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MID:COM 8000

**Installation, Operation
&
Maintenance Manual**

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MID:COM 8000 COMPUTER REGISTER INSTALLATION INSTRUCTIONS

OVERVIEW:

These instructions describe the procedures to install a standard MID:COM 8000 computer register on a fuel delivery truck. Instructions for installing and using optional or additional accessories are included with those accessories. The installation procedure is broken down into the 7 basic steps listed below. Attention to detail will insure long-term reliability.

- 1. Mounting the Computer/Printer Unit.**
- 2. Mounting the Register Head.**
- 3. Routing Cables.**
- 4. Connecting Cables.**
- 5. Power Hookup.**
- 6. Calibration.**
- 7. Spike Suppressor Installation.**

1. Mounting the Computer/Printer:

The MID:COM 8000 is supplied with an aluminum pedestal for mounting in the cab of the truck. The pedestal uses a base plate that should be securely bolted to the floor of the truck, and preferably through a structural member. A support plate under the floor may be necessary to gain rigidity. Alternately, the braces supplied may be used for further support. The pedestal post supplied is usually too long for most installations and should be cut as short as practical to further help to reduce movement and vibration.

Position the pedestal so that the driver has good access to the keyboard and will be looking relatively straight on, or slightly down at the display. Here again, it is important to keep the unit as low as possible. Keep the unit clear of gearshift levers and other controls in the cab. Once the computer is mounted, tighten all set-screws and check for stability.

2. Mounting the Register Head:

The MID:COM 8000 mounts directly onto a Neptune 1-1/4” or larger meter with no adapters. All other meters use a Veeder-Root style mounting and therefore an adapter is necessary to convert from the Veeder-Root style to a Neptune configuration. MID:COM supplies three adapters for this purpose as listed below plus a fourth adapter for Neptune compensators.

A. MODEL VR-1. - This adapter is used in the majority of conversions. It will accept all Veeder-Root gear-plates that are used in conjunction with a mechanical preset mechanism, and many that are not.

B. MODEL VR-2. - This adapter requires no gear-plate and is specifically designed for Smith meters that use a yoke style coupling and output of 1 revolution per gallon.

C. MODEL VR-3. - This adapter accepts a straight through drive from gear-plates that are used with a preset and have a 10.1 turn-down ratio from the meter to the preset.

D. MODEL VR-4. - This adapter is required when mounting to a Neptune meter with a mechanical temperature compensator. The VR-4 adapter is mounted in place of the mechanical temperature compensator assembly.

The VR adapters may be converted from one to another with the proper kits available from the factory. Instructions for using the particular adapter are included with each kit.

Mount the register to the meter or adapter by lowering it down onto the vertical-mounting studs. The drive yoke in the register and the star drive on the meter must mate properly as the register is mounted. Moving the register back and forth and side to side will aid in alignment.

Once the register is seated properly, tighten the two tie-down bolts finger tight. Wrench tighten approximately one more turn. Check to see that the register will not rock back and forth. If it does, the top of the meter is probably warped and it is necessary that a shim be installed between the meter and register to level the surface.

3. Cable Routing:

Route the register cable from proximity of the register, down along the inside of the truck frame or along piping, and then into the cab. Keep away from other wiring as much as possible. Use the cable-ties supplied to secure the cable from movement and possible chaffing, and stay clear of moving parts. Where the cable must pass through a hole in sheet metal, use grommets to line the edge of the hole. The cable may be run in a split loom or tubing to further protect it from weather and abrasion. Cover the connector ends with electrical tape for routing. Stow any excess cable behind or under the seat where it will be protected. Do not coil the excess, but rather gather it in figure-eight fashion and secure it in a bundle with cable ties.

Route the power cable from the power source (explained in step 5), to the computer in a similar manner as above, avoiding areas that may cause damage to the cables.

After the cables are connected to the computer and register, make sure that they are strapped in such a way that the connectors will not move in relation to their mates. Do not allow the cables to dangle from the connectors. However, make sure not to have excessive downward pressure on the cable ends as the connector locking ring will break.

4. Connecting Cables:

The MID:COM 8000 uses 9-pin and 4-pin circular locking type connectors. To make a connection, rotate the cable end connector until the mating keys are aligned and the connectors engage. Turn the locking collar clockwise until a noticeable “CLICK” is felt as the locking detent engages. Do not use pliers or other tools.

In a single meter system, the register cable is connected to the socket labeled “REGISTER 1” on the rear of computer. The power cable mates with the socket labeled “POWER”. (See 8000 Rear View Diagram on pg 14)

Be careful not to connect the power cable to either “Valve 1” or “Valve 2”.

The register end of the register cable has a heat shrunk cover for added protection.

5. Power Hookup:

The power cable assembly consists of a two conductor shielded cable for power, and a single conductor shielded cable for ignition pick up.

Route the single conductor cable from the computer to the vicinity of the fuse/breaker panel. Route the two-conductor cable to the vicinity of the truck battery. In both cases keep the cable protected from abrasive or moving parts, and secure with cable ties.

Make sure the truck battery has it's negative terminal grounded directly to the frame of the truck with a heavy conductor. **The truck frame will be the connection point for all grounds.**

Locate the closest connection point to the positive terminal of the battery. Usually the heavy conductor attached to the battery post terminates to a junction block close by. This is where the 12-volt power will be picked up.

Cut the two-conductor cable to a reasonable length that will allow the white wire and shield to connect to the truck frame and the red wire to the 12-volt source. Strip enough jacket to expose the shield and wires and then separate the wires from the shield. See note below on a convenient way to do this.

Strip the white wire of the two-conductor cable and twist it together with the shield. Crimp on one of the supplied terminals and attach directly to the frame of the truck with a nut and bolt. Make sure any paint or dirt has been scraped away.

Crimp terminal on the red wire and attach it to the 12-volt source. Wipe a small amount of grease on both terminations. This completes the power hookup.

Using a 12-volt test light, find a circuit at the fuse block which is only “ON” when the ignition is in the “RUN” position, and off in the “START” or “OFF” positions.

Cut and strip the single conductor cable and attach the center conductor to this circuit using an appropriate terminal or splice. Make sure the connection is secure and tie it off so that vibration will not knock it loose. The ignition sense line draws no power, so it is not necessary to find a heavy circuit. In fact it's best to find a circuit that has little load on it. I.E. AM/FM radio circuit.

Terminate the shield and connect it to a nearby screw that is grounded. Uses an Ohmmeter or test light to make sure the screw is grounded.

A length of wire is supplied to create a ground cable from the underside of the pedestal top to the truck frame. Using a 10GA single conductor cable and ring terminal and attach it to the underside of the pedestal top. Run the cable down to the top of the pedestal base and terminate again. Now run a separate cable from the top of the pedestal base down to the frame of the truck, insuring all connections are making good metal contact. This completes grounding the pedestal. Once all grounding is complete the connection(s) to the frame can be soldered in place to insure they stay tight.

On some vehicles there may be an air-ride seat to provide greater comfort for the driver. The installation of these seats can result in the driver's seat being insulated from the chassis ground thus allowing the driver/driver's seat to build up a static charge. A simple ground strap from the rail of the seat frame to the truck frame as indicated in the above procedure for the on-board computer should eliminate this potential static build-up.

NOTE: To separate the wires from the braided shield, slide the shield back so it bunches up near the end of the jacket. Use a pointed tool to open up a window in the braid. With the same tool, pull one wire out at a time through the hole.

6. Calibration:

Calibration of the MID:COM 8000 is done in the register head using numerically encoded switches. See the accompanying section describing the register module and calibration procedures.

The register leaves the factory with a calibrator setting of 1.000. This equates to a 1.1 ratio. When replacing an existing Veeder-Root register be sure to transfer any necessary gear plate from the register. This includes Liquid Control or other meters with external gearing. With the proper adaptor and gear plate in place the star gear output is one revolution equals one gallon. Installing our register set at 1.000 means it will repeat whatever the calibration was with the mechanical register.

If a Neptune or Lockheed register head was replaced note the number of the change-gears on the bottom of the register and use the example in the calibration procedure to set in the correct factor. A change-gear chart is included for reference.

CALIBRATION COMPARISON CHART FOR MECHANICAL REGISTERS TO MID:COM REGISTERS

CHANGE GEARS		MID:COM CAL. SETTINGS	CHANGE GEARS		MID:COM CAL. SETTINGS
REG. SPIN	S.B. SPIN	S1,2,3,4 (Gallons) S6,1,2,3,4 (Liters)	REG. SPIN	S.B. SPIN	S1,2,3,4 (Gallons) S6,1,2,3,4 (Liters)
29	33	1.1379	33	35	1.0606
30	34	1.1333	34	36	1.0588
24	27	1.1250	18	19	1.0556
25	28	1.1200	19	20	1.0526
26	29	1.1154	20	21	1.0500
17	27	1.1111	21	22	1.0476
28	31	1.1071	22	23	1.0455
29	32	1.1035	23	24	1.0435
30	33	1.1000	24	25	1.0417
32	35	1.0938	25	26	1.0400
23	25	1.0870	26	27	1.0385
24	26	1.0833	27	28	1.0370
25	27	1.0800	28	29	1.0357
26	28	1.0769	29	30	1.0345
27	29	1.0741	30	31	1.0333
28	30	1.0714	32	33	1.0313
29	31	1.0690	35	36	1.0286
30	32	1.0667	33	33	1.0000
31	33	1.0645			
32	34	1.0625			

NEPTUNE RECOMMENDS REPLACEMENT OF MEASURING CHAMBER @ 3% WEAR

(FOR GALLONS ROUND THE LAST 2 DIGITS)

EXAMPLE: 33 DIVIDED BY 31 = 1.0645 (LITERS) 1.065 (GALLONS)

7. Spike Suppressor Installation:

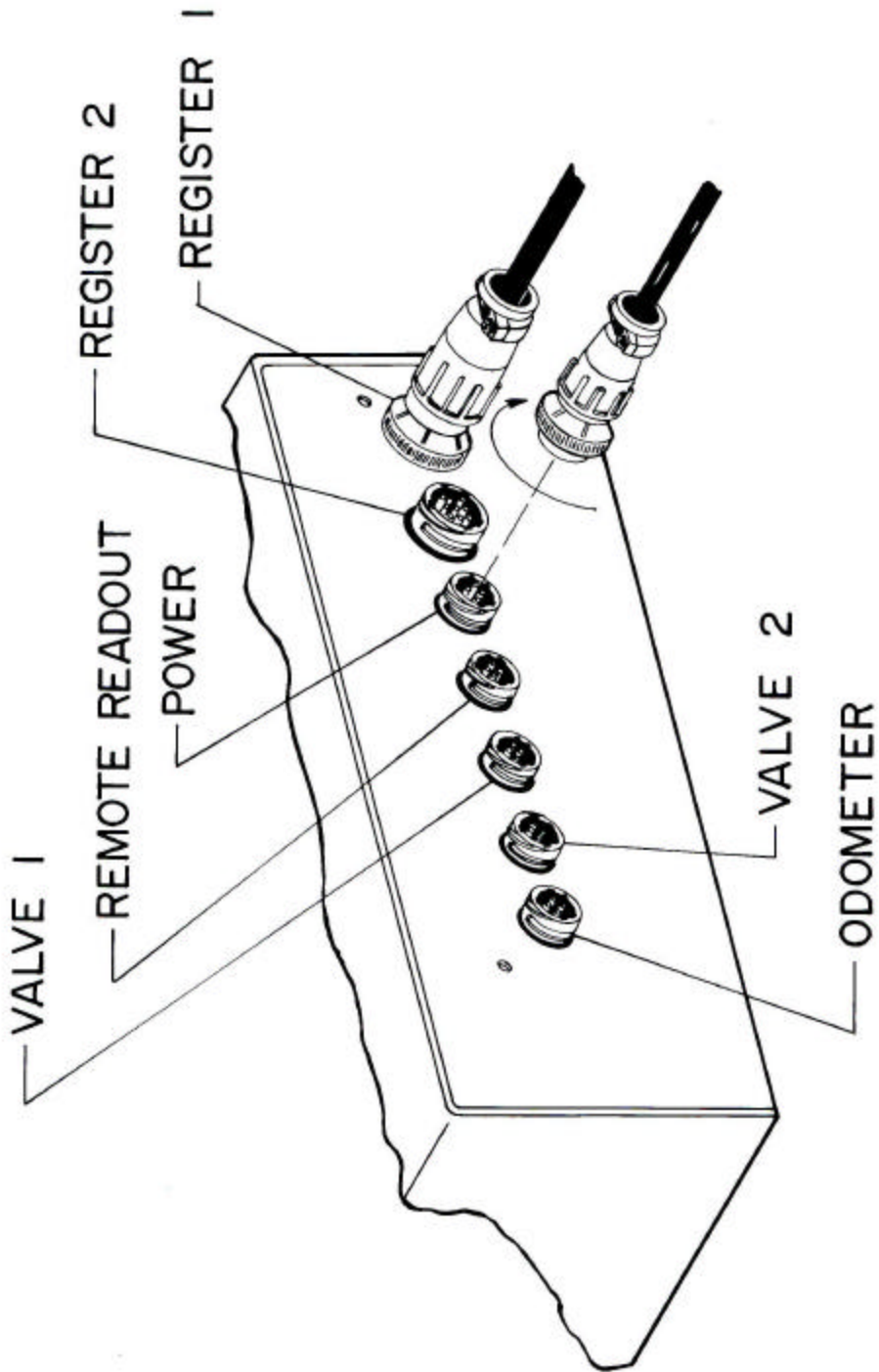
All MID:COM 8000's are shipped complete with one spike suppressor per register head, these are included in the installation kit. The spike suppressor must be installed across each hose reel solenoid. (See Accompanying Diagram) It also may be necessary to install more than the one on the hose reel solenoid or other spike producing components of the truck electrical or pumping system. If so, contact the factory to order additional spike suppressors.

NOTE: The installation kit contains extra terminals, adaptors, and splices to adapt to most installations. A simple 12-volt test light is best to use for finding the power and ignition hookups. Once the 8000's are installed and wired, perform a check of the truck's electrical system as described in the accompanying document **“Truck Electrical System Checkout”**

“TRUCK ELECTRICAL SYSTEM CHECKOUT”

1. With the truck not running and all accessories off, measure the no-load voltage directly across the battery terminals. This voltage should be between 12.0 and 12.6 volts. A voltage reading less than 12.0 indicates a faulty battery. Replace the battery with a properly rated battery. This will insure proper operation under increasing load.
2. With truck running, the voltage should read between 13.5 and 14.0 volts. This voltage should not drop significantly with all lights and accessories on. If it does, the voltage regulator or alternator may be faulty.
3. With the truck running and accessories on, check the voltage between the negative terminal of the battery and the frame of the truck, then between the negative and cab. If the reading is other than 0.0 with the meter on its lowest range, the truck has a faulty ground system. This can be corrected by connecting a large gauge wire or ground strap from the negative terminal to the point of the truck that registered a voltage.

NOTE: If the truck is equipped with a high power business band radio, this check should be made with the radio on and microphone keyed.



REEL MOTOR SOLENOID – SPIKE SUPPRESSOR INSTALLATION INSTRUCTIONS

The spike suppressor is a heavy-duty diode used to kill the high-voltage inductive kickback that occurs when the reel motor switch is released and the solenoid contactor opens. The spikes that are produced can cause electrical noise interference with any type of electronic equipment.

