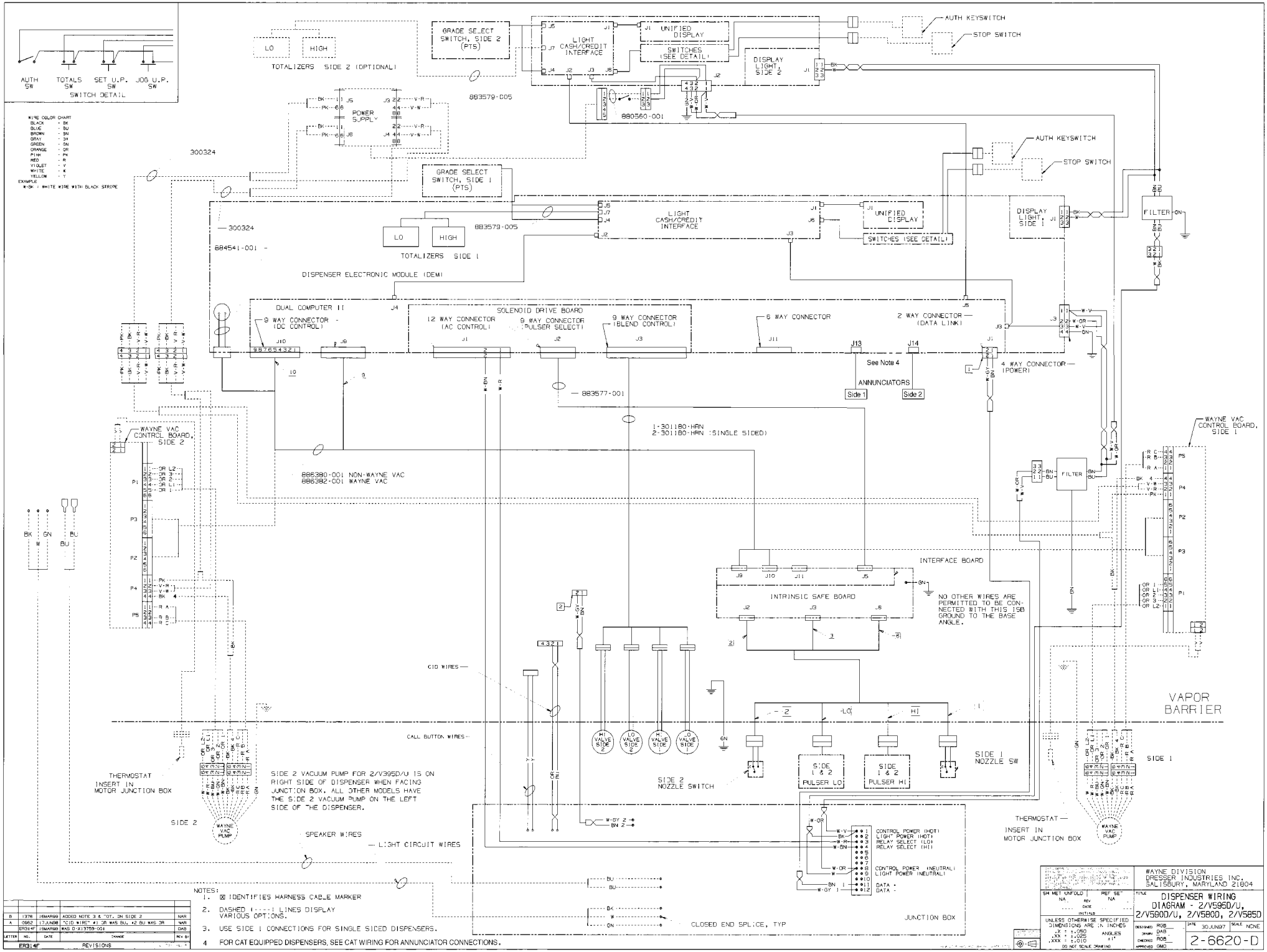
WAYNE DIVISION
DRESSER INDUSTRIES, INC.
SALISBURY, MARYLAND 21804

TITLE: DISPENSER WIRING DIAGRAM - 2/V390D/U

DESIGNED RSB | DRAWN DAB | CHECKED RSB | APPROVED GMD

DATE 24JUN97 | SCALE NONE

1-6620-D



NOTES:

1. ⊠ IDENTIFIES HARNESS CABLE MARKER
2. DASHED (- - - -) LINES DISPLAY VARIOUS OPTIONS.
3. USE SIDE 1 CONNECTIONS FOR SINGLE SIDED DISPENSERS.
4. FOR CAT EQUIPPED DISPENSERS, SEE CAT WIRING FOR ANNUNCIATOR CONNECTIONS.

LETTER	NO.	DATE	CHANGE	REV BY
B	1378	18MAR99	ADDED NOTE 3 & "OT. ON SIDE 2	NAR
A	0962	17JUN08	"CID WIRE" #1 2R WAS BU, #2 BU WAS 3R	NAR
ER314F		18MAR98	WAS D-413759-001	DAS

