SERVICE

# DL/DS 1
# Suction Pumps and Remote Dispensers

Wayne DRESSER

# DL/DS 1 Suction Pumps and Remote Dispensers SC-82B Computers—Blending Service Manual

April 1991 Part No. 917460 Rev. B

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## 1. INTRODUCTION

This manual describes the service of Wayne® dispensers which use the SC-82B computer. These dispensers can be identified by their model number, the current model numbers which are used for these dispensers are any model number which begins with a prefix of DS1 **or** has a body number of 395, 375, 585, or 374. The DS prefix shows that the dispenser in question was manufactured for Sun Oil Company. The model number bodies previously shown refer to proportional blenders; they may or may not be Sun Oil dispensers.

Any service problems which cannot be solved should be referred to Wayne Product Support or to the regional service manager.

| | |
|---|---|
| Wayne Technical Services<br>Austin, TX | 1-800-289-2963<br>24 hours/7 days |
| Northeastern Regional<br>Service Manager<br>Salisbury, MD | 410-546-6750<br>8:30AM-5:00 PM E.S.T. |
| Southeastern Regional<br>Service Manager<br>Atlanta, GA | 404-955-7982<br>8:30AM-5:00PM E.S.T. |
| Central Regional<br>Service Manager<br>Chicago, IL | 312-693-7400<br>8:30AM-5:00PM C.S.T. |
| Southcentral Regional<br>Regional Service Manager<br>Houston, TX | 713-270-9996<br>8:30AM-5:00PM C.S.T. |
| Western Regional<br>Service Manager<br>Cypress, CA | 714-952-1137<br>8:30AM-5:00PM P.S.T. |
| San Ramon Service Office<br>San Ramon, CA | 510-328-0400<br>8:30AM-5:00PM P.S.T |
| Baltimore Service Office<br>Baltimore, MD | 410-536-9300<br>8:30AM-5:00PM E.S.T |

## 1.1. THE BLENDING PROCESS (see Figure 1-1)

Proportional blenders have two grades of fuel input to the dispenser. The dispenser can then use these grades to “produce” as many as five different grades output to the nozzle. Two of these are the input grades, the other four are a mix of the two input grades. These intermediate grades are produced by mixing the two input grades at some proportion. The proportion which is used will determine the octane rating of the intermediate grade.

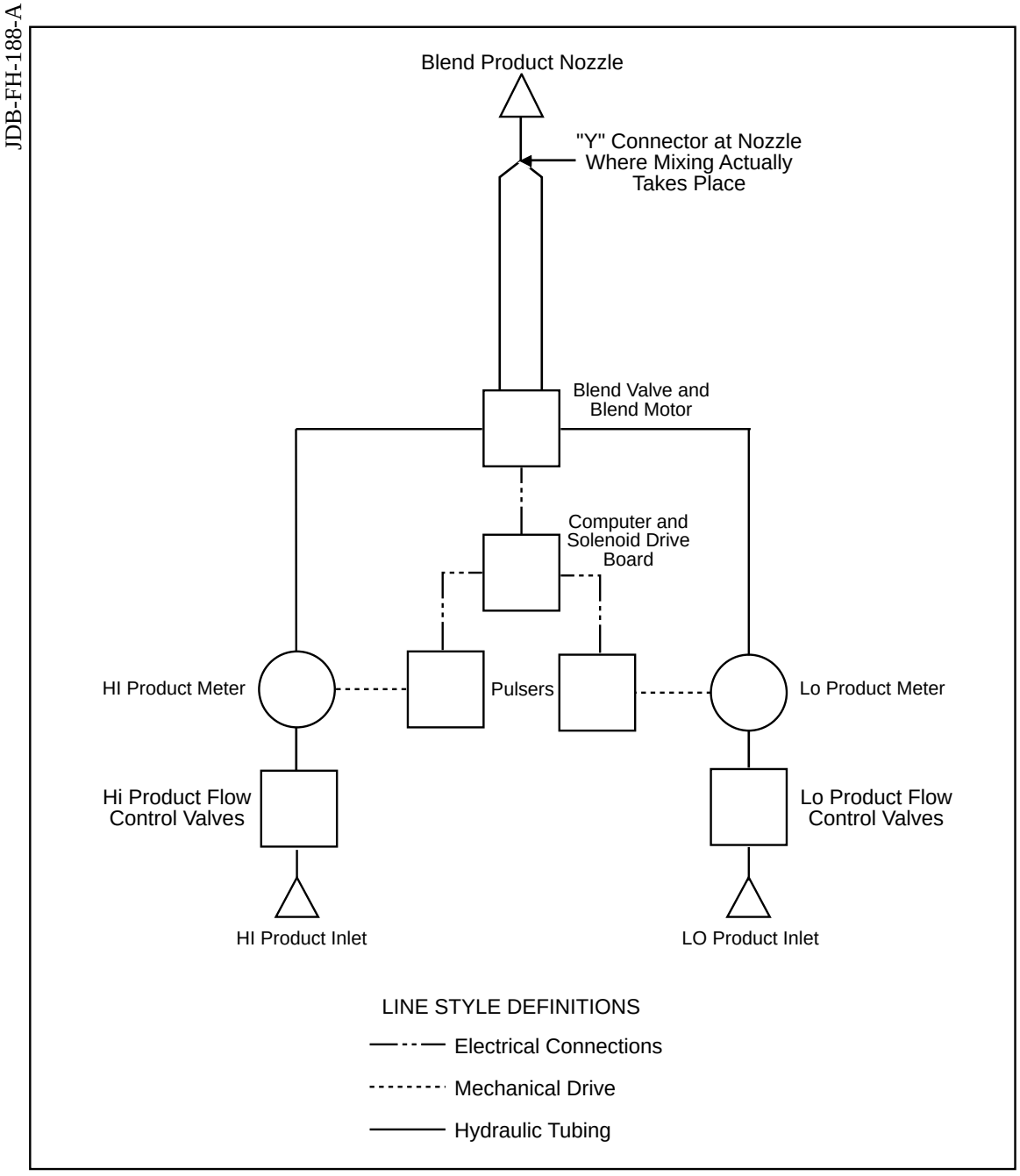



**FIGURE 1-1. BLENDING BLOCK DIAGRAM**

There are two separate sets of hydraulics inside the proportional blender. One of these sets is used to control flow of the low octane input (also called the LO feedstock), and the other is used to control the high octane input (also called the HI feedstock). The heart of the hydraulics in proportional blending dispensers is the blend valve. The HI and LO feedstocks are each input to separate chambers in the blend valve; the blend valve is designed in such a way that the outputs from these chambers can be controlled. By manipulating the valve the flow from one chamber can be restricted while the flow from the other is increased, changing the ratio of one product to the other. The hydraulics continue to be separate until the two products are mixed just before the nozzle.

The computer continually senses the flow rate of each end grade and adjusts the blend valve in order to maintain the correct blend ratio. If for some reason the correct blend ratio cannot be obtained the computer will shut the sale down and generate an error code. There are two limit switches which are used to determine if the blend motor has been adjusted to its extreme travel. If one of these limit switches is closed and the correct blend ratio has still not been reached then the sale will be shut down and a blend error generated.

## 2. GENERAL OPERATION

The general operation of Wayne dispensers is very similar for all models. There is a difference in the valve sequence with “new style” verses “old style” hydraulics. New style hydraulics are dispensers which use the 2-stage solenoid operated diaphragm valve. Old style uses a diaphragm valve, and two external solenoid valves. The difference is in the sequence in which the solenoid valves are switched on and off.

### 2.1. SEQUENCE OF THE DISPENSING CYCLE NEW STYLE HYDRAULICS

- When the operating lever is lifted, the constant +5 VDC which the computer sends to the handle switch goes to ground.

- If the dispenser has received an AUTHORIZE signal from some source the correct submersible pump relay will be energized at this time.

- The computer performs a self test and flashes eights, blanks, then resets to zero’s, on the main sale display. During the reset cycle the computer checks to see that both blend limit switches are operating correctly.

- Approximately four seconds after the submersible pump relay is energized, the slow valve coil is energized.

- After the computer detects ten pulse counts, the fast valve coil is switched on and the slow coil switched off.

- In preset sales the fast coil is switched off and the slow switched back on just prior to the final shut-off amount. The slow valve coil is then de-energized when the final amount is reached.

- When the operating lever is lowered the handle switch signal goes back to +5 VDC, and the sale is complete.

## 2.2. SEQUENCE OF THE DISPENSING CYCLE OLD STYLE HYDRAULICS

- When the operating lever is lifted, the constant +5 VDC which the computer sends to the handle switch goes to ground.

- The correct submersible pump relay is energized at this time.

- The computer performs a self test and flashes eights, blanks, then resets to zero's, on the main sale display. During the reset cycle the computer checks to see that both blend limit switches are operating correctly.

- Approximately four seconds after the submersible pump relay was energized, the slow valve coil is energized (a faint click can be heard at the base of the dispenser).

- After the computer detects ten pulse counts, the slow valve coil is switched off and the fast valve coil is switched on.

- In preset sales the fast coil is de-energized, and the slow re-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 operating lever is lowered the handle switch signal goes back to +5 VDC, and the sale is complete.

## 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 done in one of two ways, they can be manually set at the dispenser, or set from a control system.

### 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 keyswitch selects the position for which the unit price is to be changed. The Price Jog pushbutton changes the price of the position selected; see Figure 2-1 through 2-5 for switch locations.

**2.3.1. Manually Setting Unit Prices,** continued

The first closure of the Position Select keyswitch selects the single grade unit price, assuming that there is a single grade available from the dispenser in question. The unit price is then set as follows:

- Press and hold in the Price Jog pushbutton, which will cause the least significant digit or tenths of cents position of the Unit Price to cycle (Figure 2-6).

- The digit will cycle 0 through 9 until the switch is released. Each successive closure of the Price Jog pushbutton will select and then increment the next most significant digit.

The second closure of the Position Select keyswitch will select the "Hi" Product unit price on the blended grades unit price displays. Subsequent closures of the Position Select keyswitch will select the next blended grade unit price, working toward the "Lo" Product. The unit price for each position is set using the Price Jog pushbutton as described above. See Table 2-1 for definitions of subsequent switch closures.

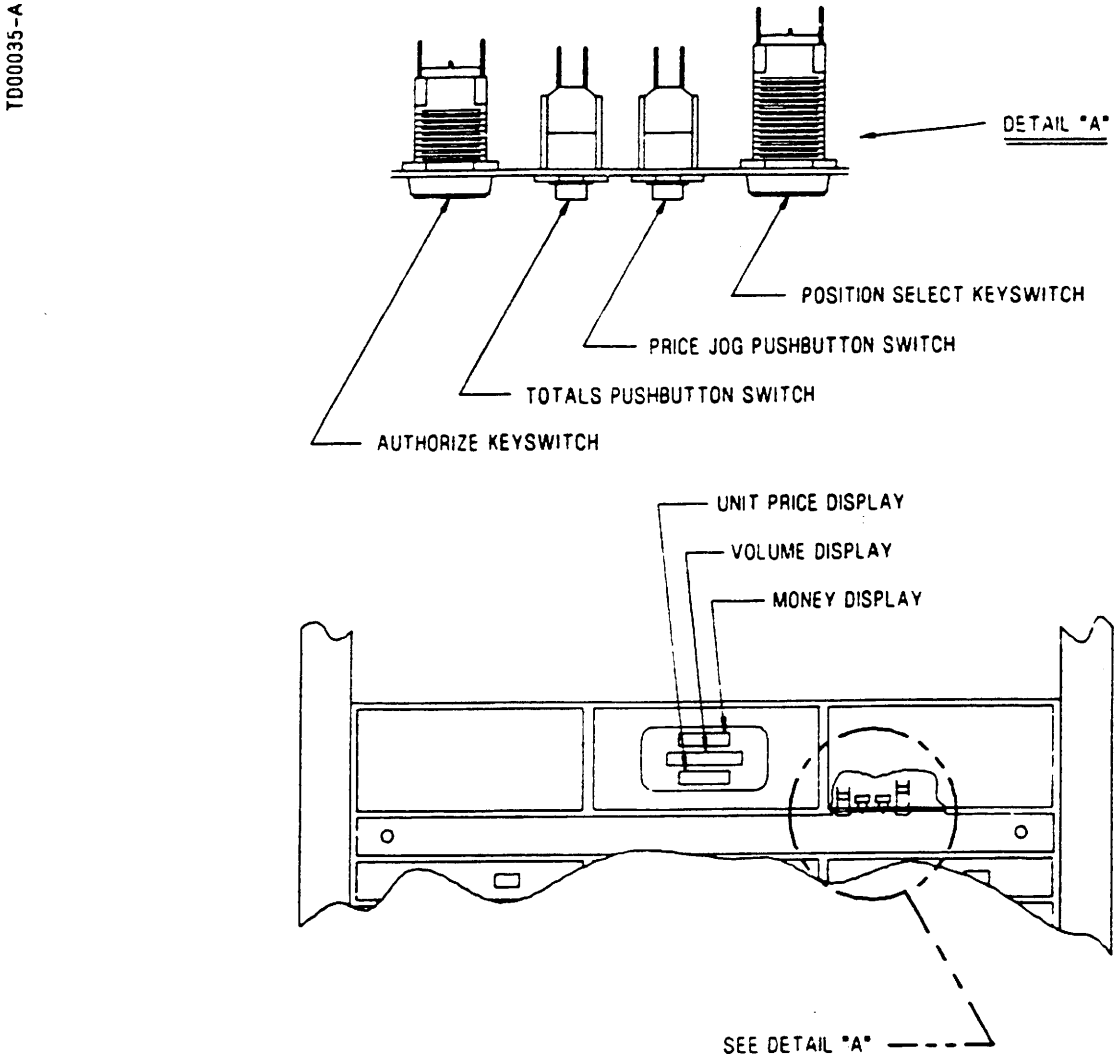



**FIGURE 2-1. FUNCTION SWITCH LOCATIONS 395 DISPENSERS**

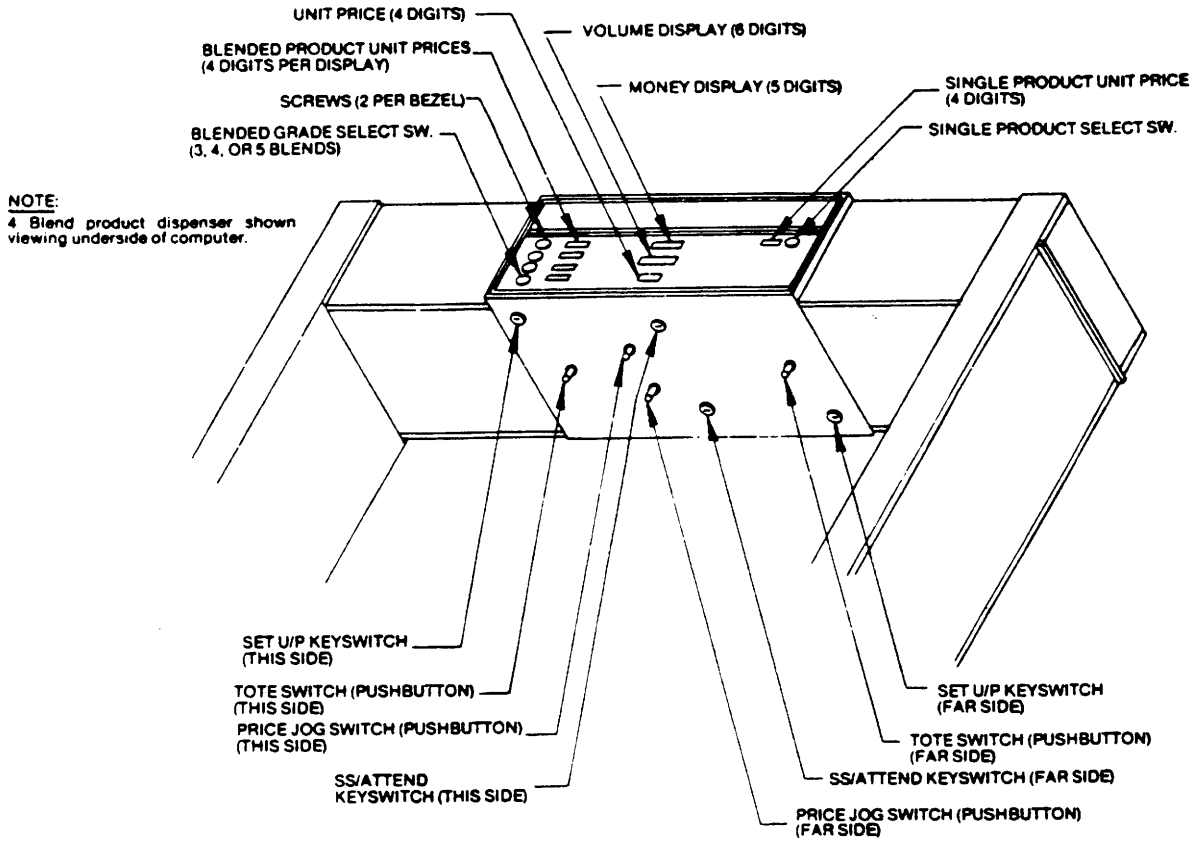



**FIGURE 2-2. FUNCTION SWITCH LOCATIONS 385 DISPENSERS**

TD00021-B

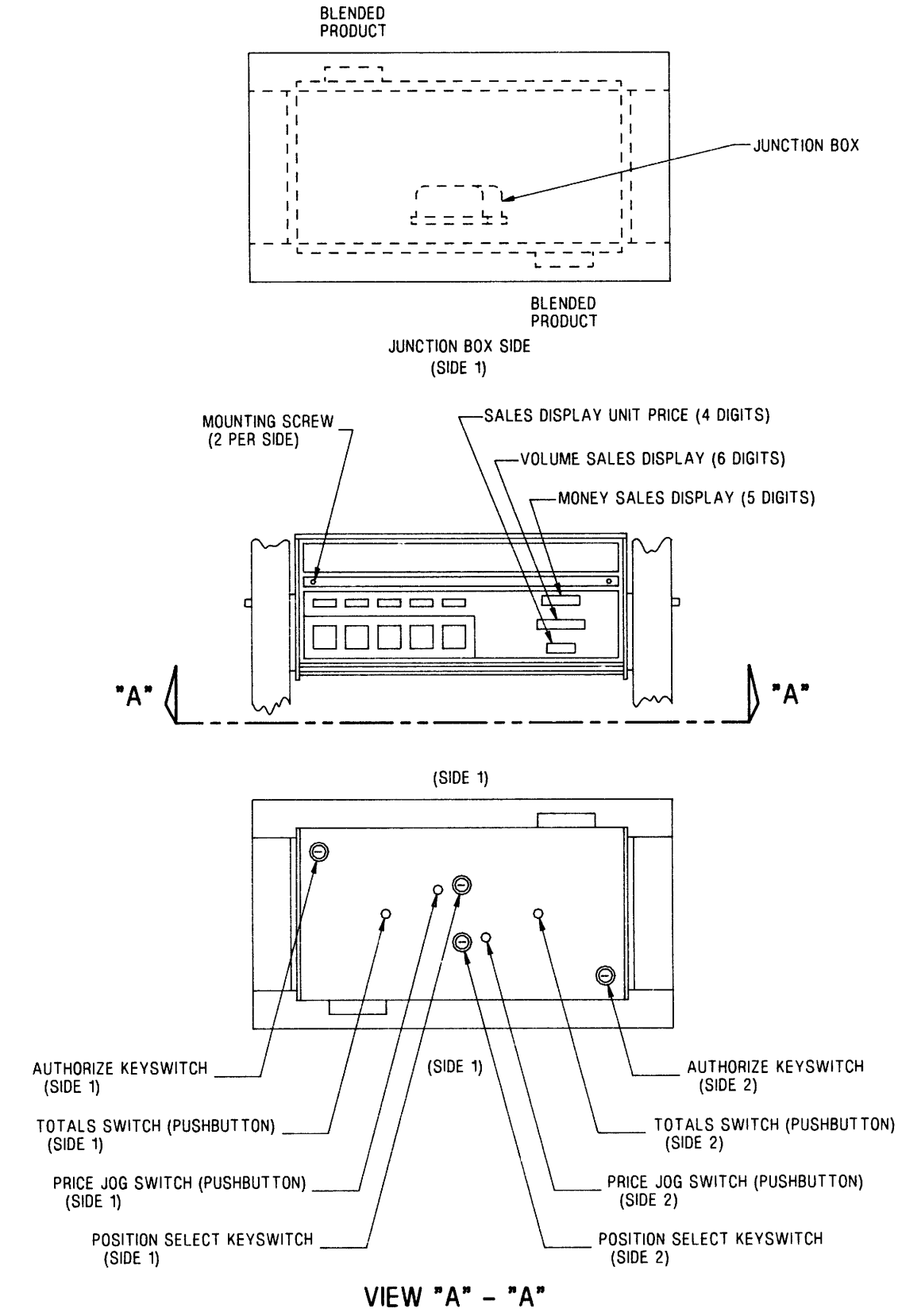



**FIGURE 2-3. FUNCTION SWITCH LOCATION 375/585 DISPENSERS**

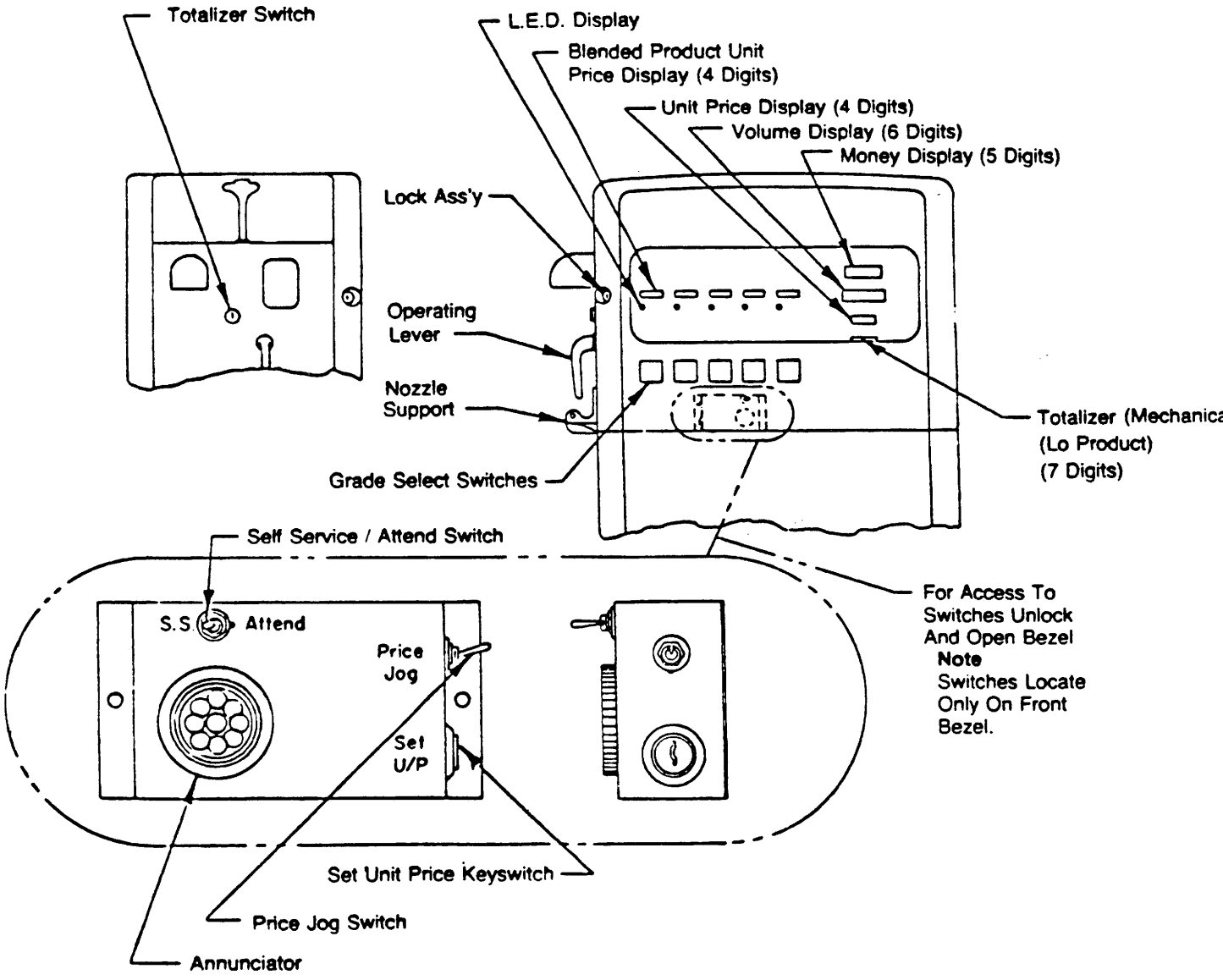



**FIGURE 2-4. FUNCTION SWITCH LOCATIONS BLENDING RETROFIT DISPENSERS**

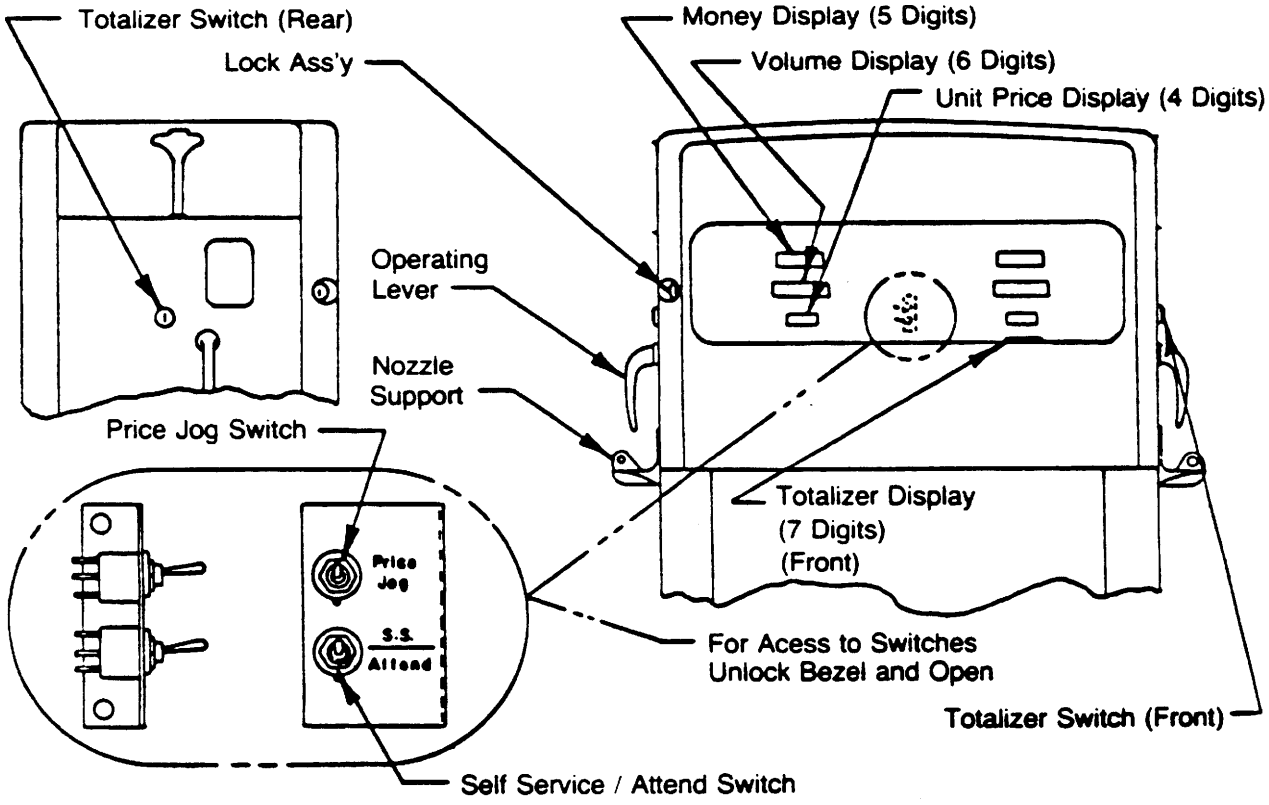



**FIGURE 2-5. FUNCTION SWITCH LOCATIONS NON-BLENDING RETROFIT DISPENSERS**

### 2.3.1. **Manually Setting Unit Prices,** continued

**IMPORTANT:**

- **To** decrease **unit prices, start with the Lo base product unit price and work toward the Hi base product unit price.**
- **To** Increase **unit prices, start with the Hi base product unit price and work toward the Lo base product unit price.**

TD00022-A

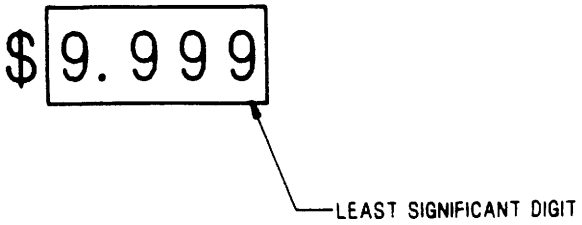



**FIGURE 2-6. UNIT PRICE DISPLAY**

**TABLE 2-1. SET UNIT PRICE SWITCH CLOSURE DEFINITION**

| POSITION SWITCH CLOSURE | POSITION SELECTED MULTI-GRADE BLENDING DISPENSERS | POSITION SELECTED PROPORTIONAL BLENDERS WITHOUT A SINGLE PRODUCT HOSE |
|---|---|---|
| **First Closure** | **Unit price for the single product position.** | **Unit price for the “”HI” feedstock position.** |
| **Second Closure** | **Unit price for the “HI” feedstock position.** | **Unit price for the “HI” octane blend position.** |
| **Third Closure** | **Unit price for the “HI” octane blend position.** | **Unit price for the “MID” octane blend position.** |
| **Fourth Closure** | **Unit price for the “MID” octane blend position.** | **Unit price for the “LO” octane blend position.** |
| **Fifth Closure** | **Unit price for the “LO” octane blend position.** | **Unit price for the “LO” feedstock position.** |
| **Sixth Closure** | **Unit price for the “LO” feedstock position.** | **The original sale display returns.** |
| **Seventh Closure** | **The original sale display returns.** | |

### 2.3.2. Self-Serve/Attend Keyswitch

The Authorize keyswitch permits dispenser operation with or without console control. In the self service position (turn switch counterclockwise), the dispenser must be authorized by the control system before each use. In the full service position (turn switch clockwise), the dispenser may be operated repeatedly without authorization from the control system.