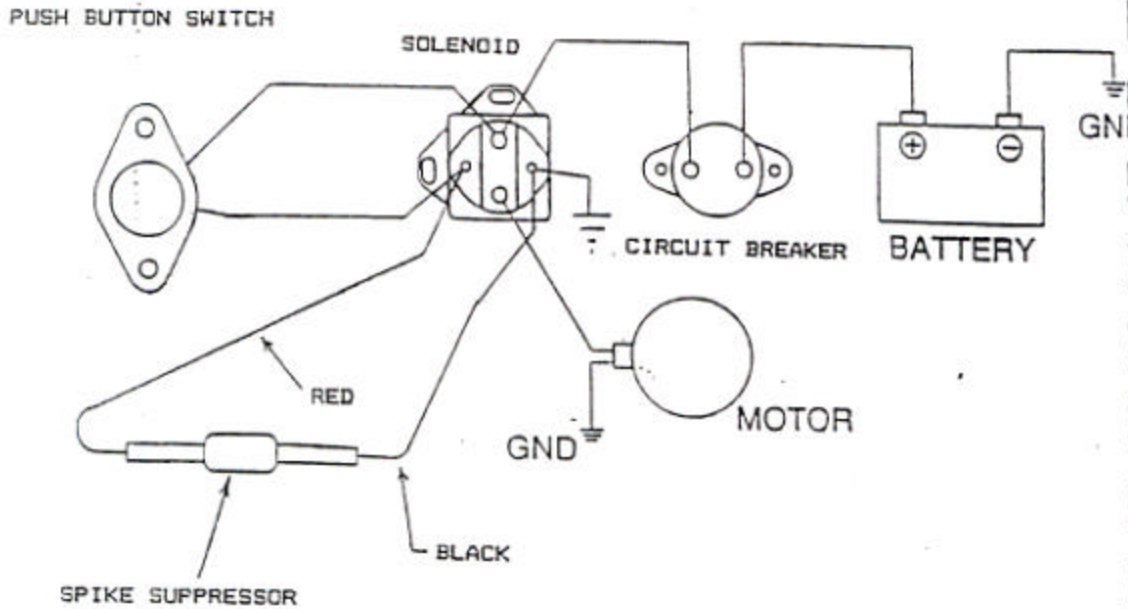
Most solenoids are equipped with a single screw stud that is connected to one side of the coil, with the other side of the coil either grounded or connected to 12-volts. Before installing the suppressor, it's important to determine which configuration you have. A 12-volt test light works well for this.

Connect the light between the switch stud and ground. If the light does not glow at all, press the reel switch and it should light. This is a grounded coil configuration. Connect the red lead of the suppressor to the stud, and the black lead to ground.

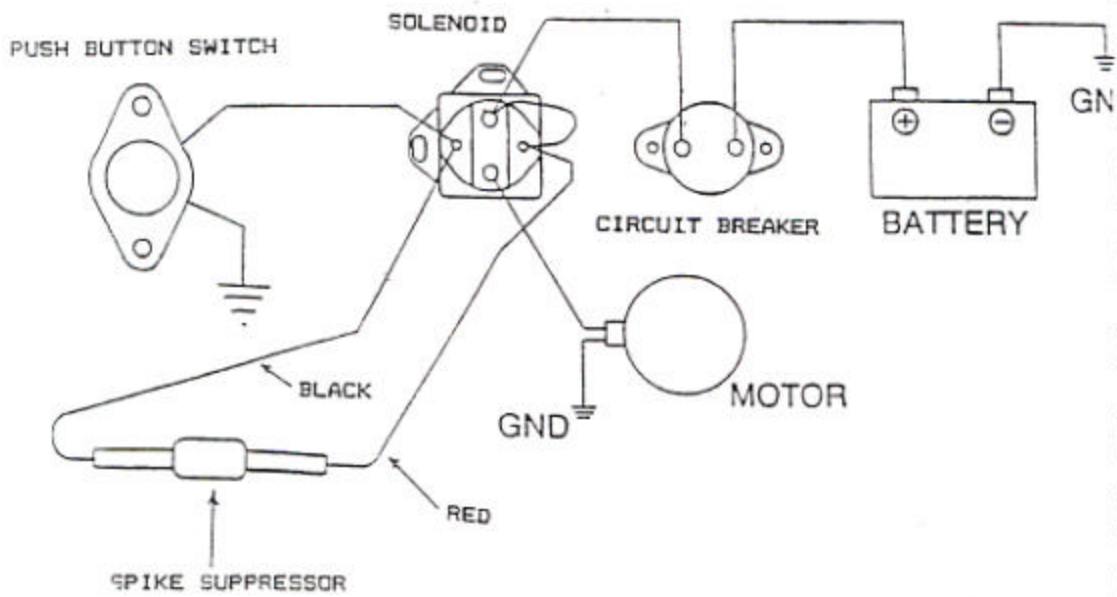
If the light glows even dimly, press the reel switch and it should go out altogether. This is a hot coil configuration. Connect the black lead to the stud and the red lead to 12-volts. (Hot side of solenoid.)

If the solenoid has two studs, and both have a wire going to them, check both as described above and connect the suppressor to whichever stud reacts like the grounded coil configuration.

SOLENOID SPIKE SUPPRESSOR
INSTALLATION DIAGRAM
(TWO POSSIBLE CONFIGURATIONS)



GROUNDING COIL CONFIGURATION



"HOT" COIL CONFIGURATION

SV104 VALVE WIRING INSTRUCTIONS

3 Conductor Valve Cable:

Red = Common

Black = 1st Stage Shut Down

White = 2nd Stage Shut Down

Valve Connections:

Common to one wire from each Solenoid.

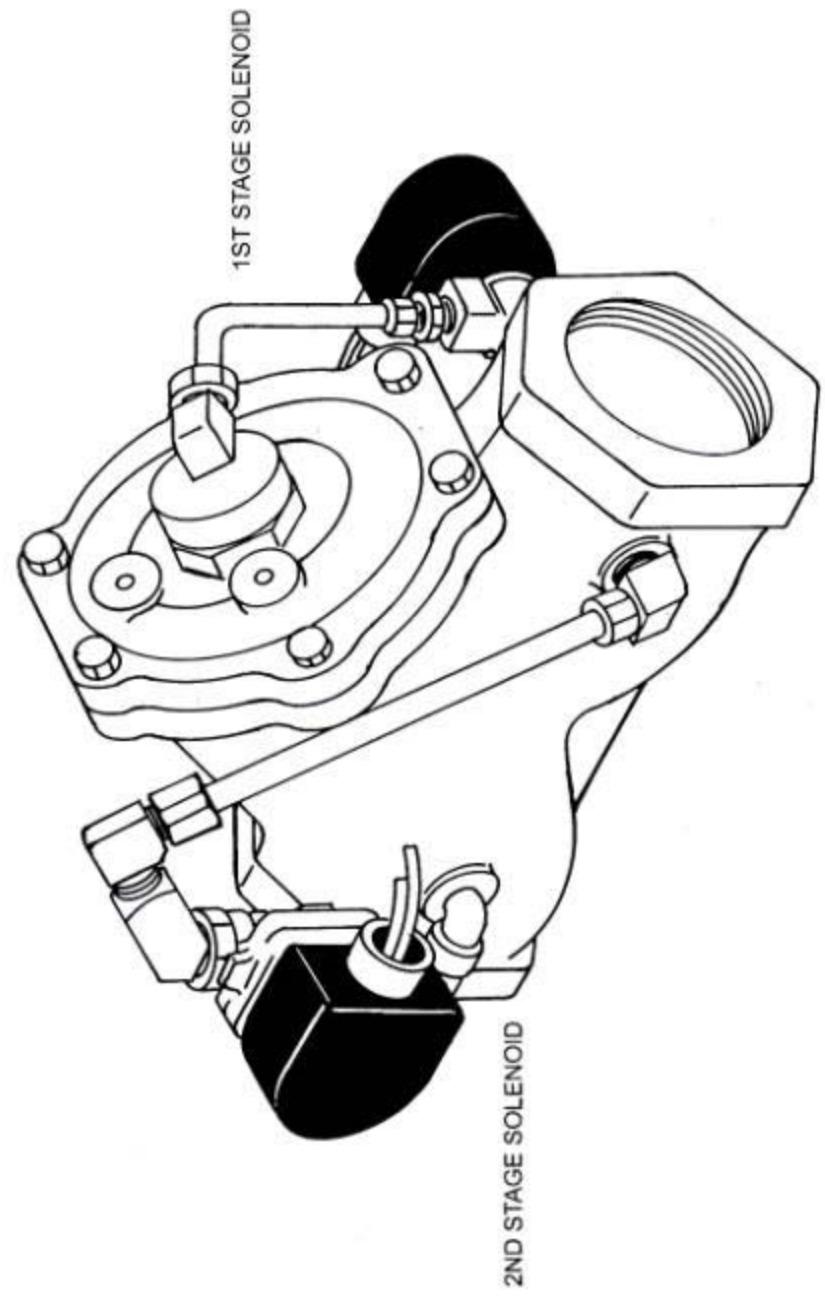
1st Stage Shut Down to solenoid Identified on tag as #7121.

2nd Stage Shut Down to solenoid Identified on tag as #7221.

Operation:

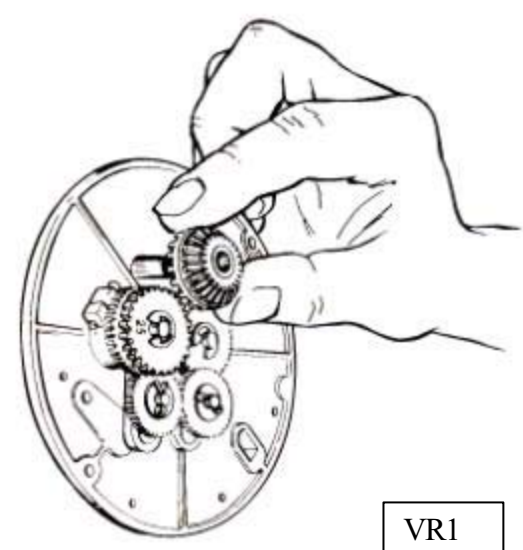
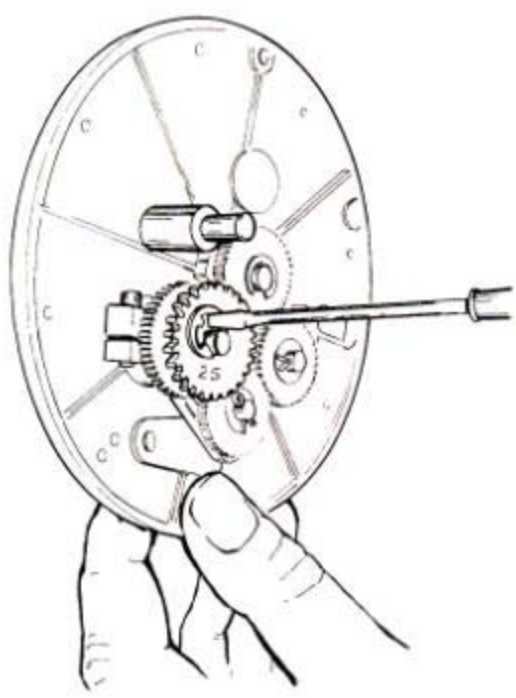
Once solenoids are energized product can begin to flow. Upon reaching 1st Stage Shut Down the large valve will slowly shut down while pressure is equalized. This is a spring assisted closure. This then creates a slow flow of approximately 10 GPM. Once preset or 2nd Stage Shut-Down is reached valve will completely close.

SV104 2 STAGE SOLENOID VALVE

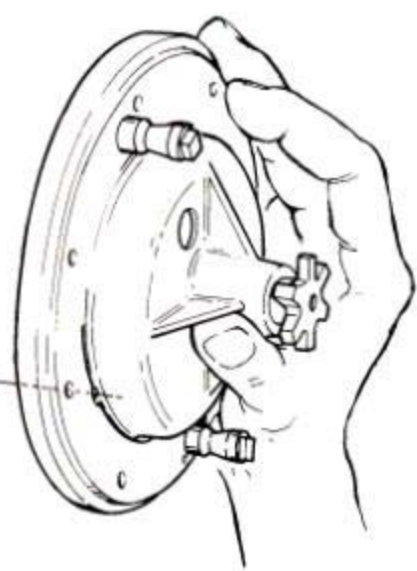
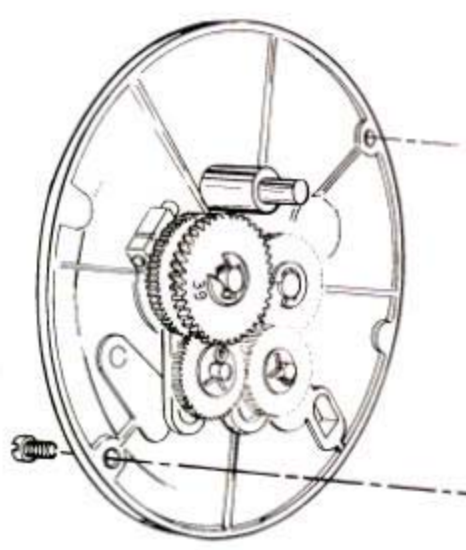


MID:COM 8000 Installation Checklist

1. Is computer display clearly viewed from driver’s position. (If not see “Contrast Adjustment”)
2. Are cables routed away from moving parts.
3. Are computer and its cables free from rubbing on items in the cab. (I.E. seat, dash, etc.)
4. Is computer securely fastened to pedestal.
5. Is pedestal securely fastened to floor of cab.
6. Are grommets in place where cables pass through sheet metal.
7. Is register head sitting squarely on meter base.
8. Is register cable connector (at register) free from excess stress (Note: it may be necessary to cut away some of the rubber boot assembly to relieve stress on connector.)
9. Are spike suppressors installed on hose reel solenoid, throttle control solenoid, etc. (Note: To check spike suppresser installation, with unit on and hose pulled out depress hose reel button and note that the register display does not reset or that volume is not erroneously registered on totalizer or display.)
10. Check to see that computer does not interfere with radio transmissions. If excess noise is noticed, make sure register cable is configured in a figure eight. It may be necessary to move the excess cable to the outside of the cab or to the rear compartment for extreme cases of interference.
11. Check to see that keying the mike does not cause the register to reset or add volume to the totalizer or display. If this occurs you need to attach jumper across J7 in the register module. (See information packet for these instructions.)
12. Do a shift report to check printer line spacing. (Line spacing is set at approximately 6 lines per inch from the factory.)
13. Shut truck off. Computer should go through a “Power Failure Sequence” prior to shutting off.
14. Are all cables installed per installation procedure. I.E. Power, register, valve cables.
15. Is the computer properly grounded.
16. Has truck’s electrical system been checked out per instructions.
17. Is the air-ride seat properly grounded.