ER314F REVISIONS

WAYNE DIVISION
DRESSER INDUSTRIES INC.
SALISBURY, MARYLAND 21804

SM MET UNFOLD NA — REF SIZE NA — REV — DATE

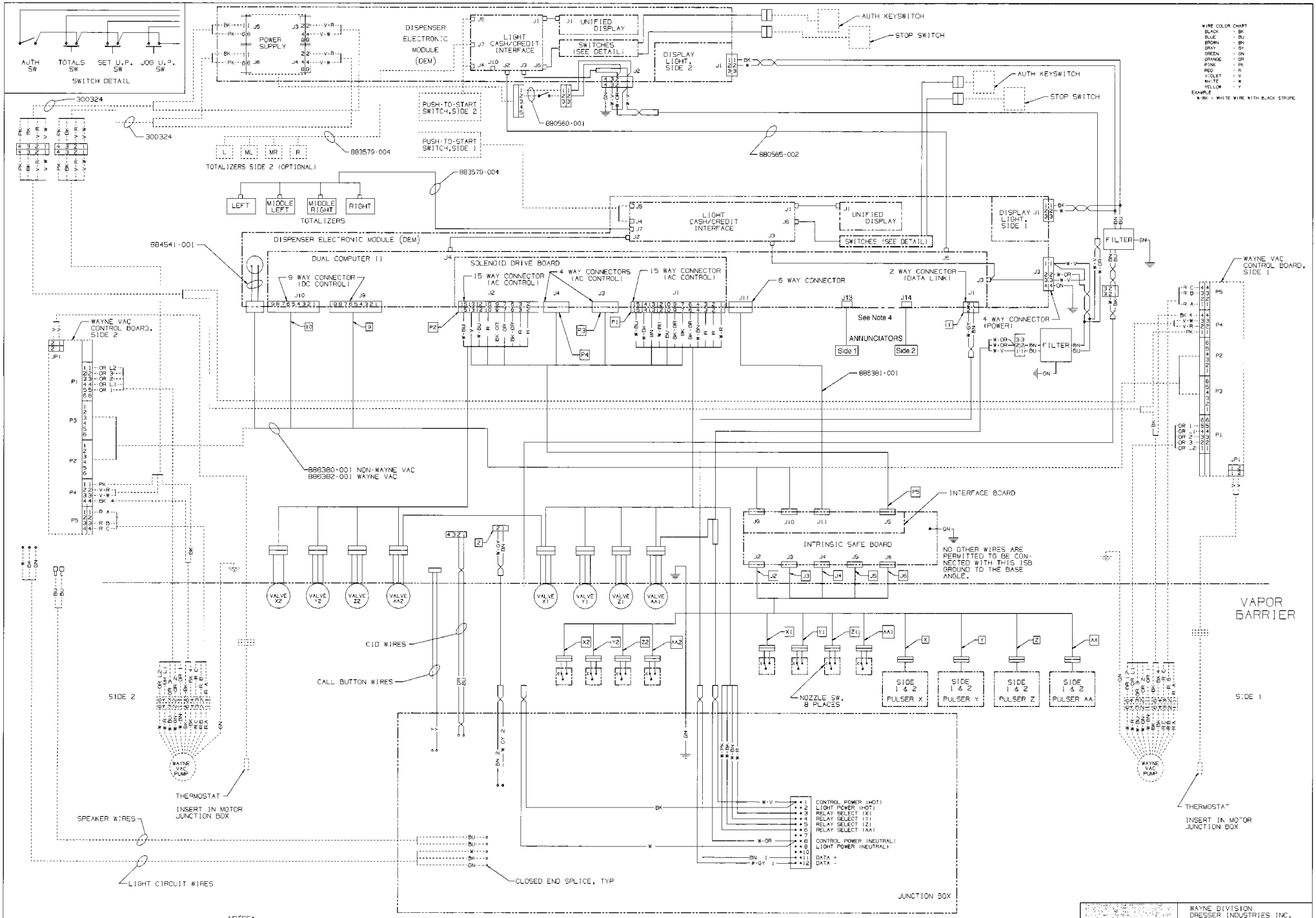
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
.X ± 1.050 — ANGLES ±1°
.XX ± .025
.XXX ± .010
DO NOT SCALE DRAWING

TITLE: DISPENSER WIRING DIAGRAM - 2/V595D/U, 2/V590D/U, 2/V580D, 2/V585D

DESIGNED RGS — DRAWN DAS — CHECKED RGS — APPROVED GMO

DATE 30JUN97 — SCALE NONE

2-6620-D



NOTES:

1. ⊠ IDENTIFIES HARNESS CABLE MARKER
2. DASHED LINES (- - - -) INDICATE VARIOUS OPTIONS.
3. USE SIDE 1 CONNECTIONS FOR SINGLE SIDED DISPENSERS.
4. FOR CAT EQUIPPED DISPENSERS, SEE CAT WIRING FOR ANNUNCIATOR CONNECTIONS.

LETTER	NO.	DATE	CHANGE	REV BY
A	1378	18MAR99	ADDED NOTE 3 & TOT. ON SIDE 2	MAR

ER314H REVISIONS

SM MET UNFOLD NA — REF SET NA — REV — DATE — INITIALS

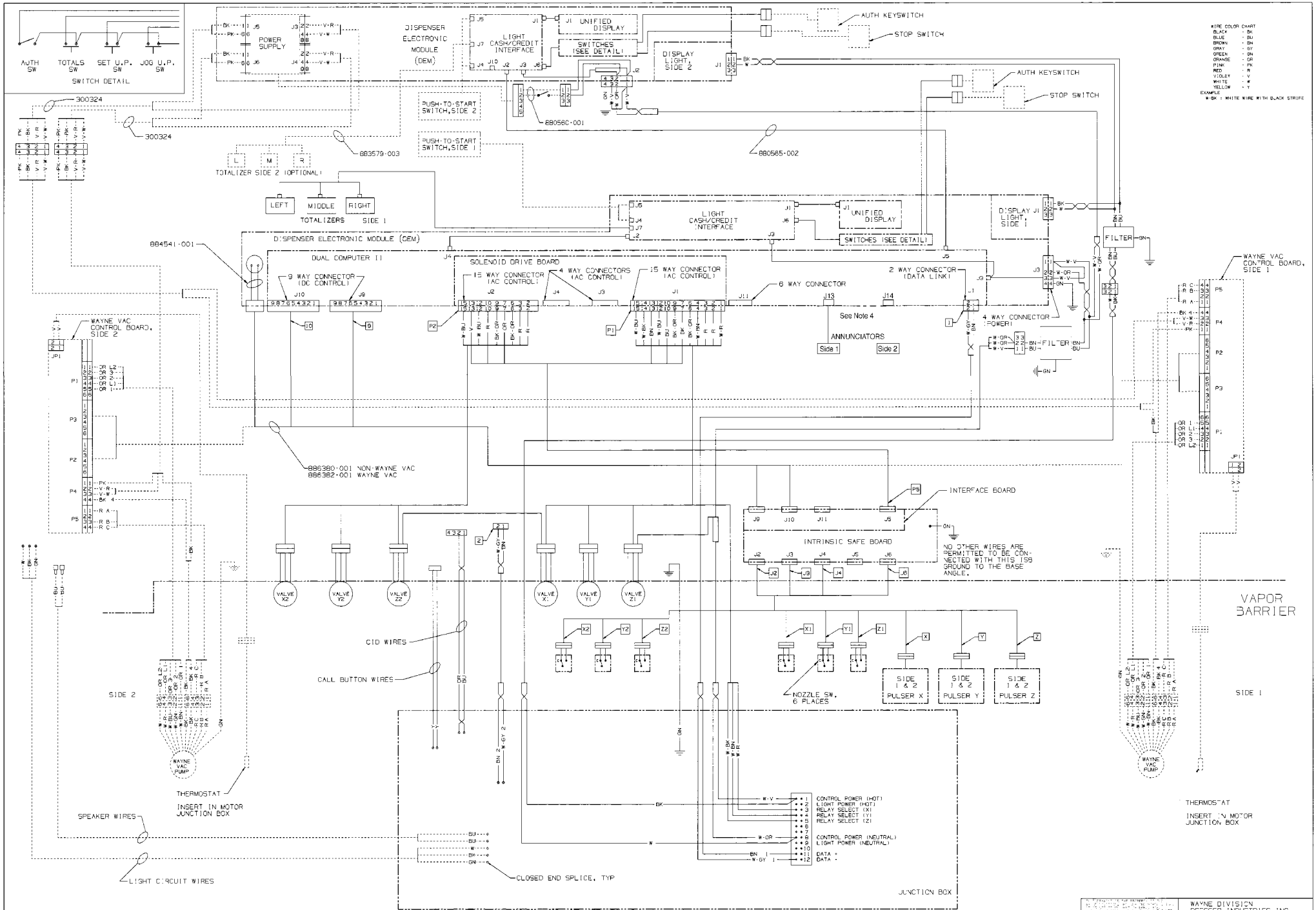
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
X = ±.050 ANGLES ±1°
.XX = ±.025
.XXX = ±.010
DO NOT SCALE DRAWING