- There is an Authorize keyswitch for each fueling point.
- The switch may be used as a one time authorize by turning the keyswitch to the full service position and back to the self service position (operating levers must be OFF). The dispenser will operate one time following this sequence. When changing from full service to self service, turn one of the operating levers ON, then OFF to avoid the one time authorize condition.
- Programming in the control system will determine the use of the Authorize Switch in 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 SC-82B computer in a dispenser represents a fueling point.

Fueling points need not be set if the dispenser is not connected to a control system.

The fueling point number is set as follows:

- The Position Select keyswitch is used to enter the fueling point setting mode. The Totals pushbutton sets the fueling point number; see Figure 2-1 through 2-5 for switch location.
- Turn the Position Select keyswitch ON, then OFF.
- To read the fueling point number, press and release the Totals switch.
- To set the fueling point number, press and hold the Totals pushbutton. The two least significant digits of the unit price display will cycle 01 through 24. Release the Totals pushbutton when the correct fueling point number is displayed.
- Cycle the Position Select keyswitch until the original sale display returns, or lift and lower one of the start levers.

## 3. ELECTRONIC/ELECTRICAL PARTS

There are five types of electronic components which may be in the head of a Wayne dispenser.

- Display Board(s)
- Solenoid Drive Board
- Triac Monitor Board
- Computer Assembly
- Intrinsic Safe Barrier

There are two electronic parts located in the hydraulics cabinet; these are the pulser assemblies and the handle switches.

### 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, and unit prices). The display boards also may incorporate interface circuits to connect the function switches (Unit Price Select, Price Jog, Self-Serve/Attend, Totals, and Grade Select Switches).

This switch interface will be accomplished on the blend unit price display in blending dispensers and on the main sale display in non-blending dispensers.

There are three different types of displays which have been used in blending dispensers. The newest use soldered in LCD elements. On these types of boards there are no replaceable parts. Older models of the displays will use socketed LCD elements. On these displays the LCD's can be replaced individually. The oldest types, of the main sale display only, include a heater strip, which is glued to the back of the crystal and maintains proper operating temperature for the display (105 degrees F). New models of the main sale display, and all service parts, are LCD's of a low temperature design, therefore the heaters are not needed. Because of this, if an old LCD is replaced by a new service part the heater strip may be removed.

The display board receives its data from the computer assembly. All decoders and drivers for the display are located on the display board itself.

### 3.2. SOLENOID DRIVE BOARD

These dispensers will use one of two styles of solenoid drive boards. Blending dispensers will use one board called a blending solenoid drive board, and non-blending dispensers will use the single product drive board. This is the same single product board which is used in DL style dispensers.

The solenoid drive board primarily serves as an AC switching board. By utilizing solid state relays it can control AC power to the submersible pump relays and solenoid valves. With the single product board this is the only function which the solenoid drive board performs.

### 3.2. **SOLENOID DRIVE BOARD,** continued

The blending drive board also performs two other functions. First, it switches the zero volt line which turns on the proper photocoupler. This is done in order to ensure that only the correct photocoupler will be sending pulses back to the computer. Second, it controls the blend motor. The computer determines whether the ratio being dispensed is correct or not and manipulates the solenoid drive board in order to control the blend.

All solenoid drive boards contain a fuse which fuses the AC voltage input to the board. This fuse is labeled F1 and is a 1 amp glass fuse. If this fuse should open the solenoid drive board would not be able to turn solenoid valves or relays on because it would have no AC input. This fuse should only be replaced with the same type which is removed.

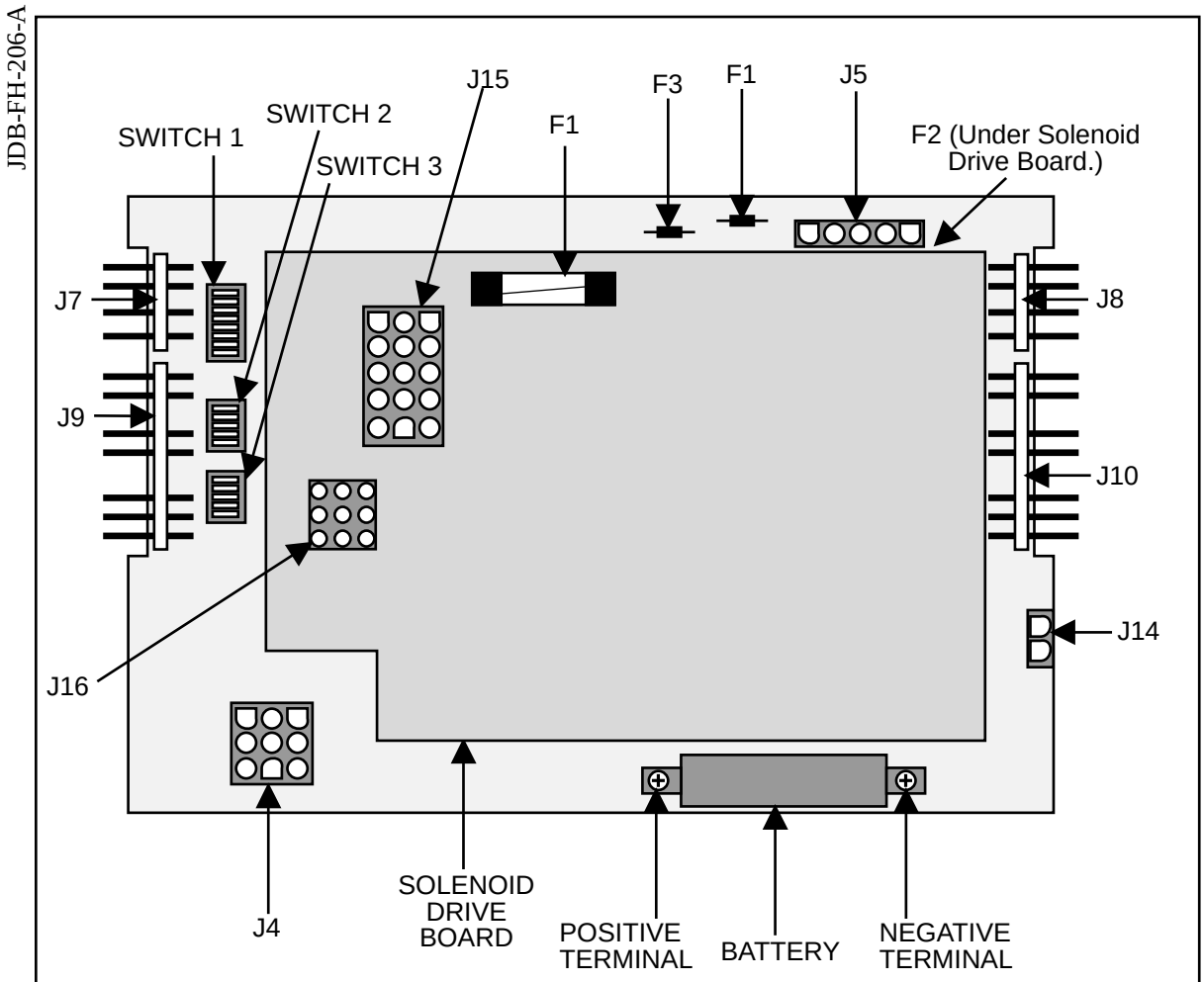
### 3.3. TRIAC MONITOR BOARD

The triac monitor board is used, in Sun Oil Company dispensers only. To determine if a solid state relay or valve is on when it should not be; for instance, if it is shorted in the ON position. If this condition is detected the triac monitor board blows a pico fuse, located on the triac monitor board, shutting off the AC input to the solenoid drive board. This will cause the dispenser to go through reset and then not energize any valves or relays. The same symptoms will occur if the F1 fuse on the drive board were to open.

### 3.4. COMPUTER ASSEMBLY **(SEE FIGURE 3-1)**

The computer is a complete self-contained unit with a built in power supply and battery back up. It is responsible for performing the following functions:

- Provides 5 VDC to, and monitors the return from, the handle switches.
- Monitors the two pulse return lines from each of the photocouplers.
- Converts the data received from the photocouplers into a volume amount.
- When blends are being dispensed it monitors the blend ratio using the volume and adjusts the blend valve to maintain the proper ratio.
- 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. In multi-grade dispensers it also switches the 0 VDC to the correct photocoupler by controlling the solenoid drive board.




COMPUTER

| | |
|---|---|
| J4 | DC Control wiring harness. |
| J5 | AC Input to the computer. |
| J7,J8,J9,J10 | Display connectors. |
| J14 | Data communications to control system. |
| F1 | Fuses the AC input to the computer board. |
| F2 | Fuses AC to the display heaters. (If used.) |
| F3 | Fuses the input to the 5 VDC regulator on the computer. |
| SWITCH 1, 3 | Control the function of the computer. (Switch 2 is unused.) |

SOLENOID DRIVE BOARD

| | |
|---|---|
| J15 | Connects all valves and relays as well as the zero volts to the pulsers to the solenoid drive board. |
| J16 | Connects the blend motor drive and the limit switches to the solenoid drive board. |
| F1 | Fuses all AC input to the solenoid drive board. |

**FIGURE 3-1. SC-82B COMPUTER AND SOLENOID DRIVE BOARD**

- Maintains electronic hose totals.
- Sends sale and hose totals data to the control system via a two wire data loop.
- Monitors all dispenser functions and, when a problem is found, generates error codes.

The SC-82 computer is fused to protect it from overvoltages and shorts. There are three fuses on the computer and they are as follows:

- F1 fuses the main AC input to the computer. All power to the computer, solenoid drive board, and the displays passes through the F1 fuse. If this fuse opens the dispenser will look as if it has been powered down.
- F2 fuses the AC supplied to the display heaters. On older dispensers the money and gallons displays require heaters to ensure proper operation. The LCD's used in newer dispenser are of a low temperature design and do not require these heaters. The heaters can be identified as a black strip glued to the back of the LCD's; if the heaters are not present then the F2 fuse will not be used.
- F3 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.

These fuses are all pico fuses. Physically they look very similar to a resistor. They are socketed and may be replaced in the field.

Also on the computer board are three banks of DIP switches. These switches configure the computers operational characteristics (see Figure 3-2). Any changes made to the switch settings are recognized only at power up. For this reason the power must be shut OFF, and then turned back ON after switch settings are changed.

The EPROM on the computer contains the operating program. This EPROM determines the operational characteristics of the dispenser.

There are several connectors on the computer. The function of each of these is listed in Table 3-1.

SWITCH LEGEND

| S1 SWITCH | | | | | | | | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| O | | | | | | X | | .XX VOLUME DISPLAY |
| C | | | | | | X | | .XXX VOLUME DISPLAY |
| | C | | | | | X | O | GALLONS (1072 PULSES/UNIT) |
| | O | | | | | X | C | LITERS (283 PULSES/UNIT) |
| | | C | C | | | X | | .X MONEY DECIMAL POINT |
| | | O | C | | | X | | .XX MONEY DECIMAL POINT |
| | | C | O | | | X | | .XXX MONEY DECIMAL POINT |
| | | O | O | | | X | | .XXXX MONEY DECIMAL POINT |
| | | | | C | C | X | | .X UNIT PRICE DECIMAL POINT |
| | | | | O | C | X | | .XX UNIT PRICE DECIMAL POINT |
| | | | | C | O | X | | .XXX UNIT PRICE DECIMAL POINT |
| | | | | O | O | X | | NO UNIT DECIMAL POINT |

| S3 SWITCH | | | | | DESCRIPTION |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | |
| O | X | | | | SINGLE COMPUTER |
| C | X | | | | MULTI-GRADE COMPUTER |
| | X | O | | | NO MONEY TOTALS DECIMAL |
| | X | C | | | MONEY TOTALS DECIMAL SAME POSITION AS MONEY DISPLAY DECIMAL |
| | X | | O | | OPEN AT ALL TIMES |
| | X | | | C | CLOSED AT ALL TIMES |

C = CLOSED
O = OPEN
X = EITHER

TO CLOSE SWITCH PUSH ON NUMBER SIDE WITH SHARP POINTED OBJECT SUCH AS AN EXTENDED PAPER CLIP.

DO NOT USE A PENCIL, PEN OR ANY OBJECT WITH A DIAMETER LARGER THAN THE SWITCH GUIDE TO SET SWITCHES.

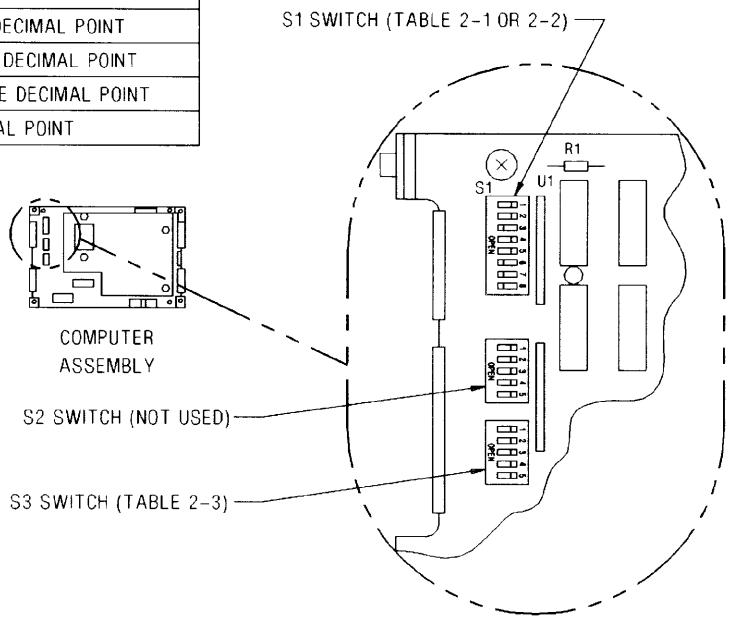



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**FIGURE 3-2. SC-82B COMPUTER DIP SWITCH DEFINITIONS**

### 3.4. COMPUTER ASSEMBLY, continued

**TABLE 3-1. COMPUTER CONNECTOR DEFINITIONS**

| CONNECTOR | DESCRIPTION |
|---|---|
| J4 | Connects the DC control wiring harness to the computer. All handle switches and pulser wiring return to this connector. |
| J5 | The main AC input to the computer. |
| J7 and J8 | Supplies the power to the display heaters, if heaters are necessary. |
| J9 and J10 | Supplies the power and data to the displays themselves. |
| J11 and J13 | Connects the solenoid drive board to the computer. |
| J14 | Connects the communication wiring from the |
| | computer to the control system, if one is installed. |

### 3.5. INTRINSIC SAFE BARRIER PRINTED CIRCUIT BOARD

The Intrinsic Safe Barrier is located in the electronic head of the dispenser. Its function is to provide a barrier between the electric energy used in the electronic head and the volatile liquids in the hydraulics cabinet This barrier uses resistors 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 cues the microprocessor to begin a new sale if the dispenser has been authorized.

The Intrinsic Safe Barrier Printed Circuit Board 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 sparks in the hydraulic area of the dispenser.

### 3.6. PULSER ASSEMBLY

The pulser assembly consists of two parts.

- The photocoupler
- The pulser disc

### 3.6.1. Photocoupler

The photocoupler consists of two infrared LED's and two phototransistors, one for each LED. These four parts work together to provide two separate pulse returns to the computer. These pulse return lines are labeled "Pulse A" and "Pulse B". The computer must receive the pulses in an alternating sequence (i.e., pulse A, pulse B, A, B, A, B...). In this way the computer can determine correct operation. If the computer sees too many A or B pulses in a row it will assume that the photocoupler is defective, shut down the sale and generate an error code (See Troubleshooting Section). If the computer sees

that the meter is turning in the wrong direction, it will shut down the sale and generate an error code (see Troubleshooting Section).

In blending dispensers the LED's in each photocoupler are wired in series, as shown in Figure 3-3. Because of this a problem in one of the photocouplers can cause symptoms to be shown on the other end grade. For instance if one of the LED's in the Lo product photocoupler was to become an open circuit the five volts would not be supplied to that LED in the Hi product photocoupler. This would cause symptoms to appear on any Hi product sales.

### 3.6.2. Pulser Disc

The pulser disc is a plastic disc with square holes cut around its outer edge. It is connected to a shaft which is turned by the meter. The holes in the edge of the disc pass between the LED's and the phototransistors. This alternately blocks and reveals the light to the phototransistors, creating the pulses.

## 3.7. SUCTION PUMP MOTOR

The pump motor used in Wayne suction pumps can be either a 1/3 or 3/4 horsepower motor. Either of these two motors can be operated on either 110 VAC or 220 VAC, depending on a switch setting. The voltage selection switch is located on the side of the motor, and is secured by a sheet metal screw. To change the operation of the motor:

- Remove the sheet metal screw which holds the switch in position.
- Move the selector switch to the desired location.
- Replace the screw to lock the switch in its new setting.

The pump motors are switched on by a relay located in the dispenser junction box. This relay is pre-wired to the relay select line from the solenoid drive board. The load side of the relay contacts are factory wired, therefore, the only on-site connections which need be made are the two input wires to the relay contactors.

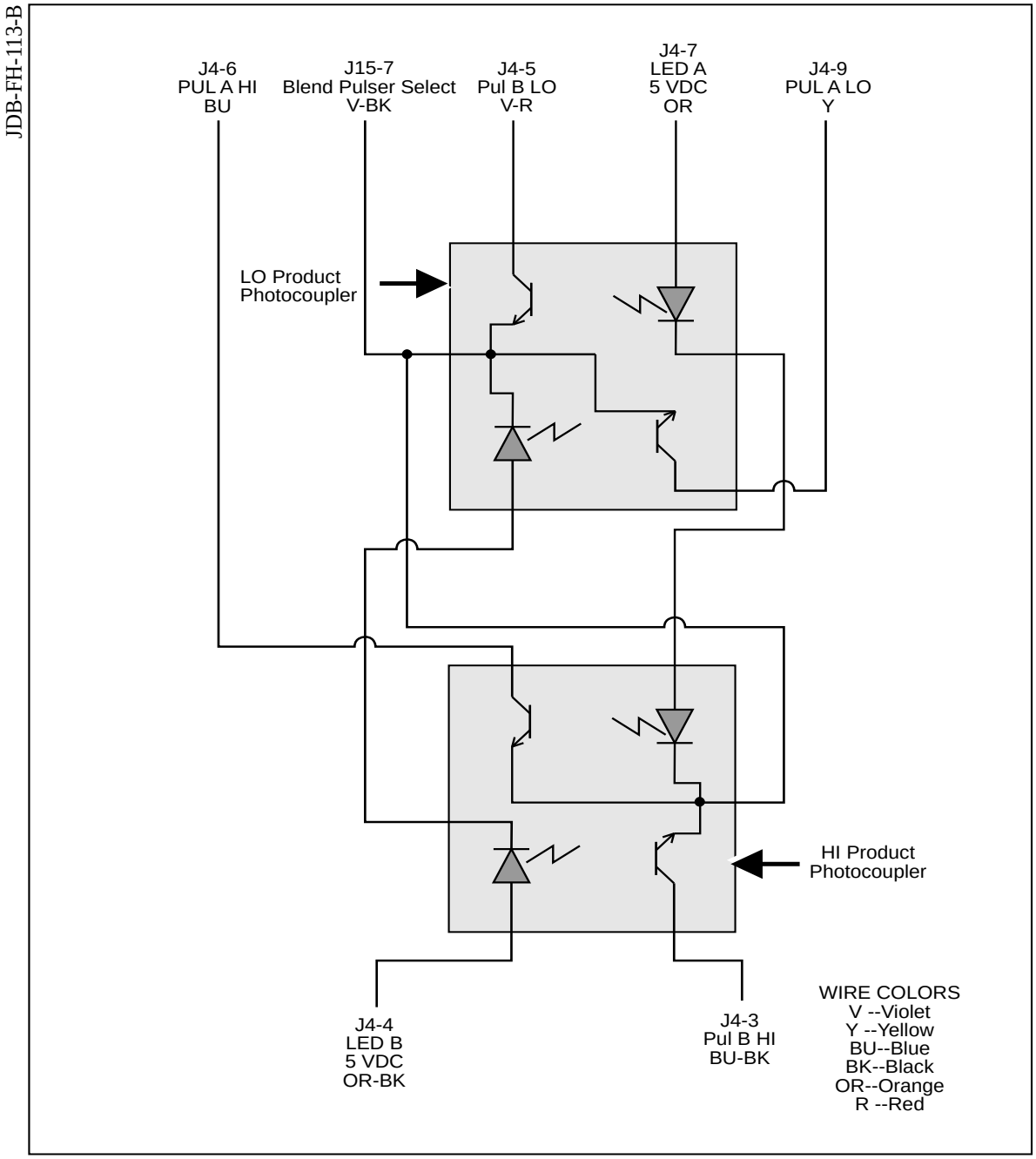


**FIGURE 3-3. BLENDING PHOTOCOUPLER WIRING DIAGRAM**

## 4. MECHANICAL PARTS

The nozzle boot contains two basic parts, a spring over center device which is operated by the lift-to-start lever, and a switch. This switch will be located in one of two places.

In dispensers with new style hydraulics the operating switch will be attached to the nozzle boot itself.

Dispensers using old style hydraulics will have a linkage going from the nozzle boot to the pulser housing. The operating switch in this case will be located inside the pulser housing. The adjustment procedures for the two operating levers/switches is described below.

### 4.1. NEW STYLE NOZZLE BOOT

The operating lever is a spring over center device that does not require adjustment. When the operating lever is lifted just over center and then released, the lever will spring to the fully-on position. Likewise, when the operating lever is lowered just over center and then, released, the lever will spring to the fully-off position.

If it is necessary to set the handle switch, push the nozzle support to the fully-on position as shown in Figure 4-1. Loosen the lock down screw. Turn the setting screw one or two turns to reposition the switch. Loosening the screw will slow the turn-on time. Tightening the screw will cause the pump to turn-on more quickly.

To test the accuracy, slowly push the nozzle support toward the “down” or “off” position. Note when the pump turns off. The pump **must** turn off at, or slightly past, the over-center position. Be certain that the dispenser does not come on again when the nozzle support is in the “fully-off” or “fully-down” position. When the handle switch is set, tighten the lock down screw.

All moving parts of the nozzle boot should operate freely without binding or sticking. The levers should click audibly during the up and down operation of the nozzle supports.

### 4.2. OLD STYLE NOZZLE BOOT

The operating lever is a spring over center device that does not require adjustment. When the operating lever is lifted just over center and then released, the lever will spring to the fully-on position. Likewise, when the operating lever is lowered just over center and then released, the lever will spring to the fully-off position.

If adjusting the handle switch is necessary, push the nozzle support to the fully-on position as shown in Figure 4-2. Snap the ball joint off the rod and turn it once or twice to lengthen or shorten the rod as required. Lengthening the rod will slow the turn-on time of the pump; shortening it will turn the pump on more quickly. Do not snap the ball joint back on to the rod yet. Hold it in place while checking the accuracy of the adjustment.