VR1

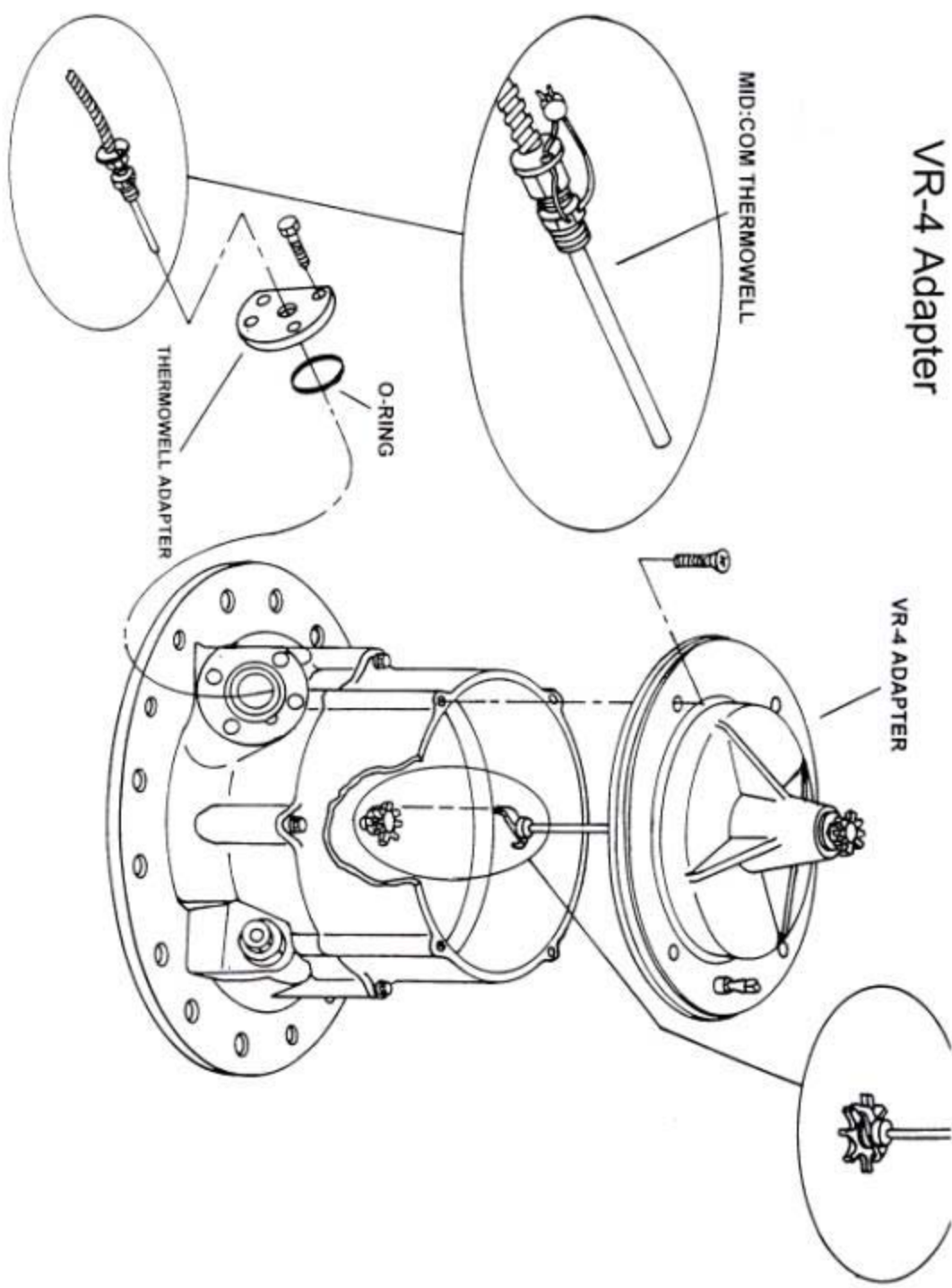


VR-1 Adapter

The gear plate from the Veeder Root register must be used with this VR-1 Adapter.

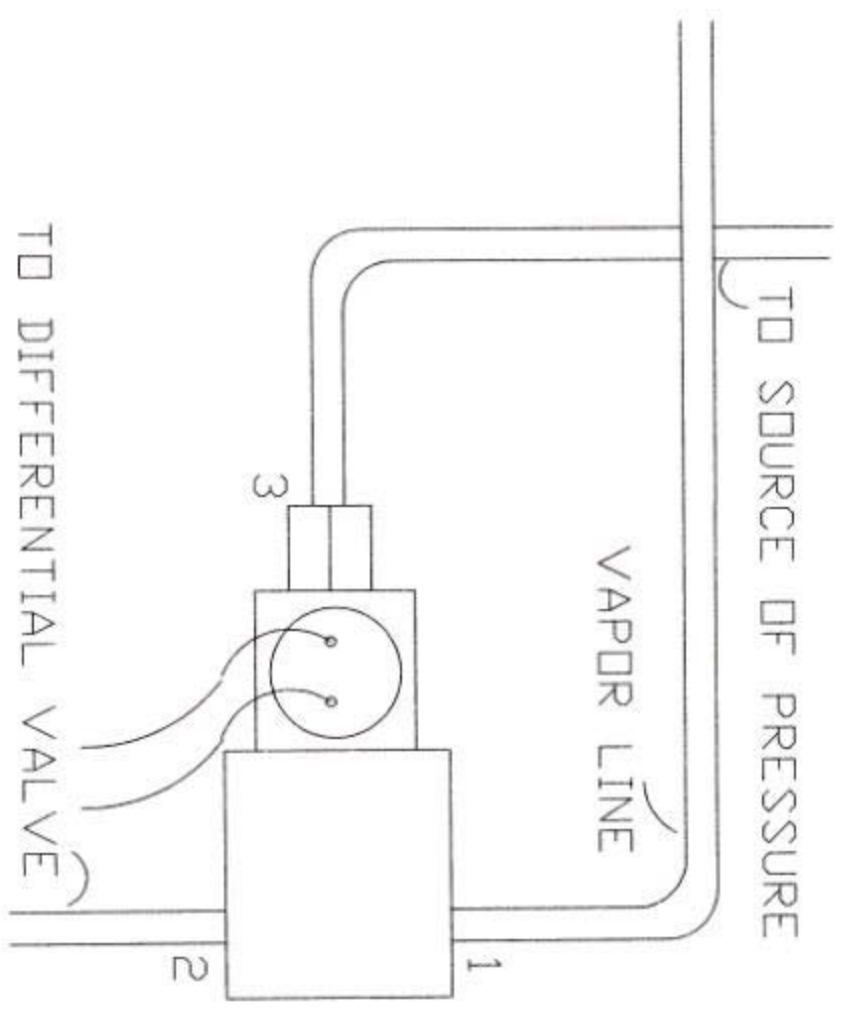
Modify the gear plate by removing and discarding the bevel tooth gear. Also remove the 25-tooth brass gear and replace with the 39-tooth gear that is attached to the adapter.

Secure gear to VR-1 Adapter using same gear plate mounting screws.



VR-4 Adapter

SV 101 SECURITY VALVE INSTALLATION



INSTALLATION INSTRUCTION

SV101 Solenoid Security/Preset Valve

For Models 6501, 8000 And SmartLink

PART NUMBER	DESCRIPTION
706-0006	Security valve for use with the 6501 register head, equipped with a short cable and a 2 pin nylon connector.
706-0004	Security valve for use with the 6501 computer's ticket interlock feature, equipped with a long cable and ¼ inch "phone" plug.
706-0015	Security/Preset valve for use with the 8000 computer, equipped with a long cable and 4 position circular plastic connector.
706-0027	Security/Preset valve for use with the SmartLink "SLS" system, equipped with a short cable and 4 position circular plastic connector.

WIRING:

706-0006 The valve comes pre-wired to the register head if it was ordered with the 6501 system or register head. For field installation, a ½ inch N.P.T. opening must be made in the register cover to accommodate the cable's compression fitting.

Route the cable through the register cover and plug the 2 pin connector onto the mating header on the right side of the headboard, just above the register cable plug. Install the compression fitting and replace the cover. Pull out any slack in the cables and tighten the fittings.

- 706-0004 Route the valve cable along the register cable and insert the plug into the receptacle on the rear of the computer.
- 706-0015 Route the valve cable along with the register cable and connect the plug to the mating receptacle labeled “VALVE 1” on the rear of the 8000 computer.
- 706-0027 Route the valve cable from the valve to the back of the “SLS” register and connect with mating receptacle.

PLUMBING:

MID:COM has supplied 5 valves manufactured by two different companies; Asco and Skinner. Although they are functionally the same, they are constructed differently and their ports are numbered differently.

They are identified as follows:

- ASCO P/N 832058 - Green solenoid housing with 3 ports on main valve body.
- Skinner P/N X54LB2XXX - Gold solenoid housing with 2 ports on main valve body, and one port out the solenoid cover.
- Skinner P/N 714X50202A - Blue solenoid housing with 3 ports on the main valve body.
- Skinner P/N 7133TVN - Black solenoid housing with 3 ports on main valve body.
- Skinner P/N 71335SN - Black solenoid housing with 2 ports on the main valve body, and one out the solenoid top.

Installation:

1. Make sure the meter is blown down and safe to break pipe connections.
2. Remove the vapor line going to the differential valve.
3. Referring to the port designations below, connect the “common” port to the differential valve with a pipe nipple. (NOTE: Fittings and hoses are user supplied) Connect the vapor line to the “vapor” port.
4. Connect the “pressure” port to any source of liquid pressure upstream of the differential valve.

Port Designations:

SKINNER #X54LB

PORT 1- VAPOR - Vapor Line
PORT 2- COMMON - Differential Valve
PORT 3- PRESSURE - Source of Pressure

SKINNER #714X & 7133

PORT 1- VAPOR - Vapor Line
PORT 2- COMMON - Differential Valve
PORT 3- PRESSURE - Source of Pressure

ASCO #832058

PORT 1- COMMON- Differential Valve
PORT 2- VAPOR - Vapor Line
PORT 3- PRESSURE - Source of Pressure

Operation:

When the valve is de-energized, liquid pressure is ported to the differential valve holding it closed. When the valve is energized, the liquid is bled back through the vapor line and the pressure port is cut off. The meter and differential valve then operate as if the valve was not in the system.

Power Cable Hook-Up And Grounding Procedure MID:COM 8000

The Power Cable Assembly consists of a two conductor shielded cable for power and a single conductor shielded cable for ignition pick-up.

Route the single conductor cable for the computer to the vicinity of the fuse/breaker panel. Route the two-conductor cable to the vicinity of the truck battery. In both cases keep the cable protected from abrasive or moving parts, and secure with cable ties.

Make sure the truck battery has its negative terminal grounded directly to the frame of the truck with a heavy conductor. The truck frame will be the connection point for all grounds.

Locate the closest connection point to the positive terminal of the battery. Usually the heavy conductor attached to the battery post terminates to a junction box close by. This is where the 12-volt power will be picked up.

Cut the two-conductor cable to a reasonable length that will allow the white wire and shield to connect to the truck frame and the red wire to the 12-volt source. Strip enough jacket to expose the shield and wires, then separate the wires from the shield. See note on a convenient way to do this.

Strip the white wire of the two-conductor cable and twist it together with the shield. Crimp on one of the supplied terminals and attach directly to the frame of the truck with a nut and bolt. Make sure any paint or dirt has been scraped away.

Crimp terminal on the red wire and attach it to the 12-volt source. Wipe a small amount of grease on both terminations. This completes the power hookup.

Using a 12-volt test light, find a circuit at the fuse block which is only **On** when the ignition is in the **RUN** position, and **OFF** in the **START** or **OFF** positions.

Cut and strip the single conductor cable and attach the center conductor to this circuit using an appropriate terminal, or splice. Make sure the connection is secure and tie it off so that vibration will not knock it loose. The ignition sense line draws no power, so it is not necessary to find a heavy circuit. In fact it's best to find a circuit that has little load on it. I.E. AM/FM radio circuit.

Terminate the shield and connect it to a nearby screw that is grounded. Use an Ohmmeter or test light to make sure the screw is grounded.

Note: To separate the wires from the braided shield, slide the shield back so it bunches up near the end of the jacket. Use a pointed tool to open up a window in the braid. With the same tool, pull one wire out at a time through the hole.

Using the 10GA single conductor cable and ring terminals, supplied in the installation kit, ground the computer pedestal as follows:

Terminate one end of the cable with a ring terminal and attach it to the underside of the pedestal top. Run the cable down to the top of the pedestal base and terminate again. Now run a separate cable from the top of the pedestal base down to the frame of the truck, insuring all connections are making good metal-to-metal contact. This completes grounding the pedestal.

MID:COM 8000 Operating Instructions

Section 1- General Rules and Operating Procedure:

The MID:COM 8000 uses a 22 key keyboard and 4 line alphanumeric display for operator control. Although the system is basically menu driven, prompting the operator for input, certain operations are particular to the 8000 and must be thoroughly understood for ease of operation.

The operator is prompted through the various modes of operation by a series of “screens” on the display screen. Any of the four lines in each screen may contain Operation selections or Customer/Delivery information.

To the left of the screen are four (4) “line keys” which point to one of the four lines on the display. The line keys are used to select the function shown in that particular line or are used to change the information that appears there. If the function can be selected or the information changed, a left arrow will appear as the first character in the line and points to the corresponding “active” line key. If the selection is not allowed at the time, the arrow will not appear and the line key will do nothing.

Movement between screens is accomplished two ways depending on what the operator is doing at the time. The screens can be thought of as being a vertical “stack”. Screens are accessed before a delivery is made and to initiate printing of the ticket. In some cases, he may need to move up through the screens as in searching for a customer record. This is done by using the up-arrow and down-arrow keys in the center of the keyboard. If the arrow keys are allowed for use, one or both will appear in the lower right corner of the screen, directing the operator as to which way to go. The other method of movement through the screens is simply selecting a function. Once selected, the function will either be performed or another screen may appear waiting for further input. In a normal delivery, a combination of the two methods is used and additional screens may appear showing the operator what the unit is doing at the time.

At times, the operator will have to input new prices, taxes, preset volumes, etc. The method of entry the 8000 uses is called S.E.A., which is an abbreviation for “select-enter-accept”. This is unique to the 8000 and must be understood completely. For example, to enter a new price, the operator presses the line key pointing to the price on the display. A blinking cursor will then appear over the first or leftmost digit of the price. Simply enter the new amount one digit at a time and the cursor will move to the right with each entry. Entering a decimal point in the number is not necessary since the decimals are fixed and the cursor will jump over it. Also, it is only necessary to enter digits up to the last one that needed to be changed. After this, the operator presses the line key again and the entry is accepted and the cursor disappears. All entries are made in this manner and it is important to note that while a cursor appears anywhere in the screen, no other function of the unit is available. The operator must extinguish the cursor by accepting the entry before going on. If an error is made during the entry and the line key was pressed to accept it, just press the line key again and start over. If the cursor is still blinking, simply continue to enter digits and the cursor will “wrap around” back to the first digit.

One very important key is the one-labeled start/stop. When this key is pressed, the 8000 will cancel the current screen and go back to a previous screen or all the way back to the main menu. Its main purpose is to get quickly back to the main menu no matter where you are in the operation of the 8000. In some cases, it may have to be pressed more than once. The only times it will not function is when a cursor is showing on the screen as explained above, or while volume is being delivered.

The following example illustrates the first three (3) screens that the operator encounters after starting the truck:

[SCREEN 1]

```
MID:COM 8000
SOFTWARE VER XXXX
SELF TEST
STAND BY
```


[SCREEN 2]

NO DATACARD
INSERTED

[SCREEN 3]

MID:COM 8000
SOFTWARE VER XXXX
SELF TEST
OK

[SCREEN 4]

<PRINT SHIFT TOTALS
<SELECT METER (1)
<LOAD TRUCK
<SETUP ?

The first three screens appear automatically after power-up while the 8000 performs a test of its hardware. Screen 4 is the “Main Menu” screen from which all other functions are chosen. There are 5 major functions of the 8000. Four of these are shown in screen 4 and are chosen by pressing the appropriate line key. These functions are done only periodically. The fifth major function which is done routinely is making a delivery. To get into the screens that prompt the operator through a delivery, the down-arrow key is pressed as indicated by the down arrow symbol ? in the lower right corner of screen 4. The 5 major functions are discussed separately in the following sections.

Section 2- Printing Shift Totals:

When “Print Shift Totals” is selected, the operator will be prompted to insert a blank ticket. Once the ticket is inserted to it’s full depth, the 8000 will begin printing the current shift total information which include the following.

1. Time and date of previous shift printout.
2. Current time and date.
3. Truck number.
4. Driver number.
5. Plant number.
6. Total gallons delivered since last print out.
7. Total dollars billed since last printout.
8. Total money received on account since last printout.
9. Current quantity of product on board.