WAYNE DIVISION
DRESSER INDUSTRIES INC.
SALISBURY, MARYLAND 21804

TITLE: DISPENSER WIRING DIAGRAM - 2/V490D

DESIGNED	RGB	DATE	6APR98
DRAWN	DAB	SCALE	NONE
CHECKED	RGB		
APPROVED	DMO		

3-6620-D



NOTES:

1. ⊠ IDENTIFIES HARNESS CABLE MARKER
2. DASHED LINES (----) INDICATE VARIOUS OPTIONS.
3. USE SIDE 1 CONNECTIONS FOR SINGLE SIDED DISPENSERS.
4. FOR CAT EQUIPPED DISPENSERS, SEE CAT WIRING FOR ANNUNCIATOR CONNECTIONS.

LETTER	NO.	DATE	CHANGE	REV BY
A	1379	03MAR99	ADDED NOTE 3 & TOT. ON SIDE 2	NAB

ER3|4H REVISIONS

WAYNE DIVISION
DRESSER INDUSTRIES, INC.
SALISBURY, MARYLAND 21804

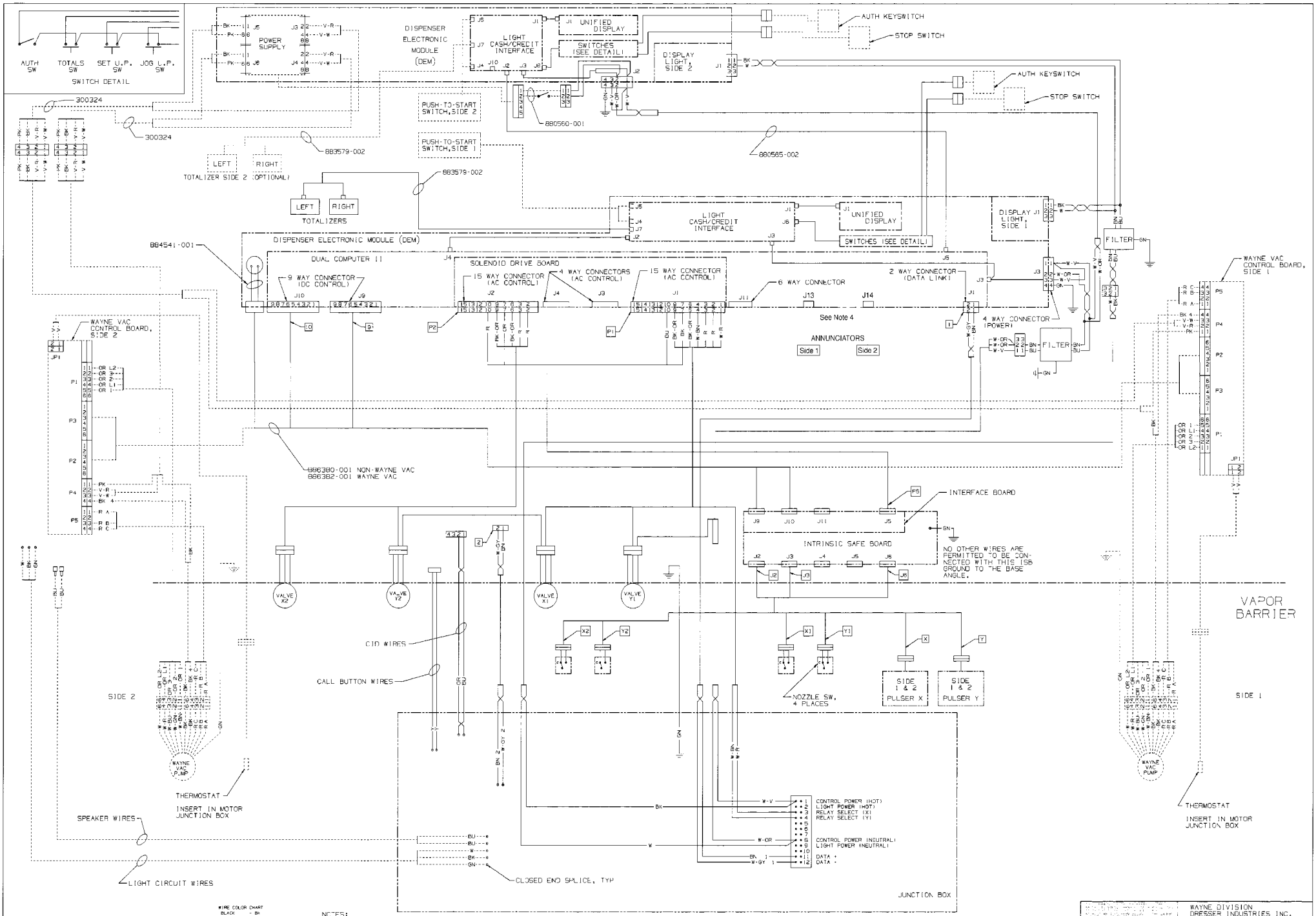
SH WET UNFOLD NA | REV NA | REF SET NA

TITLE: DISPENSER WIRING DIAGRAM - 2/V390D

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
.XX ± .050
.XX ± .025
.XXX ± .010
ANGLES ±1°
DO NOT SCALE DRAWING

DESIGNED RGB | DRAWN DAB | CHECKED RGB | APPROVED GMO | DATE 7APR98 | SCALE NONE

4-6620-D



WIRE COLOR CHART

BLACK	- BK
BLUE	- BU
BROWN	- BR
GRAY	- GY
GREEN	- GN
ORANGE	- OR
PINK	- PK
RED	- R
VIOLET	- V
WHITE	- W
YELLOW	- Y

EXAMPLE: W-BK = WHITE WIRE WITH BLACK STRIPE

NOTES:

1. ⊠ IDENTIFIES HARNESS CABLE MARKER
2. DASHED LINES (- - - -) INDICATE VARIOUS OPTIONS.
3. USE SIDE 1 CONNECTIONS FOR SINGLE SIDED DISPENSERS.
4. FOR CAT EQUIPPED DISPENSERS, SEE CAT WIRING FOR ANNUNCIATOR CONNECTIONS.