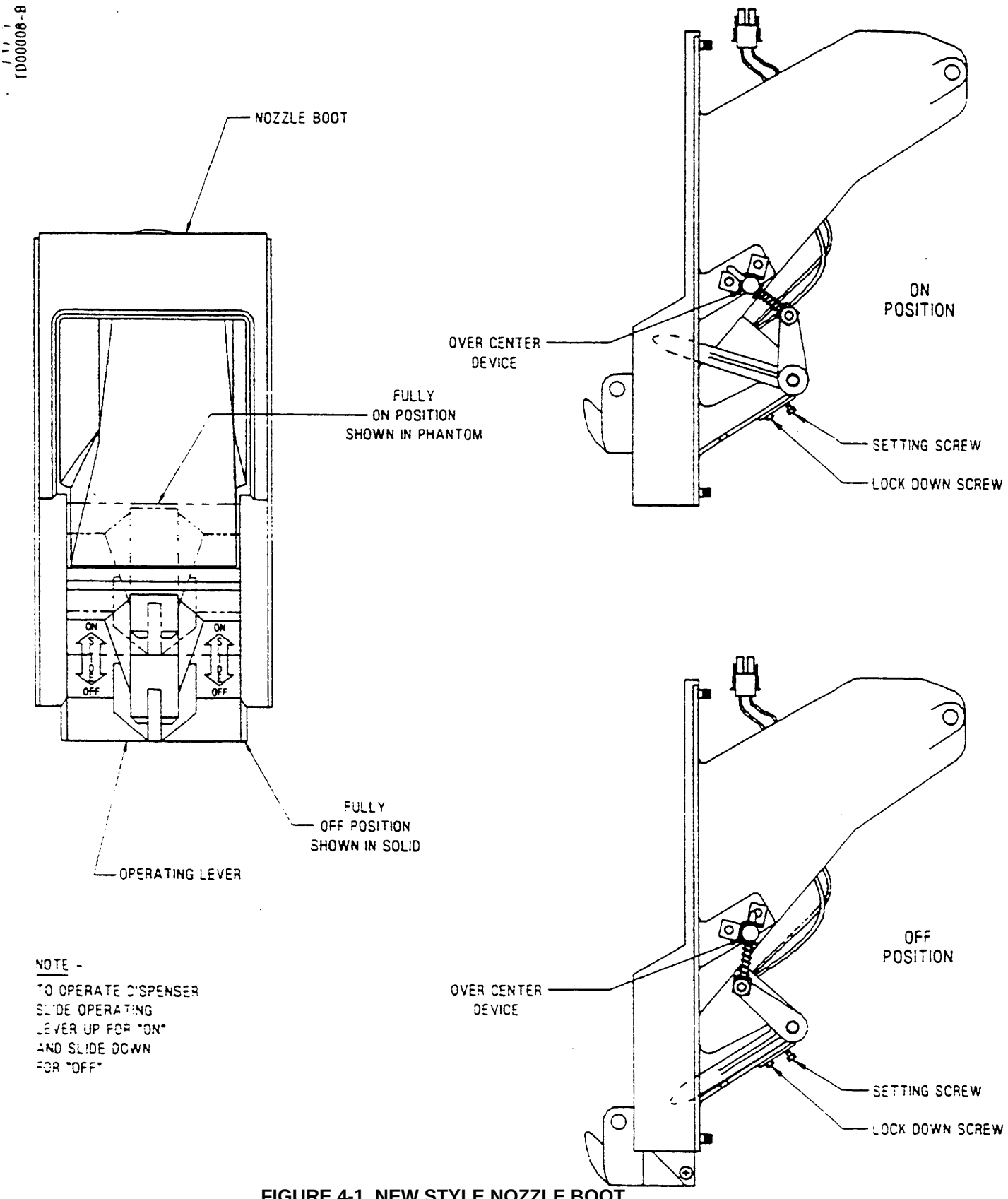


**FIGURE 4-1. NEW STYLE NOZZLE BOOT**

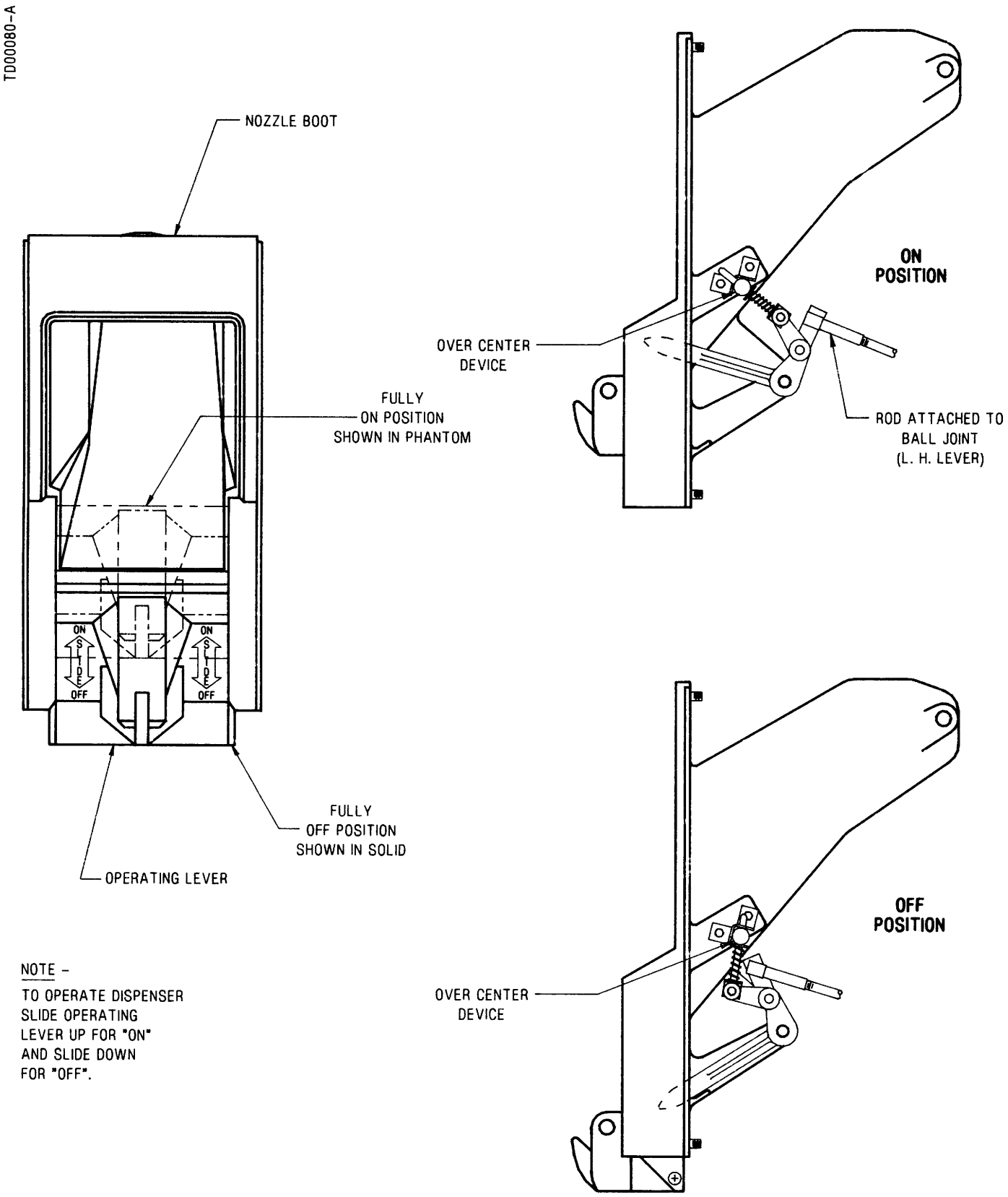


**FIGURE 4-2. OLD STYLE NOZZLE BOOT**

To test the accuracy, slowly push the nozzle support toward the “down” or “off” position. Note when the pump turns off. The pump **must** turn off at, or slightly past, the over-center position. Be certain that the dispenser does not come on again when the nozzle support is in the “fully-off” or “fully-down” position.

All moving parts of the nozzle boot should operate freely without binding or sticking. The levers should click audibly during the up and down operation of the nozzle supports.

## 5. HYDRAULIC PARTS

The following section describes the operation of all hydraulic parts in Wayne dispensers which perform some "function". Simple flow tubes will not be discussed.

There are three basic hydraulic parts in Wayne dispensers and these parts are as follows:

- The strainer and filter
- The flow control valve
- The meter

The flow control valve, also called the diaphragm valve, may be of two different types. The new style valve uses a self contained two stage solenoid valve to switch from no flow, to slow flow, and full flow. The old style uses externally mounted solenoid valves to accomplish the same operation.

### 5.1. STRAINER AND FILTER

The strainer and filter are mentioned in this document only because they can cause the dispenser to deliver slowly. In some cases this may appear to be a service problem. The filter should be changed and the strainer cleaned on a regular basis.

#### 5.1.1. Strainer

If the underground installation is a new one, 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.

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

The strainer is removed for cleaning by unfastening the cap. Place a container under the cap to catch the product and sediment. Wash the screen in product and dislodge lint and other foreign particles with compressed air. Check for leakage after reinstalling.

#### 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.

Before removing the fuel filter, trip the emergency valve and turn OFF the circuit breaker for the associated submersible pump.

**5.1.2. Filter,** continued

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

Replacement fuel filters can be obtained from the vendor or from Wayne Division, Dresser Industries, Inc.

## 5.2. NEW STYLE FLOW CONTROL VALVE

This section describes the operation of the Wayne 2-stage solenoid operated diaphragm valve.

The 2-stage solenoid operated diaphragm valve has three basic functions. It controls all flow through the dispenser. It acts as a check valve to hold the dispenser full of product between sales. And it acts as a pressure relief valve to relieve built up pressure in the dispenser.

The valve itself consists of three main parts:

- The diaphragm valve
- The actuator
- The actuator coils

The diaphragm valve is the main flow valve. It controls the full flow through the dispenser. In addition, it acts as a pressure relief valve in the event that pressure builds up downstream from the valve.

The actuator is an electrically operated actuator valve. It controls the diaphragm valve by switching the diaphragm into and out of full flow.

The actuator coils control the actuator itself. When the coils are energized “poppets” inside the actuator are moved to expose flow paths through the actuator.

Together these three parts will be referred to as the “flow control valve” throughout this section.

### 5.2.1. Operation

The flow control valve performs three separate functions. It provides for slow product flow, to be used in the slowdown at the end of preset sales. It allows for full product flow. It also acts as a check and pressure relief valve to hold the dispenser full of product at all times and to relieve any excess pressure built up in the dispenser.

In all Wayne dispensers using the 2-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 approximately one penny's worth 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.

5.2.1.1. Flow Control Valve "Off" No Flow (see Figures 5-1 and 5-2)

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 the submersible pump motor is running because another fueling point is being used. The inlet and the "inlet chamber" (A) are charged with the pump pressure. This pressure passes through a port (2) from the inlet chamber to the "outer chamber" (B). From there the product passes through the orifice (3) into the "center chamber" (C), then through a passageway (4), and into the 2-stage actuator (1).

The pressure in the inlet chamber and the center chamber are equal at this point. Because the area of the diaphragm material (8) exposed to the inlet chamber is approximately half that exposed to the center chamber, the force holding the diaphragm closed is twice that which is trying to open it. Therefore, the diaphragm material (8) remains in the closed position covering the outlet port.

5.2.1.2. Flow Control Valve "On" Slow Flow (see Figure 5-3)

Flow control valve "on" slow flow occurs at the beginning of all sales, and again at the end of preset sales. The pressures remain the same as described in Section 5.2.1.1. The difference is that the slow flow actuator coil (omitted for clarity) has been energized. This causes the slow flow poppet (12) to be pulled off of its seat exposing a path (5) to the outlet. The flow through this path is so slow that the pressure in the center chamber (C) is not reduced. Therefore, the diaphragm remains in the closed position.

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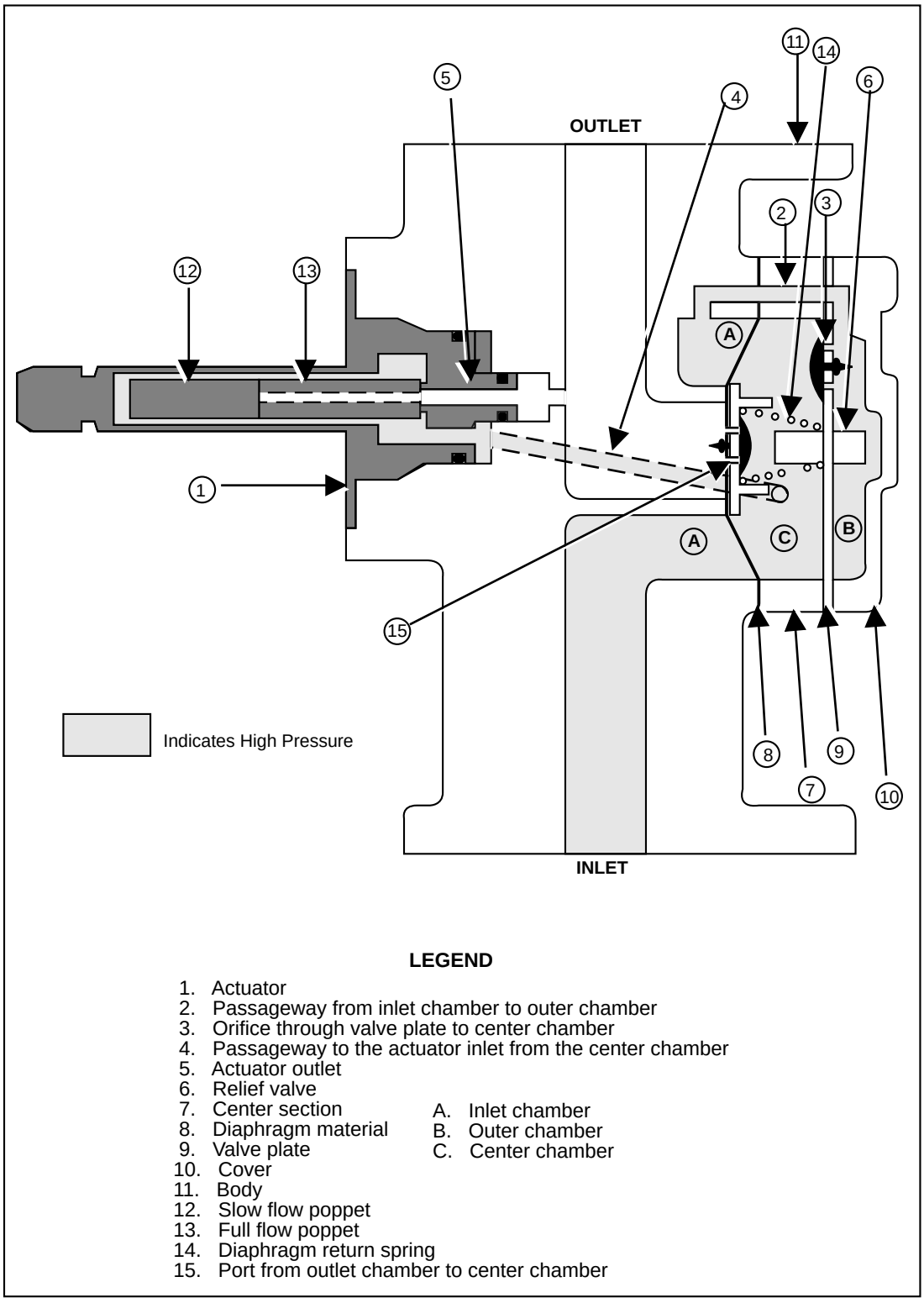


**LEGEND**

1. Actuator
2. Passageway from inlet chamber to outer chamber
3. Orifice through valve plate to center chamber
4. Passageway to the actuator inlet from the center chamber
5. Actuator outlet
6. Relief valve
7. Center section
8. Diaphragm material
9. Valve plate
10. Cover
11. Body
12. Slow flow poppet
13. Full flow poppet
14. Diaphragm return spring
15. Port from outlet chamber to center chamber

A. Inlet chamber
B. Outer chamber
C. Center chamber

**FIGURE 5-1. FLOW CONTROL VALVE “OFF” NO FLOW**

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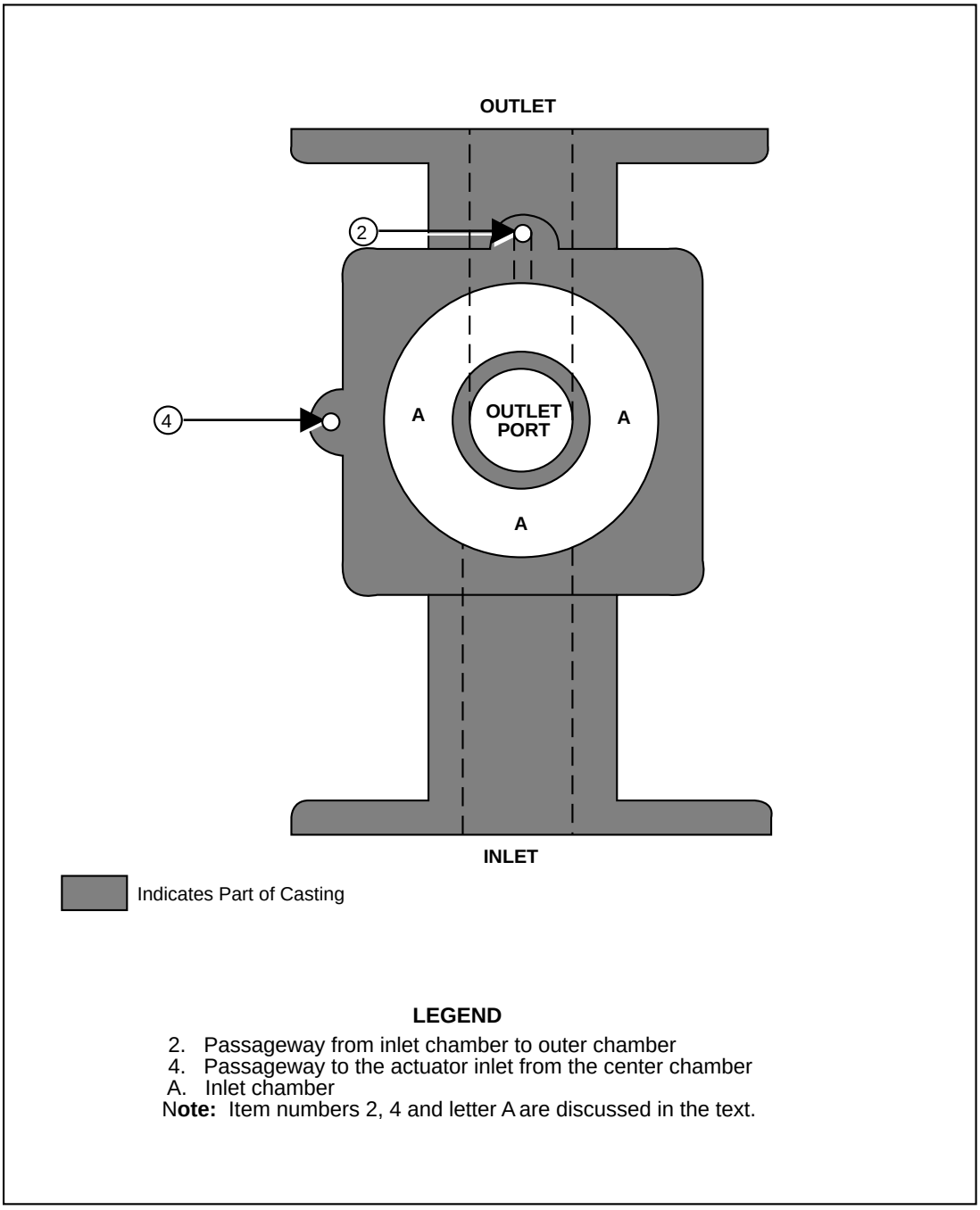


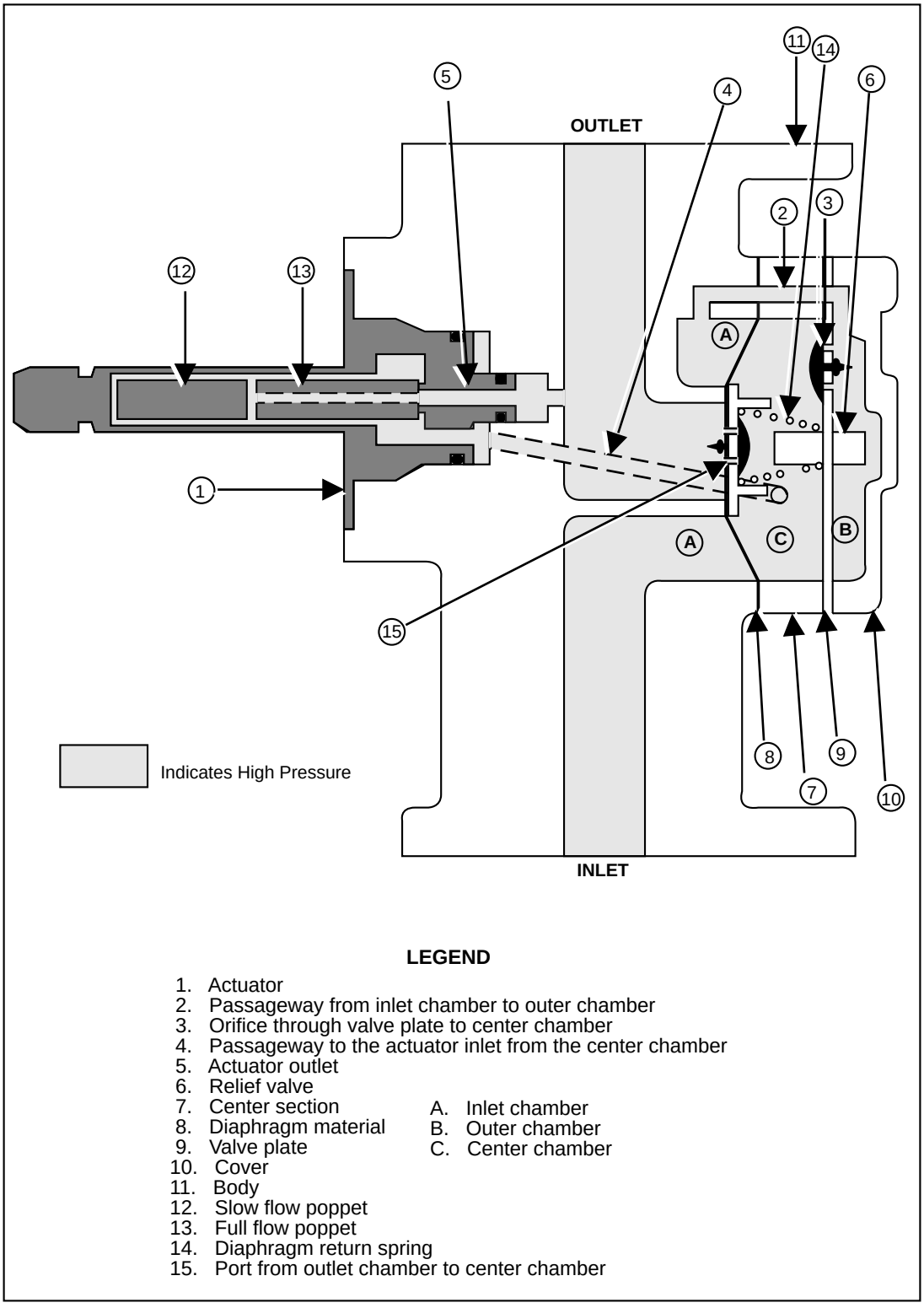

**LEGEND**

2. Passageway from inlet chamber to outer chamber
4. Passageway to the actuator inlet from the center chamber
A. Inlet chamber

N**ote:** Item numbers 2, 4 and letter A are discussed in the text.

**FIGURE 5-2. FLOW CONTROL VALVE WITH KEY NUMBERS 7, 8, 9, AND 10 REMOVED**

JDB-FH-193-B




**LEGEND**

1. Actuator
2. Passageway from inlet chamber to outer chamber
3. Orifice through valve plate to center chamber
4. Passageway to the actuator inlet from the center chamber
5. Actuator outlet
6. Relief valve
7. Center section
8. Diaphragm material
9. Valve plate
10. Cover
11. Body
12. Slow flow poppet
13. Full flow poppet
14. Diaphragm return spring
15. Port from outlet chamber to center chamber

A. Inlet chamber
B. Outer chamber
C. Center chamber

**FIGURE 5-3. FLOW CONTROL VALVE “ON” SLOW FLOW**

5.2.1.3. Flow Control Valve “On” Full Flow (see Figure 5-4)

Flow control valve “on” full flow occurs during the main portion of all sales. At this time, both the slow and fast actuator coils (omitted for clarity) are energized. This pulls both the slow (12) and fast (13) poppets rearward exposing a path to the outlet. This path is larger then the one described in Section 5.2.1.2. Pressure is relieved from the center chamber (C) faster than it can be replenished. This creates a pressure imbalance between the inlet chamber (A) and the center chamber (C); the pressure in the center chamber being lower. Because the pressure in the inlet chamber is higher than that in the center chamber, the diaphragm material is pushed towards the center chamber. This opens a path directly from the inlet to the outlet, initiating full flow.

When the delivery is complete both actuator coils are de-energized, allowing the poppets to return to their rest position. This closes both ports in the actuator and removes the pressure drain from the center chamber. The pressure now builds in the center chamber until it equals that of the inlet chamber, at which point the spring (14) pushes the diaphragm closed stopping flow.

5.2.1.4. Flow Control Valve Holding Back Pressure (see Figures 5-5)

Once a delivery is complete there is some amount of product which is trapped on the outlet side of the flow control valve. This is necessary in order to hold the meter, hose, and nozzle full. This product is held at some pressure, generally near the pressure of the last delivery. This pressure can rise as high as the by-pass pressure of the submersible pump. When one end grade is being dispensed alone the pressure generated by the submersible passes through the “Y” connector at the nozzle, backwards through the hydraulic system and into the flow control valve. This pressure then passes through the port in the diaphragm itself, equalizing the pressure on both sides of the diaphragm. Because the surface area exposed to the center chamber is larger than that exposed to the outlet chamber the diaphragm stays in the closed position. In this case the flow control valve is acting as a check valve. If the pressure should build up, for instance a car running over the hose, the flow control valve would act as a relief valve.

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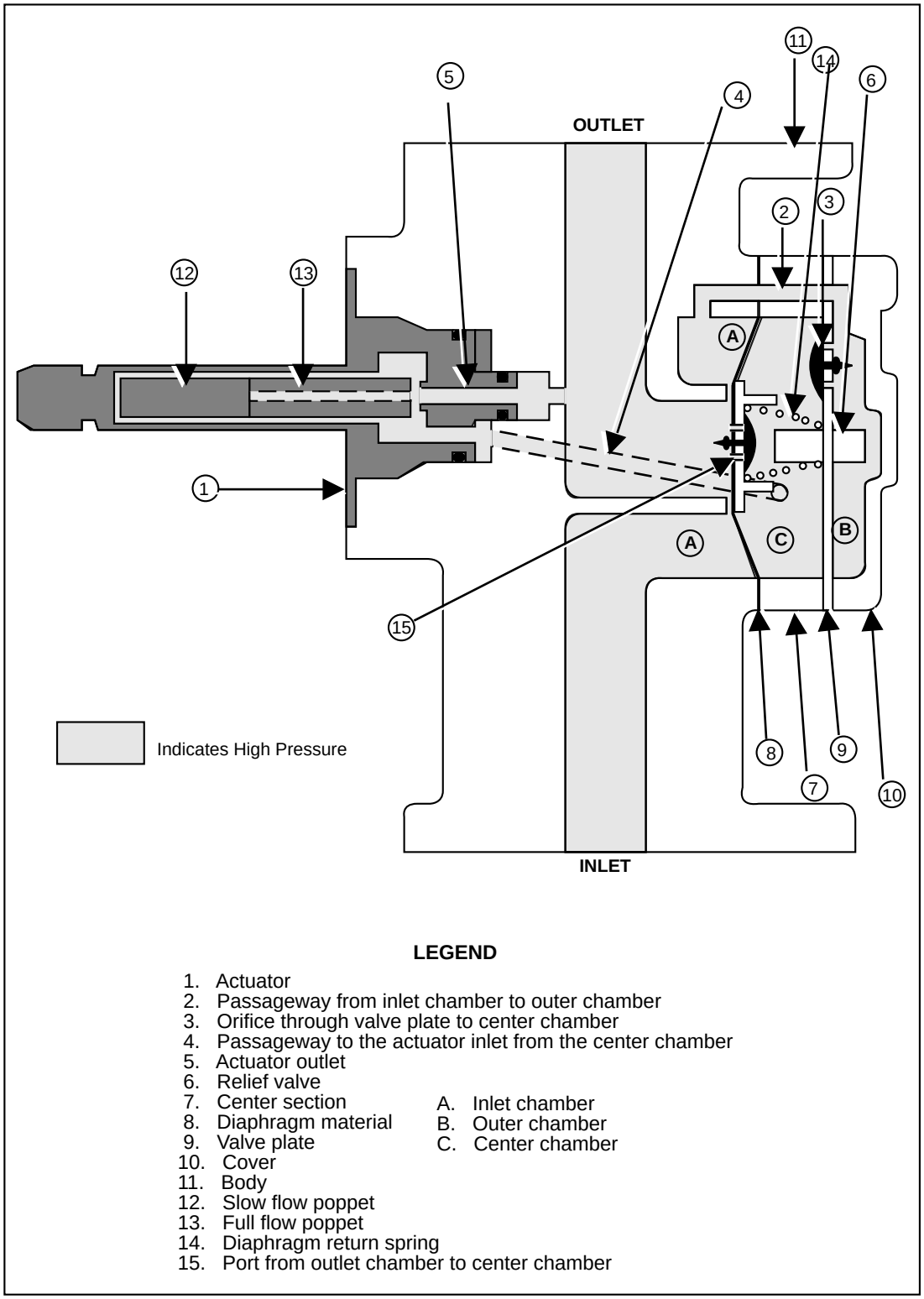



**LEGEND**

1. Actuator
2. Passageway from inlet chamber to outer chamber
3. Orifice through valve plate to center chamber
4. Passageway to the actuator inlet from the center chamber
5. Actuator outlet
6. Relief valve
7. Center section
8. Diaphragm material
9. Valve plate
10. Cover
11. Body
12. Slow flow poppet
13. Full flow poppet
14. Diaphragm return spring
15. Port from outlet chamber to center chamber

A. Inlet chamber
B. Outer chamber
C. Center chamber

**FIGURE 5-4. FLOW CONTROL VALVE “ON” FULL FLOW**

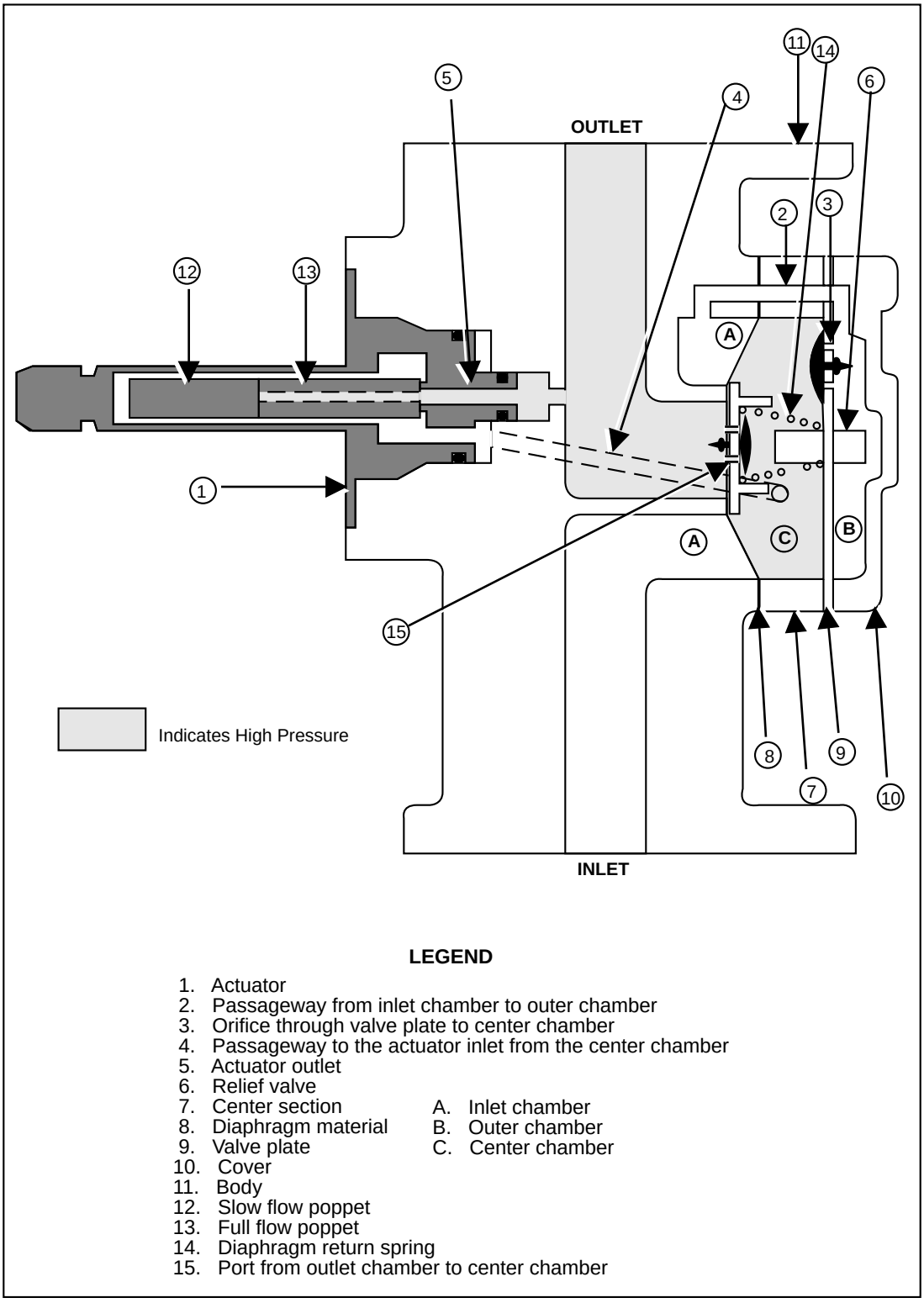



**FIGURE 5-5. FLOW CONTROL VALVE HOLDING BACK PRESSURE**

5.2.1.5. Flow Control Valve Relieving Back Pressure (see Figures 5-6)

In this instance as the pressure builds, it lifts the slow flow poppet off of its seat and passes through the port (4) into the center chamber. Once the pressure reached approximately 35 psi the relief valve (6) would open allowing product into the outer chamber, where it would flow through the port (2) into the inlet chamber, and from there back into the underground tank.

## 5.3. OLD STYLE FLOW CONTROL VALVE

The old style flow control valve consists of two basic parts:

- The diaphragm valve.
- The solenoid valves (two).

The function of the diaphragm valve and solenoid valves as a unit is threefold: 1) It controls all flow through the dispenser; 2) as a check valve to hold pressure within the hose, and; 3) as a pressure relief valve to prevent over-pressurizing the hose above predetermined levels.

The solenoid valves are meant to be operated by 120 VAC. Unless the dispenser was ordered to operate on 240 VAC, in which case the coils will be adjusted accordingly.

### 5.3.1. **Unit "Off" No Flow** (see Figure 5-7)

The dispenser has not been switched ON, therefore, the full and slow flow solenoid valves (4 and 5) and the diaphragm (8) are closed.

However, if a companion dispenser connected to the same fuel source has been switched on, the remote pumping unit would be applying full pressure through the inlet to the inlet port (A), then to the outer chamber (B) via the passageway (2). The pressurized liquid then passes through the orifice (3) in valve plate (9) lifting the umbrella check valve and pressurizing the center chamber (C) and the tube (11 and 12) leading to the full and slow flow solenoid valves (4 and 5).

The area of the diaphragm subjected to the pressure in the center chamber is larger than the area exposed to the inlet chamber. As force equals pressure times area, it is seen that the force applied to keep the diaphragm closed is greater than that being applied to open it. The spring (14) between the valve plate (9) and the diaphragm also contributes to the valve closing force. For these reasons, the diaphragm remains closed and fuel cannot be discharged through an unauthorized dispenser hose even though the nozzle might be opened.

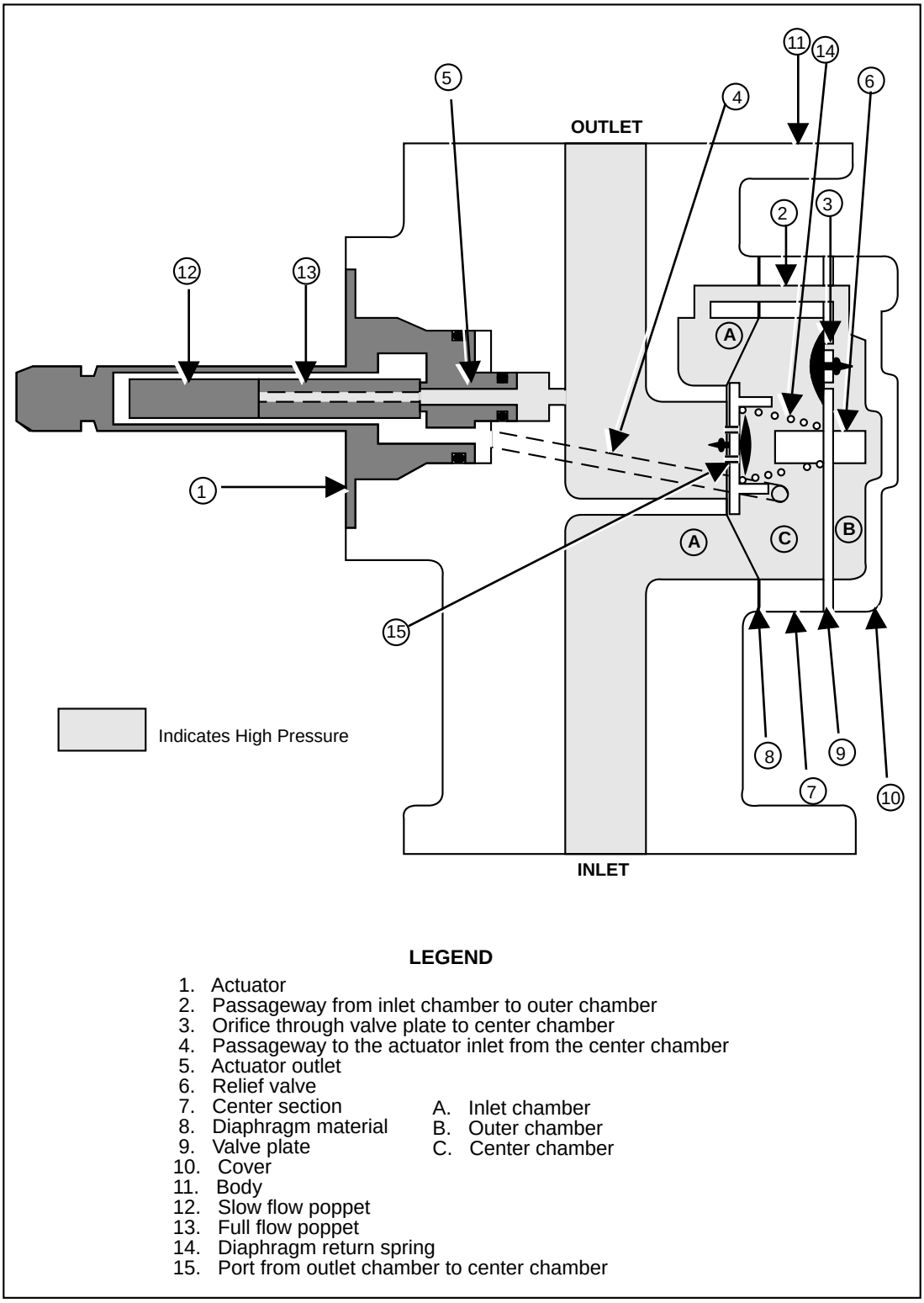
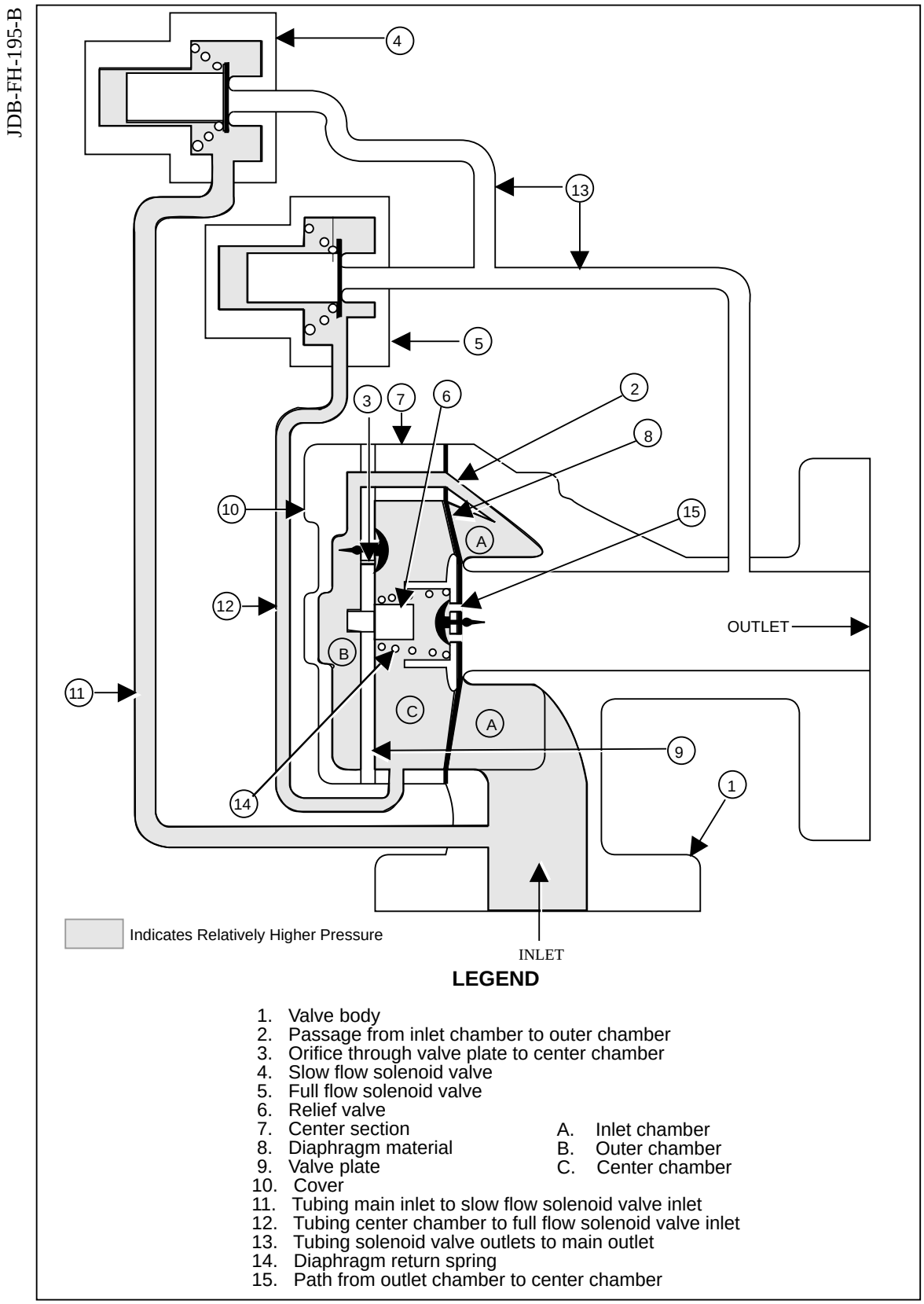



**FIGURE 5-6. FLOW CONTROL VALVE RELIEVING BACK PRESSURE**




**LEGEND**

1. Valve body
2. Passage from inlet chamber to outer chamber
3. Orifice through valve plate to center chamber
4. Slow flow solenoid valve
5. Full flow solenoid valve
6. Relief valve
7. Center section
8. Diaphragm material
9. Valve plate
10. Cover
11. Tubing main inlet to slow flow solenoid valve inlet
12. Tubing center chamber to full flow solenoid valve inlet
13. Tubing solenoid valve outlets to main outlet
14. Diaphragm return spring
15. Path from outlet chamber to center chamber

A. Inlet chamber
B. Outer chamber
C. Center chamber

**FIGURE 5-7. OLD STYLE FLOW CONTROL VALVE"OFF" NO FLOW**

### 5.3.2. **Unit "On" Slow Flow** (see Figure 5-8)

When the dispenser is switched on, the slow flow solenoid valve (4) opens and allows fluid to bypass the diaphragm valve altogether. Therefore the only flow that is allowed is what can pass through the copper tubing and the solenoid valve. This continues until approximately one penny's worth of product has been dispensed.

### 5.3.3. **Unit "On" Full Flow** (see Figure 5-9)

Once the first penny's worth of product has been dispensed, the full flow solenoid valve (5) opens and allows fluid flow from the center chamber (c) through tubes (12) and (13) to the outlet which is normally at a lower pressure than the incoming fuel. As the cross sectional area of the tubing (12 and 13) and the full flow solenoid valve (5) is considerably larger than the area of the check valve inlet orifice (3) in the valve plate (9), there is a flow restriction through the orifice. Therefore, when the full flow solenoid valve opens, the pressure in the center chamber drops below that of the inlet chamber (A) and, consequently the force on the lower side of diaphragm is now greater than the center chamber side and the diaphragm moves off the main valve seat. With the full flow solenoid valve open, the area exposed to the inlet chamber increases to equal the area on the center chamber side which insures that the valve will remain open as long as a higher inlet pressure is exerted on that side of the diaphragm.

At the conclusion of the sale the full flow solenoid valve closes allowing the pressure to equalize on both sides of the diaphragm by means of the passageway (2) and orifice (3) under the umbrella check valve. With the forces being equal, the spring will close the main valve. The down stream area and the hose will carry equal pressure or less, depending upon the nozzle being closed or open.

The dispenser will go into slow flow at a programmed amount before the end of preset sales. At this time the fast flow solenoid valve will be de-energized, and the slow flow solenoid valve energized. Once the full preset amount is reached the slow flow solenoid valve will be switched off, stopping flow.

### 5.3.4. **Unit Holding Back Pressure** (see Figure 5-10)

Once a delivery is complete there is some amount of product which is trapped on the outlet side of the flow control valve. This is necessary in order to hold the meter, hose, and nozzle full. This product is held at some pressure, generally near the pressure of the last delivery. This pressure can rise as high as the bypass pressure of the submersible pump. When one end grade is being dispensed alone the pressure generated by the submersible passes through the "Y" connector at the nozzle, backwards through the hydraulic system and into the flow

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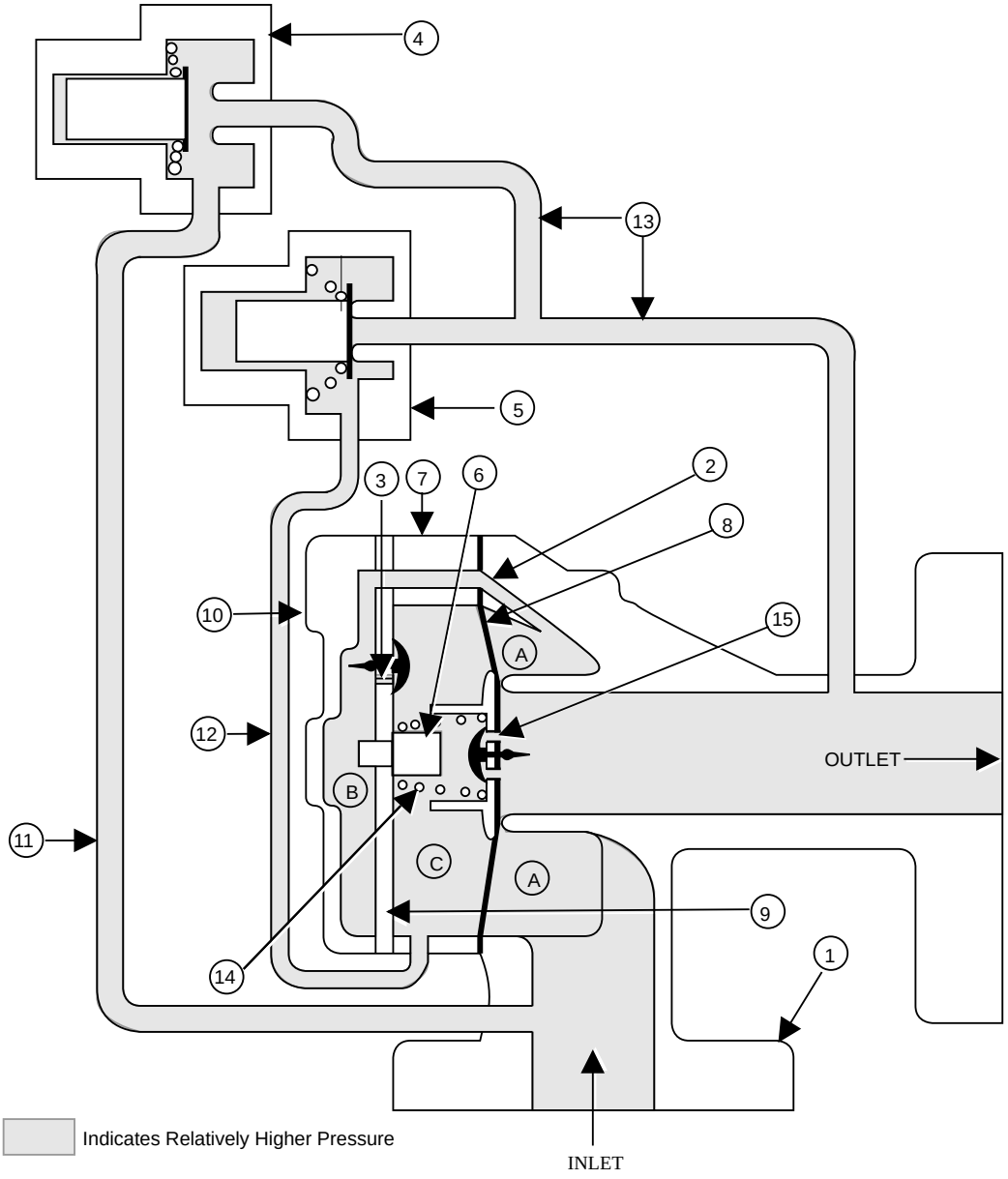


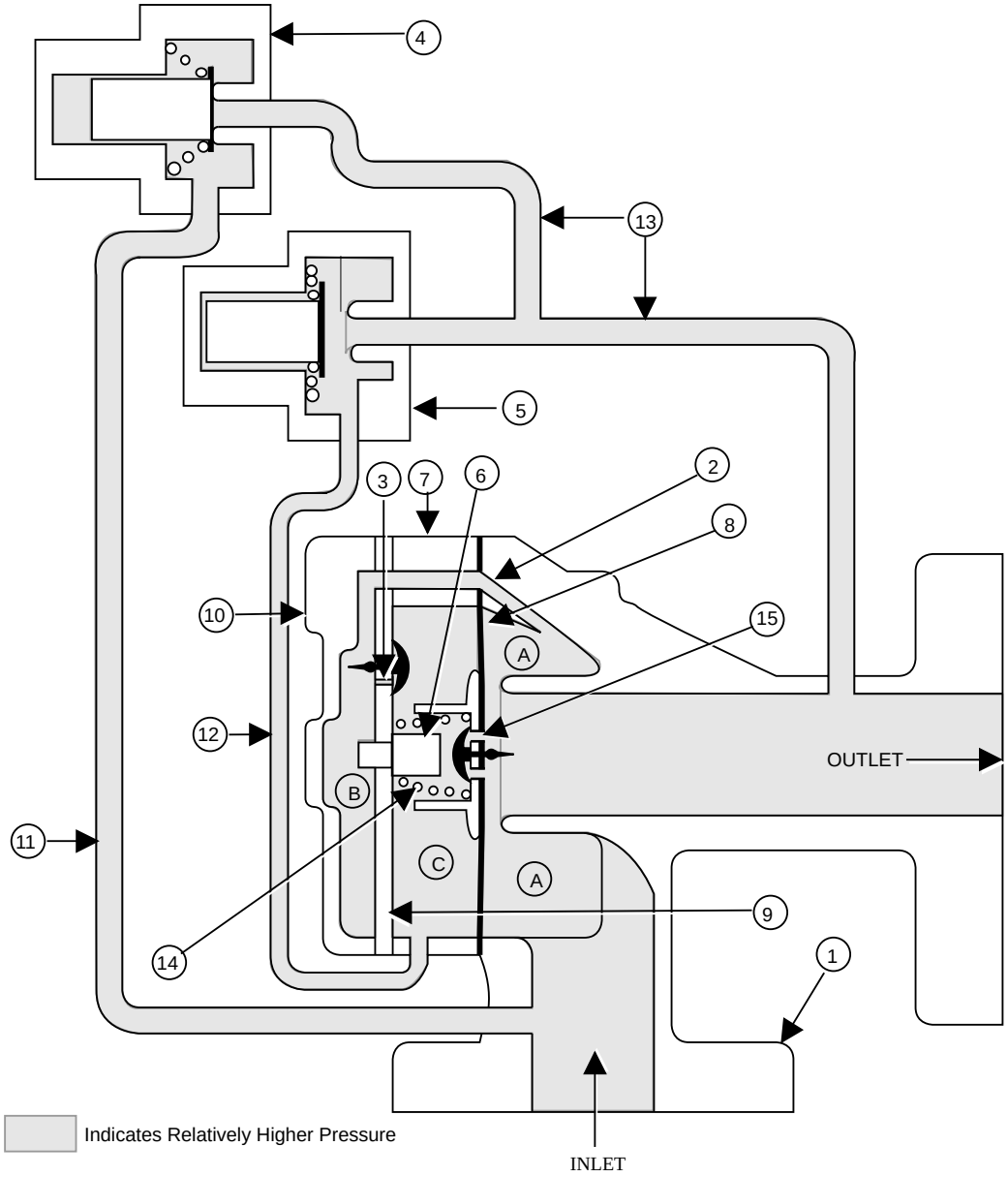

**LEGEND**

1. Valve body
2. Passage from inlet chamber to outer chamber
3. Orifice through valve plate to center chamber
4. Slow flow solenoid valve
5. Full flow solenoid valve
6. Relief valve
7. Center section
8. Diaphragm material
9. Valve plate
10. Cover
11. Tubing main inlet to slow flow solenoid valve inlet
12. Tubing center chamber to full flow solenoid valve inlet
13. Tubing solenoid valve outlets to main outlet
14. Diaphragm return spring
15. Path from outlet chamber to center chamber

A. Inlet chamber
B. Outer chamber
C. Center chamber

**FIGURE 5-8. OLD STYLE FLOW CONTROL VALVE"ON" SLOW FLOW**

JDB-FH-196-A



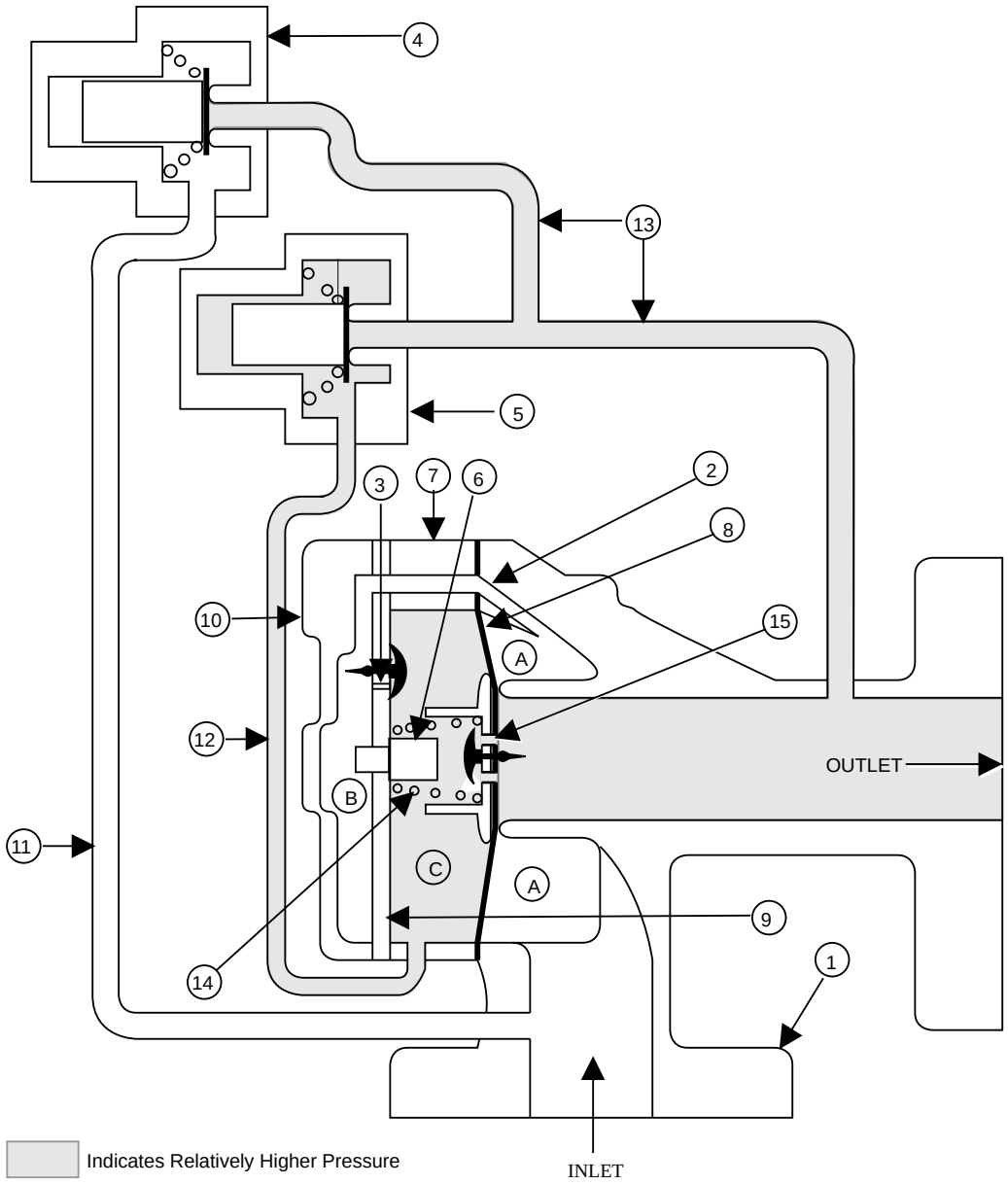

**LEGEND**

1. Valve body
2. Passage from inlet chamber to outer chamber
3. Orifice through valve plate to center chamber
4. Slow flow solenoid valve
5. Full flow solenoid valve
6. Relief valve
7. Center section
8. Diaphragm material
9. Valve plate
10. Cover
11. Tubing main inlet to slow flow solenoid valve inlet
12. Tubing center chamber to full flow solenoid valve inlet
13. Tubing solenoid valve outlets to main outlet
14. Diaphragm return spring
15. Path from outlet chamber to center chamber

A. Inlet chamber
B. Outer chamber
C. Center chamber

**FIGURE 5-9. OLD STYLE FLOW CONTROL VALVE"ON" FULL FLOW**

JDB-FH-194-A




**LEGEND**

1. Valve body
2. Passage from inlet chamber to outer chamber
3. Orifice through valve plate to center chamber
4. Slow flow solenoid valve
5. Full flow solenoid valve
6. Relief valve
7. Center section
8. Diaphragm material
9. Valve plate
10. Cover
11. Tubing main inlet to slow flow solenoid valve inlet
12. Tubing center chamber to full flow solenoid valve inlet
13. Tubing solenoid valve outlets to main outlet
14. Diaphragm return spring
15. Path from outlet chamber to center chamber

A. Inlet chamber
B. Outer chamber
C. Center chamber

**FIGURE 5-10. OLD STYLE FLOW CONTROL VALVE HOLDING BACK PRESSURE**

### 5.3.4. **Unit Holding Back Pressure,** continued

control valve. This pressure then passes through the port in the diaphragm itself, equalizing the pressure on both sides of the diaphragm. Because the surface area exposed to the center chamber is larger than that exposed to the outlet chamber the diaphragm stays in the closed position. In this case the flow control valve is acting as a check valve. If the pressure should build up, for instance a car running over the hose, the flow control valve would act as a relief valve.

### 5.3.5. **Unit Relieving Back Pressure** (see Figure 5-11)

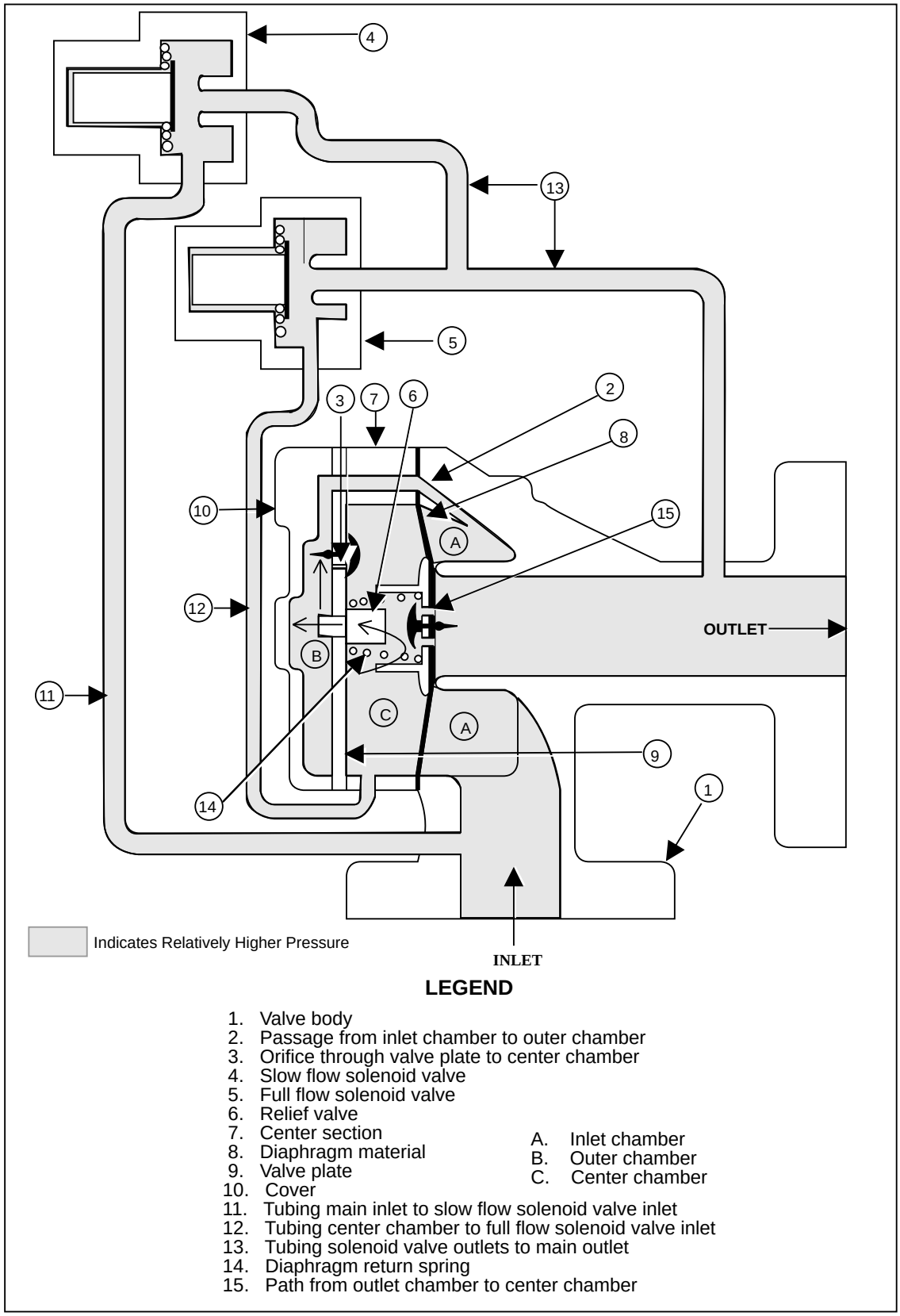
Should the pressure within a hose climb above a predetermined limit due to expansion caused by temperature increases, the full and slow flow solenoid valves (4 and 5) will open allowing some fluid to be forced back through tubes (11, 12, and 13) to the center chamber (C). Increased pressure within this chamber will open the relief valve (6) and allow sufficient fluid to reduce excess pressure to exit through passageway (2) to cavity (A) and through the valve inlet. Hose pressure relieves at approximately 35 PSI.

## 5.4. BLEND VALVE

The blend valve is used in blending dispensers to mix two different grades of product in order to produce a third grade which has an octane rating somewhere between the first two. The blend valve is designed in such a way that as it restricts the flow of one product it permits increased flow of the other.

In order to accomplish this the valve has two separate chambers. Each of these chambers has its own inlet and outlet. The outlets come together at some point after the blend valve and this point is where the mixing actually takes place. Each of the outlets is covered, in some part, by a “shoe”. These “shoes” are attached to a drive shaft in such a way that as one port is being uncovered the other is being covered, thus adjusting the flow of each product. (see Figure 5-12.)

JDB-FH-198-A




**LEGEND**

1. Valve body
2. Passage from inlet chamber to outer chamber
3. Orifice through valve plate to center chamber
4. Slow flow solenoid valve
5. Full flow solenoid valve
6. Relief valve
7. Center section
8. Diaphragm material
9. Valve plate
10. Cover
11. Tubing main inlet to slow flow solenoid valve inlet
12. Tubing center chamber to full flow solenoid valve inlet
13. Tubing solenoid valve outlets to main outlet
14. Diaphragm return spring
15. Path from outlet chamber to center chamber

A. Inlet chamber
B. Outer chamber
C. Center chamber

**FIGURE 5-11. OLD STYLE FLOW CONTROL VALVE RELIEVING BACK PRESSURE**

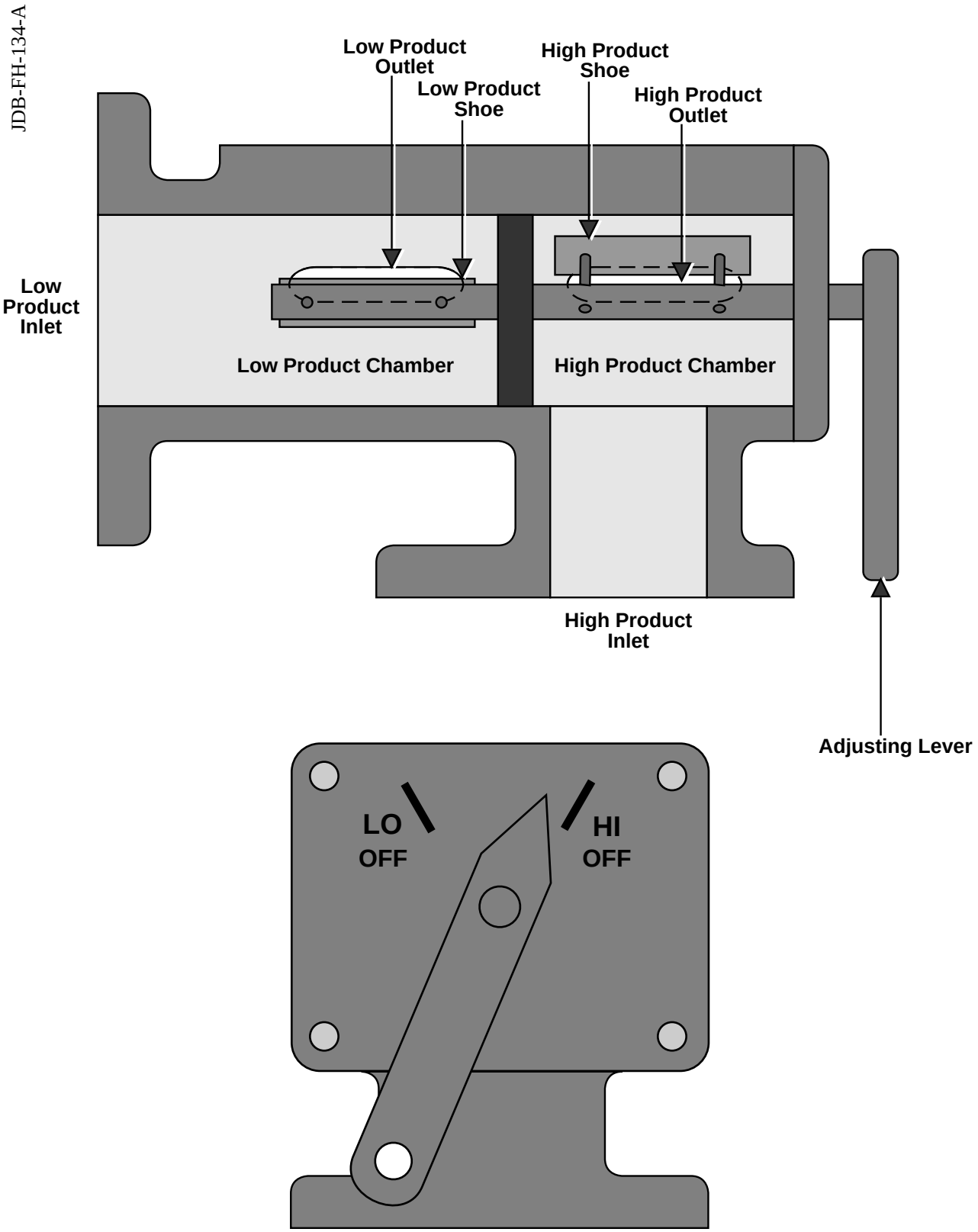



**FIGURE 5-12. BLEND VALVE**

### 5.4.1. Adjusting the Blend Valve Linkage

There is a mechanical linkage which connects the blend motor to the adjusting lever on the blend valve. This linkage may periodically need to be adjusted. In order to perform an initial adjustment, for instance after replacing the blend valve, perform the following steps:

- Authorize the dispenser and select the middle blended grade. The blend motor will pre-position the blend valve in an initial position.
- Dispense some product. As product is dispensed the blend motor will begin to adjust the blend valve based on the flow of each end grade; there should be little or no movement of the blend valve linkage at this point. If the blend valve linkage moves a significant amount note which direction it moves.
- If the linkage moves **toward the blend valve**, release the ball joint and **lengthen the linkage** by turning the ball joint.
- If the linkage moves **away from the blend valve**, release the ball joint and **shorten the linkage** by turning the ball joint.

## 5.5. METER (see Figure 5-13)

The meter is, in effect, a three-cylinder motor, using cylinders ‘B’ and ‘C’ and chamber ‘D’ as the three cylinders. As the filling and discharging ports in the valve are located 120° apart, and the port openings in the valve seat are at 120°, there is no dead-center position in the meter. The operation of filling is continuous, in that, before one chamber is fully filled, the next one is in the process of starting to fill. The same procedure applies to the discharging operation. The filling and discharging operations each occupy 180 degrees of rotation. Measurement of flow is determined by the fact that the displacement of each cylinder, together with the displacement from chamber ‘D’, represents a known quantity, and the flow has a direct and substantially constant relationship to the rotation of the output shaft.

By connecting the output shaft to the pulser assembly, the rotary movement of the meter can be converted into pulses, which can in turn be counted by the computer. For U.S. gallons, the meter makes 4 revolutions per U.S. gallon. Calibration is made possible by the incorporation of an adjusting knob on the top of the unit. Movement of

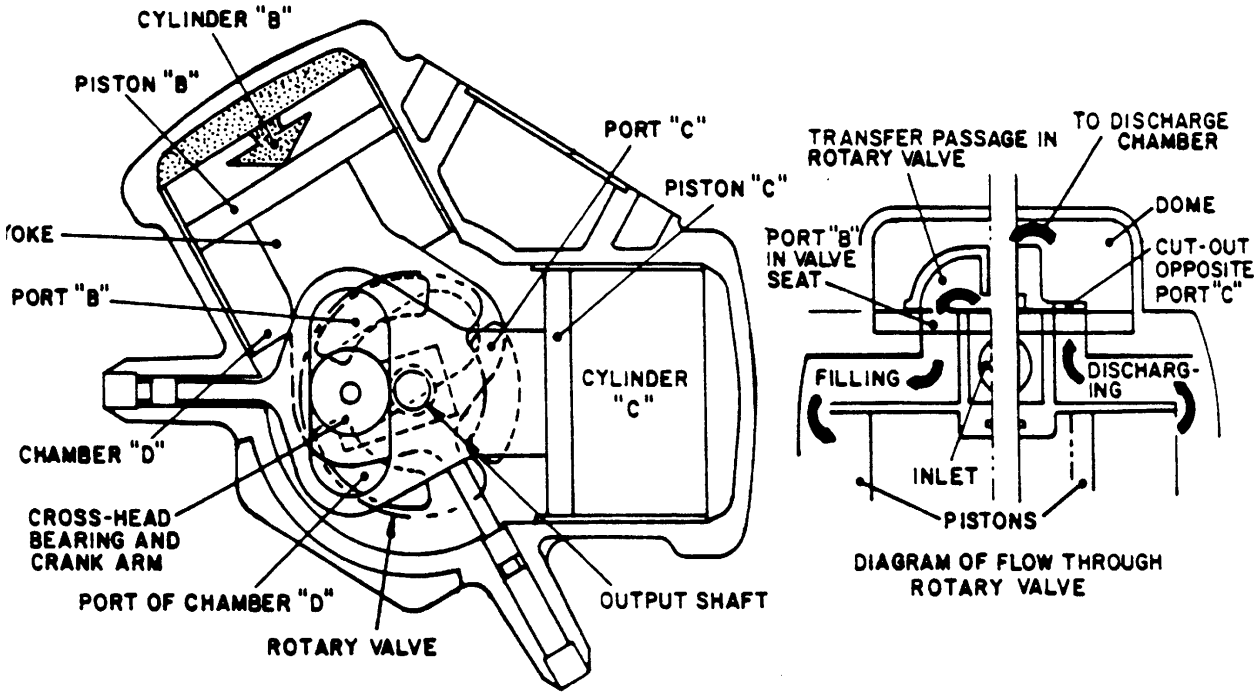



**FIGURE 5-13. METER**

this knob causes the throw of the crank arm on the output shaft to be varied, so that the speed at which the shaft rotates can be accurately adjusted to the known output of the meter.

### 5.5.1. Meter Adjustment (see Figure 5-14)

While the dispensers leave the factory properly adjusted, rough handling in transit or special installation conditions can change this. Therefore, before placing the dispenser in operation, these items must be checked and adjusted, if required.

If meter adjustment is required, the adjustment knob is located on the top of the meter; see Figure 5-14. If the test can reads low, break the seal, lift the adjustment knob and turn in a clockwise direction, viewing the knob from the top of the meter. The lower portion of the knob is hexagonal and, in a normal position, the portion of the knob is inserted in the output shaft assembly. There are 18 vertical notches within the shaft, therefore, as the adjustment is made, the knob can be felt to click over the leading edge of the notches. Each notch is equivalent to a correction of approximately one cubic inch in five gallons. After the meter has been adjusted and brought within tolerance, replace the seal wire and seal by pinching the lead lock on the wire.

When adjusting meters in blending dispensers adjust only one end grade at a time. The blended products cannot be calibrated themselves. However, after the two end grades are zeroed the blend grades will be in tolerance.

## 5.6. COMPACT PUMPING UNIT

The Wayne compact pumping unit is a rotary-type gear pump. These pumps are called “self-priming” because they will remove all air and vapor from the suction line without assistance from an outside source. Rotary pumps operate with extremely close clearances between the rotating member and the pump casing. This feature enables them to be good “self-primers” and ideal pumps for gasoline dispensing systems.

The bypass valve in the compact pumping unit should be set at one of two pressures. If the pumping unit is driven by a 1/3 horsepower motor the pressure should be 21-22 psi. If the motor is 3/4 horsepower then the bypass pressure should be 28-30 psi. To adjust the bypass pressure remove the acorn nut on the bypass assembly, then loosen the locking nut on the adjusting screw. Tightening the adjusting screw will raise the pressure; loosening the screw will lower the pressure.

Also part of the compact pumping unit is the air eliminator. This is a holding chamber with an outlet at the top. This outlet is attached to the sump assembly. As product is delivered to the air eliminator the vapor, in the form of foam, rises to the top and passes through the outlet to the sump assembly.

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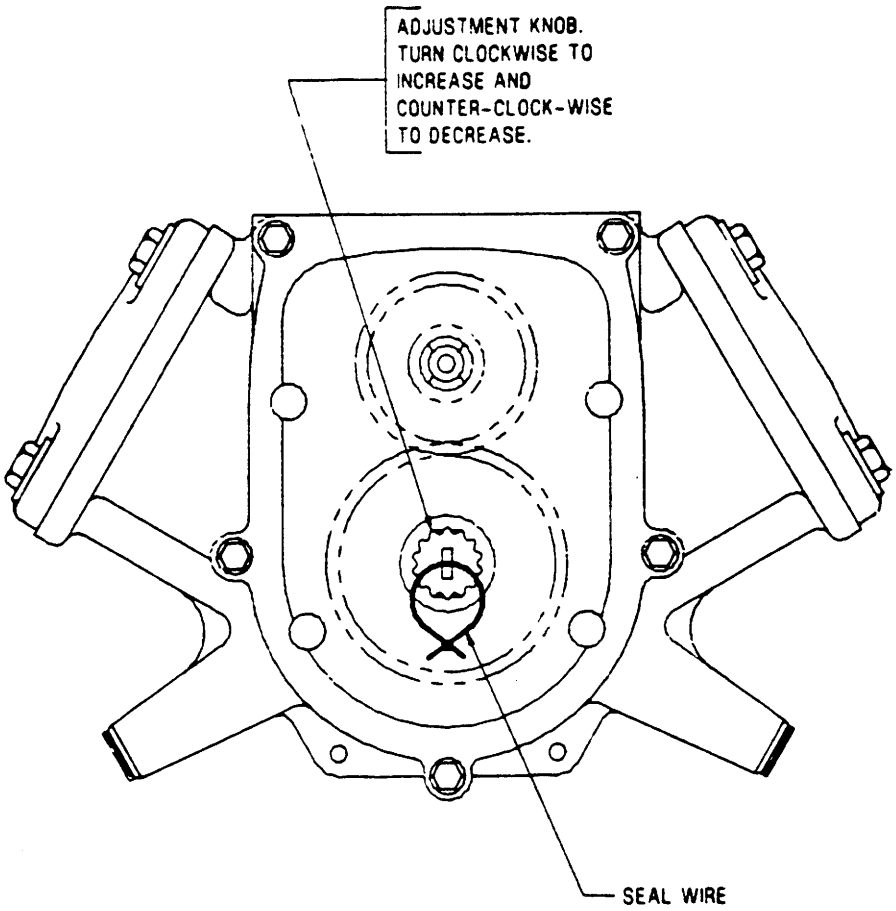



**FIGURE 5-14. METER ADJUSTMENT**

### 5.6.1. Priming the Compact Pumping Unit

It is not advisable to run any type of pumping unit dry during the priming process, therefore, it is recommended that a small quantity (1/2 pint or 1/4 liter) of motor oil be inserted through the priming port of the pumping unit before commencing operation.

If difficulty is encountered using the priming port, the pumping unit should be primed by removing the pressure relief valve seal cap complete with adjusting screw, the valve spring and the valve poppet.

## 5.7. WAYNE SUMP ASSEMBLY

When air enters a suction pump, it is eliminated by the air separator and the sump assembly. In the pumping unit, gasoline vapors rise to the top and escape to the sump assembly. At the top of the sump assembly is an orifice connected to the nozzle boot via a copper tube. This tube provides an outlet for the vapors. Along with this vapor is a small amount of product. This fluid remains in the bottom of the sump. A needle valve at the bottom of the sump provides for recirculation of the product. As the level of product rises in the sump, a float rises, opening the needle valve and allowing the gasoline to pass through copper tubing back to the suction side of pumping unit.

## 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 normally be replaced unless a second occurrence of the same problem results.

To perform a RAM clear perform the following steps:

- Disconnect AC power from the computer assembly, while leaving all displays connected.
- Disconnect the positive terminal of the battery from the computer.
- When the displays go blank a RAM clear should have occurred.
- Reconnect the positive terminal of the battery, and the AC power.
- Reset the fueling point I.D.

**Warning: The following actions require that the electrical power to the equipment be on. Remember that electrical power is dangerous and proper precautions to protect oneself from contact with the electrical power are necessary.**

| FAILURE INDICATION | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| Sale display and price displays are blank. | 1. No power to computer. | Check control power breaker. Check for AC input between pins 1 and 2 of J5.<br><br>Check the F1 and F3 fuses on the computer. Replace if necessary. |
| | 2. Defective display. | Replace display. |
| | 3. Defective computer assembly. | Replace the computer. |
| Sale displays black. | 1. Ambient temperature is above 165 deg. F. | Unit is being operated above the maximum temperature. |
| | 2. Defective display. | Replace display. |

| FAILURE INDICATION | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| One or more digits or segments fail to operate during reset cycle.* | 1. Defective LCD. | Replace LCD. On newer dispensers the LCD's are not replaceable in this case replace the board. |
| | 2. Defective display assembly. | Replace the faulty display assembly. |
| | 3. Defective data cable. | Replace data cable. |
| | 4. Defective computer assembly. | Replace computer assembly. |
| Selected unit price not correctly displayed.* | 1. Loose or defective cables. | Repair or replace cables. |
| | 2. Loose or defective LCD. | Repair or replace LCD. |
| | 3. Defective display board. | Replace display board. |
| ***** One display may affect any or all other displays for that side. To isolate, connect only one display at a time to the computer using a good data cable. | | |
| Sale Display ON Unit will not respond to individual function switch (i.e., the totals switch **or** the price switch). | 1. Defective switch. | Check for 5 VDC off, zero volts on, across the switch. Replace switch if stays at 5 or 0 VDC. |
| | 2. Defective wiring to switch. | Check all wiring to defective jog function switch. |
| | 3. Defective function switch interface circuitry. | Replace the display which the functions switch wiring harness is connected to. |
| | 4. Defective computer assembly. | Replace computer assembly. |
| Totalizer reading does not tally with expected amounts.** | 1. Defective battery on the computer assembly. Voltage on the battery should be 3.55 VDC or higher. | Replace battery if necessary. |
| | 2. Defective computer assembly. | Replace computer assembly. |
| ****** Many reported totalizer inaccuracies are the result of arithmetic bookkeeping errors. Be sure the mechanical totalizers and arithmetic is correct before replacing any computer. | | |
| Unit price equals 0.000. | 1. Control system unit price reads 0.000. | Set correct price. Refer to the control system operation manual. |
| | 2. Unit price not entered. Dispensers without a control system attached. | Set correct price using Price Jog switch. |
| | 3. No fueling point I.D. | Set fueling point number. |

| FAILURE INDICATION | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| Unit price equals 0.000, continued. | 4. Battery voltage is low. Voltage across battery on computer assembly should be 3.55 VDC or more measured with power off. | Replace battery if necessary. |
| | 5. Defective computer assembly. | Replace computer assembly. |
| Computer does not reset. | 1. Unit Price displays zero. | Set Unit Price to a value if dispenser is stand-alone.<br><br>Check pricing in control system, if one is connected.<br><br>Check fueling point I.D. number if a control system is installed. |
| | 2. No authorization from control system. | Refer to control system operation or service manual. |
| | 3. Defective authorize keyswitch. 5 VDC off, 0 VDC on, across keyswitch. (If a control system is not installed.) | Replace keyswitch. |
| | 4. Nozzle switch not operating or mis-adjusted. | Adjust or replace switch. |
| | 5. Switch interface circuitry. | Replace the display which the function switch wiring harness is connected to. |
| | 6. Defective computer assembly. | Replace computer assembly. |
| Computer resets without authorization from control system. | 1. Defective authorize keyswitch. | If switch checks defective, replace switch. Disconnect and check switch with an ohm meter. |
| | 2. Defective wiring harness to function switches. | Repair or replace as needed. |
| | 3. Defective computer assembly. | Replace computer assembly. |

| FAILURE INDICATION | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| 2 2 2 2 2 | Pulser jitter: | |
| | 1. Dirt blocking opening on pulser disc. | Clean pulser disc. |
| | 2. Dust in pulser housing. This could give the same symptoms as a defective photocoupler. If dust is found **do not** replace the photocoupler unless the problem reoccurs. | Clean dust from housing. Adjust the disc to keep it from rubbing on photocoupler. |
| | 3. Cracked or broken disc. Shut down occurs at 2.5 gallons or 9.5 liters. | Replace disc. |
| | 4. Defective photocoupler. Shut down occurs at .024 gallons or .088 liters. | Replace photocoupler. |
| | 5. Misalignment between pulser drive shaft and coupling gear on meter. | Drive shaft must be aligned in center of coupling gear on meter. To align, loosen mounting bolts on pulser housing and reposition housing. |
| | 6. Disc tension is not correct. | Adjust or shim wave washers on pulser shaft assembly. |
| | 7. Air in system causing severe hydraulic shock. | Repair or replace faulty piping in the system. |
| | 8. Loose plug or wire connection. | Secure plug or wire connection between pulser and computer assembly. |
| | 9. Defective computer assembly. | Replace computer. |

| FAILURE INDICATION | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| 3 3 3 3 3 | Blend error, the dispenser could not maintain the correct blend ratio. | |
| | 1. Blend valve linkage is out of adjustment. | Adjust linkage. |
| | 2. Flow is restricted on one end grade. To isolate observe blend valve pointer as blends are being dispensed. If the sale shuts down with the pointer pointing at “LO OFF” the problem is on the HI product and vice versa. | Check all valves and underground piping for the source of a restriction on the affected grade. |
| | 3. Shorted limit switch or wiring to the limit switch. | Check both limit switches and the wiring to the switches replace or repair as necessary. |
| | 4. Defective blend motor. If the blend motor is warm but will not turn, it is defective. | Remove the blend motor from its housing. If it still will not turn replace it. If it turns when removed replace the entire housing. |
| | 5. Defective solenoid drive board. If the blend motor is cold and not turning the solenoid drive board is defective. | Replace the solenoid drive board. |
| | 6. Defective wiring to the blend motor. | Check all wiring repair or replace as necessary. |
| | 7. Defective blend valve. | Check the blend valve for cut “O”-ring between chambers, or cracked blend shoes. Repair or replace the blend valve as necessary. |
| | 8. Defective computer assembly. | Replace the computer. |

| FAILURE INDICATION | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| 4 4 4 4 4 | Illegal pulse; a pulse was received from an end grade when that end grade was not being dispensed. | |
| | 1. Defective solenoid drive board. Shorted solid state relay is holding a valve open. | Replace the solenoid drive board. |
| | 2. Debris holding a valve open. | Check all solenoid valves and diaphragm valves for debris. The actuator should not be disassembled. Repair or replace the valves as necessary. |
| | 3. Defective diaphragm valve. | Rebuild the diaphragm valve. |
| | 4. Defective computer. | Replace the computer. |
| 5 5 5 5 5 | The computer did not detect one of the limit switches during reset. | |
| | 1. Defective blend motor. | If the blend motor does not move during the reset cycle, but is warm to touch, remove it from housing. If it still does not turn during reset replace. |
| | 2. Defective solenoid drive board. | Replace the solenoid drive board. |
| | 3. Defective limit switches. | Check both switches and all wiring to the switches. Repair or replace as necessary. |
| | 3. Defective computer assembly. | Replace the computer. |

| FAILURE INDICATION | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| 6 6 6.6 6 | Gallons/Liters not selected. | Set S1 switches on the computer assembly. |
| 7 7 7.7 7 | Reverse Pulse<br>1. Disc tension is not correct. | Adjust or shim the wave washer on pulser shaft assembly. |
| | 2. Air in system causing severe hydraulic shock. | Repair or replace faulty piping in the system. |
| | 3. Loose or misaligned pulser disc.Check for loose pulser shaft and disc tension. | Realign pulser assembly.<br>Adjust or shim wave washers. |
| | 4. Defective meter. | Replace meter. |
| 8 8 8.8 8 | Processor Check. | |
| | 1. Some malfunction within the computer assembly has been detected. | If this error happens repeatedly, replace computer assembly. |
| Computer resets but solenoid valves do not open | 1. Check fuse F1 on solenoid drive board. | Replace fuse with fast acting fuse if necessary. |
| | 2. Solenoid drive board defective. Test for AC voltage to solenoid (Do not use VOM). Test with spare coil or test lamp with pigtail. | Replace solenoid drive board. |
| | 3. Defective solenoid, or actuator, coil. | Replace coil. |
| | 4. Defective slow solenoid valve or actuator. | Replace the valve or actuator. |
| | 5. Defective computer assembly. | Replace computer assembly. |
| | 6. Full flow coil. (Slow valve works but fast flow does not, i.e., pumps 1 cent then stops). | Replace full flow coil. |

| FAILURE INDICATION | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| Computer resets but submersible pump does not come on. | 1. Check fuse F1 on solenoid drive board. | Replace with fast acting fuse if necessary. |
| | 2. Solenoid drive board defective. Test for AC voltage to relay (from proper pin on J15 connector). | Replace solenoid drive board if necessary. |
| | 3. Defective relay. | Replace relay. |
| | 4. Defective computer assembly. | Replace computer assembly. |
| Unit overruns preset. | 1. Solenoid valve triac shorted on solenoid drive board. | Replace solenoid drive board. |
| | 2. Debris in solenoid valve or two stage actuator. | Check all solenoid valves or the actuator; repair or replace as necessary. The two stage actuator should not be disassembled, instead it should be replaced as a unit. |
| | 3. Diaphragm valve not closing. | Rebuild diaphragm valve. |
| | 4. Computer assembly. | Replace computer. |

# 7. COMPONENT REPLACEMENT

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

## 7.1. ELECTRONIC COMPONENT REPLACEMENT

**Note: Always turn off the dispenser control power prior to accessing the computer enclosure, pulser enclosure and/or any junction box. AC power may still be present due to common relay control lines from other dispensers. Unplug solenoid drive board connectors to eliminate hazard of electrical shock.**

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.

To prevent damage due to static electricity always wear an approved grounding wrist strap (part no. 916962 or equivalent) when handling electronic circuit boards and components. Make sure the wrist strap is attached to a good earth ground.

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. Computer Assembly Replacement

**Note: The computer assembly has a battery to hold product and cash totalizers and the current sale. The information is held even if the computer base is removed. Do not let metal parts or wire contact the computer base circuit board or exposed pin contacts as damage may result.**

1. Put the appropriate switch in the data distribution box to bypass.

2. Turn OFF the control power.

3. Record the totalizer readings if the totalizer is functional.

### 7.1.1. **Computer Assembly Replacement,** continued

**Note: On multi-grade blending dispensers the computer is located below and behind the main sale display. To access the computer there are two quarter turn screws above the main sale display. Disengaging this screws will allow the chassis, called the "cruciform", which holds all of the electronics, to be tilted outward allowing access to the computer.**

4. Disconnect all cables before removing the computer assembly. (The connectors have two latches which must be squeezed to disengage them from the board.)

5. Remove the screws securing the computer base assembly to the housing.

6. Lift the computer assembly out of the chassis.

7. Remove the solenoid drive board (4 screws) and install on the new computer assembly.

8. Set the option switches as required.

9. Install the new computer assembly and secure with the hardware removed in Step 5.

10. Connect all cables to the computer assembly. The connectors will click when fully engaged.

11. Set the switches in the data distribution box back to auto.

12. Turn the control power ON.

13. Program the dispenser as follows:

    a. Set the unit prices (if stand-alone); or
    b. Set the fueling point number.

14. Record the totalizer readings and give them to the dealer.

### 7.1.2. Intrinsic Safe Barrier PCB Replacement

1. Open head of dispenser opposite the junction box side.
2. Remove black metal protective shroud.
3. Remove connectors
4. Remove mounting screws from PCB assembly.
5. Replace with new board using the reverse procedure.

### 7.1.3. Liquid Crystal Display Replacement

**Note: In some dispensers the LCD's will be soldered to the board and are not replaceable.**

1. Remove the display board face plate.
2. Grasp the two ends of the LCD and pull straight out.
3. If a heater strip is present, cut the wires which attach the heater strip to the display board and remove both the LCD and the heater.
4. Orient the new LCD such that the decimal points are to the bottom.
5. Install the new LCD, assuring that all pins are properly engaged in the display board socket.
6. Reinstall the face plate using the hardware removed in Step 1.

### 7.1.4. Display Board Replacement

1. Disconnect any data cable(s) from the display.
2. Remove the screws securing the display assembly to its mounting bracket.
3. Disconnect the display from the computer assembly. This need be done only in dispensers with the display connected directly to the computer.
4. Remove the screws securing the face plate and other associated parts to the display board. Install the face plate and all other parts to the new display.

**7.1.4. Display Board Replacement,** continued

5. Connect the new display to the computer assembly (apply pressure to board edges only). This need be done only in dispensers with the display connected directly to the computer.

6. Check to make sure the display is connected properly; that all pins are properly engaged.

7. Resecure the display with hardware removed in Step 2.

8. Reconnect any data cable(s) to the sale display.

**7.1.5. Unit Price Display Replacement**

1. Disconnect all data cable(s) from the unit price display.

2. Remove the screws that fasten the unit price display board to it's mounting bracket, and remove the unit price display.

3. Remove the screws securing the face plate and all other associated parts. Install the face plate on the new display board.

4. Install the new unit price display with the screws removed in Step 2.

5. Reconnect all data cable(s) to the unit price display.

6. Set the position switches to the same settings as the displayed which was removed.

**7.1.6. Solenoid Drive Board Replacement**

1. Disconnect the cables to the solenoid drive board.

2. Remove the four screws securing the solenoid drive board to the triac monitor board and remove the solenoid drive board.

3. Install the new solenoid drive board using screws removed in Step 2. Check to make sure the pins are properly engaged.

4. Reconnect the cables to the solenoid drive board. Connector will click when fully engaged.

### 7.1.7. Triac Monitor Board Replacement

1. Remove the solenoid drive board by following the steps listed in section 7.1.6.

2. Remove the triac monitor board from the computer.

3. Install the new triac monitor board. Make sure that all of the pins are properly engaged.

4. Replace the solenoid drive board.

### 7.1.8. Photocoupler/Pulser Disc Replacement

1. Remove the hex head 1/4-20 screws and cover from the pulser-switch assembly.

2. Disconnect the cable to the photocoupler.

### 7.1.8. Photocoupler/Pulser Disc Replacement, continued

3. Remove the screw holding the photocoupler to the housing and loosen the set screws holding the pulser disc on the shaft. Pull both the disc and the photocoupler up and out of the housing.

4. Slip the new pulser parts into the housing. Tighten the screw holding the photocoupler. Adjust the disc so it does not rub on the photocoupler and tighten the set screws. Centering the disc is very important to avoid damage to the photocoupler and disc.

5. Reconnect the cable to the photocoupler.

6. Rotate the disk through two or three revolutions to ensure that it does not contact the photocoupler.

7. Replace the cover with the hex head screws removed in Step 1.

### 7.1.9. Switch Replacement Old Style

1. Remove the hex head 1/4-20 screws and cover from the pulser switch assembly.

2. Remove and tag the wires from the switch terminals.

3. Remove the two screws retaining the switch.

**7.1.9. Switch Replacement Old Style,** continued

4. Install the new switch with the screws removed in Step 3.

5. Check for proper operating "window". Switch should actuate when the lift-to-start lever clears the nozzle locks. Adjust the tab as needed.

6. Replace the wires removed in Step 2.

7. Replace the cover using the hardware removed in Step 1.

**7.1.10. Switch Replacement New Style**

1. It may be necessary on certain model dispensers to remove the nozzle boot in order to access the handle switch. If so, remove the nozzle boot taking care to disconnect the wiring harness from the handle switch as the boot is being removed.

2. Remove the two (2) 6-32 screws which secure the handle switch to its mounting bracket.

3. Install the new switch using the previously removed screws.

4. Re-install the nozzle boot if it was previously removed.

5. Connect the wiring harness to the head of the dispenser.

6. Test the handle switch for proper operation.

**7.1.11. Battery Replacement**

**Note: It may be necessary to remove the computer from the dispenser in order to replace the battery.**

1. Remove the two Phillips head screws which secure the battery to the computer and remove the defective battery.

2. Install the new battery.

3. Tie wrap the battery down and apply silicone compound to the leads to prevent corrosion.

**Note: When replacing a NICAD battery with a LITHIUM battery the transistor labeled Q10 must be cut off of the computer. Failure to do so will destroy the LITHIUM battery.**

## 7.2. HYDRAULIC COMPONENT REPLACEMENT

### 7.2.1. Installation of Diaphragm Kit All Styles

**Note: Before removing any parts from the diaphragm valve, trip the impact valve, and shut off the submersible pump for the product in question.**

1. Remove the four (4) bolts and the diaphragm cover.

2. Remove all existing parts and discard them, with the exception of the center section and the cover, which must be reused. Take note of the position of the parts as they are removed so that the new parts can be installed in the same way.

3. The perforated back up plate must be assembled first, with the dished center hole located around the valve seat and the higher outside diameter level with the valve body. Care must be taken during assembly to be sure the plate has not slipped and become pinched between the diaphragm and the body.

4. The spring must be seated squarely in the spring cup so that it will stay in place when the valve plate is installed. The relief valve must enter the end of the spring without dislodging the spring from the spring cup.

**7.2.1. Installation of Diaphragm Kit All Styles,** continued

5. The notched gasket must be between the valve plate and cover, and the gasket with the hole between the valve plate and center section.

6. Hand tighten the four (4) bolts, using a criss-cross pattern until the bolt heads just contact the valve cover. Continue this pattern increasing torque until all bolts are fastened, to a torque of 9-11 ft.-lbs. This torque must not be exceeded in order to prevent the gaskets from deforming and covering the ports.

7. Check operation and inspect for leaks.

### 7.2.2. New Style Diaphragm Valve

**Note: Before removing any parts from the diaphragm valve, trip the impact valve, and shut off the submersible pump for the product in question.**

1. Remove the three (3) bolts which secure the diaphragm valve to the strainer casting.

2. Remove the three (3) bolts which secure the diaphragm valve to the meter support.

3. Remove the two (2) bolts which secure the diaphragm valve to the rear of the junction box, and pull the diaphragm valve free.

4. Remove the two screws which secure the actuator to the diaphragm casting and remove the actuator.

5. Install the actuator onto the new diaphragm casting and reinstall the diaphragm, using the reverse procedure. Be sure to use a new gasket between the diaphragm and the strainer casting.

6. Check operation and inspect for leaks.

### 7.2.3. Actuator, in New Hydraulic Dispensers Only

**Note: Before removing any parts from the diaphragm valve, trip the impact valve, and shut off the submersible pump for the product in question.**

1. Remove the diaphragm as in Section 7.8.8.

2. Remove the actuator from the diaphragm valve casting by first removing the two screws which secure it.

3. Install the new actuator, and reinstall the diaphragm.

4. Check operation and inspect for leaks.

### 7.2.4. Meter in New Hydraulic Dispensers

**Note: Before removing the meter trip the impact valve and shut off the submersible pump for the product in question.**

1. Remove the four (4) bolts which secure the meter to the meter support.

2. Remove the meter. Note the position of the two (2) "O" rings so that they may be replaced in the proper location.

3. Reinstall the meter using the previously removed bolts. Take care that the "O" rings remain in their proper positions.

4. Check operation and inspect for leaks.

### 7.2.5. Old Style Diaphragm Valve

**Note: Before removing any parts from the diaphragm valve, trip the impact valve, and shut off the submersible pump for the product in question.**

1. Remove the two (2) sets of nuts, bolts, and lockwashers which secure the diaphragm valve to its bracket. These are located at the lower end of the diaphragm valve casting.

2. Remove the three (3) copper tubings which connect the solenoid valves to the diaphragm valve.

3. Remove the two (2) bolts which attach the diaphragm casting to the totalizer bracket and gear assembly. This will require that a seal wire be cut off of one of the bolts.

4. Remove the meter and diaphragm valve as a unit.

5. Remove the four (4) bolts which attach the diaphragm valve to the meter, and remove the diaphragm valve from the meter.

6. Install the new diaphragm valve casting using the previously removed bolts. Take care that the "O" rings, which seal the meter inlet and outlet, remain in their proper positions.

7. Reinstall the diaphragm and meter assembly. Replace the seal wire which was cut off in Step 3.

8. Reconnect the copper tubings removed in Step 2.

**7.2.5. Old Style Diaphragm Valve,** continued

9. Check the operation and inspect for leaks.

**7.2.6. Meter in Dispensers Using Old Style Hydraulics**

**Note: Before removing the meter trip the impact valve and shut off the submersible pump for the product in question.**

1. Remove the four (4) bolts which secure the meter to the diaphragm valve casting.

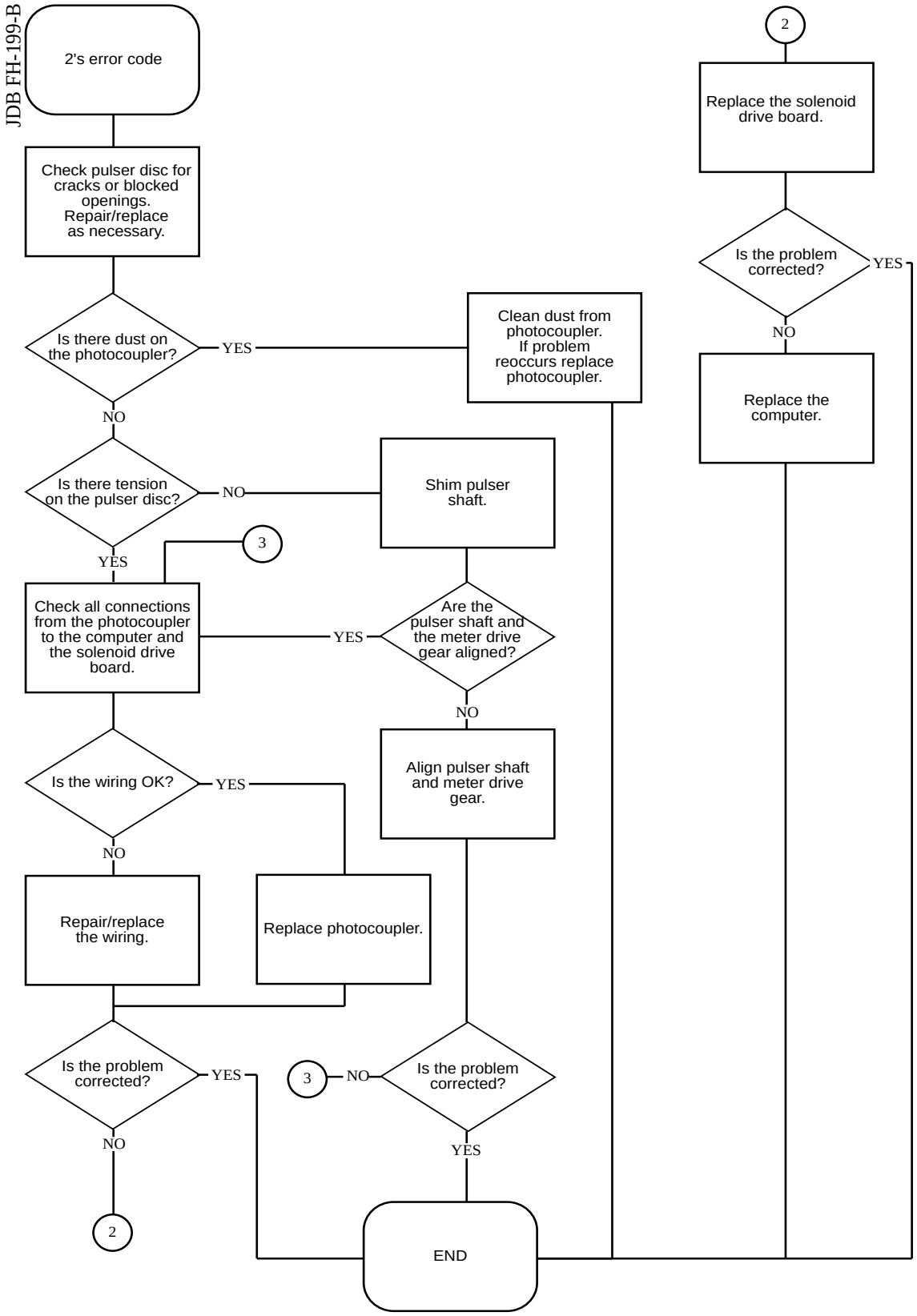
2. Remove the meter. Take note the position of the "O" rings so that the new ones may be installed in the correct position.

3. Install the new meter using the previously removed bolts. Be careful that the "O" rings remain in their proper position.

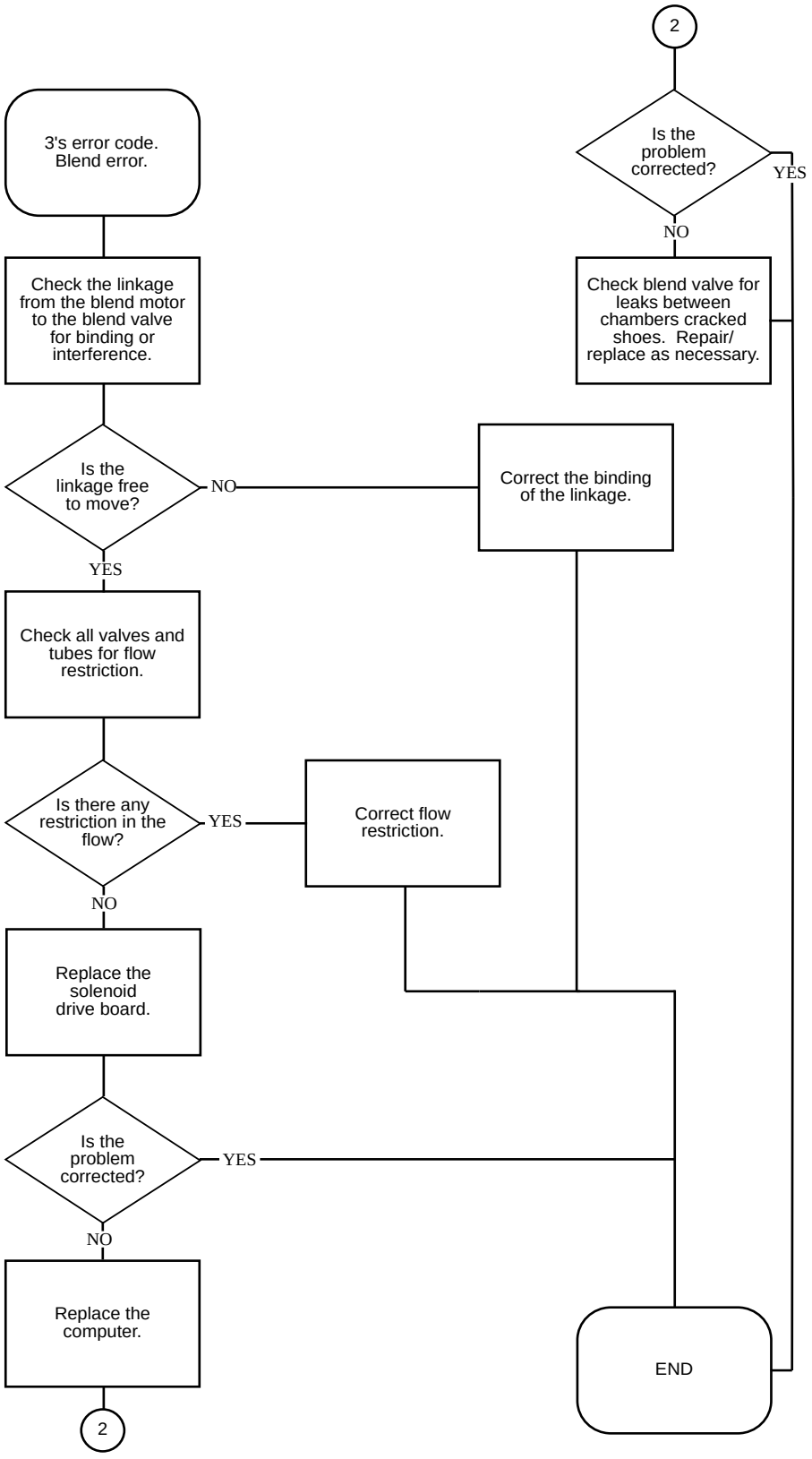
4. Check the operation and inspect for leaks.

## APPENDIX A

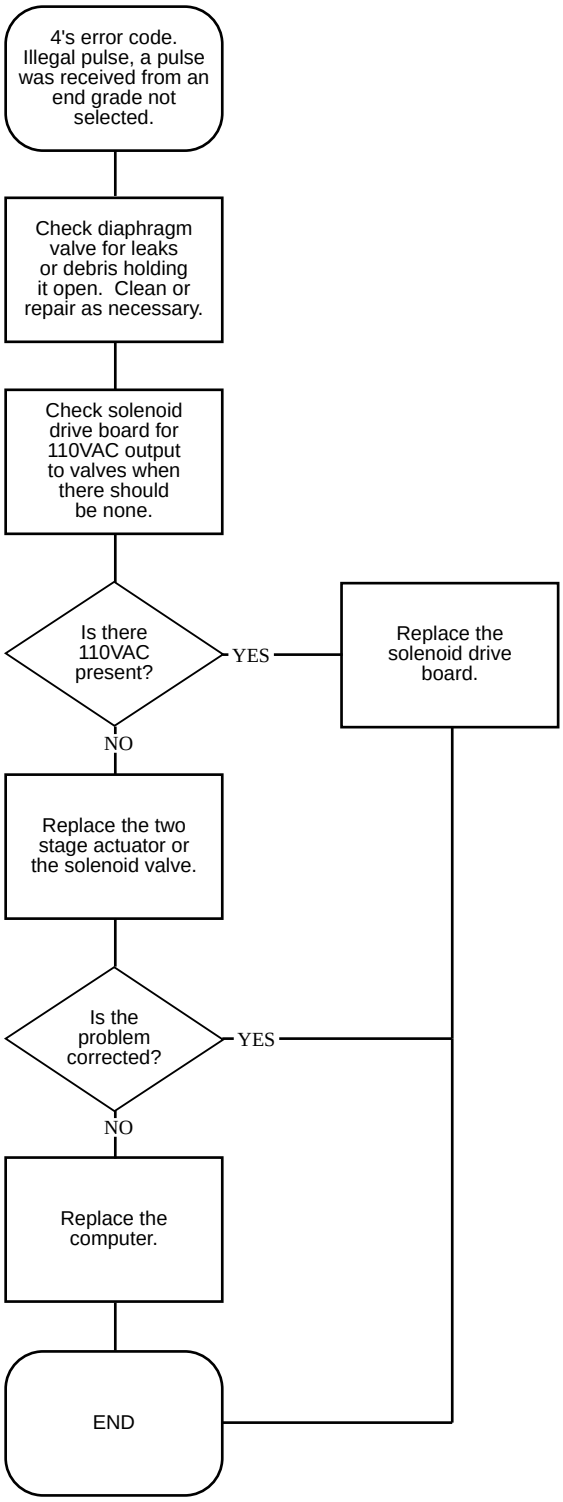
TROUBLESHOOTING FLOWCHARTS



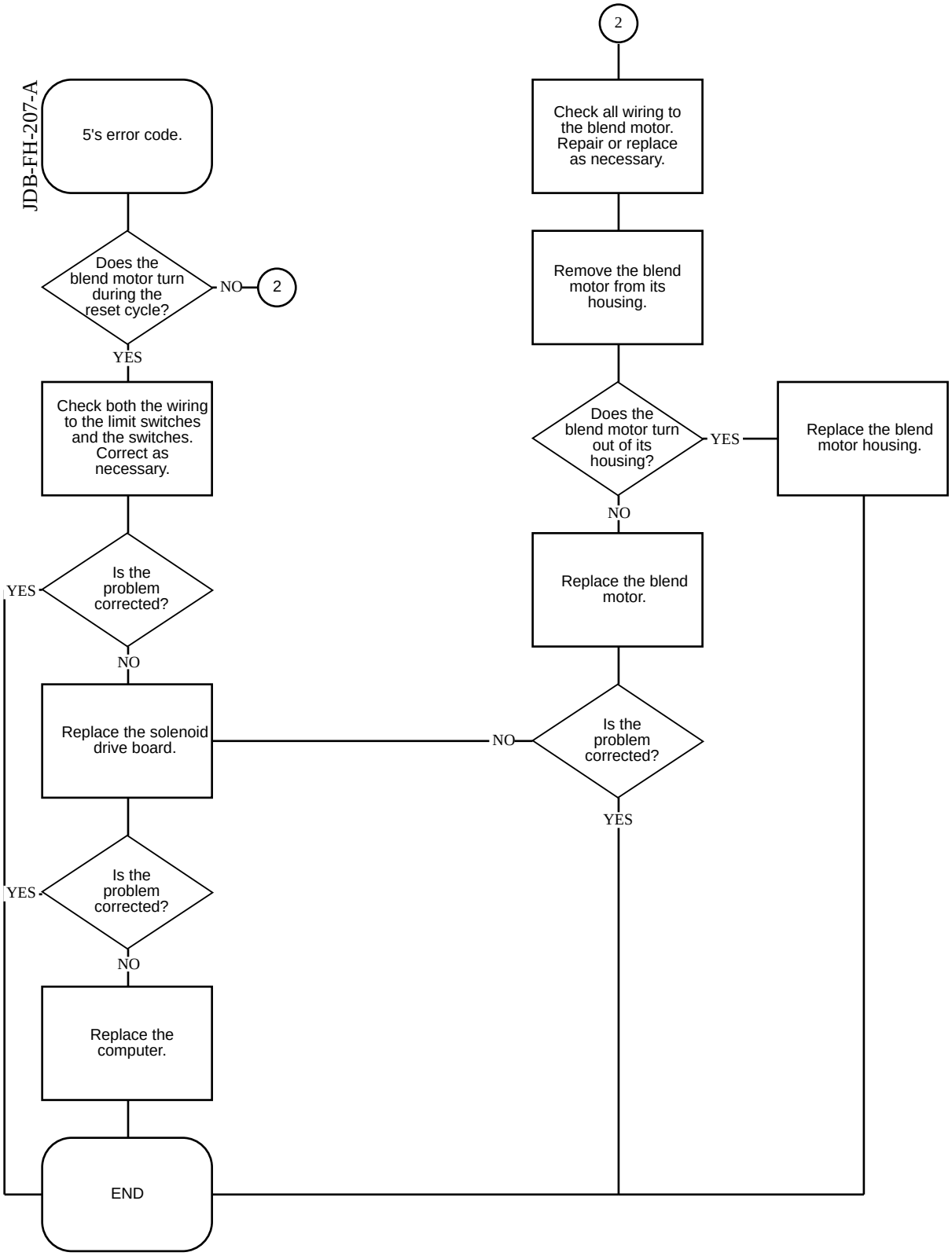

**FLOWCHART A-1. 2'S ERROR CODE**




**FLOWCHART A-2. 3'S ERROR CODE**

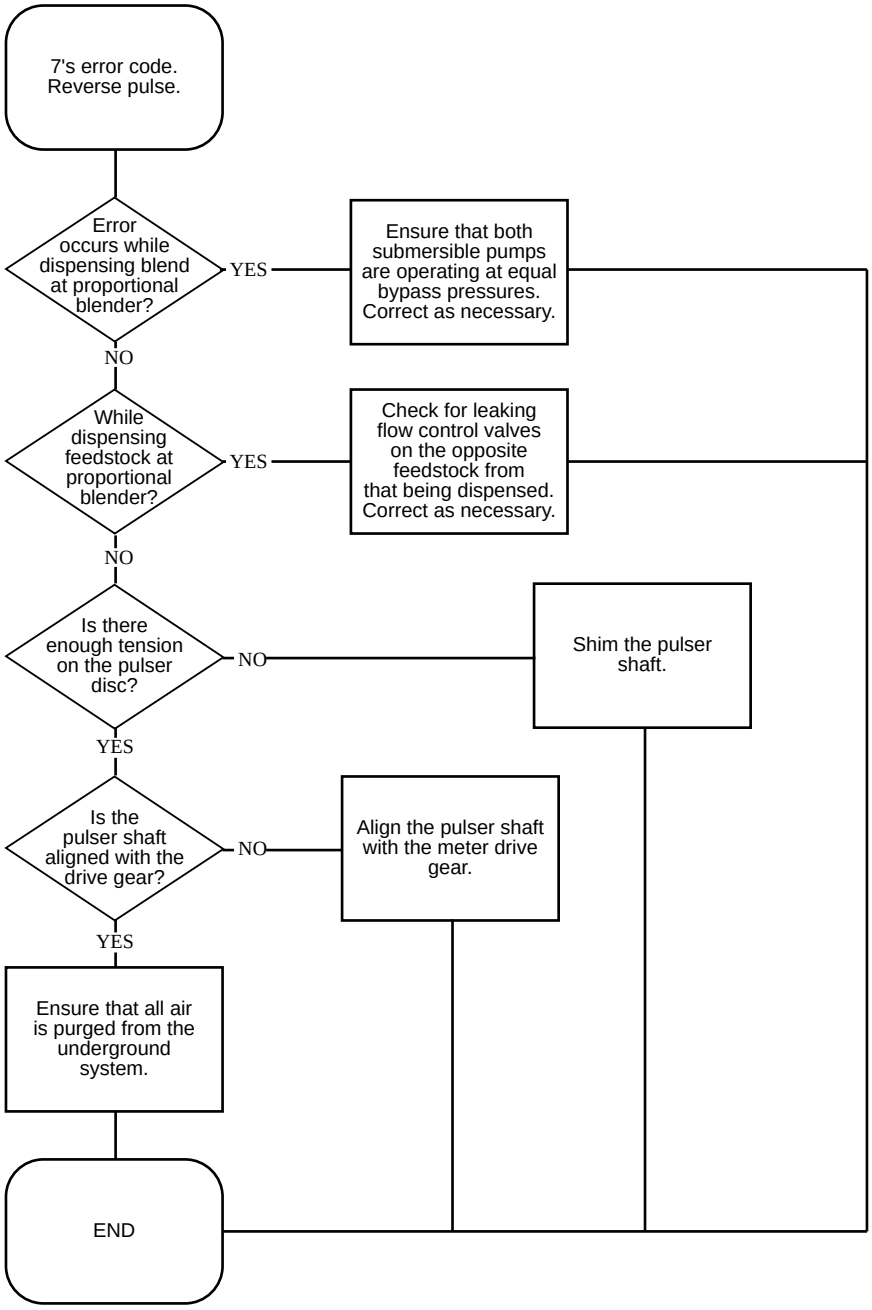



**FLOWCHART A-3. 4'S ERROR CODE**

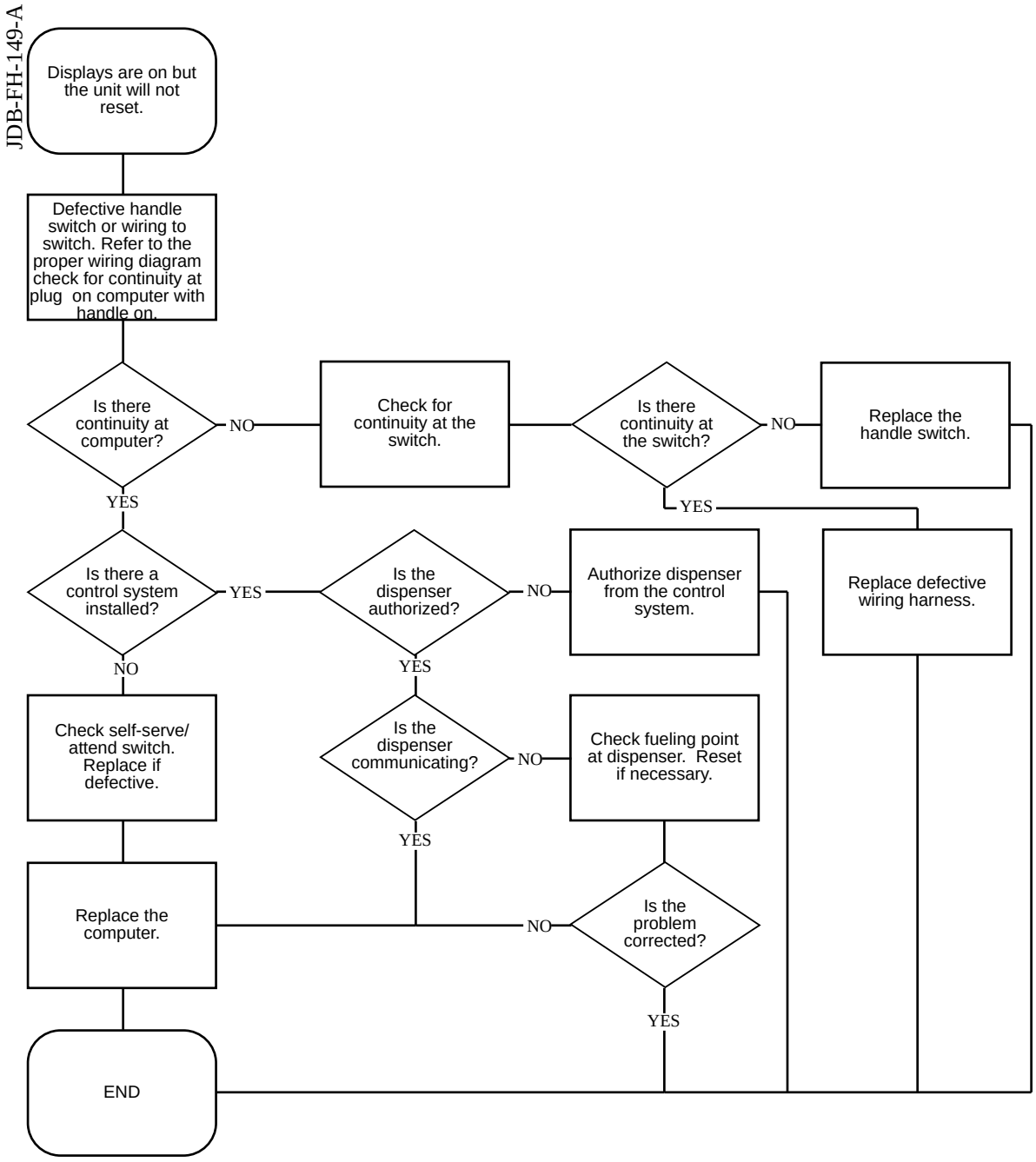



**FLOWCHART A-4. 5'S ERROR CODE**

JDB-FH-202-B

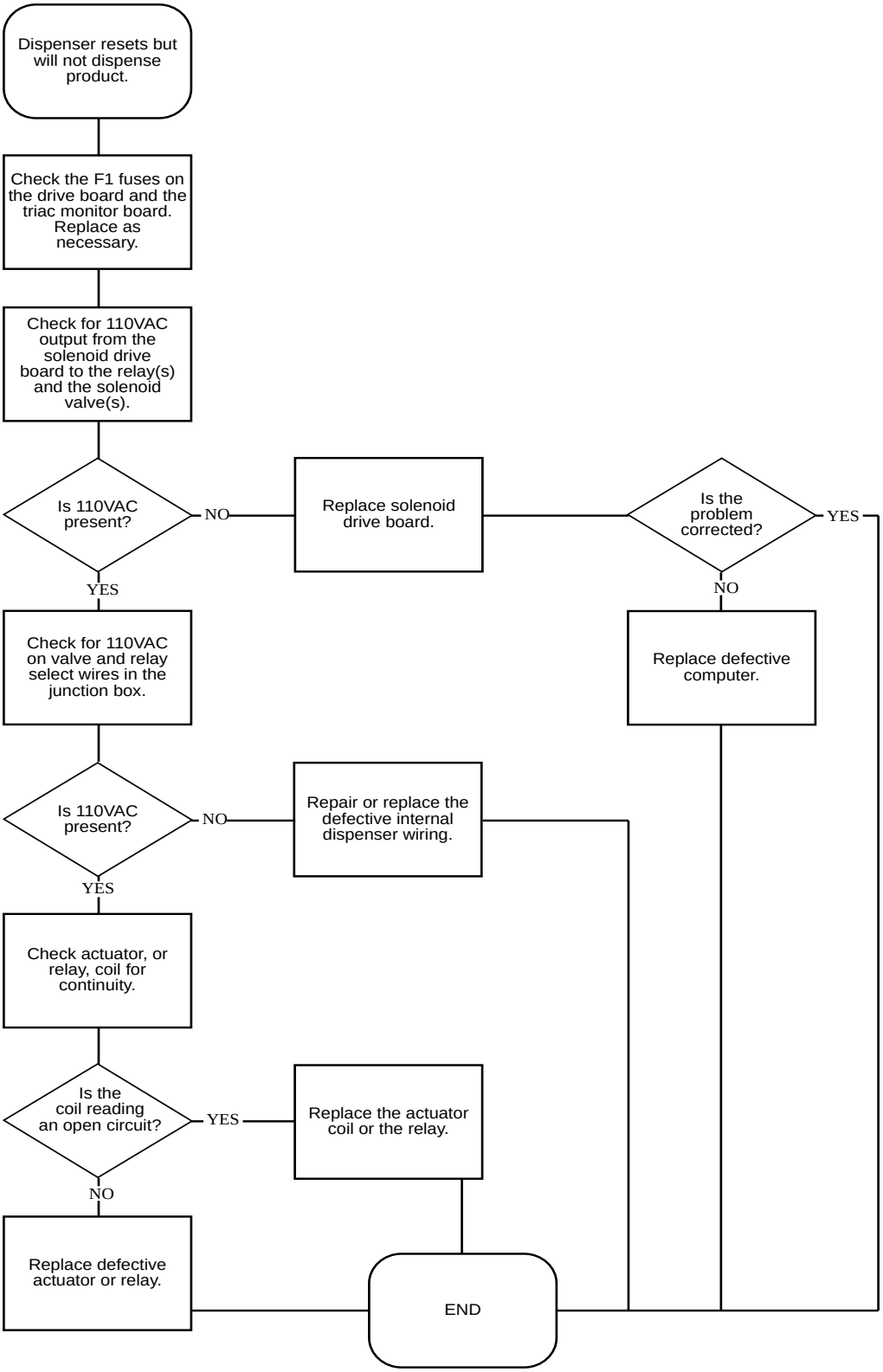



**FLOWCHART A-5. 7'S ERROR CODE**

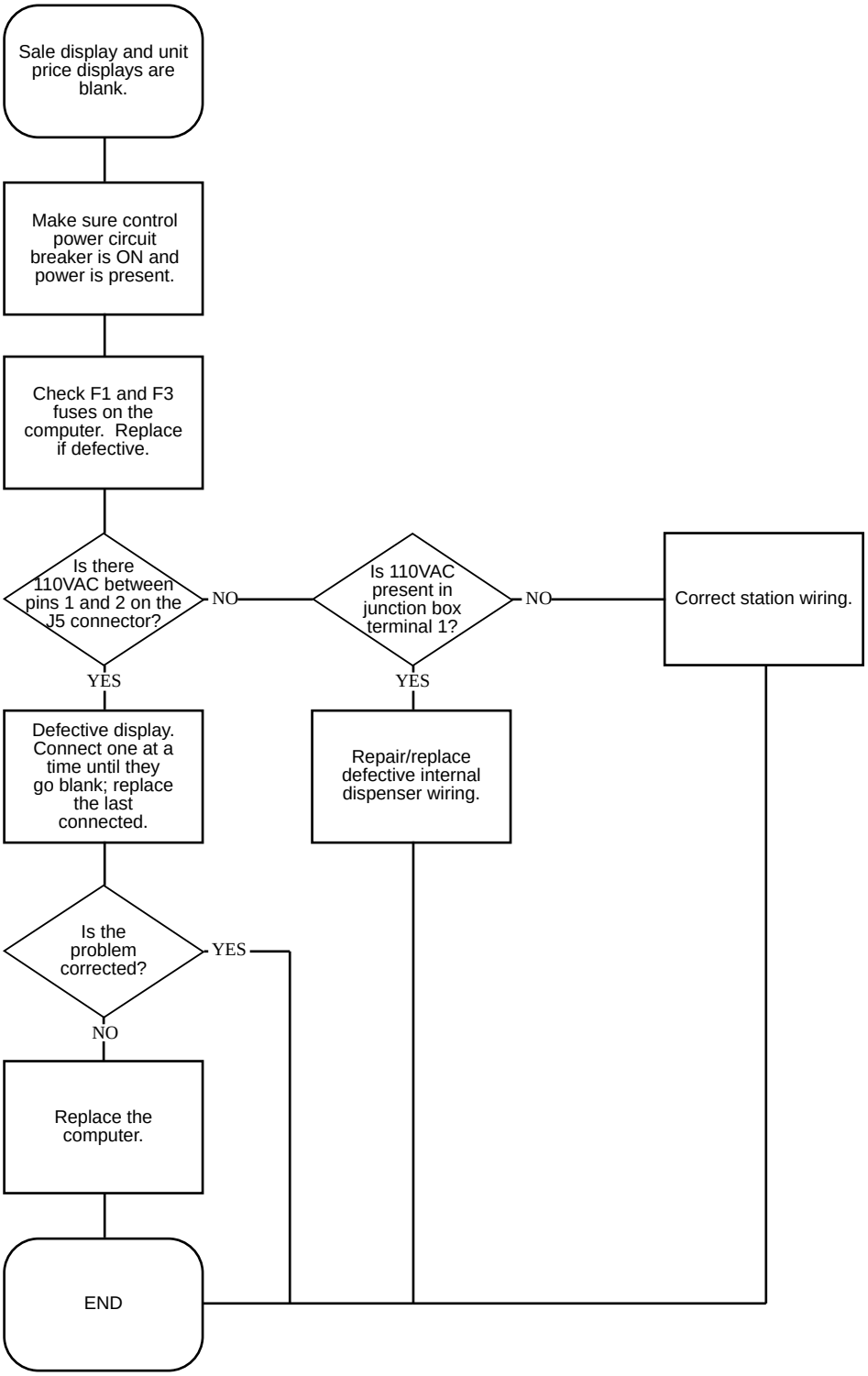



**FLOWCHART A-6. UNIT WILL NOT RESET**

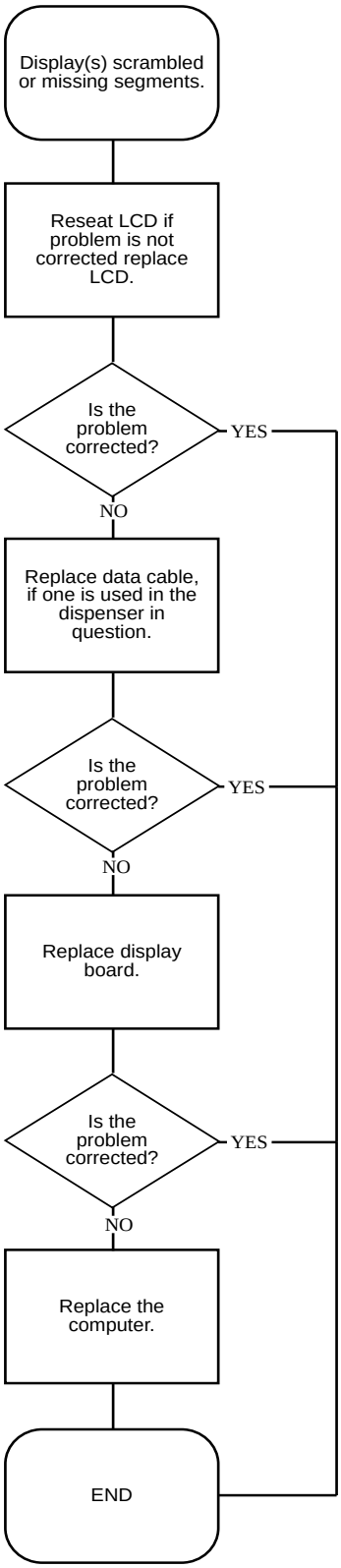
JDB-FH-203-A



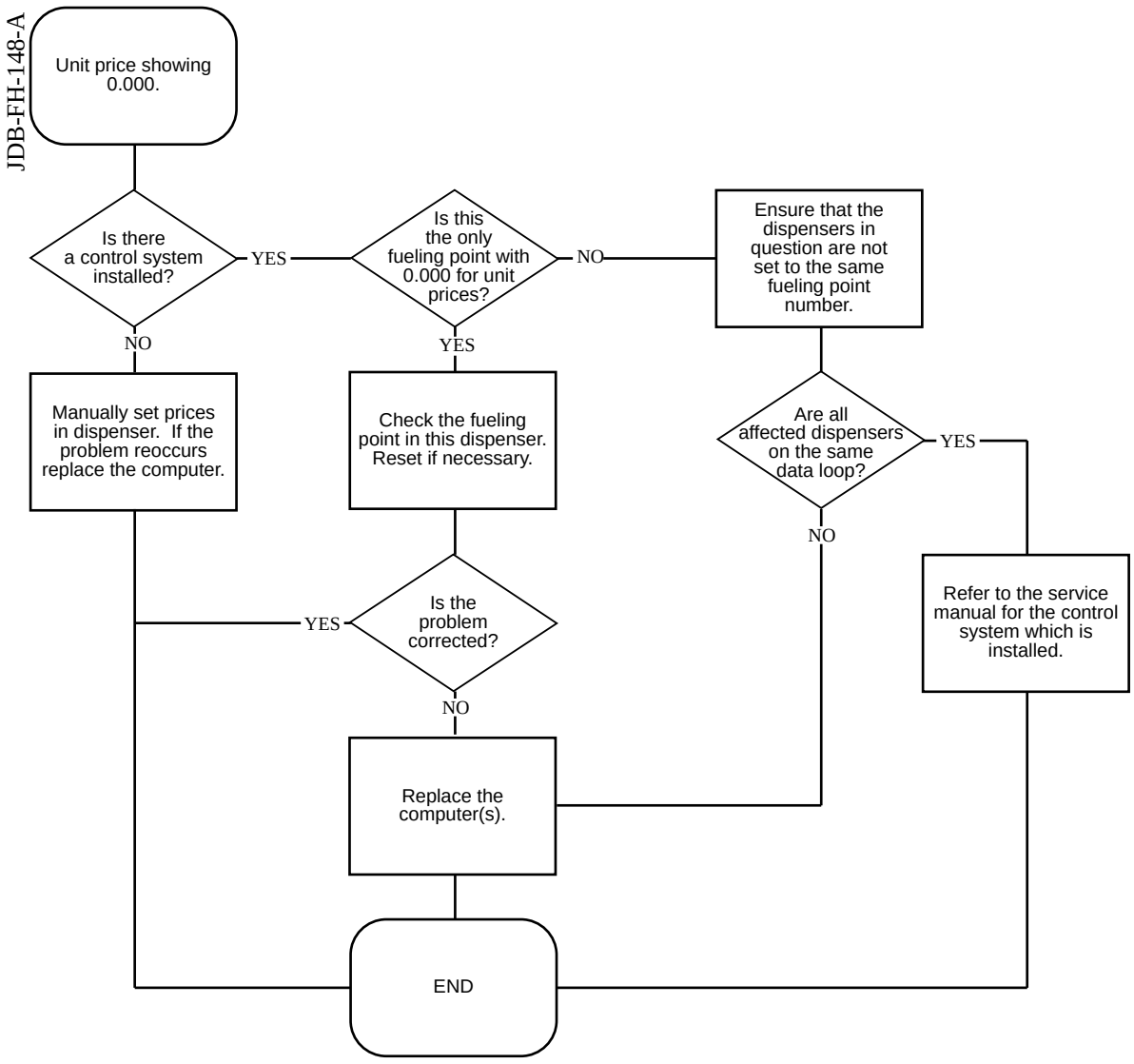

**FLOWCHART A-7. DISPENSERS RESETS BUT WILL NOT DISPENSE**



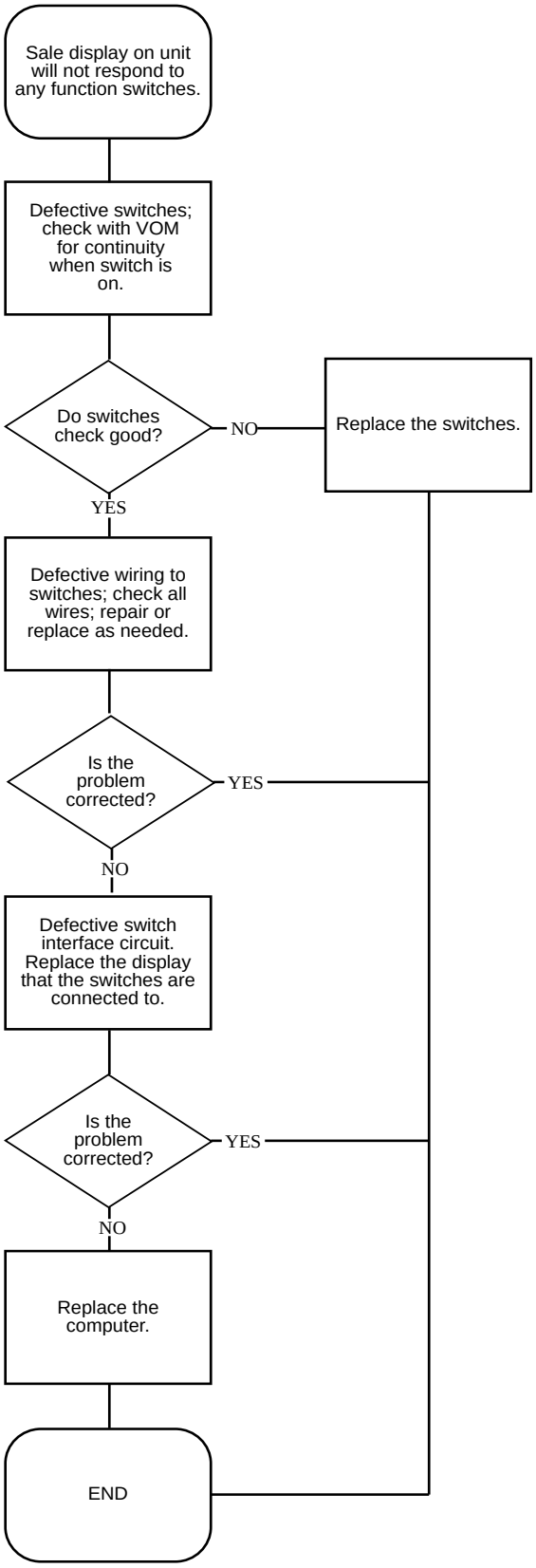

**FLOWCHART A-8. DISPLAYS ARE BLANK**




**FLOWCHART A-9. DISPLAYS ARE SCRAMBLED**

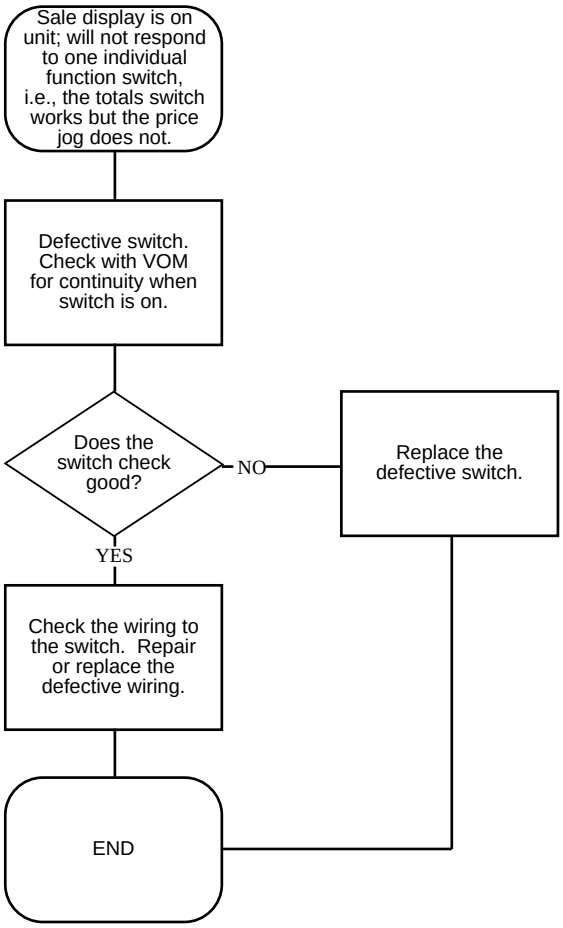



**FLOWCHART A-10. UNIT PRICES SHOWING 0.000**

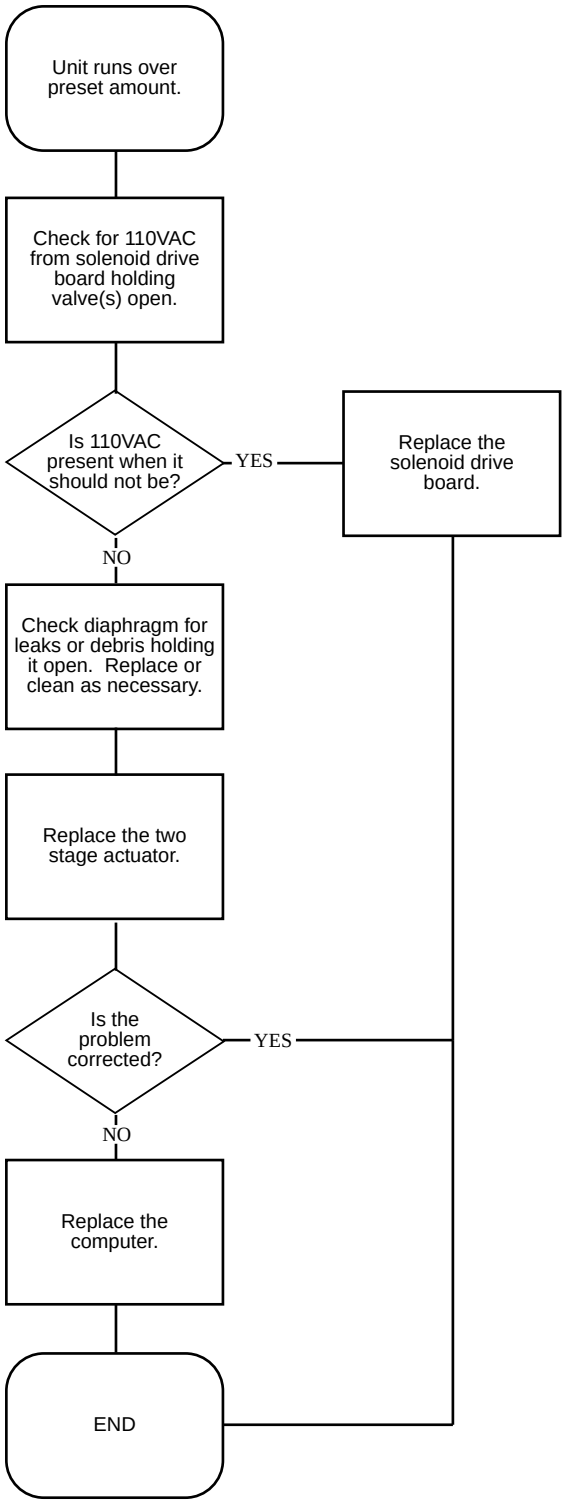



**FLOWCHART A-11. NO RESPONSE TO FUNCTION SWITCHES**

JDB-FH-146-A



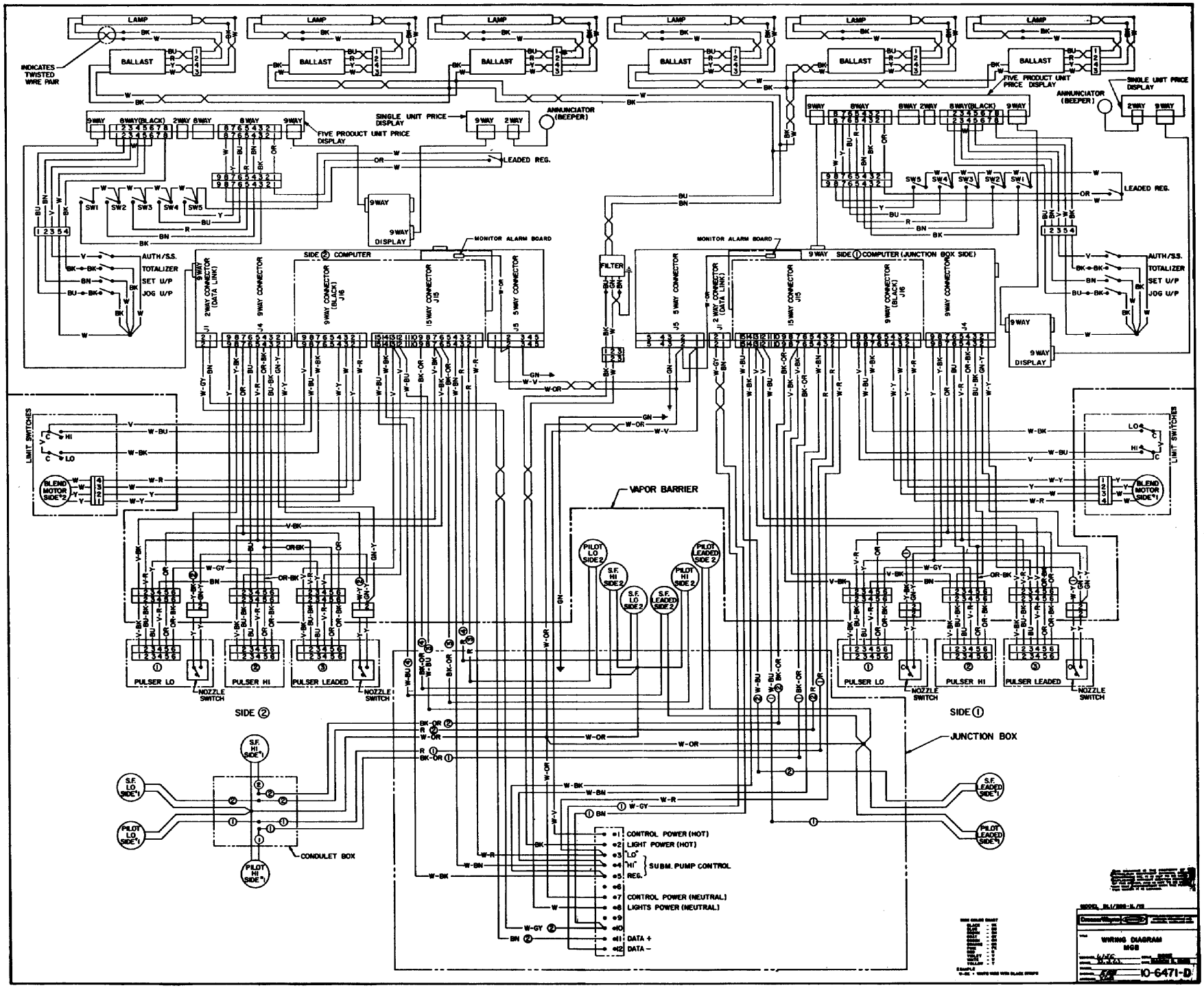

82 **FLOWCHART A-12. UNIT WILL NOT RESPOND TO AN INDIVIDUAL FUNCTION SWITCH**

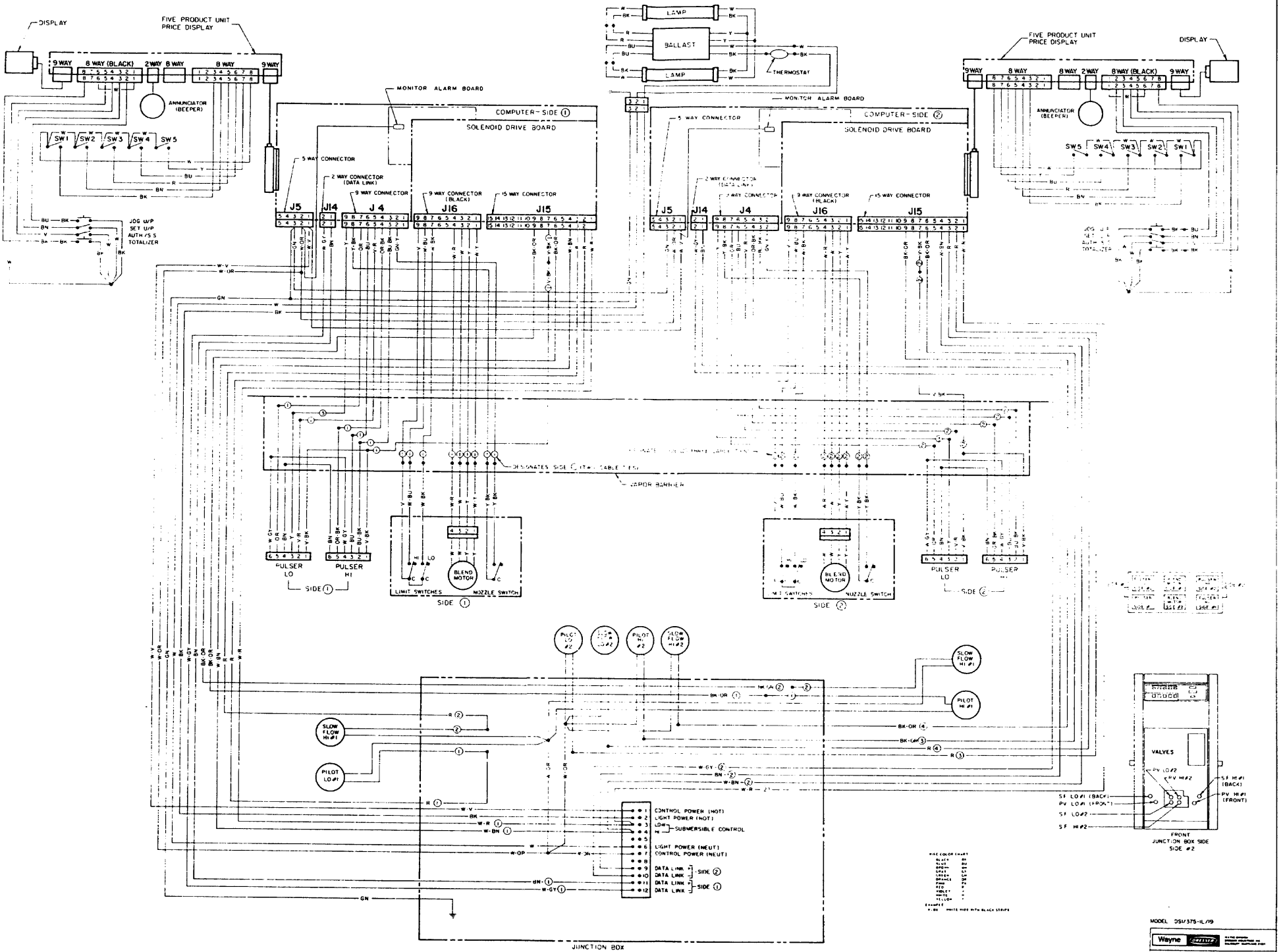



**FLOWCHART A-13. UNIT RUNS OVER PRESET AMOUNT**

## APPENDIX B

DISPENSER INTERNAL WIRING DIAGRAMS


LAMP
BALLAST
INDICATES TWISTED WIRE PAIR
FIVE PRODUCT UNIT PRICE DISPLAY
SINGLE UNIT PRICE DISPLAY
ANNUNCIATOR (BEEPER)
LEADED REG.
9 WAY DISPLAY
MONITOR ALARM BOARD
SIDE ② COMPUTER
SIDE ① COMPUTER (JUNCTION BOX SIDE)
AUTH/S.S.
TOTALIZER
SET U/P
JOG U/P
FILTER
LIMIT SWITCHES
BLEND MOTOR SIDE #2
BLEND MOTOR SIDE #1
VAPOR BARRIER
PILOT LO SIDE 2
S.F. HI SIDE 2
S.F. LO SIDE 2
PILOT HI SIDE 2
PILOT LEADED SIDE 2
S.F. LEADED SIDE 2
PULSER LO
PULSER HI
PULSER LEADED
NOZZLE SWITCH
SIDE ②
SIDE ①
JUNCTION BOX
CONDULET BOX
S.F. HI SIDE #1
S.F. LO SIDE #1
PILOT LO SIDE #1
PILOT HI SIDE #1
S.F. LEADED SIDE #1
PILOT LEADED SIDE #1
#1 CONTROL POWER (HOT)
#2 LIGHT POWER (HOT)
#3 "LO"
#4 "HI" SUBM. PUMP CONTROL
#5 REG.
#6
#7 CONTROL POWER (NEUTRAL)
#8 LIGHTS POWER (NEUTRAL)
#9
#10
#11 DATA +
#12 DATA –
WIRING DIAGRAM MGB
10-6471-D




MODEL DSI/375-HL/19

Wayne

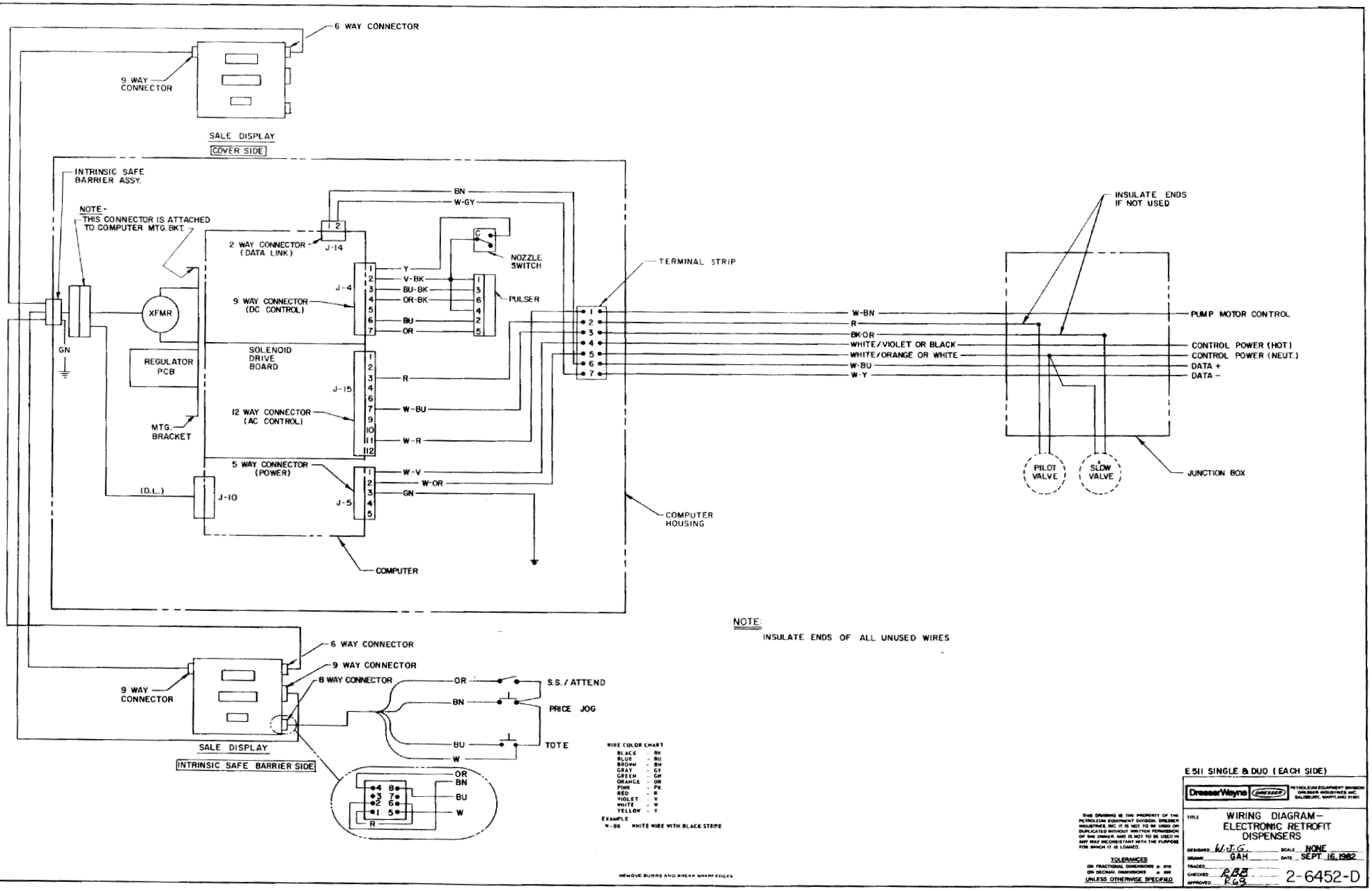
# WIRING DIAGRAM

DUO BLENDER REMOTE DISPENSER

NONE

MARCH 12, 1987

9-6478-D




NOTE:
INSULATE ENDS OF ALL UNUSED WIRES

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

REMOVE BURRS AND BREAK SHARP EDGES



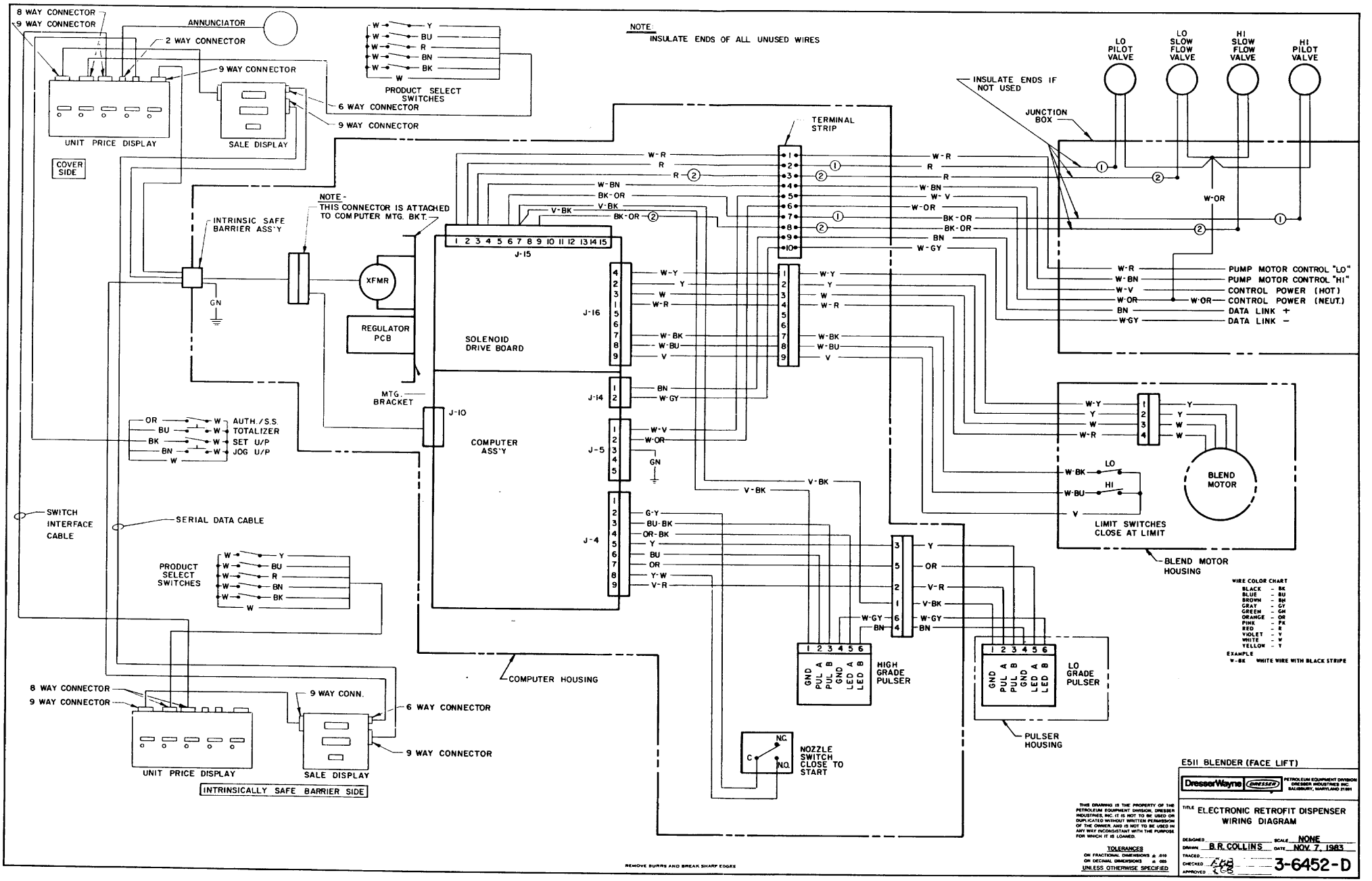
TOLERANCES
ON FRACTIONAL DIMENSIONS ± 1/16
ON DECIMAL DIMENSIONS ± .005
UNLESS OTHERWISE SPECIFIED

E 511 SINGLE & DUO (EACH SIDE)

Dresser Wayne — PETROLEUM EQUIPMENT DIVISION, DRESSER INDUSTRIES INC., SALISBURY, MARYLAND 21801

TITLE: WIRING DIAGRAM— ELECTRONIC RETROFIT DISPENSERS

| | | | |
|---|---|---|---|
| DESIGNED | W.J.G. | SCALE | NONE |
| DRAWN | GAH | DATE | SEPT. 16, 1982 |
| TRACED | | | |
| CHECKED | RBB | | 2-6452-D |
| APPROVED | RGS | | |




E511 BLENDER (FACE LIFT)

DresserWayne / DRESSER — PETROLEUM EQUIPMENT DIVISION DRESSER INDUSTRIES INC SALISBURY, MARYLAND 21801

TITLE: ELECTRONIC RETROFIT DISPENSER WIRING DIAGRAM

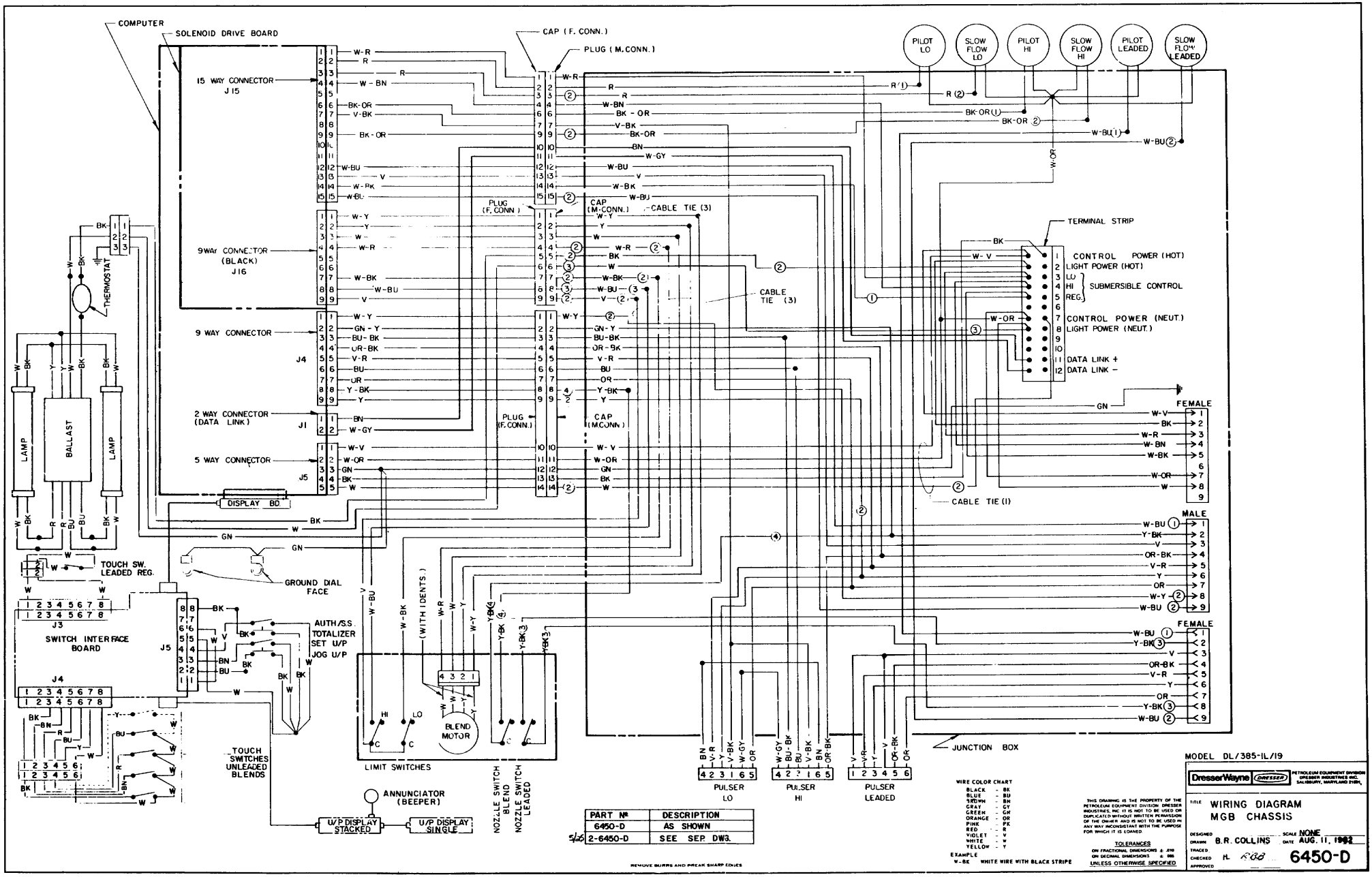
DESIGNED
DRAWN B.R. COLLINS
TRACED
CHECKED
APPROVED

SCALE NONE
DATE NOV. 7, 1983

3-6452-D



TOLERANCES
ON FRACTIONAL DIMENSIONS ± .010
ON DECIMAL DIMENSIONS ± .005
UNLESS OTHERWISE SPECIFIED




| PART № | DESCRIPTION |
|---|---|
| 6450-D | AS SHOWN |
| 5/26 2-6450-D | SEE SEP. DWG. |

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

REMOVE BURRS AND BREAK SHARP EDGES



TOLERANCES
ON FRACTIONAL DIMENSIONS ± 1/16
ON DECIMAL DIMENSIONS ± .005
UNLESS OTHERWISE SPECIFIED

MODEL DL/385-IL/19

Dresser Wayne / DRESSER — PETROLEUM EQUIPMENT DIVISION DRESSER INDUSTRIES INC. SALISBURY, MARYLAND 21801

TITLE WIRING DIAGRAM MGB CHASSIS

DESIGNED
DRAWN B.R. COLLINS
TRACED
CHECKED H. RBB
APPROVED

SCALE NONE
DATE AUG. 11, 1982

6450-D

# USER'S RESPONSE SHEET

Manual Title: _____

Manual Revision: _____ Date of This Letter: _____

User's Name: _____ Telephone: _____

Company: _____ Your Position: _____

Street Address: _____

City/State/Zip Code: _____

How would you rate the quality of this manual:

| | Excellent | Good | Fair | Poor |
|---|---|---|---|---|
| Accuracy | _____ | _____ | _____ | _____ |
| Organization | _____ | _____ | _____ | _____ |
| Clarity | _____ | _____ | _____ | _____ |
| Completeness | _____ | _____ | _____ | _____ |
| Overall Design | _____ | _____ | _____ | _____ |
| Length | _____ | _____ | _____ | _____ |
| Illustrations | _____ | _____ | _____ | _____ |
| Examples | _____ | _____ | _____ | _____ |
| Index | _____ | _____ | _____ | _____ |
| Binding Method | _____ | _____ | _____ | _____ |

Please list any discrepancy found in this manual by page, paragraph, figure, or table number in the following space. If there are any other suggestions that you wish to make, feel free to include them. Thank you.

Location in Manual Comment/Suggestion/Discrepancy

_____ _____

_____

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FOLD

# 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."

Wayne Division, Dresser Industries Inc., P.O. Box 1859, Salisbury, MD 21802-1859, (410) 546-6600
Part No.917460 Rev. B  200/4/91