The shift totals are mainly for delivery reference and are not intended to be very detailed. The information returned to the office on the datacard can be processed by the office computer for very detailed reports. After the printout is done, the 8000 returns to the main menu.

Section 3- Select Meter:

Select meter is only used where the truck has two meters and two register heads are connected to the 8000 computer. Selecting “Select Meter” will change the meter number shown in parentheses from (1) to (2) or (2) to (1) each time line key 2 is pressed. The correct meter must be selected before the delivery is made. Meter number must also be correct before the delivery is made. Meter number must also be correct before entering setup since some of the setup functions are unique to each meter.

Note: Selecting meter (1) will only activate valve (1). Selecting meter (2) will only activate valve (2).

Note: On simultaneous (SP) pumping units, operator can reset (1), (2), or (B) for both.

Section 4- Loading The Truck:

When the “Load Truck” function is selected, the following screen will appear:

<QTY ON BOARD	01234.5
<QTY LOADED	00000.0
<PRODUCT CODE	02
<LOADED LOCATION	01 ?

The operator may enter new numbers for any of the lines listed above. The quantity on board is automatically decreased by the amount of each delivery and will be increased by the amount entered into quantity loaded. Normally, quantity on board needs to be manually entered only to adjust to the actual amount on board in the event that a prior load had not been entered, or when first setting up the 8000. Quantity loaded will initially come up with 00000.0, while product code and load location will be retained from the last load operation. If a datacard is being used, the information will be written to the card. If a card is not used, the quantity on board is still updated. Pressing the down-arrow as indicated or the start/stop key will return the operator to the main screen.

Section 5- Setup:

Selecting “Setup” places the operator in a set of screens used to configure the 8000 for how it will be used, set the clock, enable discounts, etc.. Setup is required when the machine is installed and periodically when such things as daylight savings time may require the clock to be reset. The screens in “Setup” are shown and explained below. The operator can arrow-down through the screens, change what is necessary, and then press start/stop to return to the main menu. The first screen that appears after pressing “Setup” is:

```

<DRIVER NUMBER      0000
      ADDITIONAL SETUP
      REQUIRES ACCESS CODE
<ENTER # _____
    
```

This screen allows the operator to enter the driver number that may change from time to time. Further access to the setup procedures is not allowed except with the proper access code. When the 8000 leaves the factory, the code is programmed as 000000. Entering 000000 will allow access to the screens below. One part of this setup procedure will allow the 000000 code to be changed to any other 6 digit number, however, **it is important to remember the new number.** Once the access code is entered, this next screen will appear:

```

<TIME      14:20:34
<DATE      08/01/99
<SALES NO.  000025
<NEW ACCESS # _____
      ?
    
```

Enter the current time and date (MM/DD/YY) ignoring the colons and slashes. The cursor will jump over them. Time is military format. I.E. 14:20 = 2:20 PM. The sales number is the next sequence number to be printed on the delivery ticket. It may be reset to zero, or to any starting number entered. A new access number may also be entered here but remember that once leaving setup, this number is the only way to get back in. It's wise to use a number such as a birthday to remember it. As indicated by the ? , down-arrow will move to the next setup screen.

```

      ELAPSED TIME PRINT
<ENABLE (Y)
<DELAY MINUTES 01 ?
    
```

The elapsed time print feature causes the ticket to be automatically printed after a number of minutes have elapsed since product flow stopped. To enable or disable this feature, simply press the line 3 key to change it from N to Y. Enter the delay in minutes from 1 to 30 in line 4. Pressing down-arrow will move to this next screen:

Note: In Canada this feature is “hard coded” at 3 min. maximum per W&M regulations, and cannot be disabled.

<STAGE 1 SHUTOFF	00
<STAGE 2 DWELL	0.0
<TRUCKKNUMBER	0000
<PLANT	000 ?

The first two lines of this screen are used to set valve closures when a preset actuator or preset solenoid valve is used in the system. Stage 1 shutoff is the number of units preceding final shutdown that the first stage valve is shut or the actuator trips for the first time slowing flow into the second stage. Stage 2 dwell is the number of units and tenths of units preceding the final shutdown that the second stage valve closes or the actuator trips for the second time. Stage 1 shutoff usually ranges from 3-60 units. Stage 2 dwell may have to be periodically adjusted to compensate for a change in product viscosity. If the meter is set up for single stage operation then stage 1 shutoff should be set at 00 and only stage 2 dwell used. Enter truck number and plant number, and then use the down-arrow to get to these next two screens.

<DISC A ENABLED (Y)
<10 DAYS TO PAY
<RATE 00.0000%
FOR TYPE PRESS \$?

<DISC B ENABLED (Y)
<RATE \$00.0000
FOR TYPE PRESS \$?

These two screens allow the operator to enable or disable the two types of discounts allowed by the 8000 as well as determine the rate and pay time. Refer to the document that covers taxes and discounts for further explanation of how the discounts are applied and calculated. The discount setups here apply to all deliveries made without the use of a datacard. Therefore, if either or both of the discounts are enabled, they cannot be selectively disabled for any particular delivery without going back into setup. When a datacard is being used, the customer record contains discount information which overrides the setup information and therefore each delivery may be unique in discount structure. A down-arrow from here will produce the next screen.

PRINT NAME AND
ADDRESS ON TICKET
< (Y)

In this screen, you may select whether or not the name and address will be printed on the ticket by pressing the line 3 key to change it from Y to N, or N to Y. If “No” is selected, the first line of the printout will be the customer account number. A down-arrow from here will produce the next screen for calibrating the odometer sensor, an optional accessory.

ODOMETER START
<MILES 000000000
<CALIBRATE
<ABORT

Miles (or kilometers) shows the current mileage on the truck. A new number may be entered here to correspond with the actual mileage on the truck. The mileage figure is updated as the truck is driven. Because the sensor does not distinguish between forward and reverse, there is an inherent forward “creep” for this reading when compared to the actual odometer. “Abort” will leave this screen and return to the main menu or press star/stop. Selecting “calibrate” will bring the operator to this next screen:

ODOMETER CALIBRATION
<BEGIN
<ABORT

Before selecting “begin” to start the calibration procedure, the operator should note the truck’s odometer reading. To insure an accurate calibration, it’s best to start with all numbers in an even position in the odometer window. Also, note whether the reading is in whole units or tenths. Press “begin” for the next screen.

ODOMETER CALIBRATION
DRIVE EXACT MILES
<END DRIVEN MILES
<ABORT

While this screen is showing, drive the truck at least two miles (or 4 kilometers) and try to stop the truck with the odometer digits in an even position in the odometer window. Note the exact odometer reading once

again and the press “end driven miles (or kilometers)”. This will bring us to the last screen.

ODOMETER CALIBRATION	
<MILES DRIVEN	000.0
<CALIBRATE COMPLETE	
<ABORT	

Subtract the beginning odometer reading from the last and enter the difference in “miles (or kilometers) driven”. Be careful to note the position of the decimal point. When accepted, press “calibrate complete” to exit and return to the main screen. At this point, all setup has been complete.

Section 6- Loading Tax Code Information:

Besides entering and using single tax rates explained in the following sections, the 8000 can accept and use multiple tax codes. Refer to the documents covering tax and discount calculations as well as the programmers guide for detailed information on this.

The tax code information needs to be loaded at the time of setup or whenever tax rates change. To load the information, plug in the “master tax datacard” into the 8000 before it is turned on, and then power the unit up. Once the 8000 has passed through the self-test screens and the main menu appears, the tax data has been loaded and the tax datacard can be removed.

Section 7- Making a Delivery Without a Datacard:

From the main menu, press the down-arrow key. This next screen will appear:

GALLONS	0000542.7
<PRICE	\$01.0950
<TAX	06.5000%
<PRESET	000250 ▼

All four lines of this screen will show the values from the previous delivery. Therefore, if the information does not have to be changed, the operator simply presses the down-arrow key and he will be prompted to insert the delivery ticket and begin the delivery. Changing price and preset can be done directly from this screen. If tax is selected, the operator is given a tax screen to make the tax changes.

GALLONS	0000000.0
PRICE	\$01.0950
TAX	06.5000%
PRESET	000250 ?

INSERT
TICKET

Short-cut Delivery

Delivery With a Datacard:

1. Insert the customer Datacard in the slot marked DATACARD before starting the truck or while in main menu.
2. ▼ from the main menu.
3. Select either SCAN ACCOUNTS or ENTER ACCOUNT NUMBER with corresponding Line Key button.
4. If SCAN ACCOUNTS, use ▼ to find the account on the card.
5. If ENTER ACCOUNT NUMBER was selected, enter the account number using the number keys.
6. The account will come up to the screen, and can be selected using Line Key 1.
7. Make any changes to price, tax or preset if needed.
8. Use the ▼ and insert the ticket.
9. Make delivery.
10. Press PRINT, make changes if necessary.
11. Press DISC key, ticket prints.
12. Enter R.O.A., Percent Full, Alert Code and Tank Number if necessary.
13. Press START/STOP to return to MAIN MENU.

Delivery Without a Datacard:

1. ▼ from the Main menu.
2. Make any changes to price, taxes or preset using the Line Keys.
3. Down arrow ▼.
4. Insert ticket.
5. Make delivery.
6. Press PRINT once.
7. Make any changes to price or tax if needed.
8. Press PRINT again or press DISC if discount applies.
9. Ticket prints and returns to MAIN MENU.

VOLUME CORRECTION FACTORS
SPECIFIC GRAVITY 0.505 TO .0514 - L.P.G.

Observed Temperature 'F	Observed Temperature 'F	Observed Temperature 'F			
-20	1.114	24	1.055	68	0.987
-19	1.113	25	1.054	69	0.985
-18	1.111	26	1.052	70	0.984
-17	1.11	27	1.051	71	0.92
-16	1.108	28	1.049	72	0.981
-15	1.107	29	1.048	73	0.979
-14	1.106	30	1.046	74	0.977
-13	1.104	31	1.045	75	0.976
-12	1.103	32	1.043	76	0.974
-11	1.101	33	1.042	77	0.972
-10	1.1	34	1.04	78	0.97
-9	1.099	35	1.039	79	0.969
-8	1.098	36	1.037	80	0.967
-7	1.096	37	1.036	81	0.965
-6	1.095	38	1.034	82	0.963
-5	1.094	39	1.033	83	0.962
-4	1.093	40	1.031	84	0.96
-3	1.092	41	1.03	85	0.958
-2	1.09	42	1.028	86	0.956
-1	1.089	43	1.027	87	0.955
0	1.088	44	1.025	88	0.953
1	1.086	45	1.024	89	0.951
2	1.085	46	1.022	90	0.949
3	1.084	47	1.021	91	0.947
4	1.082	48	1.019	92	0.946
5	1.081	49	1.018	93	0.944
6	1.08	50	1.016	94	0.942
7	1.078	51	1.014	95	0.94
8	1.077	52	1.012	96	0.939
9	1.076	53	1.011	97	0.937
10	1.074	54	1.009	98	0.935
11	1.073	55	1.008	99	0.933
12	1.071	56	1.006	100	0.932
13	1.07	57	1.005		
14	1.069	58	1.003		
15	1.068	59	1.002		
16	1.066	60	1		
17	1.065	61	0.998		
18	1.064	62	0.997		
19	1.062	63	0.995		
20	1.061	64	0.994		
21	1.06	65	0.992		
22	1.058	66	0.99		
23	1.057	67	0.989		

VOLUME CORRECTION FACTORS
#2 FO - API GRAVITY 35 - COEFFICIENT OF EXPANSION 00045

Observed Temperature 'F	Observed Temperature 'F	Observed Temperature 'F			
-30	1.0414	14	1.0212	58	1.0009
-29	1.0409	15	1.0207	59	1.0005
-28	1.0405	16	1.0202	60	1
-27	1.05	17	1.0198	61	0.9995
-26	1.0396	18	1.0193	62	0.9991
-25	1.0391	19	1.0189	63	0.9986
-24	1.0386	20	1.0184	64	0.9982
-23	1.0382	21	1.0179	65	0.9977
-22	1.0377	22	1.0175	66	0.9972
-21	1.0373	23	1.017	67	0.9968
-20	1.0368	24	1.0166	68	0.9963
-19	1.0363	25	1.0161	69	0.9959
-18	1.0359	26	1.0156	70	0.9954
-17	1.0354	27	1.0152	71	0.9949
-16	1.035	28	1.0147	72	0.9945
-15	1.0345	29	1.0143	73	0.994
-14	1.034	30	1.0138	74	0.9936
-13	1.0336	31	1.0133	75	0.9931
-12	1.0331	32	1.0129	76	0.9926
-11	1.0327	33	1.0124	77	0.9922
-10	1.0322	34	1.012	78	0.9917
-9	1.0317	35	1.0115	79	0.9913
-8	1.0313	36	1.011	80	0.9908
-7	1.0308	37	1.0106	81	0.9903
-6	1.0304	38	1.0101	82	0.9899
-5	1.0299	39	1.0097	83	0.9894
-4	1.0294	40	1.0092	84	0.989
-3	1.029	41	1.0087	85	0.9885
-2	1.0285	42	1.0083	86	0.988
-1	1.0281	43	1.0078	87	0.9876
0	1.0276	44	1.0074	88	0.9871
1	1.0271	45	1.0069	89	0.9867
2	1.0267	46	1.0064	90	0.9862
3	1.0262	47	1.006	91	0.9857
4	1.0258	48	1.0055	92	0.9853
5	1.0253	49	1.0051	93	0.9848
6	1.0248	50	1.0046	94	0.9844
7	1.0244	51	1.0041	95	0.9839
8	1.0239	52	1.0037	96	0.9834
9	1.0235	53	1.0032	97	0.983
10	1.023	54	1.0028	98	0.9821
11	1.0225	55	1.0023	100	0.9816
12	1.0221	56	1.0018		
13	1.0216	57	1.0014		