LETTER	NO.	DATE	CHANGE	REV BY
A	1376	16MAR99	ADDED NOTE 3 & TOT. ON SIDE 2	NAR

ER314H REVISIONS

WAYNE DIVISION
DRESSER INDUSTRIES, INC.
SALISBURY, MARYLAND 21804

SH SET UNFOLD: NA | REF SET: NA
REV
DATE
INITIALS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
.X ± .050
.XX ± .025 ANGLES ±1°
.XXX ± .010
DO NOT SCALE DRAWING

TITLE: DISPENSER WIRING DIAGRAM - 2/V389D AND 2/V399D

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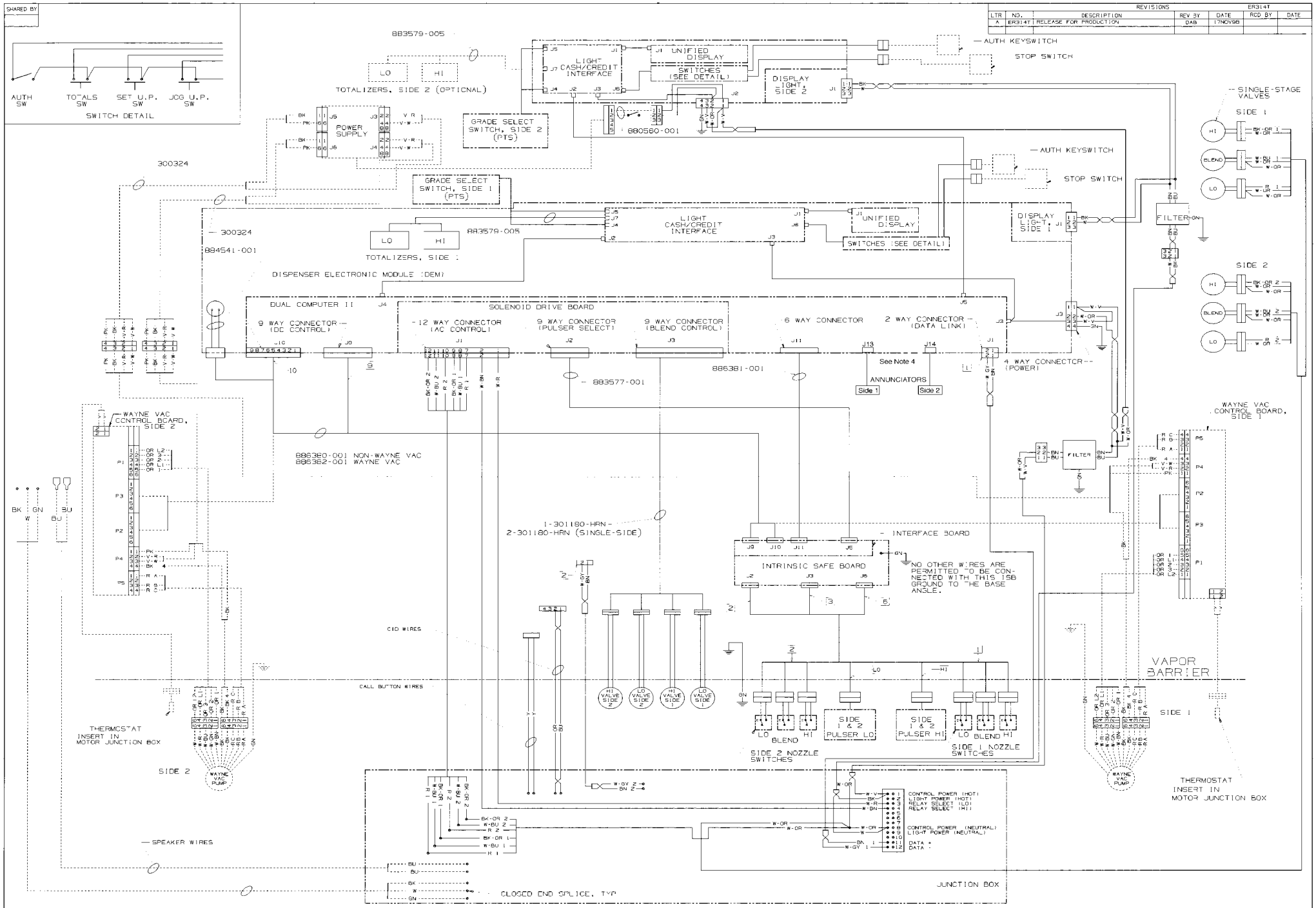
DRAWN	DAB	SCALE	NONE
CHECKED	RBB		
APPROVED	GMO		

5-6620-D



REVISIONS						ER314T
LTR	NO.	DESCRIPTION	REV BY	DATE	RCD BY	DATE
A	ER314T	RELEASE FOR PRODUCTION	DAB	17NOV98		

WIRE COLOR CHART

BLACK	- BK
BLUE	- BU
BROWN	- BN
GRAY	- GY
GREEN	- GN
ORANGE	- OR
PINK	- PK
RED	- R
VIOLET	- V
WHITE	- W
YELLOW	- Y

EXAMPLE
W-BK = WHITE WIRE WITH BLACK STRIPE

LIGHT CIRCUIT WIRES

NOTES:
1. ⊠ IDENTIFIES HARNESS CABLE MARKER
2. DASHED (----) LINES DISPLAY VARIOUS OPTIONS.
3. USE SIDE 1 CONNECTIONS FOR SINGLE-SIDE DISPENSERS
4. FOR CAT EQUIPPED DISPENSERS, SEE CAT WIRING FOR ANNUNCIATOR CONNECTIONS.