CALIBRATION COMPARISON CHART FOR MECHANICAL REGISTERS TO MID:COM REGISTERS

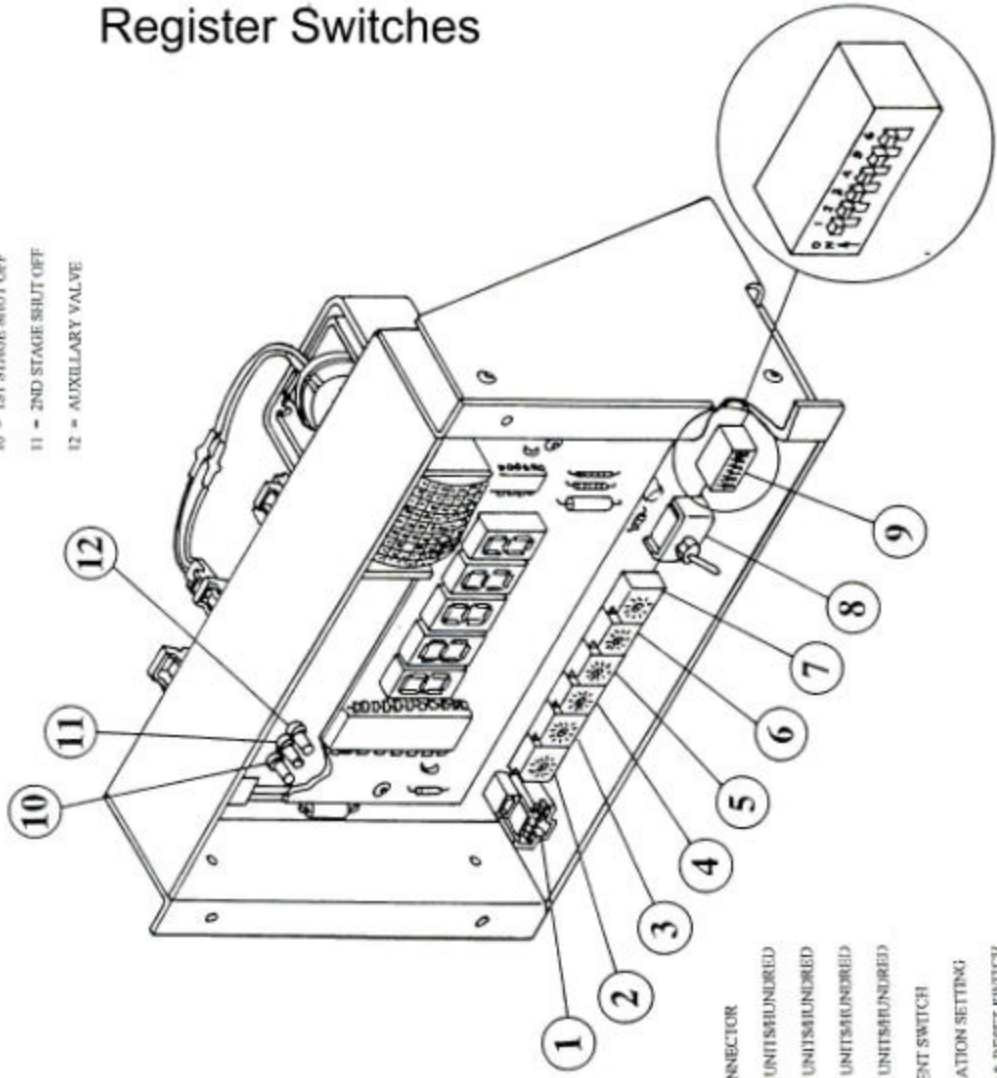
CHANGE GEARS		MID:COM CAL. SETTINGS	CHANGE GEARS		MID:COM CAL. SETTINGS
REG. SPIN	S.B. SPIN	S1,2,3,4 (Gallons) S6,1,2,3,4 (Liters)	REG. SPIN	S.B. SPIN	S1,2,3,4 (Gallons) S6,1,2,3,4 (Liters)
29	33	1.1379	33	35	1.0606
30	34	1.1333	34	36	1.0588
24	27	1.1250	18	19	1.0556
25	28	1.1200	19	20	1.0526
26	29	1.1154	20	21	1.0500
17	27	1.1111	21	22	1.0476
28	31	1.1071	22	23	1.0455
29	32	1.1035	23	24	1.0435
30	33	1.1000	24	25	1.0417
32	35	1.0938	25	26	1.0400
23	25	1.0870	26	27	1.0385
24	26	1.0833	27	28	1.0370
25	27	1.0800	28	29	1.0357
26	28	1.0769	29	30	1.0345
27	29	1.0741	30	31	1.0333
28	30	1.0714	32	33	1.0313
29	31	1.0690	35	36	1.0286
30	32	1.0667	33	33	1.0000
31	33	1.0645			
32	34	1.0625			

NEPTUNE RECOMMENDS REPLACEMENT OF MEASURING CHAMBER @ 3% WEAR

(FOR GALLONS ROUND THE LAST 2 DIGITS)
EXAMPLE: 33 DIVIDED BY 31 = 1.0645 (LITERS) 1.065 (GALLONS)

Register Switches

VALVE LIGHTS
 10 - 1ST STAGE SHUT OFF
 11 - 2ND STAGE SHUT OFF
 12 - AUXILIARY VALVE



- 1 - J9 PUSH BUTTON SWITCH CONNECTOR
- 2 - S1 CALIBRATION SWITCH, 10 UNITS/HUNDRED
- 3 - S2 CALIBRATION SWITCH, 1 UNITS/HUNDRED
- 4 - S3 CALIBRATION SWITCH, .1 UNITS/HUNDRED
- 5 - S4 CALIBRATION SWITCH, .01 UNITS/HUNDRED
- 6 - S5 COMPENSATOR ADJUSTMENT SWITCH
- 7 - S6 TEST FUNCTION & CALIBRATION SETTING
- 8 - S7 COMPENSATOR LOCKOUT & RESET SWITCH
- 9 - S8 PROGRAM SWITCHES

MID:COM 8000 Register Module
Switch Description and Calibration Instructions
Use For Register Models SRG QXX-X

Switches 1-4 (S1-S4) Meter Calibration Factor

Meter factor range: 0.000 – 1.999 (000.0 – 199.9% of un-calibrated reading)

Increase or decrease amount registered as follows:

- SWITCH #:** Amount of change for each switch position
- S4 = .1 Units per hundred
- S3 = 1 Unit per hundred
- S2 = 10 Units per hundred
- S1 = Use to calibrate above or below a 1:1 ratio. (Set to 0 or 1)
- *** To register more on the register, adjust switches to a higher number. ***

Switch 5 (S5) Temperature Compensator Adjustment

Range = approx. +1.5° F, -1.8 F° (+.8°C, -1.0°C)

Midrange factor setting is 5.

Each increment of the switch from 5 toward 0 adjusts the temperature .4°F (.2°C) toward a colder temperature or higher comp factor.

Each increment of the switch from 5 toward 9 adjusts the temperature .4°F (.2°C) toward a warmer temperature or lower comp factor.

Switch 6 (S6) Test Functions

Set switch to desired test and reset register with Switch 7 (to the right)

- Setting 0: Normal operating mode.
- Setting 1: Pulser test. Bypasses all computations on raw pulses.
- Setting 2: Switch test. S1 through S6 are read out two digits at a time.
- Setting 3: Compensated product code (indicates installed volume correction table).
I.E. 1=propane, 2=fuel oil, 3=gasoline, 4=kerasene
- Setting 4: Temperature in degrees C – Note 1
- Setting 5: Temperature in degrees F – Note 1
- Setting 6: Volume correction factor for indicated temperature – Note 2
- Setting 7: Analog to digital converter value for indicated temperature.
- Setting 8, 9: Not used.

Note 1: Displayed temperatures are negative when reading switches back and forth from 0.0 to the actual temperature.

Note 2: Format X.XXXX – “1” must be added for factors greater than .9999 (that is, for 60°F or 15°C).

-----CAUTION-----

Switch 6 Must be Reset to 0 For Normal Operation.

Switch 7 (S7) Gross/Net Display Selection – Register Reset

Switch Centered: Net (compensated) volume displayed – Note 3.

Switch left: Gross (uncompensated) volume displayed – Note 3.

Switch right: (momentary) resets register

Note 3: If a compensator is not installed, the gross volume is displayed in either switch setting.

Switch 8 (S8) Dipswitch (not used at this time)

MID:COM 8000 Register Module
Switch Description and Calibration Instructions
Use For Register Models SRL001-X

Switches 1-4 (S1-S4) Meter Calibration Factor

Meter factor range: 0.000 – 1.999 (000.0 – 199.9% of un-calibrated reading)

Increase or decrease amount registered as follows:

SWITCH #:	Amount of change for each switch position
S4 =	.01 Units per hundred
S3 =	.1 Unit per hundred
S2 =	1 Units per hundred
S1 =	10 Units per hundred
S6 =	Use to calibrate above or below a 1:1 ratio. (Set to 0 or 1)
***	To register more on the register, adjust switches to a higher number. ***

Switch 5 (S5) Temperature Compensator Adjustment

Range = approx. +1.5° F, -1.8 F° (+.4°C, -.5°C)

Midrange factor setting is 5.

Each increment of the switch from 5 toward 0 adjusts the temperature .4°F (.1°C) toward a colder temperature or higher comp factor.

Each increment of the switch from 5 toward 9 adjusts the temperature .4°F (.1°C) toward a warmer temperature or lower comp factor.

Switch 6 (S6) Test Functions

Set switch to desired test and reset register with Switch 7 (to the right)

Setting 0: Normal operating mode. Calibration Factor = 0.XXXX
 Setting 1: Normal operation mode. Calibration Factor = 1.XXXX
 Setting 2: Pulser test. Bypasses all computations on raw pulses.

Setting 3: Switch test. S1 through S6 are read out two digits at a time.

Setting 4: Compensated product code (indicates installed volume correction table).
 I.E. 1=propane, 2=fuel oil, 3=gasoline, 4=kerasene

Setting 5: Temperature in degrees F – Note 1

Setting 6: Temperature in degrees C – Note 1

Setting 7: Volume correction factor for indicated temperature – Note 2

Setting 8: Analog to digital converter value for indicated temperature.

Setting 9: Not used.

Note 1: Displayed temperatures are negative when reading switches back and forth from 0.0 to the actual temperature.

Note 2: Format X.XXXX – “1” must be added for factors greater than .9999 (that is, for 60°F or 15°C).

-----CAUTION-----

Switch 6 Must be Reset to 0 For Normal Operation.

Switch 7 (S7) Gross/Net Display Selection – Register Reset

Switch Centered: Net (compensated) volume displayed – Note 3.

Switch left: Gross (uncompensated) volume displayed – Note 3.

Switch right: (momentary) resets register

Note 3: If a compensator is not installed, the gross volume is displayed in either switch setting.

MID:COM Quick Calibration Sheet

Company Address

Product(s) Calibrated

Truck #

Date

Tester

Approved

Adjusted

Step	Example	1 st Run	2 nd Run	3 rd Run
1. Initial Calibration Factor (if new, factory = 1.000 or 1.0000) or S/R from Neptune Register. ATC off - S7 left - if ATC used.	US Gallons, Model 8000 Initial Calibration Factor = 1.027			Note: If system will not calibrate by 3 rd run, check the meter for wear or malfunction.
2. Gross Volume of Prover or (Master	100 gallons			
*Note. If no ATC, Gross = Net				
3. MID:COM Volume	97.3 gallons			
Prover - Register/100 =% error	100-97.3/100 = 0.027			
5. Add or Subtract % error to Calibration Factor to increase or decrease MID:COM volume. This is your new Calibration Factor.	1.027 0.028 1.054			
6. For Temperature Corrected Products. Record MID:COM Net Volume after moving S7 to center.	New Calibration Factor			
7. Calculated Net Volume in Prover.				

Note: US Gallons, x:xxx - S1 - S4. Liters 8000 and all SmartLinks, x:xxxx - S6 = first digit, then S1 - S4 for .xxxx

FOR 100 UNIT VOLUME TEST

MID:COM 8000

MAINTENANCE CHECKLIST

1. Cable connectors free of excess strain.
2. Cable connected and locked in place.
3. Battery connectors free of corrosion.
4. Ignition line secured.
5. Pedestal mounting assembly properly grounded.
6. Ground lugs tight and free of corrosion.
7. Cables free of nicks and cuts
8. Register cover and calibration plate screws tight.
9. Register mounting bolts tight.
10. Remote readout sealing cap on.
11. Contrast on computer display correct.
12. Internal battery 12 volts or more.
13. Do a shift report and remove power cable while printer is printing, does battery allow print out to be finished.
14. Check line spacing on printout.
15. Was insertion of ticket free from obstructions.
16. CPU and printer mounting screws tight.
17. Spike suppressors installed on hose reel solenoid.
18. Odometer sensor secured to mounting bracket.
19. Magnet still in place on inside of wheel.

For Canadian Installation

20. Are all government seals secure and intact.
21. Does the computer have the latest “G” version software with the “H” chip in the register.
22. Do the register and computer serial numbers match those originally installed? If different, is the register calibration per the original installation?

MID:COM Printer Model MCR-80 Adjustments Computer Register Models 8000, 6501B and SmartLinks SLS

The MCR-80 Printer is adjustable for ticket width, ticket depth, and vertical line spacing. Unless otherwise specified, the factory settings are for a 4-1/4 inch wide ticket, depth as described below, and line spacing of 6 lines per inches. To re-adjust the printer, refer to the instructions below and illustrations accompanying this document.

Ticket Width:

Adjustment is made by moving the right and left ticket guides in or out. The guides are located on either side and between the two halves of the ticket tray. Two allen head screws in the front and two in the back hold the guides and clamp the assembly together. Loosen the screws and move the guide as necessary to accommodate the ticket with about 1/16-inch side clearance. Make sure the guides are parallel to each other and also with the edge of the ticket tray. It is recommended that the guides be of equal distance from the outside edge of ticket tray.

The ticket should be inserted fully into the printer when making this adjustment. To release the ticket clamp, pull up on the bent rod on the left side of the printer.

When the adjustment is complete, the screws should be tight and the ticket should move freely in and out of the slot with the ticket clamp released. If any bind at all is noted, the guides are not adjusted correctly.

Ticket Depth:

The depth the ticket can be inserted into the printer determines where the first or top line of print will occur. Adjustment is made by removing the printer from the unit, loosening the two screws shown in the illustration and sliding the stop switch plate in or out. A metal tang on the switch acts as both the ticket stop and as the sensor to tell the computer to clamp the ticket. As the ticket plate is slid from minimum to maximum depth it will encounter an obstacle at the clamp shaft and again at the back edge of the ticket tray. Removing the other four screws on the bottom of the printer will allow the base to be picked up so the switch tang can be moved to the other side of the shaft or ticket tray. If you must move the switch inside the printer, on the 8000 printer, you must remove the spacers that the switch is resting on otherwise the tang may get hung up upon inserting a ticket. Also if the spacers are removed you must attach the switch to the switch plate with different screws (4-40 X ½ BDSLMS). If the switch tang is to be positioned near the shaft or the back of the tray, make sure the ticket will fully depress the tang until it bottoms on the switch housing. After tightening the screws, insure again the switch tang travels freely, does not bind on the edge of the slot in the ticket tray and it is fully depressed when the ticket is inserted.

NOTE: The obstacles above create 2 areas on the ticket where the top edge of the top line cannot start. These are from 1.5 and 2.75 – 3.1 inches from the insertion edge of the ticket.

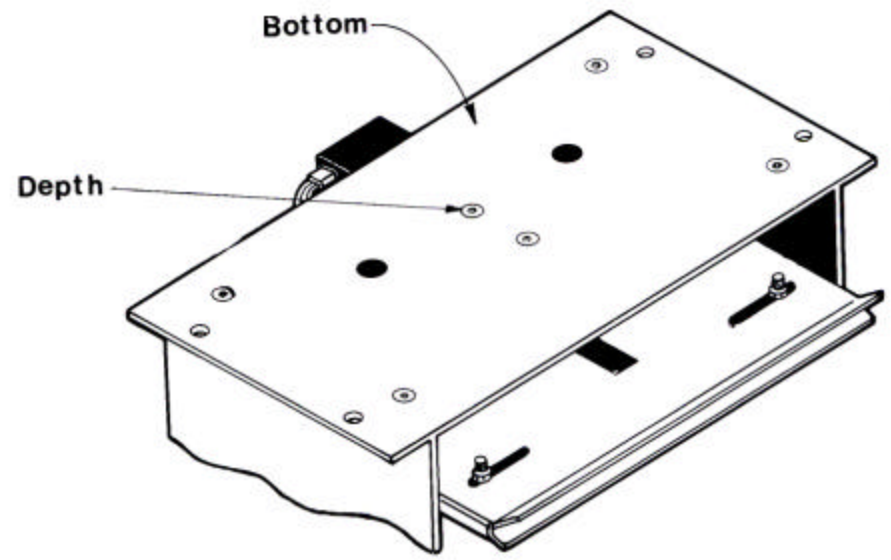
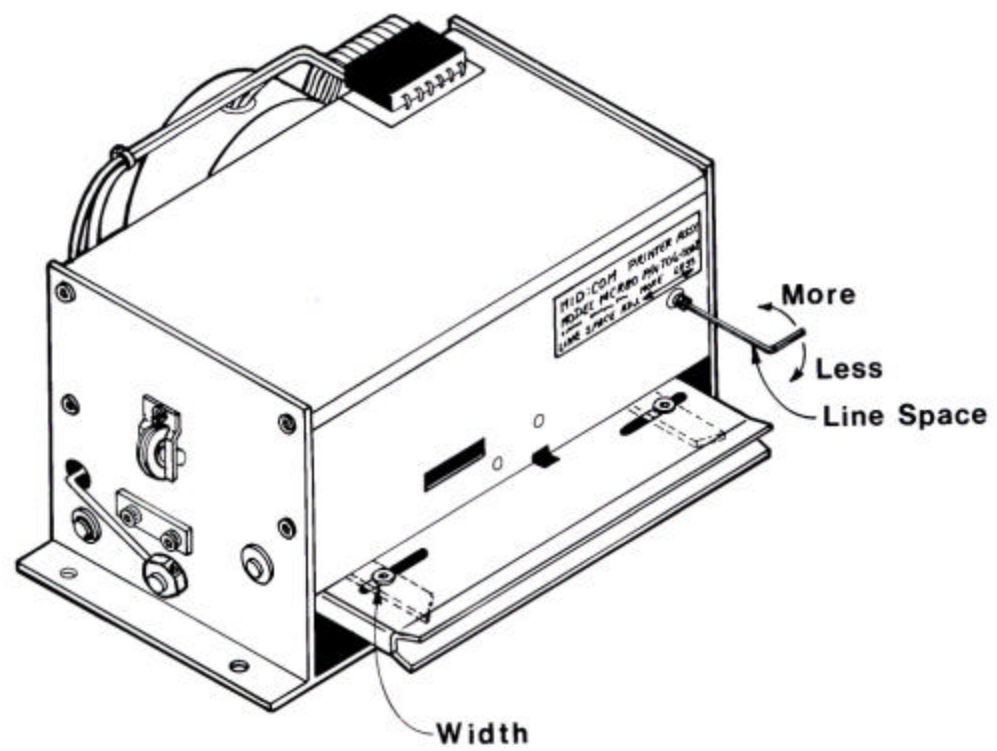
Line Spacing:

The space between lines may be adjusted to expand or compress the printout. Although set to 6 lines per inch at the factory, ticket thickness and construction, as well as system voltage will affect the spacing.

To compress the spacing, turn the allen screw on the back of the printer clockwise about 1/8 turn at a time until you get the desired spacing. Turn counterclockwise to expand the lines.

NOTE: The 6501B has a small hole below the ticket slot to access the screw. Also printers that have a serial number above D6000 refer to attached drawing for line spacing adjustment.

Back Of Printer



Engineering Revision

RE: 6501B and 8000 Printer Line Spacing Adjustment

As of July 1996, printers that have been sent out as replacements or as part of a system, have been modified with a revision to the paper mechanism. This revision has altered the line spacing adjustment to both the 6501B and 8000 printers. (See attached document)

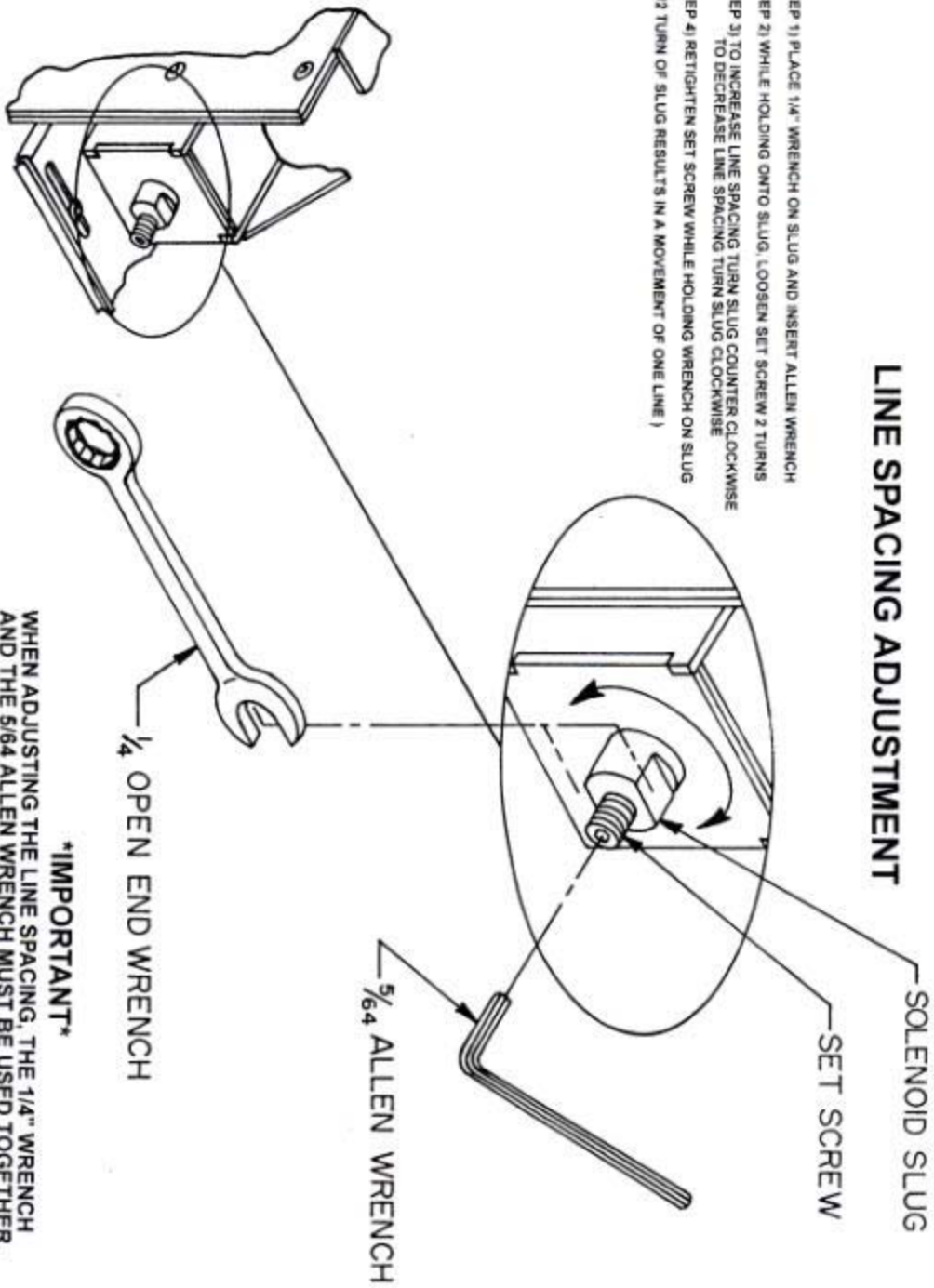
Systems that are shipped have a slight modification to the operating software that incorporates a single paper feed rather than the previous double paper feed. This is identified by an “H” or “HP” rev. level on the 8000 operating software. IE: 604H, 604HP. For the 6501B an “S” is used as part of the software version. IE: S15.

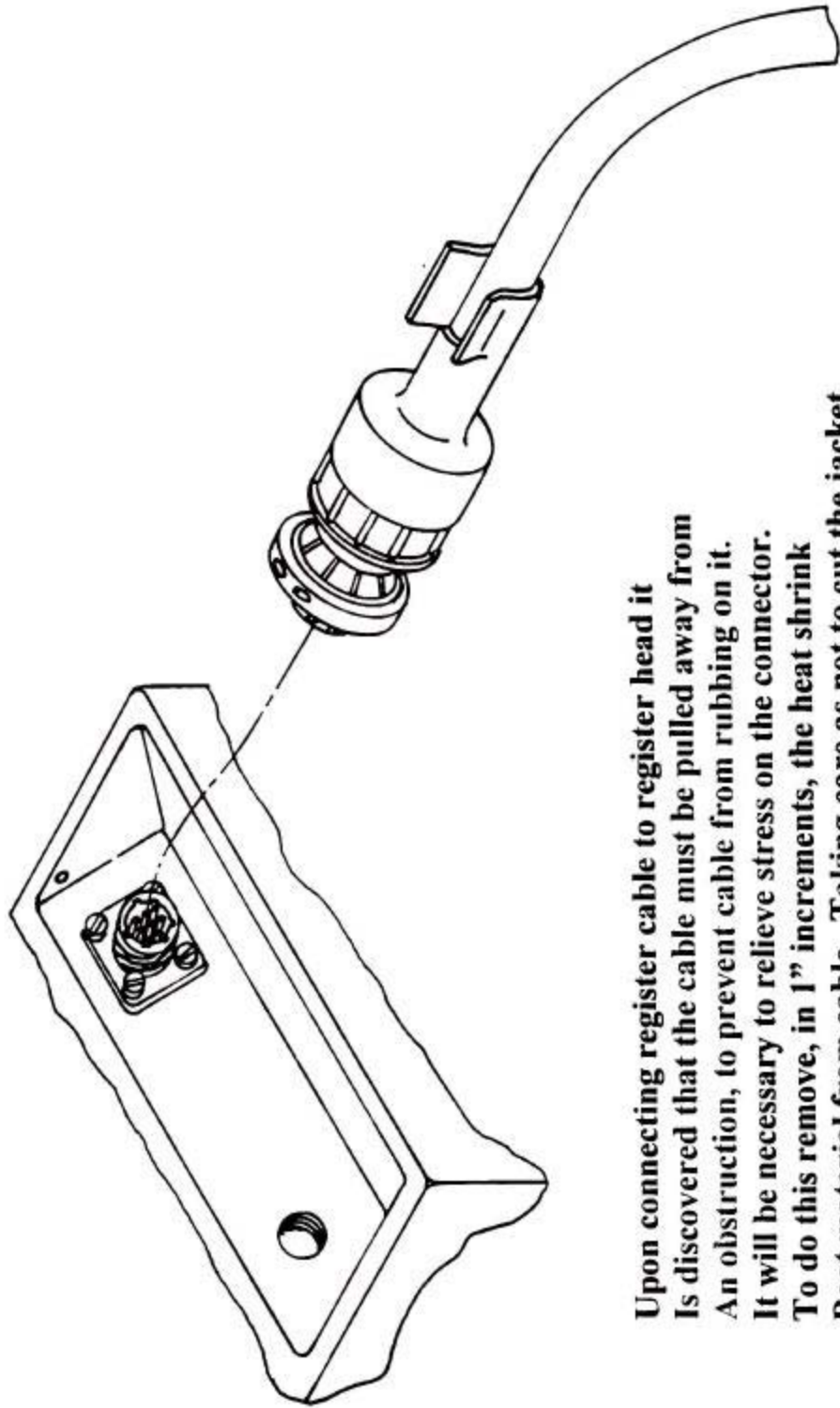
Printers sent out will be set up for double paper feed, unless specified to be used with an “H” or “S” version computer. This revised printer works equally well with any version of software currently being used. However, any printer with a serial number below D6000 will not function correctly with the “H”, “HP”, or “S” levels of software.

NOTE: “HP” versions perform a self-test of the printer during power up! (8000 MODELS ONLY)

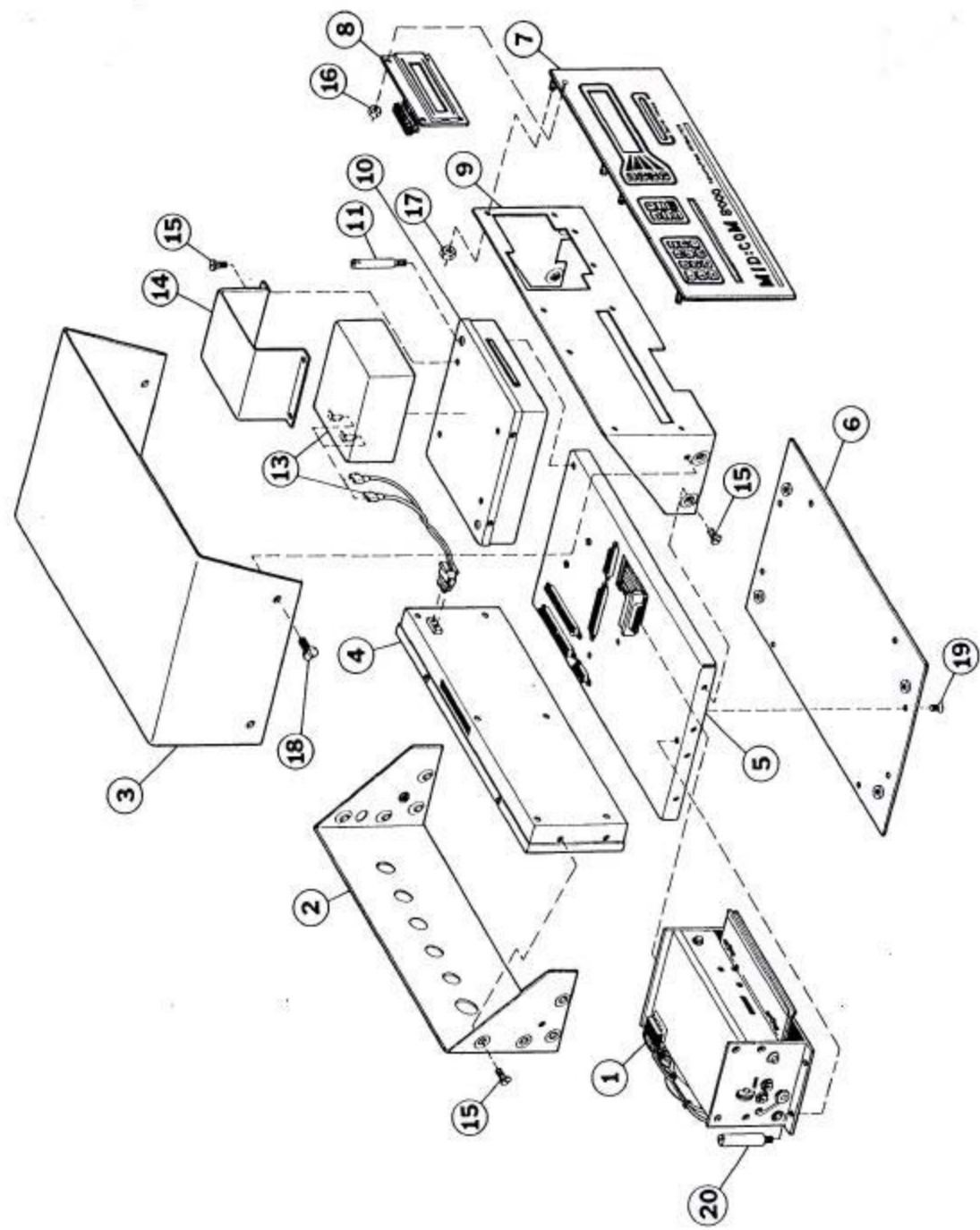
LINE SPACING ADJUSTMENT

- STEP 1) PLACE 1/4" WRENCH ON SLUG AND INSERT ALLEN WRENCH
- STEP 2) WHILE HOLDING ONTO SLUG, LOOSEN SET SCREW 2 TURNS
- STEP 3) TO INCREASE LINE SPACING TURN SLUG COUNTER CLOCKWISE TO DECREASE LINE SPACING TURN SLUG CLOCKWISE
- STEP 4) RETIGHTEN SET SCREW WHILE HOLDING WRENCH ON SLUG (1/2 TURN OF SLUG RESULTS IN A MOVEMENT OF ONE LINE)