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
ANGLES +/- 1° .X +/- .050 .XX +/- .020 .XXX +/- .010
PART SHALL BE FREE OF BURRS
BREAK SHARP EDGES

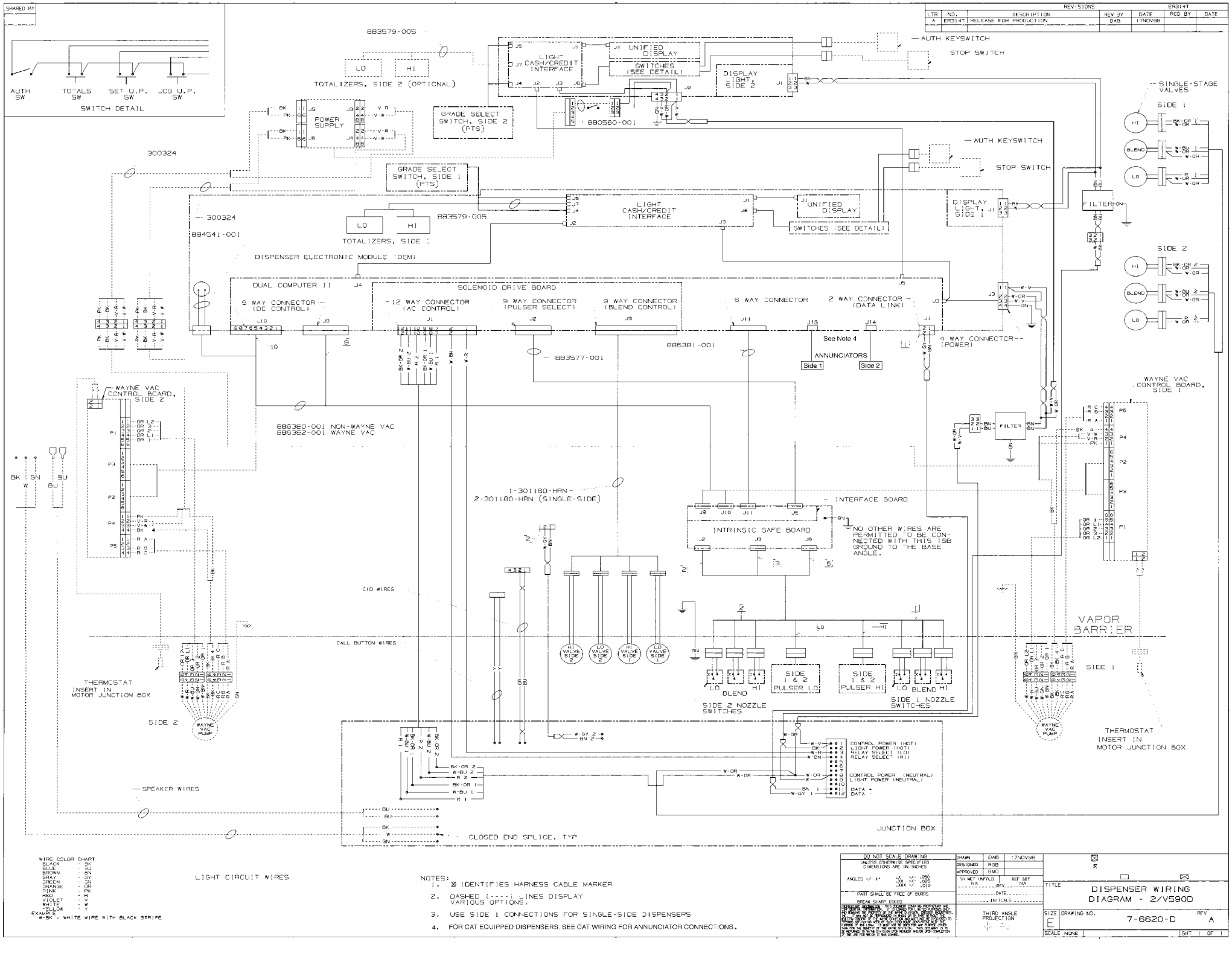
DRAWN	DAB	17NOV98
DESIGNED	RGB	
APPROVED	GMO	
SHEET INFOLD	REF SET	
NA	NA	
REV.		
DATE		
INITIALS		

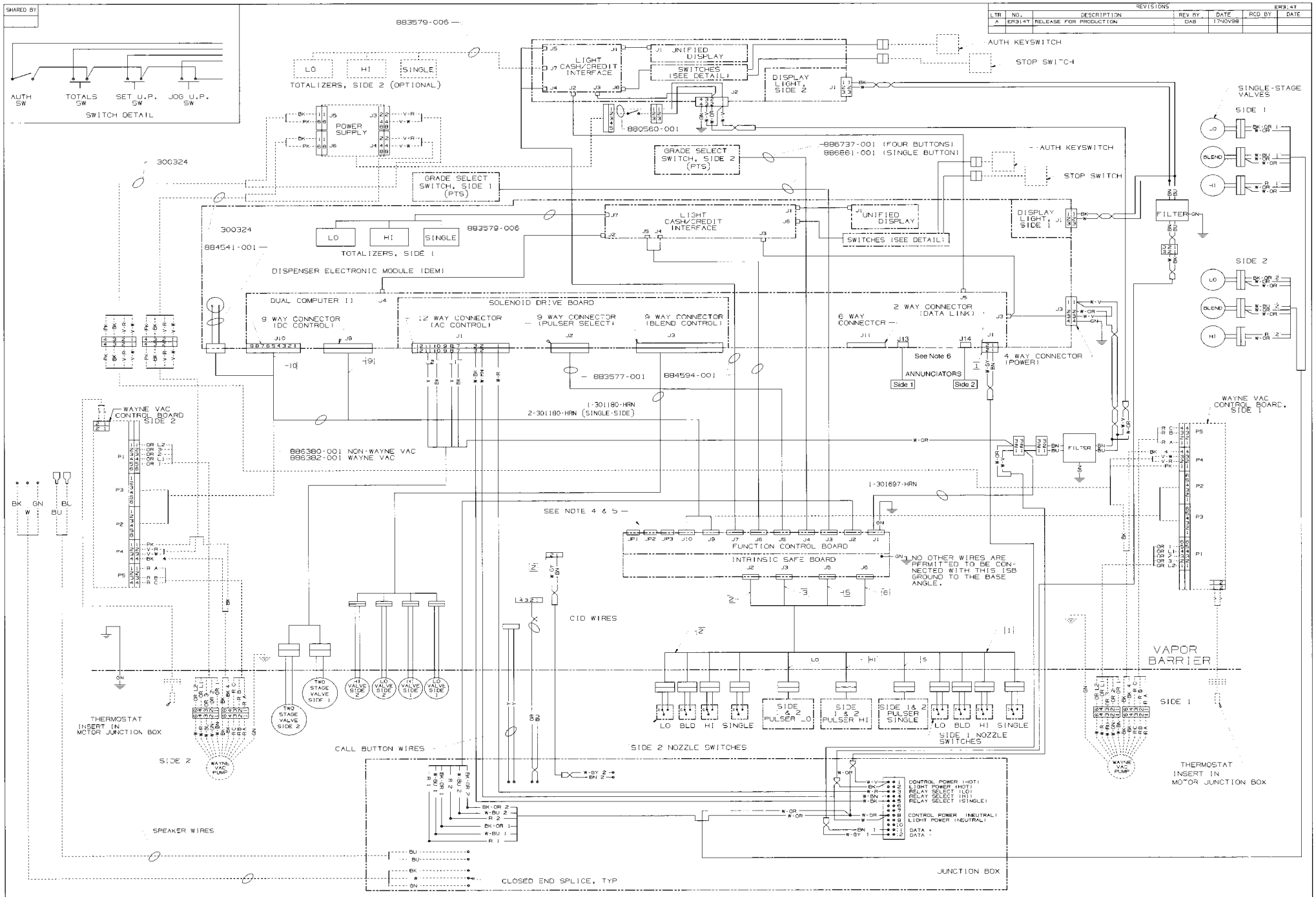
THIRD ANGLE PROJECTION

TITLE: DISPENSER WIRING DIAGRAM - 2/V590D

SIZE	DRAWING NO.	REV
E	7-6620-D	A

SCALE NONE | SHT 1 OF 1


SHARED BY
AUTH SW
TOTALS SW
SET U.P. SW
JOG U.P. SW
SWITCH DETAIL
REVISIONS
LTR NO. DESCRIPTION REV BY DATE RCD BY DATE
A ER3147 RELEASE FOR PRODUCTION DAB 17NOV98
883579-005
TOTALIZERS, SIDE 2 (OPTIONAL)
LIGHT CASH/CREDIT INTERFACE
UNIFIED DISPLAY
SWITCHES (SEE DETAIL)
DISPLAY LIGHT, SIDE 2
AUTH KEYSWITCH
STOP SWITCH
SINGLE-STAGE VALVES
SIDE 1
SIDE 2
POWER SUPPLY
GRADE SELECT SWITCH, SIDE 2 (PTS)
880560-001
300324
GRADE SELECT SWITCH, SIDE 1 (PTS)
884541-001
TOTALIZERS, SIDE 1
DISPENSER ELECTRONIC MODULE (DEM)
DUAL COMPUTER II
SOLENOID DRIVE BOARD
10 WAY CONNECTOR (DC CONTROL)
12 WAY CONNECTOR (AC CONTROL)
9 WAY CONNECTOR (PULSER SELECT)
9 WAY CONNECTOR (BLEND CONTROL)
6 WAY CONNECTOR
2 WAY CONNECTOR (DATA LINK)
4 WAY CONNECTOR (POWER)
883577-001
886381-001
See Note 4
ANNUNCIATORS
Side 1
Side 2
DISPLAY LIGHT, SIDE 1
FILTER
WAYNE VAC CONTROL BOARD, SIDE 2
WAYNE VAC CONTROL BOARD, SIDE 1
886380-001 NON-WAYNE VAC
886382-001 WAYNE VAC
1-301180-HRN
2-301180-HRN (SINGLE-SIDE)
INTERFACE BOARD
INTRINSIC SAFE BOARD
NO OTHER WIRES ARE PERMITTED TO BE CONNECTED WITH THIS ISB GROUND TO THE BASE ANSLE.
CID WIRES
CALL BUTTON WIRES
VAPOR BARRIER
SIDE 1
SIDE 2
THERMOSTAT INSERT IN MOTOR JUNCTION BOX
WAYNE VAC PUMP
HI VALVE SIDE 2
LO VALVE SIDE 2
HI VALVE SIDE 1
LO VALVE SIDE 1
SIDE 2 NOZZLE SWITCHES
SIDE 1 NOZZLE SWITCHES
BLEND
PULSER LO
PULSER HI
SPEAKER WIRES
CONTROL POWER (HOT)
LIGHT POWER (HOT)
RELAY SELECT (LO)
RELAY SELECT (HI)
CONTROL POWER (NEUTRAL)
LIGHT POWER (NEUTRAL)
DATA +
DATA -
JUNCTION BOX
CLOSED END SPLICE, TYP
WIRE COLOR CHART
BLACK - BK
BLUE - BU
BROWN - BN
GRAY - GY
GREEN - GN
ORANGE - OR
PINK - PK
RED - R
VIOLET - V
WHITE - W
YELLOW - Y
EXAMPLE W-BK = WHITE WIRE WITH BLACK STRIPE
LIGHT CIRCUIT WIRES
NOTES:
1. ⊠ IDENTIFIES HARNESS CABLE MARKER
2. DASHED (----) LINES DISPLAY VARIOUS OPTIONS.
3. USE SIDE 1 CONNECTIONS FOR SINGLE-SIDE DISPENSERS
4. FOR CAT EQUIPPED DISPENSERS, SEE CAT WIRING FOR ANNUNCIATOR CONNECTIONS.
DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
ANGLES +/- 1° .X +/- .050 .XX +/- .025 .XXX +/- .010
PART SHALL BE FREE OF BURRS
BREAK SHARP EDGES
DRAWN DAB 17NOV98
DESIGNED RGB
APPROVED GMO
SH WT UNFOLD NA REF SET NA
REV. DATE INITIALS
THIRD ANGLE PROJECTION
TITLE
DISPENSER WIRING DIAGRAM - 2/V590D
SIZE E DRAWING NO. 7-6620-D REV A
SCALE NONE SHT 1 OF 1



REVISIONS						ER3141
LTR	NO.	DESCRIPTION	REV BY	DATE	RCD BY	DATE
A	ER3141	RELEASE FOR PRODUCTION	DAB	17NOV98		

WIRE COLOR CHART
BLACK - BK
BLUE - BU
BROWN - BN
GRAY - GY
GREEN - GN
ORANGE - OR
PINK - PK
RED - R
VIOLET - V
WHITE - W
YELLOW - Y
EXAMPLE
W-BK = WHITE WIRE WITH BLACK STRIPE