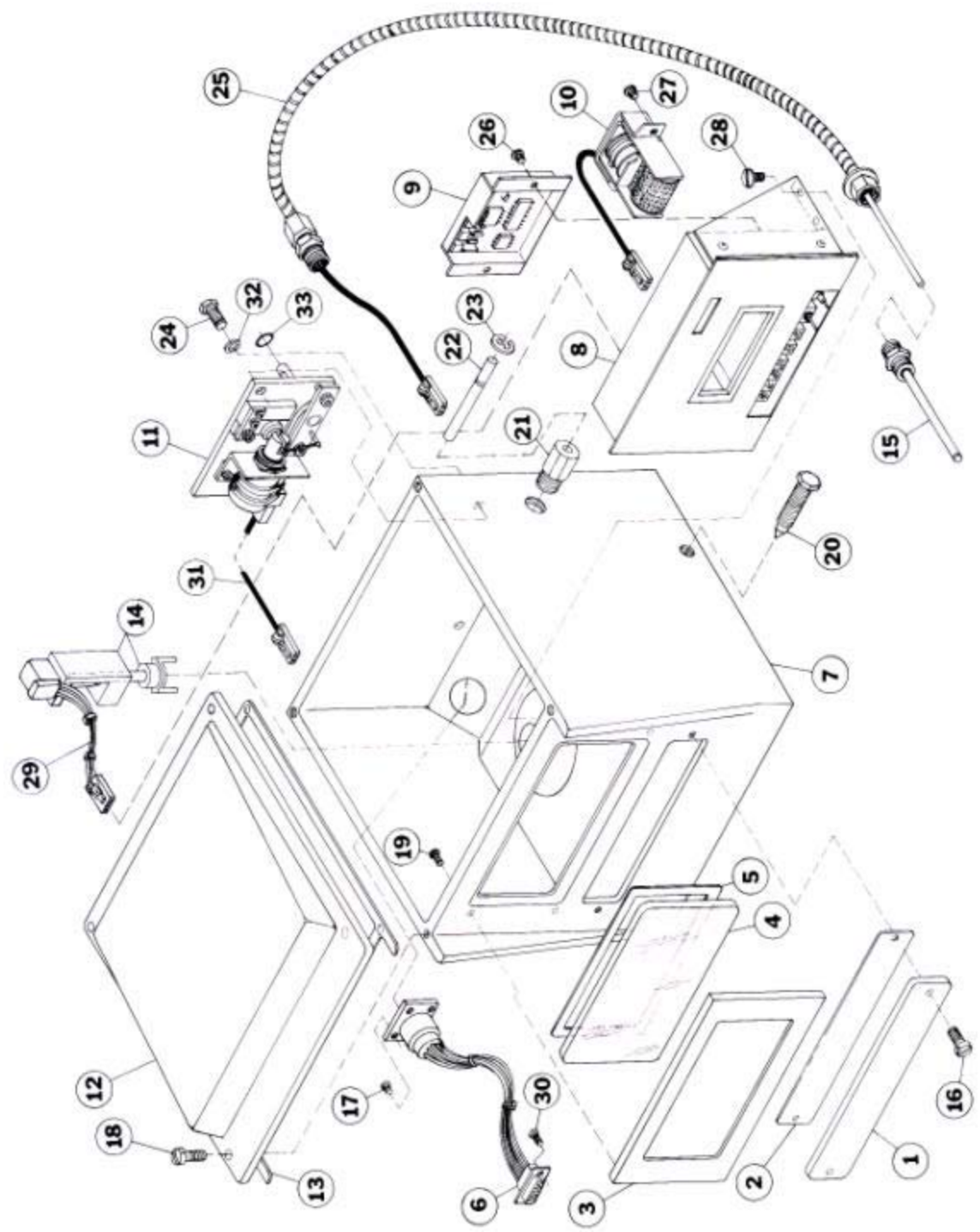


Upon connecting register cable to register head it is discovered that the cable must be pulled away from an obstruction, to prevent cable from rubbing on it. It will be necessary to relieve stress on the connector. To do this remove, in 1" increments, the heat shrink Boot material from cable. Taking care as not to cut the jacket of the cable.



Part Numbers for 8000 Computer

Item #	MID:COM Part#	Description
1	706-0002	8000 printer assembly
2	201-0026	8000 back panel
3	201-0029	8000 computer cover
4	707-0006	8000 power module
5	709-0003	8000 chassis assembly
6	201-0034	8000 base plate
7	706-0008	8000 keyboard assembly
8	707-0005	8000 display module
9	201-0025	8000 front panel
10	707-0007	8000 CPU module
11	300-0085	6-32 X 2.15 CPU MTG screw
13	706-0009	8000 battery assembly
14	201-0048	battery bracket
15	300-0030	6-32 X ¼ black screw
16	301-0011	2-56 nut
17	301-0001	6-32 nut
18	300-0065	8-32 X ¼ black screw
19	300-0078	6-32 X 3/8 screw
20	300-0020	6-32 slotted printer MTG screw



Part Numbers for Register

Item #	MID:COM Part #	Description
1	202-0038	register calibration cover
2	206-0004	calibration gasket
3	202-0037	register bezel
4	202-0034	register lens
5	206-0003	register lens gasket
6	701-0001	register harness
7	200-0001	8000 casting
8	707-0004	register module
9	707-0008	temperature comp. module
10	701-0035	totalizer assembly
11	706-0003	actuator assembly
12	200-0001	8000 casting
13	206-0002	register cover gasket
14	712-0004	encoder bracket
15	705-0021	8000 thermowell assembly
16	300-0084	10-32 X 5/8 seal screw
17	300-0051	4-40 X 1/2 screw
18	300-0084	10-32 X 5/8 seal screw
19	300-0023	6-32 X 1/2 pan head screw
20	202-0006	register mounting bolt
21	202-0055	actuator trip bushing
22	202-0018	actuator stop rod
23	308-0008	¼ “E” ring
24	300-0060	¼-20 X 3/4 actuator bolt
25	701-0049	temp. comp. probe assy.
26	300-0043	6-32 X 3/16 screw
27	300-0053	6-32 X ¼ screw
28	300-0056	8-32 X 3/8 screw
29	800-0001	encoder wire harness
30	300-0049	4-40 X 3/16 screw
31	701-0048	actuator plug wire harness
32	303-0034	bonded sealing washer
33	203-0024	actuator shaft O-ring

MID:COM Program Updates and Sipstick Replacement

The MID:COM “sipstick” is the central processing unit(s) for the 6501B computer, 8000 computers, and datacard interface adapter. These sipsticks contain the microprocessor and program/data memory that controls the unit. If a program change or update has been made, it’s necessary to replace the sipstick(s) as described below.

The sipsticks are installed in both vertically and right-angle sockets as shown in the diagram on the reverse side of this sheet. They are held into the socket by a clip on each side of the stick. The clips may be metal or plastic.

To remove the sipstick: Using you thumbs and forefingers, spread the clips toward the outside of the socket and rotate the sipstick to a 45 degree angle way from the clips. Pull the sipsticks out of the socket.

To insert the sipstick: Insert the sipstick into the socket at a 45 degree angle and rock it back and forth to insure it’s seated squarely. Once seated, rotate toward the clips and against the stops until an audible “click” is heard. The sipsticks are keyed in the center and on one side t allow it to be inserted only one way. However, it’s still important to note the orientation of the original one, to make certain the sipstick is installed correctly.

Sipstick Location And Labeling

6501B Computer: Left side of main board – REDES-XX or V-XX
(XX= Version)

Remove top cover to access.

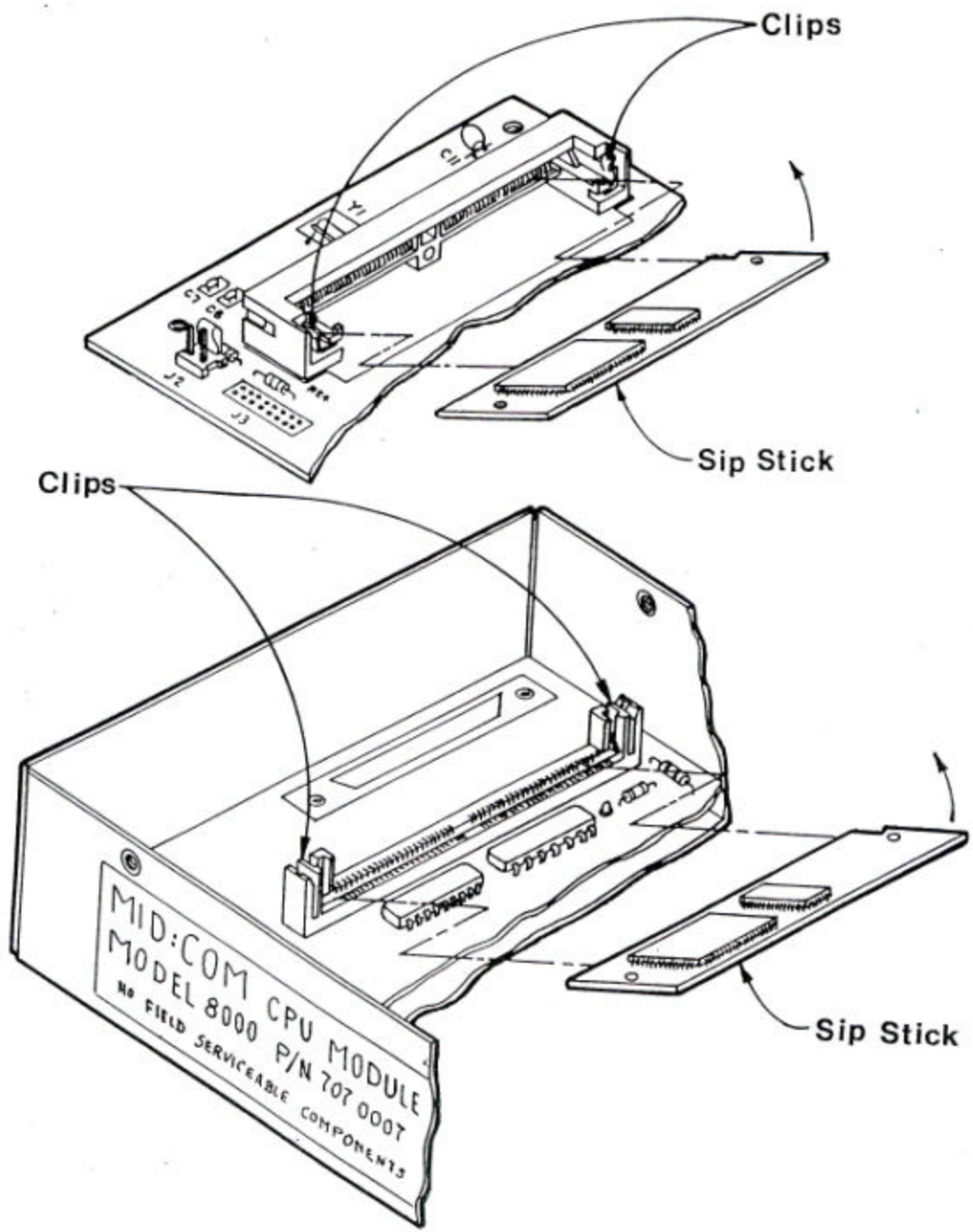
8000 Computer: CPU Module – 2 sipsticks – Main-XX and PLK-XX
Remove computer cover and CPU cover to access.

Datacard Interface Adapter: Circuit Board – DATA-X
Remove cover to access.

Caution

The sipsticks are susceptible to damage by static electricity. It is very important to leave them in the anti-static package they came in until the moment before installation. Return the original to the package as soon as possible.

Sipstick Installation



MID:COM 8000 Computer register Ticket Specifications Model MCR-80 DOT Matrix Printer

General Type:	Snap set or continuous form, with or without envelope
Copies:	Maximum of 5 copies or a total thickness of .017.
Paper Type:	Top copy – Carbonless self-contained remaining copies – carbonless or carbon interleave.
Width:	4.0 to 5.0 inches. Printer side stops are field adjustable and factory set at 4.25 inches.
Length:	Minimum 4.5 inches. Any length is permissible.
Line Spacing:	4 –7 lines per inch. Line spacing is field adjustable and set to 6 inches at the factory, using a 3 part carbonless form. Adjustment may be necessary depending on the thickness and construction of the form.
Print Type:	8 pin DOT matrix impact using reverse double strike.
Line Length:	25 characters maximum, occupying 3 inches in width.
# of Lines:	16 to 20 maximum depending on line spacing. Printer is adjustable for insert depth. The first line of print will occur 3.5 inches from the insertion edge of the ticket with the depth set to maximum. The number of lines may vary from one delivery to another depending on how the 8000 is used and number of taxes calculated.

Construction:

Ticket must be glued on the insertion edge. On continuous form tickets the sprocket stub may be removed but does not have to be if the maximum number of lines will not be printed. It is preferable to also glue the opposite end of the ticket, or at least provide solid crimp to keep the copies together.

Cautions:

It is very important to have no discontinuities in form thickness in the print area. All parts of the form need to bound at the insertion edge. If the ticket uses an envelope, the edge of the envelope or a strip for the envelope cannot be present in the print area. Perforations on any parts of the form are also prohibited in the print area. Failure to observe these cautions may cause ticket tearing and printer problems, and void warranties.

Electronic Versus Mechanical temperature Compensation

Although difficult to quantify, our experience in the meter calibration business has shown that as much as a 1 percent gain in delivery product can be gained by the use of electronic compensation. In some cases more. There are a number of reasons:

? Mechanical compensators use expanding bellows, which can only approximate the actual characteristics of the product. In the case of propane, it is a very poor match. The MID:COM electronic compensator uses the API Tables to calculate the exact correction for every tenth of a degree from -40 to +160. Mechanical compensators will only operate to -10 degrees. When you need it most, it can't do the job.

? With the exception of a collapsed bellows, all of the many problems a mechanical compensator can have results in a loss to the dealer. Slipping clutches and ratchet assemblies can cause enormous losses that can go unnoticed until inventories are checked. The electronic compensator does not wear out and should not require adjustment. Mechanical compensators may require adjustment with major changes in temperature.

? Mechanical compensator may take several minutes to react to a change in temperature. The electronic compensator calculates a new correction factor every tenth of a gallon, with accuracy to four decimal places.

? Mechanical compensators put a considerable drag on the metering element, gear trains and mechanical adjusters, causing product slippage through the meter and premature failure of all the mechanical components. The electronic compensator has no moving parts, and coupled with electronic calibration puts no additional drag on the meter. Maintenance costs alone will pay for the compensator.

MID:COM 8000 Trouble Shooting Guide

After the MID:COM has been installed, per the installation instructions supplied with the system, initial power up should be performed to test that the MID:COM has been installed correctly and that it is operating properly. The following is a brief run through simulating a basic delivery from start to finish covering correct responses VS incorrect responses with possible fixes.

Turn Unit ON:

Correct Response: After a short delay computer will turn on and go through a series of self-tests, while resetting the register to 0.0. After the self-tests, the computer display will be at the main menu:

PRINT SHIFT TOTALS
SELECT METER (1)
LOAD TRUCK
SETUP

Incorrect Response:

1. If unit does not power up, remove cover and check to see what lights are on. You should have ignition, 12 volts and 5 volts. If these lights are on check connection to display. If connection to display is OK replace display module.
If ignition or 12 volt lights are not on, check power hook up to MID:COM and at terminal ends.
2. If unit locks up on the first screen (self test stand by) replace CPU module. Internal battery must be disconnected before unit will power down.
3. If first screen appears like this:
Replace CPU module.