LIGHT CIRCUIT WIRES

NOTES:
1. ⊠ IDENTIFIES HARNESS CABLE MARKER
2. DASHED (- - -) LINES DISPLAY VARIOUS OPTIONS
3. USE SIDE 1 CONNECTIONS FOR SINGLE-SIDE DISPENSERS
4. PLACE SHUNT ON JP1 FOR SEPARATE PUSH-TO-START SWITCHES
5. PLACE SHUNTS ON JP2 & JP3 FOR MEMBRANE SINGLE-BAR PUSH-TO-START SWITCHES
6. FOR CAT EQUIPPED DISPENSERS, SEE CAT WIRING FOR ANNUNCIATOR CONNECTIONS

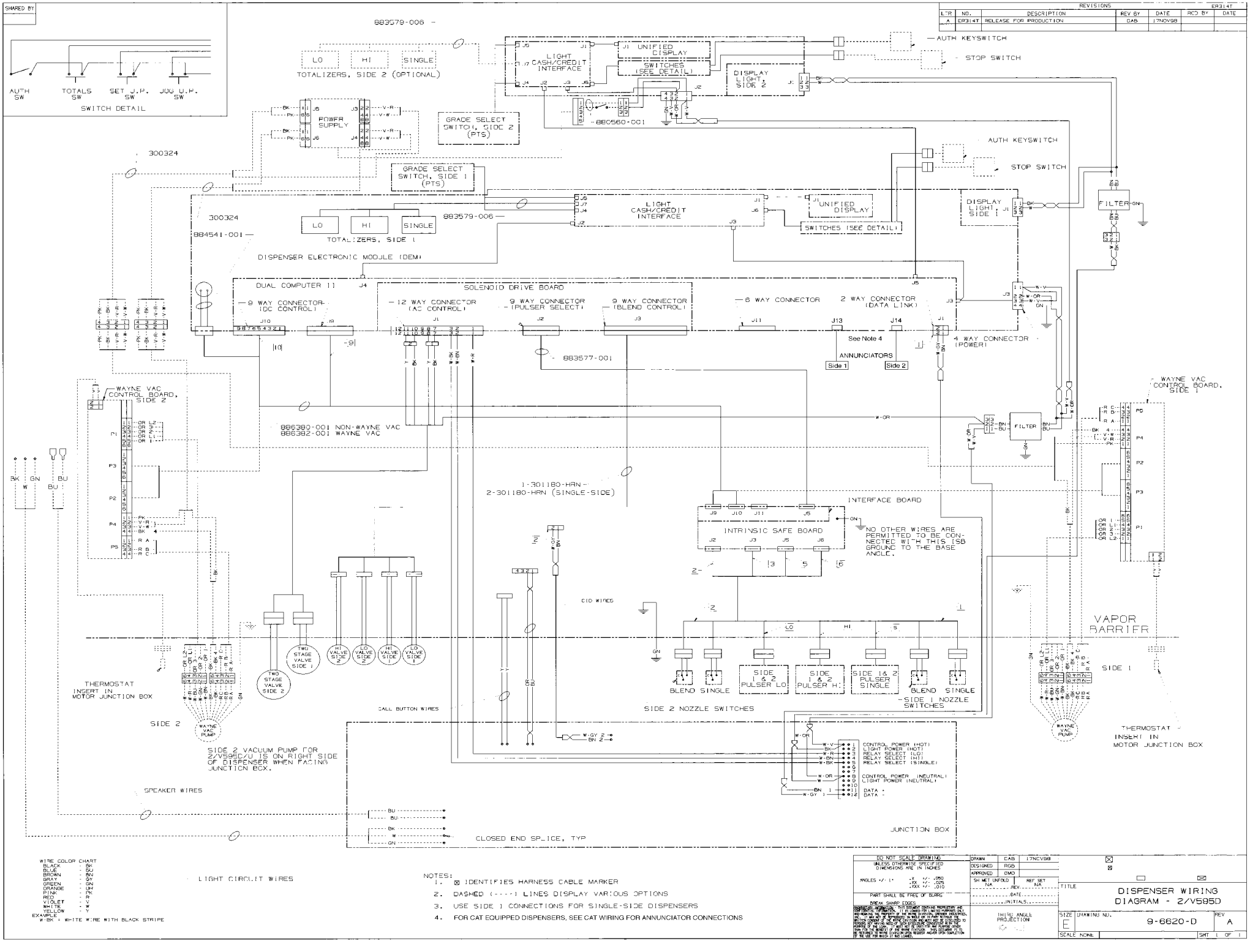
DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
ANGLES +/- 1° .X +/- .050 .XX +/- .025 .XXX +/- .010
PART SHALL BE FREE OF BURRS
BREAK SHARP EDGES

DRAWN	DAB	17NOV98
DESIGNED	RGB	
APPROVED	GMC	
SH MET UNFOLD	REF SET	
NA	NA	
REV.		
DATE		
INITIALS		

THIRD ANGLE PROJECTION

TITLE: DISPENSER WIRING DIAGRAM - 2/V591D

SIZE	DRAWING NO.	REV
E	8-6620-D	A
SCALE NONE		SHT 1 OF 1


SHARED BY
AUTH SW
TOTALS SW
SET U.P. SW
JOG U.P. SW
SWITCH DETAIL
REVISIONS
LTR NO. DESCRIPTION REV BY DATE RCD BY DATE
A ER314T RELEASE FOR PRODUCTION DAB 17NOV98
883579-008
LO HI SINGLE
TOTALIZERS, SIDE 2 (OPTIONAL)
LIGHT CASH/CREDIT INTERFACE
UNIFIED DISPLAY
SWITCHES (SEE DETAIL)
DISPLAY LIGHT, SIDE 2
AUTH KEYSWITCH
STOP SWITCH
880560-001
POWER SUPPLY
GRADE SELECT SWITCH, SIDE 2 (PTS)
300324
GRADE SELECT SWITCH, SIDE 1 (PTS)
884541-001
883579-006
LO HI SINGLE
TOTALIZERS, SIDE 1
DISPLAY LIGHT, SIDE 1
FILTER
DISPENSER ELECTRONIC MODULE (DEM)
DUAL COMPUTER 11
SOLENOID DRIVE BOARD
9 WAY CONNECTOR (DC CONTROL)
12 WAY CONNECTOR (AC CONTROL)
9 WAY CONNECTOR (PULSER SELECT)
9 WAY CONNECTOR (BLEND CONTROL)
6 WAY CONNECTOR
2 WAY CONNECTOR (DATA LINK)
4 WAY CONNECTOR (POWER)
See Note 4
ANNUNCIATORS
Side 1
Side 2
883577-001
WAYNE VAC CONTROL BOARD, SIDE 2
WAYNE VAC CONTROL BOARD, SIDE 1
886380-001 NON-WAYNE VAC
886382-001 WAYNE VAC
1-301180-HRN
2-301180-HRN (SINGLE-SIDE)
INTERFACE BOARD
INTRINSIC SAFE BOARD
NO OTHER WIRES ARE PERMITTED TO BE CONNECTED WITH THIS ISB GROUND TO THE BASE ANGLE.
VAPOR BARRIER
SIDE 1
SIDE 2
THERMOSTAT INSERT IN MOTOR JUNCTION BOX
TWO STAGE VALVE SIDE 1
TWO STAGE VALVE SIDE 2
HI VALVE SIDE 2
LO VALVE SIDE 2
HI VALVE SIDE 1
LO VALVE SIDE 1
CID WIRES
CALL BUTTON WIRES
SIDE 2 NOZZLE SWITCHES
SIDE 1 NOZZLE SWITCHES
BLEND SINGLE
SIDE 1 & 2 PULSER LO
SIDE 1 & 2 PULSER HI
SIDE 1 & 2 PULSER SINGLE
WAYNE VAC PUMP
SIDE 2 VACUUM PUMP FOR 2/V595D/U IS ON RIGHT SIDE OF DISPENSER WHEN FACING JUNCTION BOX.
SPEAKER WIRES
CLOSED END SPLICE, TYP
JUNCTION BOX
CONTROL POWER (HOT)
LIGHT POWER (HOT)
RELAY SELECT (LO)
RELAY SELECT (HI)
RELAY SELECT (SINGLE)
CONTROL POWER (NEUTRAL)
LIGHT POWER (NEUTRAL)
DATA +
DATA -
WIRE COLOR CHART
BLACK - BK
BLUE - BU
BROWN - BN
GRAY - GY
GREEN - GN
ORANGE - OR
PINK - PK
RED - R
VIOLET - V
WHITE - W
YELLOW - Y
EXAMPLE
W-BK = WHITE WIRE WITH BLACK STRIPE
LIGHT CIRCUIT WIRES
NOTES:
1. ⊠ IDENTIFIES HARNESS CABLE MARKER
2. DASHED (- - - -) LINES DISPLAY VARIOUS OPTIONS
3. USE SIDE 1 CONNECTIONS FOR SINGLE-SIDE DISPENSERS
4. FOR CAT EQUIPPED DISPENSERS, SEE CAT WIRING FOR ANNUNCIATOR CONNECTIONS
DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
BREAK SHARP EDGES
DRAWN CAS 17NOV98
DESIGNED RGS
APPROVED GMO
SH MET UNFOLD N/A
REF SET N/A
REV
DATE
INITIALS
THIRD ANGLE PROJECTION
TITLE
DISPENSER WIRING DIAGRAM - 2/V595D
SIZE E
DRAWING NO. 9-6620-D
REV A
SCALE NONE
SHT 1 OF 1

Service Manual
2/Vista Series

Written by S. G. Martin

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Manuals were electronically produced on a Xerox Docutech 135 Publishing System at 600 dpi.

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Dresser Industries' general telephone number is (410)-546-6600.
The Documentation fax number is (410)-546-6753.

WARRANTY AND LIMITATION OF REMEDY AND LIABILITY

Seller warrants that new products and parts of its own design and manufacture when shipped, will be of good quality and will be free from defects in material and workmanship and will conform to applicable specifications. Work, when performed by Seller, will meet applicable work requirements. No warranty is made with respect to used or rebuilt equipment and with respect to products not manufactured by Seller. Seller's only obligation shall be to assign to Buyer, at the time of sale, whatever warranty Seller has received from the manufacturer. Items such as but not limited to lamps, electric motors, hoses, nozzles, hose swivels and safety impact valves are included in the category referred to in the previous sentence. Seller's recommendations with respect to the operation of Seller's equipment are advisory only and are not warranted. All claims under this warranty must be made in writing immediately upon discovery and, in any event, within twenty-four (24) months from date of start-up, if a product is involved, or from completion of the applicable work, if work is involved, or thirty (30) months from date of invoice (whichever shall occur first). (Provided however, that with respect to the Wayne Plus system, 2400 system, DL series dispensers, and card readers, all claims must be made in writing within twelve (12) months from date of start-up. With respect to receipts/totals printers, and any other printers or printing mechanisms, all claims must be made in writing within ninety (90) days from date of start-up. Wayne Vista dispenser external metal panels will be free from defects due to rust and/or corrosion for a period of forty-eight (48) months from date of dispenser start-up.) Defective and nonconforming items must be held for Seller's inspection and returned to the original f.o.b. point upon request. Seller's warranty on service parts, whether new or reconditioned, is ninety (90) days from the date of installation, or twelve (12) months from date of invoice, whichever first occurs. THE FOREGOING IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES WHATSOEVER, EXPRESSED, IMPLIED AND STATUTORY, INCLUDING WITHOUT LIMITATIONS, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS.

Upon Buyer's submission of a claim as provided above and its substantiation, Seller shall, at its option either (I) repair or replace its product or work at the original f.o.b. point or location of purchase products and/or parts or (II) refund an equitable portion of the purchase price.

THE FOREGOING IS SELLER'S ONLY OBLIGATION AND BUYER'S EXCLUSIVE REMEDY FOR BREACH OF WARRANTY AND, EXCEPT FOR GROSS NEGLIGENCE OR WILLFUL MISCONDUCT, THE FOREGOING IS BUYER'S EXCLUSIVE REMEDY AGAINST SELLER FOR ALL CLAIMS ARISING HEREUNDER OR RELATING HERETO WHETHER SUCH CLAIMS ARE BASED ON BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR OTHER THEORIES. BUYER'S FAILURE TO SUBMIT A CLAIM AS PROVIDED ABOVE SHALL SPECIFICALLY WAIVE ALL CLAIMS FOR DAMAGES OR OTHER RELIEF, INCLUDING BUT NOT LIMITED TO CLAIMS BASED ON LATENT DEFECTS. IN NO EVENT SHALL BUYER BE ENTITLED TO INCIDENTAL OR CONSEQUENTIAL DAMAGES. ANY ACTION BY BUYER ARISING HEREUNDER OR RELATING HERETO, WHETHER BASED ON BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR OTHER THEORIES, MUST BE COMMENCED WITHIN ONE (1) YEAR AFTER THE CAUSE OF ACTION ACCRUES OR IT SHALL BE BARRED.

"NOTE: 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."

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