XXXXXXXXXXXXXXXXXXXX
XXXX
XXXXXXXXXXXXXXXXXXXX

4. If unit powers up to main menu then goes into power failure and then powers back up and then repeats itself over and over, the circuit breaker or fuse may have popped. Reset and check cable for shorts. Also power module may have a broken trace on the 12 volt or ground line, which may have been caused by a shorted register cable. Replace power module and register cable.
5. Display is backlit but no headings are present. Adjust display intensity located on top of power module, to the left of the row of lights, counter clockwise for more intensity.
6. If a continuous beep is heard upon power up and :
 - A. Unit is not locked up, replace power module.
 - B. Unit is locked up, disconnect internal battery and power down. Wait 1 minute then reconnect battery and power up unit. If beep is still heard replace CPU module. If power up is OK and no beep is heard, go into the setup portion of the MID:COM and scroll through the screens verifying that no letters appear where a number should be. If letters are present replace CPU, if none are present continue on.

MAIN MENU:

Correct response: (No Datacard Inserted)

Down arrow twice to insert ticket screen.

Incorrect Response:

1. If keyboard is inactive (no beep when button is depressed) replace keyboard. If keyboard is active (beep is heard) but screen does not advance, replace CPU module.

Insert Ticket:

Correct Response:

Upon insertion of a ticket, the ticket will depress a micro switch that activates the ticket clamp solenoid and drops the printer platen down allowing the ticket to travel to the stop switch. When the stop switch is activated the printer platen clamps down on the ticket and the printer will start to print information about this delivery. After information is printed, the register will reset to 0.0 and computer screen will advance to the following screen:

GALLONS PRICE TAX PRESET

You are now ready to make the delivery.

Incorrect Response:

1. Printer will not accept the ticket. If no sound is heard (slug being pulled in by solenoid) check to see if there is any obstruction in ticket tray. Verify micro switch is plugged in (visual from cut out on printers front frame) check to see that the flat ribbon cable is plugged in and that no cuts or tears are present

Correct Response:

Printer accepts ticket. When destination is reached ticket will be clamped and information will be printed and register will be reset.

Incorrect Response:

1. Ticket is not clamped upon reaching the ticket stop switch. Possible loose drive arm and hub assembly or not enough pressure from idler rollers. In both cases push printer's idler rollers up against paper feed

rollers and tighten up setscrews on hub. These screws need to be secured with Loctite.

2. Printer clamps down but nothing is printed. Possible loose carriage block cable or bad print head. Replace printer.

Correct Response:

Delivery should begin with gallons being registered on both displays.

Incorrect Response:

1. If no product flows, check security or preset valve to be sure they are operational. Lights on top of power module will indicate if the proper signal has been sent to the valve.
2. Product flows but no registration on rear display. Check switch settings and connections to register module. If that checks out OK, it may be a faulty encoder. Refer to calibration instructions, switch #6 test functions, pulser test. If nothing registers, replace encoder. If register is temperature compensated verify probe is plugged in, verify shorting block is connected, check temperature on register (switch #6) to see if probe is out of range. Replace temperature probe.
3. Registration stops during delivery. Possible bad encoder or loose connection. Possible probe out of range condition. (see #2 above)
4. Register resets during delivery. Check register cable for intermittent connection. Verify J7 is installed. Replace register module.

FOR CANADA ONLY:

5. If register displays 0.1, temperature compensator probe is faulty. Replace probe.

Correct Response:

Computer display will show the gallons registered.

Incorrect Response:

1. No registration on computer display. Switch register cable to meter 2, valve cable to valve 2, select meter 2 on main menu and try again. If OK replace power module when convenient. If still no registration, replace register cable 1st, then CPU if problem is still present.

Correct Response:

Once delivery is completed driver takes up hose then pushes Print (twice) on the computer and delivery ticket is printed.

Incorrect Response:

1. When hose reel solenoid is activated the register's display either resets or adds gallons to display. Install or replace spike suppresser.
2. Displays do not match. One of the displays is probably correct. If this situation comes up the system usually is affected by an intermittent connection or some outside interference. I.E. solenoid, radio, voltage spikes from power source. Verify J7 is installed.

Correct Response:

Delivery ticket is printed and ticket is advanced out. Once ticket has finished printing, remove ticket will appear on computers display. Once ticket is removed, display will go back to the main menu. Printer will have printed each line clearly with proper line spacing.

Incorrect Response:

1. Print button is inactive and computer is locked up. Replace CPU module.
2. If print out is ghosting itself, replace printer.
3. If printer prints information on one line or line spacing is erratic. Replace printer.

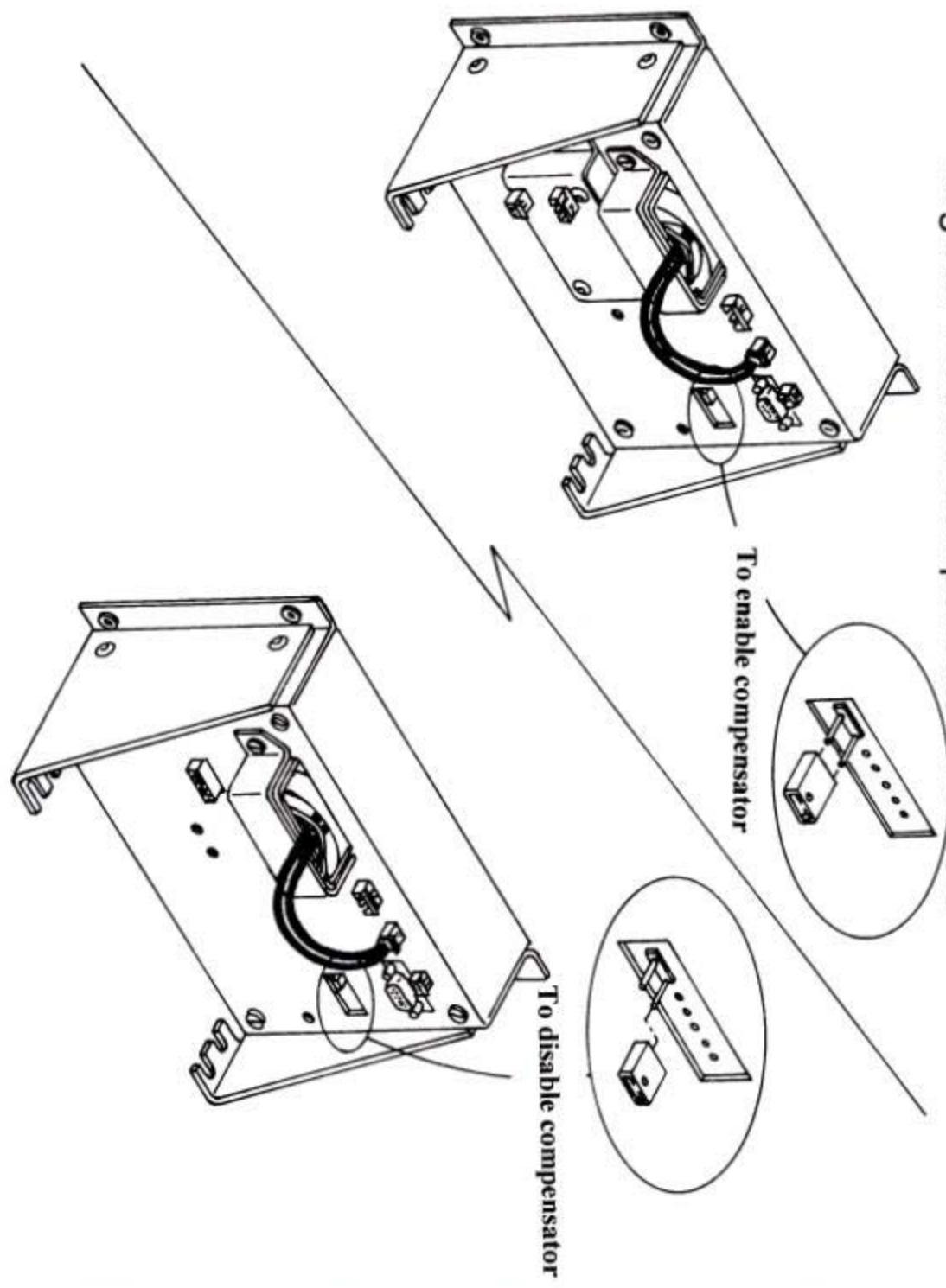
Correct Response:

When truck is shut off, MID:COM will go into a power failure sequence, then shut off.

Incorrect Response:

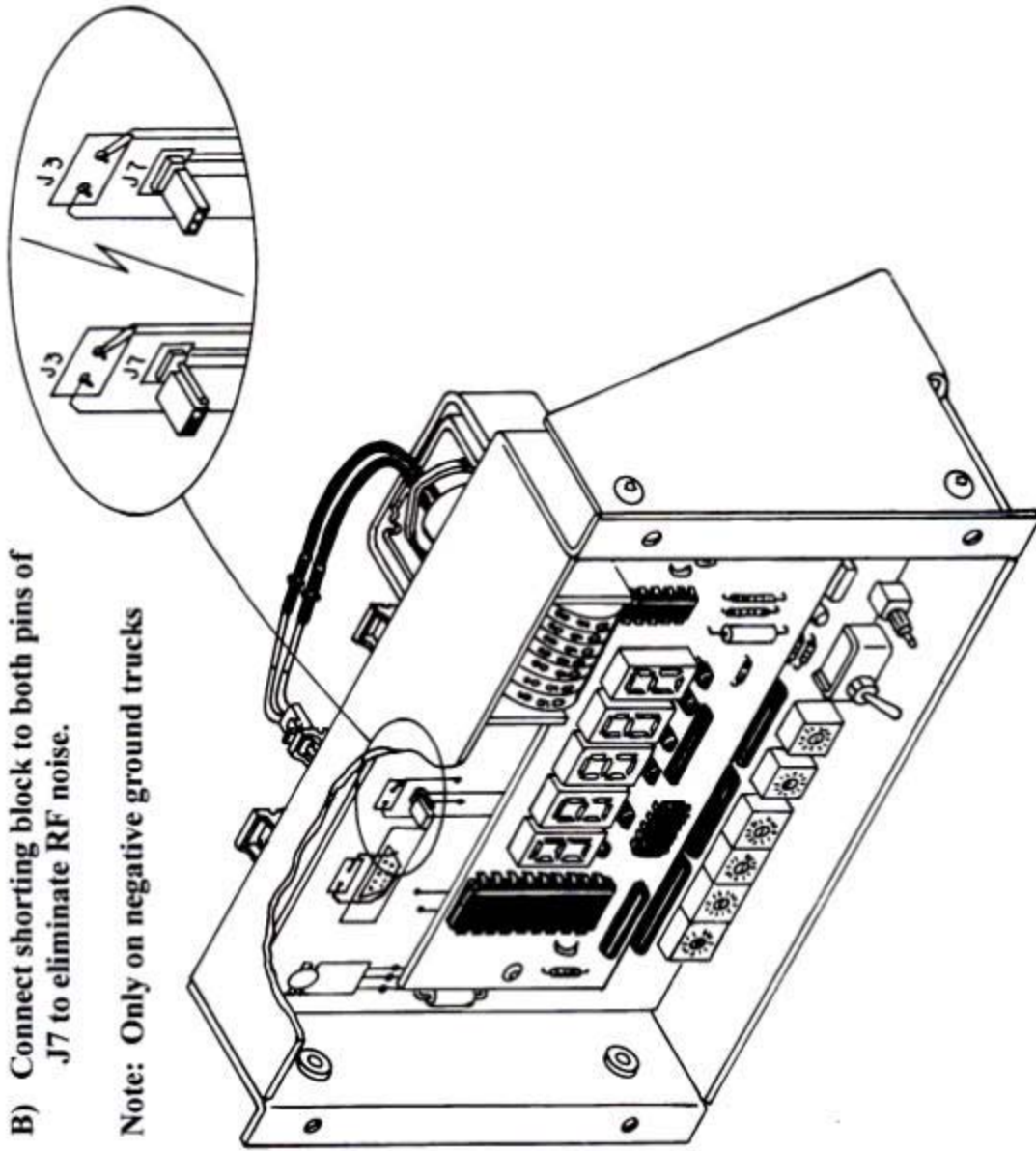
1. MID:COM shuts down without going through the power failure sequence. Replace internal battery.

Register Module Compensator and Able

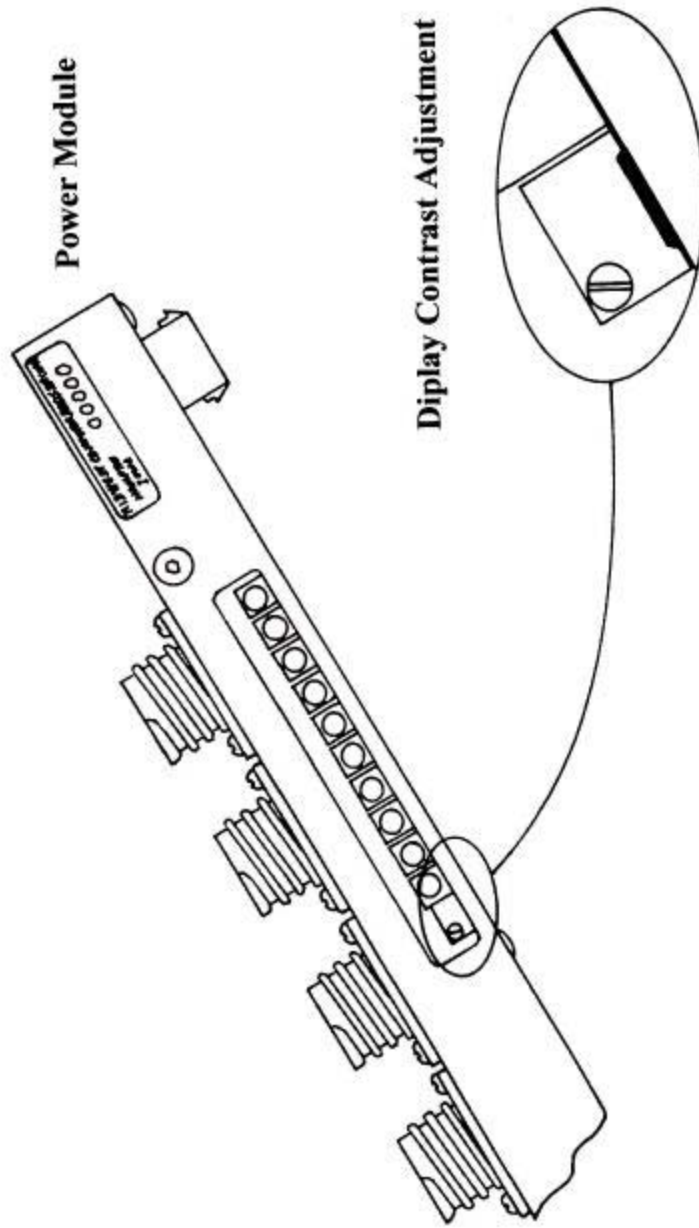


- A) As it is shipped from the manufacturer.
- B) Connect shorting block to both pins of J7 to eliminate RF noise.

Note: Only on negative ground trucks



LCD Display Contrast Adjustment



Power Module

Display Contrast Adjustment

Clockwise = Less
Counterclockwise = More

**MID:COM
8000
Service Report**

Date: _____ / _____ / _____
 Company: _____
 Name: _____
 Phone: _____
 Fax: _____
 E-mail: _____

**MODULE RETURNED
(PLEASE CHECK)**

P/N	DESCRIPTION	S/N	MFG DATE
701-0035	Totalizer Assy	_____	_____
701-0049	Temperature Probe	_____	_____
706-0002	Printer Assy (D)	_____	_____
706-0008	Keyboard Assy	_____	_____
707-0004	Register Module (G)	_____	_____
707-0005	LCD Display Module	_____	_____
707-0006	Power Module (F)	_____	_____
707-0007	CPU Module (E)	_____	_____
707-0008	Compensator (H)	_____	_____

NOTE: Assemblies that do not have a letter designation must have the computer's S/N that it was installed with, accompanying the assembly to receive credit!

REPORTED PROBLEM: