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# **MID:COM SmartLink SLS** **Installation Instructions**

## **Overview:**

These instructions describe the procedures to install a standard MID:COM SmartLink SLS 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 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 Printer Unit:**

The SmartLink printer has a flat baseplate with four ¼” holes for mounting. It can be mounted anywhere that is convenient for the driver. Optionally it is supplied with an aluminum pedestal for mounting in the cab of the truck. The pedestal uses a base plate, which 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. The braces supplied may be used for further support. The pedestal’s post is usually too long for most installations and should be cut as short as practical to further help to reduce movement and vibration.

## **2. Mounting the Register Head:**

The MID:COM SmartLink mounts directly onto a standard Neptune 1¼” 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 not used in conjunction with a mechanical preset mechanism, and many that are.

### **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 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 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 a 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 printer box 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.



#### **4. Connecting Cables:**

Remove the printer cover and loosen the screws that hold the cable clamp at the rear of the unit. Route the power and register cables through the slot. Plug the power cable onto the lower 6 pins on the printer circuit board, then the first register to the center 6 pins, and finally (if used) the second register to the top 6 pins. The connectors are keyed so they can't be mismatched, but care should be taken to make sure the bottom connection is power.

##### **Register:**

Note the keys on the register connector. Rotate the cable end until the keys line up, then push the connectors together and use the locking ring to pull the mates together. Turn the locking ring until you can feel a detent snap in place. A seal wire can be used by threading it through the white seal ring and the hole in the register casting.

##### **Valves:**

Connect the circular plastic connector to the register as described above. The other end of the cable is pre-terminated to the 3-way propane valve. In the case of the 2-stage solenoid valve, a junction box must be used to connect the valve pigtails to the valve cable. MID:COM does not supply this box.

## **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 cables 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 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 on next page for 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 and 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 in it. I.E. AM/FM radio circuit.

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

**Note:** 1. 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.

2. 10 AMP automotive fuse, located in your installation kit, must be inserted in fuse holder located on the red wire of power cable.

## **6. Calibration:**

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

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 initial calibration factor. A change-gear chart is included for reference. If a Veer-Root register was replaced simply leave the calibration switches at the factory setting of 1.000.

## **7. Spike Suppressor Installation:**

All MID:COM SmartLinks are shipped complete with one spike suppresser per register head, these are included in the installation kit. The spike suppresser must be installed across each hose reel solenoid. (See accompanying diagram, page 14 &15) It also may be necessary to install more than the one on the hose reel solenoid. If so, contact the factory to order additional spike suppressers.

**Note:** The installation kit contains extra terminals, adapters, and splices to adapt to the situation at hand. A simple 12-volt test light is best to use for finding the power and ignition hookups. Once the SmartLink is 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 terminal and cab. If either 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.

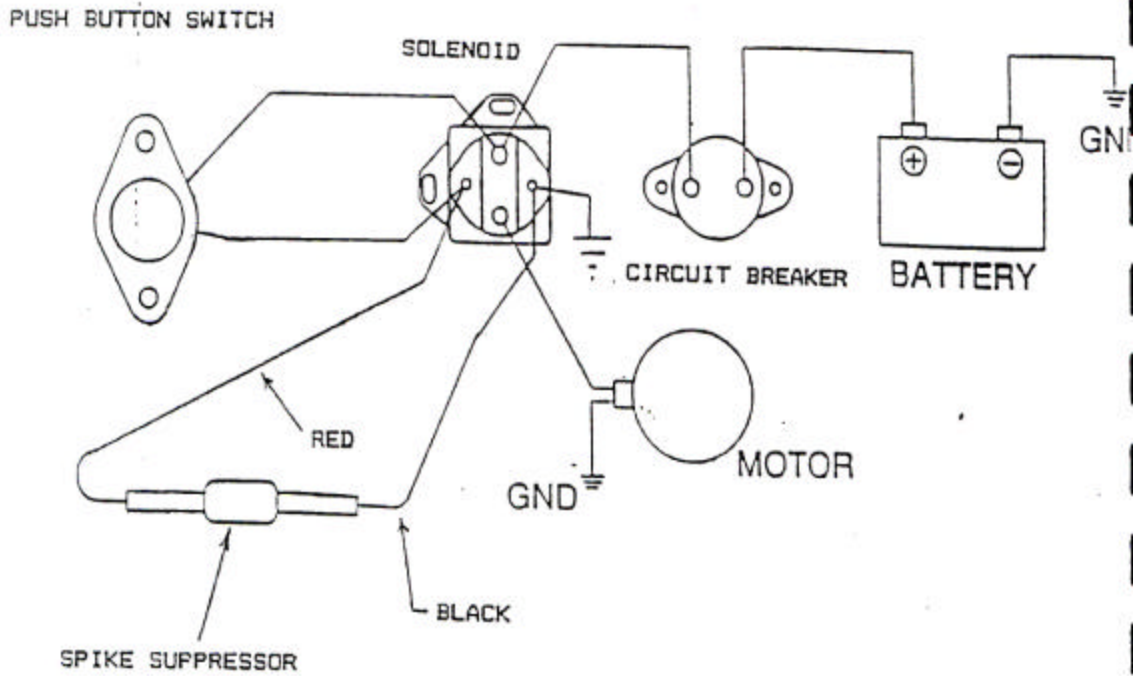
**Note:** The truck is equipped with a high power business band radio, this truck check should be made with the radio on and microphone keyed.

**Calibration Comparison Chart**  
**For**  
**Mechanical Register To MID:COM Registers**

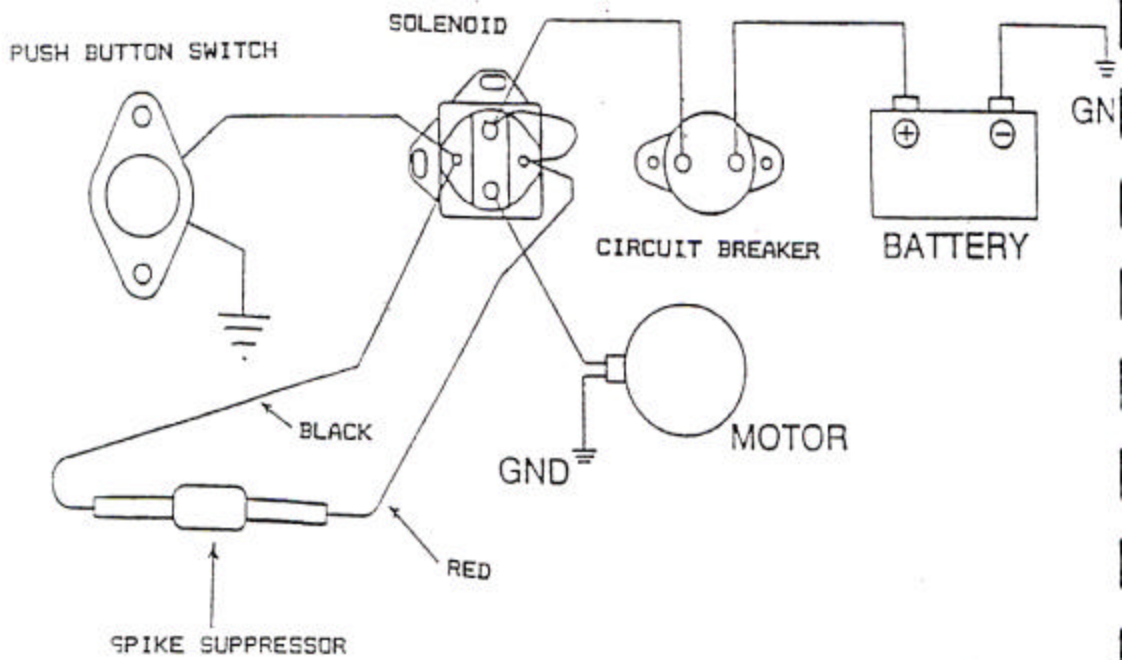
Change Gears		MID:COM Cal. Settings	Change Gears		MID:COM Cal. Settings
Reg. Spin	S.B. Spin	S6,1,2,3,4	Reg. Spin	S.B. Spin	S6,1,2,3,4
29	33	1.1379	33	35	1.0606
30	34	1.1333	34	36	1.0588
24	27	1.1250	18	19	1.0556
25	28	1.1200	19	20	1.0526
26	29	1.1154	20	21	1.0500
27	30	1.1111	21	22	1.0476
28	31	1.1071	22	23	1.0455
29	32	1.1035	23	24	1.0535
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.**

SOLENOID SPIKE SUPPRESSOR  
 INSTALLATION DIAGRAM  
 (TWO POSSIBLE CONFIGURATIONS)



GROUNDED COIL CONFIGURATION



"HOT" COIL CONFIGURATION



## **Reel Motor Solenoid – Spike Suppressor** **Installation Instructions**

The spike suppressor is a heavy-duty diode used to kill the high-voltage inductive kick-back that occurs when the reel motor 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 which ever stud reacts like the grounded coil configuration.

## **MID:COM SmartLink SLS 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. Is 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 suppressers installed on hose reel solenoid, throttle control solenoid, etc. (Note: To check spike suppresser installation, with unit on and hose pulled out depress hose take up and note that the register display does not reset or that gallons/liters are 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 that excess cable to the outside of the cab or to the rear compartment for extreme cases of interference.
11. Do a shift report to check printer line spacing. (Line spacing is set at approximately 6 lines per inch from the factory.)
12. Shut truck off. Computer should go through a "Power Failure Sequence" prior to shutting off.
13. Are all cables installed per installation procedure. I.E. Power, register, valve cables.
14. Is the computer properly grounded.
15. Has truck's electrical system been checked out per instructions.

## **SV101 Solenoid Security/Preset Valve For Models 6501, 8000 and SmartLink**

<b>Part Number</b>	<b>Descriptions</b>
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.
706-0023	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 the register cable and connect the plug to the mating receptacle labeled “VALVE 1” on the rear of the 8000 computer.
- 706-0023            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 or 71395SN – 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.) The nipple is adequate for mounting purposes, and no other support is necessary.
4. Connect the vapor line to the “vapor” port.
5. Connect the “pressure” port to any source of liquid pressure ahead of the differential valve. A drain plug on the measuring element is often convenient. Otherwise, a portion of the meter may have to be drilled and tapped for a pipefitting. (See note below.)

## **Port Designations:**

ASCO #832058                      Port 1 – Common – Differential Valve  
   Port 2 – Vapor – Vapor Line  
   Port 3 – Pressure – Source of Pressure

Skinner #X54LB                      Port 1 – Vapor – Vapor Line  
   Port 2 – Common – Differential Valve  
   Port 3 – Pressure – Source of Pressure

Skinner #714X, 7133, 7139                      Port 1 – Vapor – Vapor Line  
   Port 2 – Common – Differential Valve  
   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.

**Note:** An in line filter has been added to be installed on the pressure port of the valve. This is to eliminate debris getting in to the valve and clogging it up.

## **SmartLink SLS**

### **Features – Advantages - Benefits**

- ? Cab mounted ticket printer – Keeps printer and tickets protected from weather.
- ? Ticket interlock feature – Requires proper reset sequence to start delivery.
- ? Elapsed time lockout – Prevents “riding the ticket”.
- ? Uses your current tickets – Allows you to use you existing inventory.
- ? One printer serves two meter – Saves space and money.
- ? Shift totals can be printed at any time – Greater accountability.
- ? On dual meter trucks, both registers can operate at the same time - Saves time.
- ? Register has built in preset buttons – Convenient operation at the meter.
- ? Optional electronic temperature compensator – Higher accuracy – Nothing to wear.
- ? Digital calibration – Eliminates gears and adjusters that can give away product.
- ? Optional Multi-Product calibration – Eliminates the need for multiple meters.
- ? Extremely low torque – Longer life – Eliminates added wear to meter internals.
- ? Electro-Mechanical totalizer – Provides tamper-proof inventory control.
- ? Weatherproof aluminum register housing – Meets DOT specifications.

- ? Powder coat finish and stainless hardware with anti-seize – Prevents corrosion.
- ? Bright red LED numerals – Excellent visibility, especially at night.
- ? Can be updated to the **MID:COM 8000** at any time – Saves money later.
- ? Can communicate with all types of computers and peripherals – Easy interface.
- ? Easy installation – Only register and printer required.  
No junction boxes, power supplies, or dual meter adapters.
- ? Lowest overall cost of any register system!
- ? Fastest return on investment!

**Delivery Ticket Printout Includes:\***

Time & date  
 Truck & meter number(s)  
 Sequential sales number  
 Zero start  
 Volume delivered (gross and/or net)

**Shift Ticket Printout Includes:\***

Time & date last shift ticket  
 Time & date this shift ticket  
 Truck & meter number(s)  
 Gross and/or net total volumes

\* On dual meter trucks both deliveries can be printed on the same ticket.



## **SmartLink SLS Theory of Operation**

The SmartLink SLS System is designed to replace all mechanical registers, printers, presets, temperature compensators and valves on any type of meter. The system can be configured with one or two registers, and in the case of two registers, both products can be pumped at the same time, with each delivery on a separate ticket, or both on one ticket. The system can control single or two-stage solenoid valves as well as an electromechanical actuator for controlling existing mechanical auto-stop valves. Although the system can be used without solenoid valves, it is highly recommended they be used to insure security against riding the ticket and other fraudulent activities.

### **The Register Has Three Control Buttons:**

- 1. Start/Stop**  
Used to start the delivery by resetting the Register and opening the solenoid valves, and also to stop the delivery while pumping, by closing the solenoid valves.
- 2. Preset**  
Used to set a predetermined volume to be delivered.
- 3. Restart**  
Used to restart the delivery if the start/stop button was used to stop the delivery, or the preset amount was met. It is also used to reset display to zero.

## **The Printer Has Three Control Buttons:**

- 1. Print 1/Off**  
Used to print the ticket for Register #1, and also to turn the System Off.
- 2. Print 2**  
Used to print the ticket for Register #2.
- 3. Print 1+2/Totals**  
Used to print a single ticket for both registers, and also to print a shift total report.

## **General System Overview**

The register(s) and printer contain microprocessors that perform the various functions for each. They communicate with each other via an RS-232 Serial Link. In addition to this “internal” communication, there is an external serial port on the printer that can communicate with other devices such as PC’s and hand held terminals.

To get the best picture of how the system operates, we will use an example of a typical delivery and explain what’s happening each step of the way. We’ll use the more complicated situation of the two registers on a dual system. In this case we are using solenoid valves, which are recommended to maintain security.

The system is wired to the truck battery for power and to the ignition switch for a means of powering-up. When the ignition is turned on, there is about an 8 second delay before a relay closes and powers the system. This delay is used to keep the unit off while the truck power fluctuates during starting. Once on, the registers will reset and go through a count sequence ending up at zero. After this, the printer will interrogate each register to see

if it is present. This is a very important feature since most of the functions of the printer are dependent on knowing which heads are connected. If the register is present, the print button corresponding to the register, light will blink temporarily. In this case, **Print 1** and **Print 2** light up.

After this start-up sequence and at any time the printer is ready to accept a ticket, the three buttons will flash momentarily from right to left. The driver now inserts a ticket; the ticket clamp will automatically open allowing the ticket to be inserted until it hits the adjustable stop switch at the rear of the printer mechanism. If the driver does not get the ticket inserted fully in about five seconds, the clamp will shut and the ticket must be removed and reinserted. This prevents “hanging” the printer by leaving a ticket partially in. Once the ticket hits the stop switch, the ticket is clamped and the delivery sequence has started.

At this point, the **Print 1 + Print 2** button will flash momentarily indicating that the registers are being interrogated to see if either register has a previous delivery pending to be printed. If so, the corresponding print button(s) will light continuously. For the time being we'll assume there are no pending deliveries, so the buttons will not be lit. At this time the printer sends a command to the registers to prepare them for presetting and resetting.

Now at the registers, the driver starts by presetting the amount to be delivered. This is an optional step and if not done the preset amount is set to maximum. Press the restart button, which clears the display of the last delivery to zero and resets the preset amount to zero. This must be done or the preset button will not function. Then press the preset button to advance the display to the preset amount. The display counts faster the longer the button is pressed, and returns to a slow count each time the button is released and pressed again. This allows the driver to advance quickly into hundreds of units and then to “bump” the display to the exact amount. If you go over the amount, press the restart button to start over.

Once you are done presetting the amount to deliver, press the Start/Stop button to start the delivery. The display will self-test by counting up to from all 9's, display then goes through the product code, calibration factor, product code sequence then to 0.0. At this point the solenoid valves will open, indicated by the yellow and green LED's on the register module, and the preset button will no longer function. The driver may now do the

same to the other register, or start pumping and then attend to the other register. Both registers may be running at the same time.

During a delivery the Start/Stop button may be used to close the solenoids in the case of an emergency or to check tank levels, etc. The restart button will open the solenoids to resume the delivery. It's important to note that while the registers are counting, and for a few seconds after flow has stopped, there is no communication with the printer and therefore it is not possible to print a ticket.

When the preset amount is met, the register will shut the solenoid valves. If the driver needs to deliver more product, press the restart button to once again open the valves. You cannot however preset another amount to be delivered. If you stop the delivery before the preset amount is met, the valves will remain open until one of the following occurs; press the Start/Stop button, the elapsed time shutdown (if activated) times out, or you attempt to print a ticket. In the later two cases, the valves cannot be reopened until the deliveries have been printed and the whole reset procedure is started over again.

Now back at the printer, the driver initiates printout by pressing any button. When you do this, the registers are again interrogated for any volumes delivered and the corresponding print buttons will light solid. Assuming you made a delivery on both registers, all three buttons will be lit indicating you have a choice of printing each delivery on a separate ticket, or both on one. Let's assume you press Print 1. The sales number will advance and the printer will print the date and time, sales number, truck number, product and volume for Register 1. The Print buttons will now flash from left to right prompting you to remove the ticket.

If you decide to print both on the same ticket, you would simply press Print 1+2. In this case there is only one sales number for both deliveries. Inserting another ticket at this point starts the whole procedure from the top by preparing the registers for presetting and resetting. Until both deliveries have been printed, a "reset" sequence cannot begin to prepare the registers for the next delivery. Once the ticket has been removed, the PRINT 2 button will come on prompting you to insert a second ticket. Once ticket is inserted press the PRINT button twice to print ticket.

## **Print Shift Totals**

A shift total ticket can be printed at any time. The ticket contains the time and date of the last shift ticket, the present time and date, and the accumulated volume totals for one or both registers. To print the shift ticket, the driver presses the Print 1+2/Total Button. The button will light. Insert the ticket and the printer will clamp the ticket, print the totals, record the present time and date, and reset the totals to zero. If you decide to not print the ticket, you can push the button again and the light will turn off.

## **Shutting Down the System**

The SmartLink powers-up by sensing the ignition switch but will not automatically shut down when the ignition is turned off. The driver must press the Print 1/off button, with the ignition off, to request a shutdown. When you do this, the printer once again interrogates the registers to see if there is a ticket pending to be printed. If not, the unit will shut off. Otherwise the ticket(s) must be printed and the Print 1 button pressed again.

**NOTE:** When used with a compensator, the RED led lights up indicating the previous delivery was delivered at a net volume and the compensated message prints on the ticket. When not compensated the red light does not come on.

# MODEL SLP-100 PRINTER PROGRAM SWITCHES VERSIONS WITH “C” SUFFIX AND HIGHER

A set of eight switches used for programming various features of the printer is located on the top right hand corner of the printer control board. Remove the printer cover to gain access to the switches. The switches are labeled 1-8 from right to left, and are in the “ON” position when flipped forward toward the front of the unit.

## SWITCH FUNCTIONS

### 1. SPARE

### 2. SET CLOCK

Flip switch **ON**. The hours and minutes are now set to 00:00. Push and hold the **PRINT 1** (hours) button. It will flash once for each hour that it increments from 00. Release the button when it has counted to the present hour. In the same manner push and hold the **PRINT 2** (minutes) button to set the minutes. Flip switch 2 to **OFF** and **PRINT 1+2** will light to indicate the time is set. You can verify the time setting by printing a shift ticket. Note the clock runs in military time and if the minutes are :00, there is no need to push the **PRINT 2** button.

EXAMPLE: Set time to 1:15 PM (13:15); push and hold **PRINT 1** for 13 flashes. Push and hold **PRINT 2** for 15 flashes. Flip switch 2 **OFF**.

### 3. SET TRUCK NUMBER/RESET SALES SEQUENCE NUMBER

The truck number is a four-digit number. Flip switch 3 **ON** and push and hold **PRINT 1**, while counting the flashes, to set the left two digits of the number. Then push and hold **PRINT 2** to set the right two digits of the number. Flip switch 3 **OFF** and **PRINT 1+2** will light to indicate the truck number has been set. Each time switch 3 is turned **ON**, the sales sequence number will be reset to zero.

EXAMPLE: Truck numbers 1234 – flip switch 3 **ON**. Push **PRINT 1** for 12 flashes. Push **PRINT 2** for 34 flashes. Flip switch 3 **OFF**.

4. **SPARE**

5. **PRINT NET AND GROSS**

With this switch **ON**, both the net and gross volumes will be printed. If the switch is **OFF**, only the net volume will be printed. If the switch is **ON** and a compensator is not installed or it is deactivated, only the gross volumes will print.

6. **SUPPRESS TIME AND DATE PRINT**

With the switch **ON**, the time and date will not be printed on the delivery ticket, but will still print on a shift ticket.

7. **VEEDER-ROOT/NEPTUNE PRINT FORMATS**

With this switch **OFF**, printing is right-side-up with respect to the insertion edge of the ticket, or **VEEDER-ROOT STYLE**. With the switch **ON**, the printing is upside-down with respect to the insertion edge of the ticket, or **NEPTUNE STYLE**. Note the ticket stop switch on the printer must be adjusted so either print format lines up with the blank area on the Neptune or Veeder-Root ticket.

8. **PROGRAM MODE**

Turning this switch **ON** puts the printer in **Program Mode**. A new program can be downloaded through the DB-9 serial port on the back panel of the printer through any P.C. Download software is provided by MID:COM.

**SMARTLINK MODEL SRG(L)-3XX REGISTER**  
**PROGRAM SWITCHES**  
**VERSIONS WITH “C” SUFFIX AND HIGHER**

**1. PROGRAM MODE**

Turning this switch on at any time puts the unit in the program mode. A new program can be downloaded through the register connector, which contains the serial port connections. A special adapter is required to connect directly to a P.C. Software to download is provided by MID:COM.

**2. ELAPSED TIME SHUTDOWN**

Turning this switch **ON** enables the elapsed time shutdown. The timer starts when 10 units of volume (gallons or liters) have been registered. The timer is continually reset during flow and starts to time out when flow stops. When the timer times-out, the solenoid valves will shut and cannot be restarted with the “restart” button.

This switch has no function on versions **CX.X**. The shutdown is always enabled.

**3. ELAPSED TIME SET**

Turn the switch **ON** and **\*RESET** the register. Push **RESTART** to clear the last setting. **(This must be done)** push and hold the **PRESET** button until the desired number of minutes is showing on the display, disregarding the decimal point. Return the switch to the **OFF** position and **RESET** the register. In versions **CX.X**, the timeout is limited to a maximum of 3 minutes.

**4. SET VALVE STAGE 1**

Turn the switch **ON** and **RESET** register. The last setting will be displayed. Push **RESTART** to clear out the last setting. **(This must be done)** push and hold the **PRESET** button until the desired number of units is showing on the display, disregarding the decimal point. Note that the first



stage shutdown is in whole units. Return the switch to the **OFF** position and **RESET** the register.

## **5. SET VALVE STAGE 2**

Turn the switch **ON** and **RESET** register. The last setting will be displayed. Push **RESTART** to clear out the last setting. **(This must be done)** push and hold the **PRESET** button until the desired number of units, and tenths of units, are showing on the display. Return the switch to the **OFF** position and **RESET** the register.

## **6. GALLONS/LITERS**

With this switch off, the register is in gallons mode. Each revolution of the input shaft will register 1.0 gallon. The totalizer will increment once for each gallon. With this switch on, the register is in liters mode. Each revolution of the input shaft will register 10.0 liters. The totalizer will increment once, for each **TEN** liters. The printer is interlocked to this switch for printing either gallons or liters on the ticket.

**\* Reset the register by momentarily pushing S7 toggle switch to the right.**

## SmartLink SLS Quick Delivery Sequence

- 1. Insert Delivery Ticket in Printer.**

The three buttons will flash from right to left. Insert the ticket face-up until it stops, PRINT 1 and PRINT 2 button will momentarily turn on then go off.
- 2. Select Product.**

Press the restart one or more times until a number other than zero shows. Press preset until the correct code shows. This only needs to be done if the product is different from the last delivery.
- 3. Set the Preset Volume.**

Press the restart button one or more times until 0.0 shows. Then press and hold the preset button until the desired volume is showing. To start from zero again, press the restart button.
- 4. Reset the Register.**

Press start/stop. The register will reset and open the valves. Preset is now disabled.
- 5. Deliver Product.**
- 6. Print Ticket.**

Press any button on the printer. The buttons will light indicating which register is ready to print. Press the lit button to print. After printing the three lights will flash from left to right. Pull the ticket out of the printer.

**NOTE:** On a dual system, if a delivery was made on both registers, all three buttons will be lit. if PRINT 1+2 is pressed, both deliveries will be printed on one ticket. If the deliveries are to be printed on separate tickets either PRINT 1 or PRINT 2 may be pressed, and then a second ticket inserted and the last lit button pressed twice.

### **Emergency Shutoff**

Pressing start/stop anytime during the delivery will shut the solenoid valve and stop flow. Press the restart button to resume.

### **Printing Shift Total Ticket**

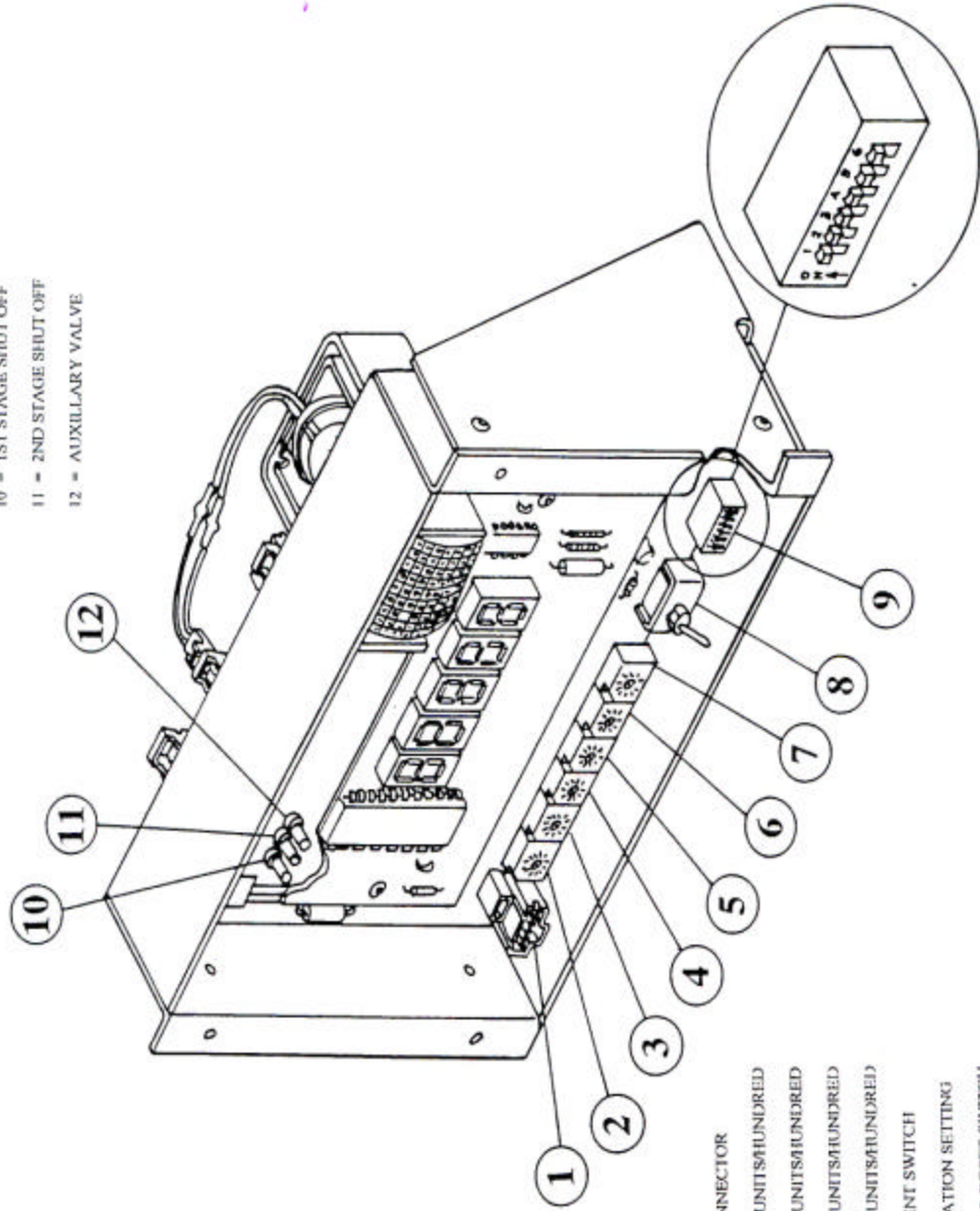
With no ticket in the printer, press PRINT 1+2. The button will light. Insert a ticket until it stops. The shift ticket will automatically print. If PRINT 1+2 is pressed again prior to inserting a ticket, the light will turn off and regular operation resumes.

### **System Shutdown**

The system turns on with the ignition eight seconds after the truck starts. To shut the system down, make sure all tickets have been printed, no ticket is in the printer, the ignition is off and all three buttons are flashing from right to left. Press PRINT 1 to turn off.

# 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

**SmartLink SLS**  
**Multi-Product Calibration and Operation**  
**For Models SRG(L) 302-M**

**General:**

The Multi-Product version of SmartLink allows up to nine products to be delivered through a single meter. Each product can have its own unique calibration factor and second-stage valve setting. Products 1-7 are predefined types with corresponding temperature compensation tables as listed below. With a compensator installed, any product may be set to compensated or not compensated. Products 8 & 9 are not defined, nor do they have a corresponding temperature compensation table. They may however be used in an uncompensated mode. The name of the current product selection is printed on the delivery ticket.

The Multi-Product version also supports two meters for dual operation, with the capability of running both meters at the same time. The shift total ticket will list the total gross and net volumes for each meter and each product that was delivered in that shift.

PRODUCT 1 – Propane  
PRODUCT 2 – Fuel Oil/Diesel  
PRODUCT 3 – Gasoline  
PRODUCT 4 – Lube Oil  
PRODUCT 5 – Methanol  
PRODUCT 6 – Anhydrous Ammonia  
PRODUCT 7 – Jet A  
PRODUCT 8 – Any  
PRODUCT 9 – Any

## **Operation:**

With the Multi-Product version the product code must be selected on the register prior to making the delivery. To do this we make additional use of the RESTART and PRESET buttons.

Each time the RESTART button is pushed the display will toggle between all zeros and the current product code (I.E. 0.0, 0.1, 0.0, 0.1). Pressing the PRESET button when zeros are showing will set the preset. The RESTART button can be pressed again to reset the preset and start over as many times as necessary. Pressing the PRESET button when the product is showing will advance the product code to the next available code. Note that only products with a non-zero calibration factor will be shown. Therefore it's not necessary to scroll through all 9 products to get to the one you want. The product code and preset can be entered in any order and reentered at any time before the register is reset to make the delivery. The product code only needs to be selected when the product is different from the last delivery. The current product code will be retained even after power-down.

The rest of the operation is as outlined in "SmartLink Delivery Sequence". Note that once the register is reset and the valves open, neither the product code nor the preset can be changed. Upon pressing start/stop to reset the register, you will see that the display goes through it's test sequence, then shows the current product code, then shows the calibration factor for that code, then shows the product code again, and finally clears to zero and the valves open.

## **Calibration:**

In the Multi-Product version the switches are only read during the calibration procedure and the settings are stored away with their corresponding product codes. Note that if the switches are all zero for any particular product, the product is disabled and not accessible in the normal delivery mode. The whole calibration procedure can be done at the register without the need to have a ticket in the printer.

Use the following procedure to calibrate the SmartLink for each product. Before starting, note the following items.

- A. A “**Hard Reset**” is done by pushing the toggle switch (S7) to the right momentarily. This starts the microprocessor at the beginning of its program.
- B. A “**Soft Reset**” is done by pressing the Start/Stop button. This reset is used for the start of a normal delivery.
- C. The calibration switches are read and stored for the currently selected product only after a **Hard Reset**, following entering the calibration mode, as described in #2 below.
- D. Unused products must be disabled by setting the calibration switches to all zeros during the calibration for that product. All products, other than 01, are disabled at the factory prior to shipment.

### **Calibration Procedure:**

1. Remove the calibration plate to gain access to the switches.
2. Enter the calibration mode by doing a **Hard Reset** and immediately returning to the toggle switch to its left most position.
3. Press **Restart** to display the current product code. Note that the preset function is still operable and subsequent presses of **Restart** will toggle between product code and preset mode.
4. Press **Preset** until the desired product code shows on the display. All 9 codes are available in the calibration mode regardless of previously disabled codes.
5. Set the calibration switches where desired. If the product is not to be temperature compensated, set (S5) to 0. If the product is to be compensated, set (S5) to 5 for the factory default or to any non-zero number for compensator adjustment.

6. Do a **Hard Reset**. This will store the switch settings for the current product code. The display will show product code, then the calibration factor, and then the product code again.
7. Do a **Soft Reset**. The display will do a segment test, then shows the product code, then the calibration factor, then the product code again, and finally 0.0 when the valves open.
8. Fill the prover, and if further adjustments are necessary, start over with #2 above.

**Note:** If after a Hard Reset in Step 6, the display only shows 0.0, step 2 was not done correctly and the register was not previously in the calibration mode. It will be necessary to start over.

## **Important**

**When calibration is complete, power the system down and then backup. This will synchronize the printer and register(s) for normal communication. S7 must be in the center (net) position for normal operation, whether the register is compensated or uncompensated.**

### **Second Stage Valve Dwell Setting:**

Do a Hard Reset. Press Restart to show the current product code. Press Preset to select the product code. Then follow the procedure in “SmartLink register Program Switches”. The dwell setting will be stored with the current product code and used when that product is selected. Note that the first-stage valve shutdown is the same for all products.



**MID:COM SmartLink Register Module**  
**Switch Descriptions**  
**Use For Register Models SRG(L) 3X2-M**

**Switches 1-4 (S1-S4) and Switch 6 (S6) = 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:

<b>Switch #:</b>	Amount of change for each switch position:
S4 =	.01 Gallons (litres) per hundred gallons (litres).
S3 =	.1 Gallons (litres) per hundred gallons (litres).
S2 =	1 Gallon (litres) per hundred gallons (litres).
S1 =	10 Gallons (litres) per hundred gallons (litres).
S6 =	Set to 1 or 0 for above or below 1:1 calibration.
***	<b>To register more on the register, adjust switches to a higher number. ***</b>

**Switch 5: (S5) Temperature Compensator Adjustment:**

Range = approximately +1.58F, -1.88F (gallons) + .38C, -.38C (litres).  
Mid-Range factory setting is 5.

Each increment of the switch from 5 toward 0 adjusts the temperature .48f/.18C toward a colder temperature or higher compensator factor.

Each increment of the switch from 5 toward 9 adjusts the temperature .48F/.18C toward a warmer temperature or lower compensator factor.

**Switch 6: (S6) Test Functions and Calibration Setting:**

Set switch to desired test setting and reset register with Switch 7.

Setting 0: Normal operating mode. Calibrator factor = 0.XXXX

Setting 1: Normal operating mode. Calibrator 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= Lube Oil, 5= Methanol, 6= NH<sub>3</sub>, 7= Jet A, 9= Multi-Product

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

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

Note 2: Format X.XXXX a “1” must be added for factors greater than .9999 (that is, for temperatures below 608F or 158C).

-----**Caution**-----

**Switch 6 must be reset to 0 or 1 for normal operation**

Switch 7: (S7) Reset Register, Gross/Net Selection, Program Mode Selection:

Switch centered: Net (compensated) mode – normal operating position.

Switch left: Gross (non-compensated) mode – test position only.

Switch right momentarily: Resets register – test position only.

Switch right then returned to left position before reset complete:

Calibration mode – Switches 1-6 are read and stored on next reset.

**Switch 8: (S8) 6 Switch Dipswitch:**

(See SmartLink SLS Register Program Switches)

FOR 100 UNIT VOLUME TEST

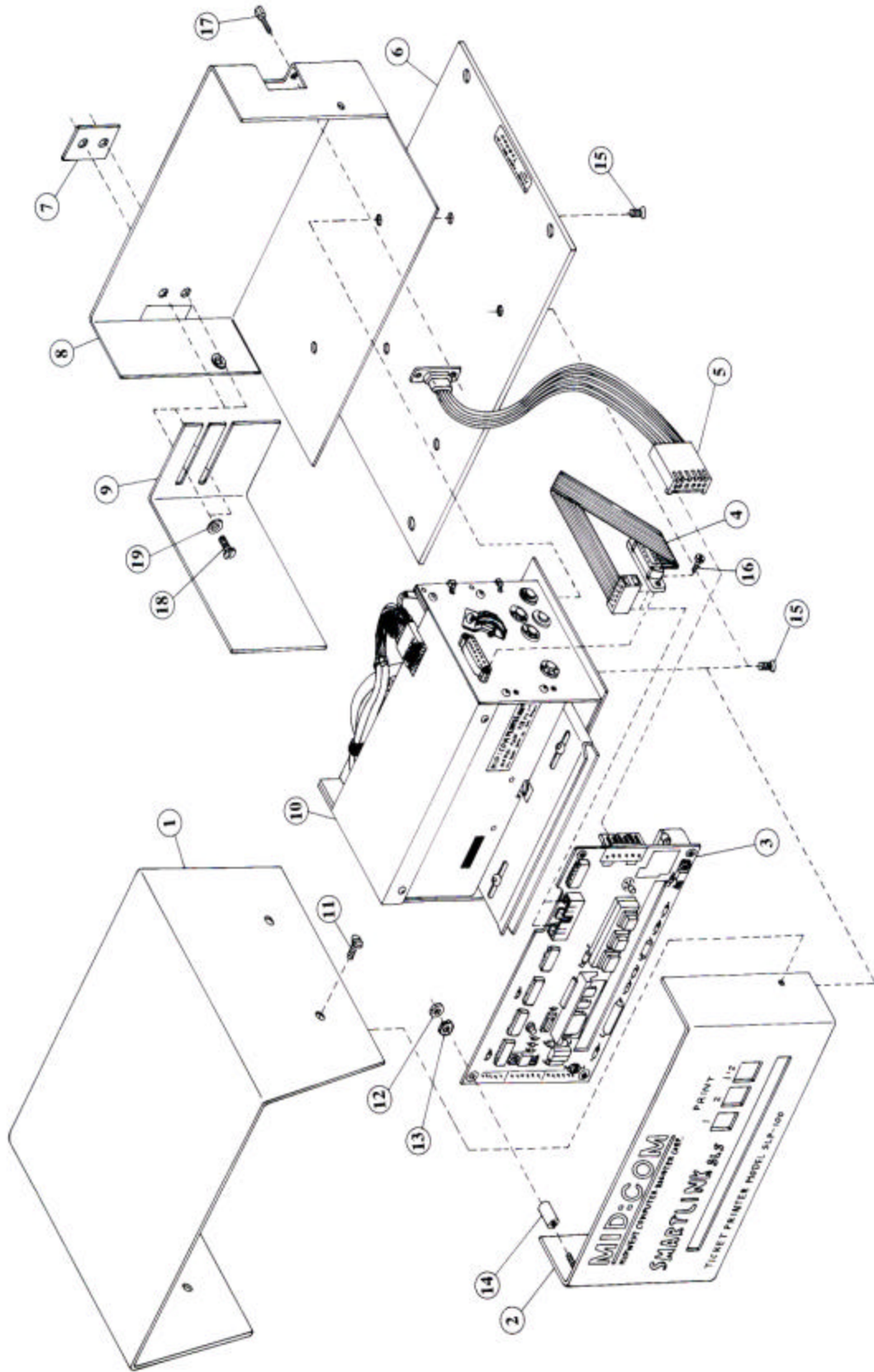
Company Address MID:COM Quick Calibration Sheet Product(s) Calibrated

Truck # Date Tester

Approved  Adjusted

Step	Example	1 <sup>st</sup> Run	2 <sup>nd</sup> Run	3 <sup>rd</sup> 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 <sup>rd</sup> 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 <hr/> 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.				

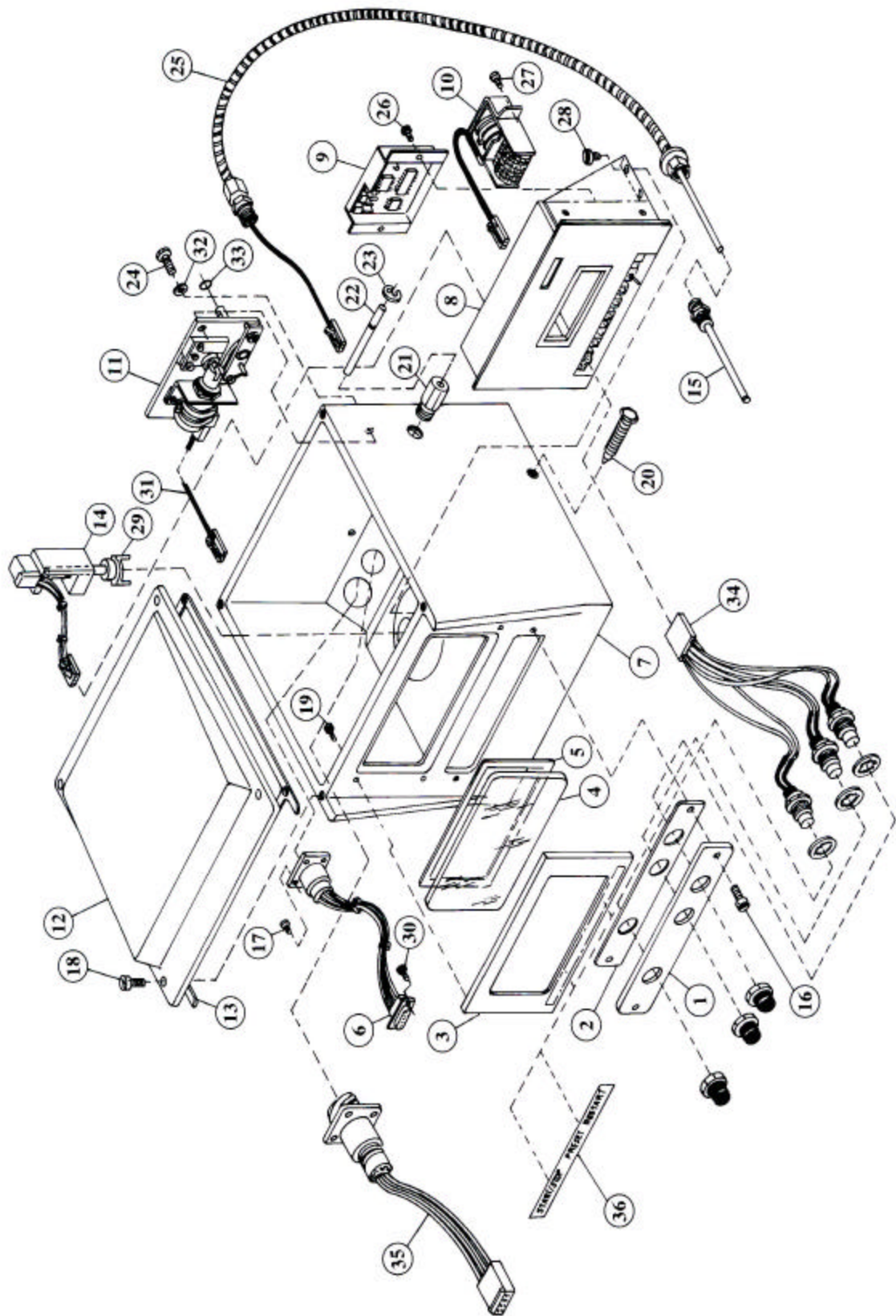
Note: US Gallons, x:xxx - S1 - S4, Liters 8000 and all SmartLinks, x:xxxx - S6 = first digit, then S1 - S4 for .xxxx



## MID:COM SmartLink SLS Part List

<b>Item #</b>	<b>Part Number</b>	<b>Description</b>
1.	201-0083	SLS printer cover
2.	201-0081	SLS front panel
	208-0062	SmartLink overlay
3.	800-0048	SLS system board
	707-0027	Sip stick
4.	703-0005	Printer cable harness
5.	701-0071	SLS serial cable assy
6.	201-0084	SLS printer base
7.	201-0019	Cable clamp adapter
8.	201-0082	SLS back panel
9.	201-0085	SLS cable clamp
10.	706-0002	Printer assembly
11.		Seal screw
12.	301-0001	6-32 X ¼ nut
13.	303-0015	#6 int washer
14.	305-0012	Aluminum standoff
15.	300-0078	6-32 X 3/8 flat head
16.	300-0050	4-40 X ¼ binder machine screw
17.	304-0015	4-40 jack screw standoff
18.	300-0027	6-32 X 3/8 binder machine screw
19.	303-0008	#6 flat washer
**.	702-0042	SLS power cable

\*\* Not shown



## MID:COM SmartLink SLS Meter

<b>Item #</b>	<b>Part Number</b>	<b>Description</b>
1.	202-0038	Calibrator cover
2.	206-0004	Calibrator gasket
3.	202-0037	Display bezel
4.	202-0034	Display lens
5.	206-0003	Lens gasket
6.	701-0001	Register hardness
7.	200-0001	Register casting
8.	707-0028	SLS Register module
9.	707-0008	Compensator module w/ probe
10.	701-0035	Totalizer assembly
11.	706-0003	Mechanical actuator
12.	200-0001	Register cover
13.	206-0002	Cover gasket
14.	712-0004	Encoder bracket assembly
15.	705-0021	Thermowell assembly
16.	300-0084	Seal screw
17.	300-0051	4-40 x 1/2 screw
18.	300-0084	Seal screw
19.	300-0007	6-32 X 7/16 screw
20.	202-0006	Mounting bolt
21.	202-0055	Actuator trip bushing
22.	202-0018	Actuator stop rod
23.	308-0008	1/4 "E" ring
24.	300-0060	1/4 -20 X 3/4 actuator bolt
25.	701-0049	Temperature probe assembly
26.	300-0043	6-32 X 3/16 screw
27.	300-0053	6-32 X 1/4 screw
28.	300-0056	8-32 X 3/8 screw
29.	705-0012	Drive fork assembly

30.	300-0049	4-40 X 3/16 screw
31.	701-0048	Actuator wire harness
32.	303-0034	Bonded sealing washer
33.	203-0024	Actuator shaft O-ring
34.	701-0070	Push button assembly
35.	701-0068	Valve wire harness
36.	-----	Button ID label
**.	702-0041	“SLS” register cable
**.	702-0045	“SLS” valve cable

\*\* Not shown



## **MID:COM SmartLink** **Maintenance Checklist**

1. Cable connectors free of excess strain.
2. Cables 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. Check line spacing on printout.
11. Was insertion of ticket free from obstruction?
12. Spike suppressers installed on hose reel solenoid.

## **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 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 release. If any bind at all is noted, the guides are not adjusted correctly.

## **Ticket Depth:**

The depth the ticket can be inserted onto 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:**

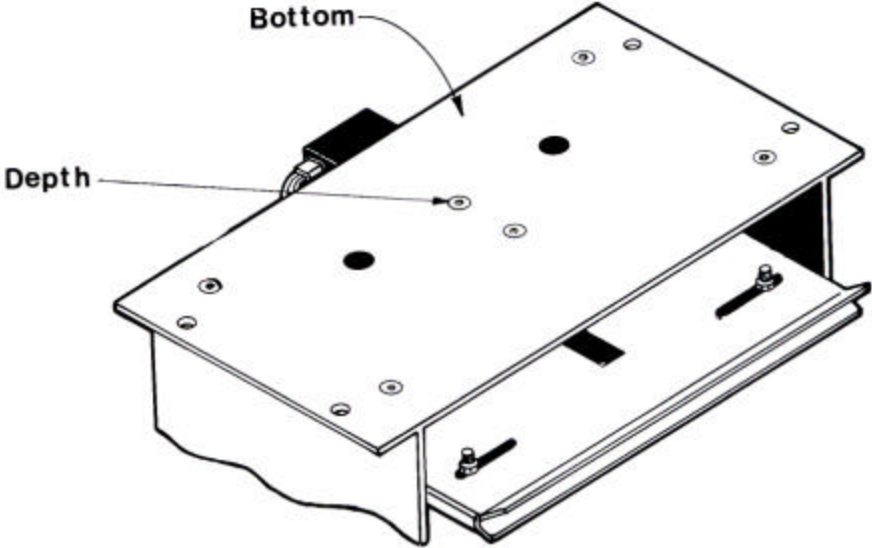
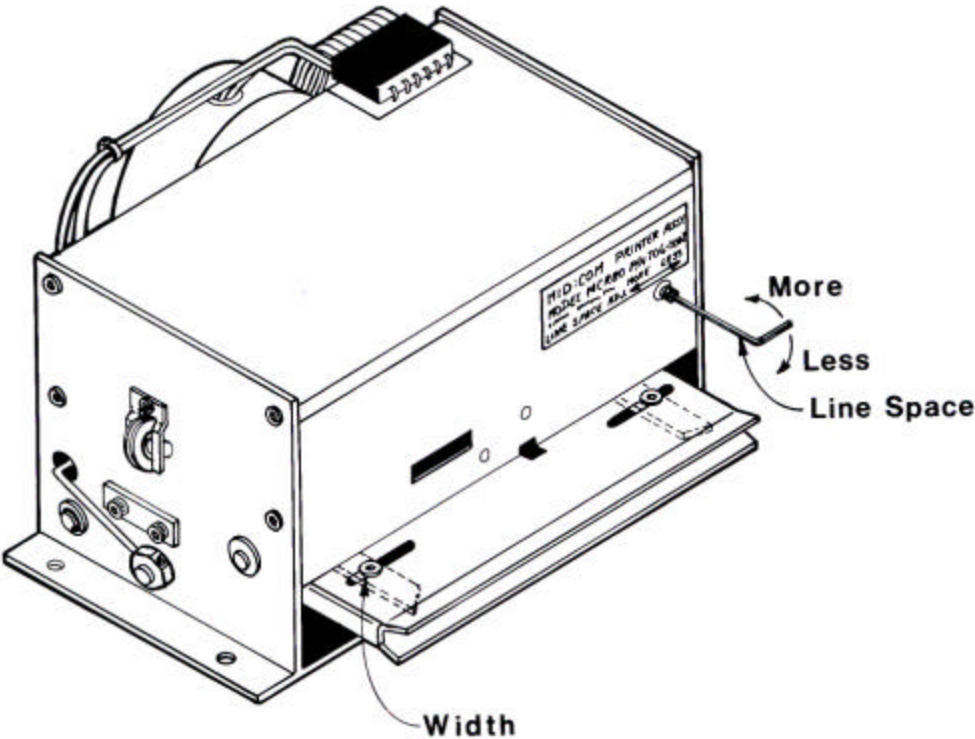
The space between lines may be adjusted to expand or compress the printout. Although set to 6 inch at the factory, ticket thickness and construction, as well as system voltage will affect the spacing.

To compress the spacing, turn the allen screw on the front 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. On the 8000, the printer or keyboard must be removed 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)

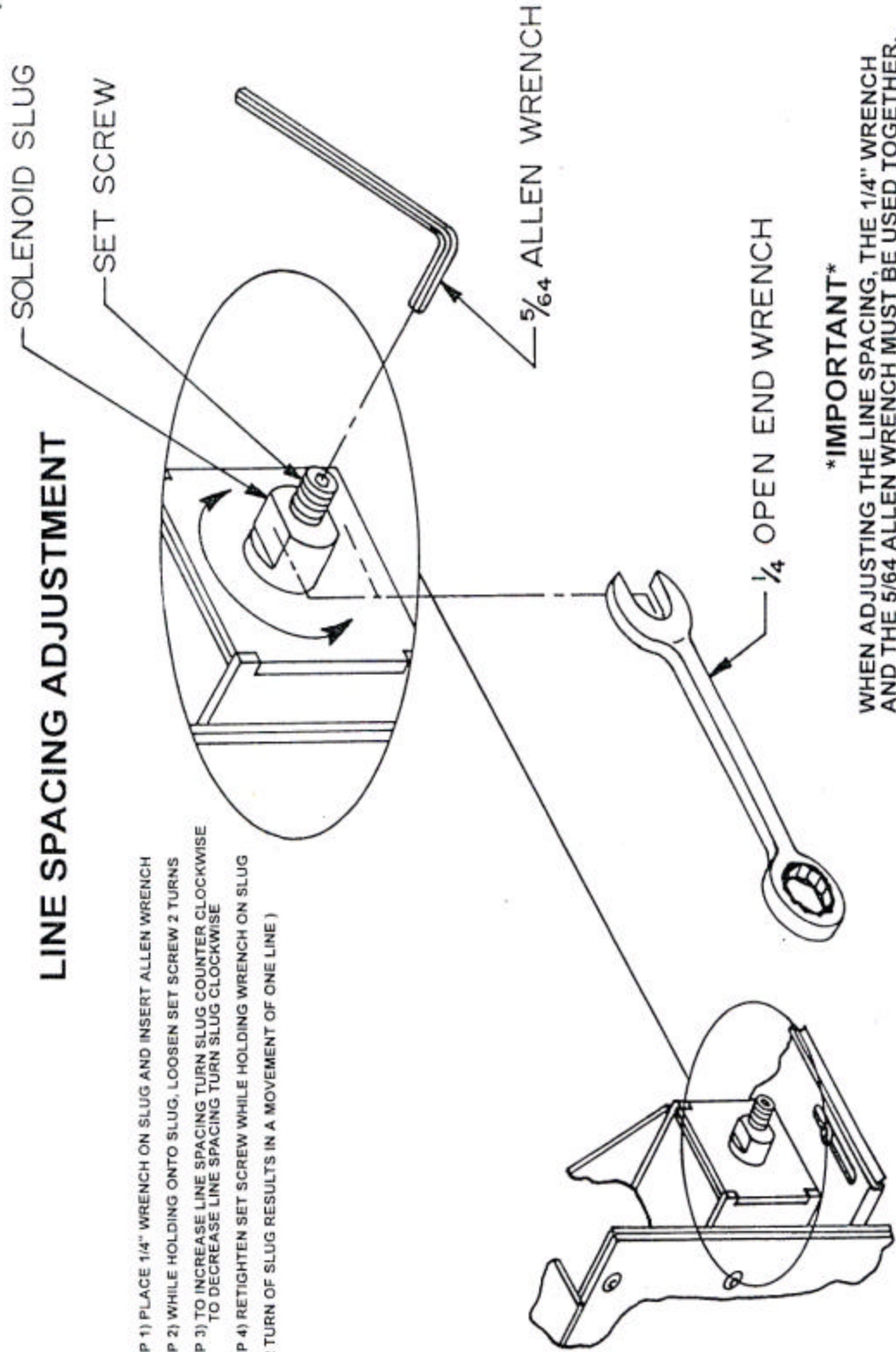
Systems that are shipped have a slight modification to the operating software that incorporates a single paper feed rather than the previous double paper feed. This is identified by a "H" or "HP" rev. level on the 8000 operating software. IE: 604H, 604HP. For the 6501B an "S" is used as part of the software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

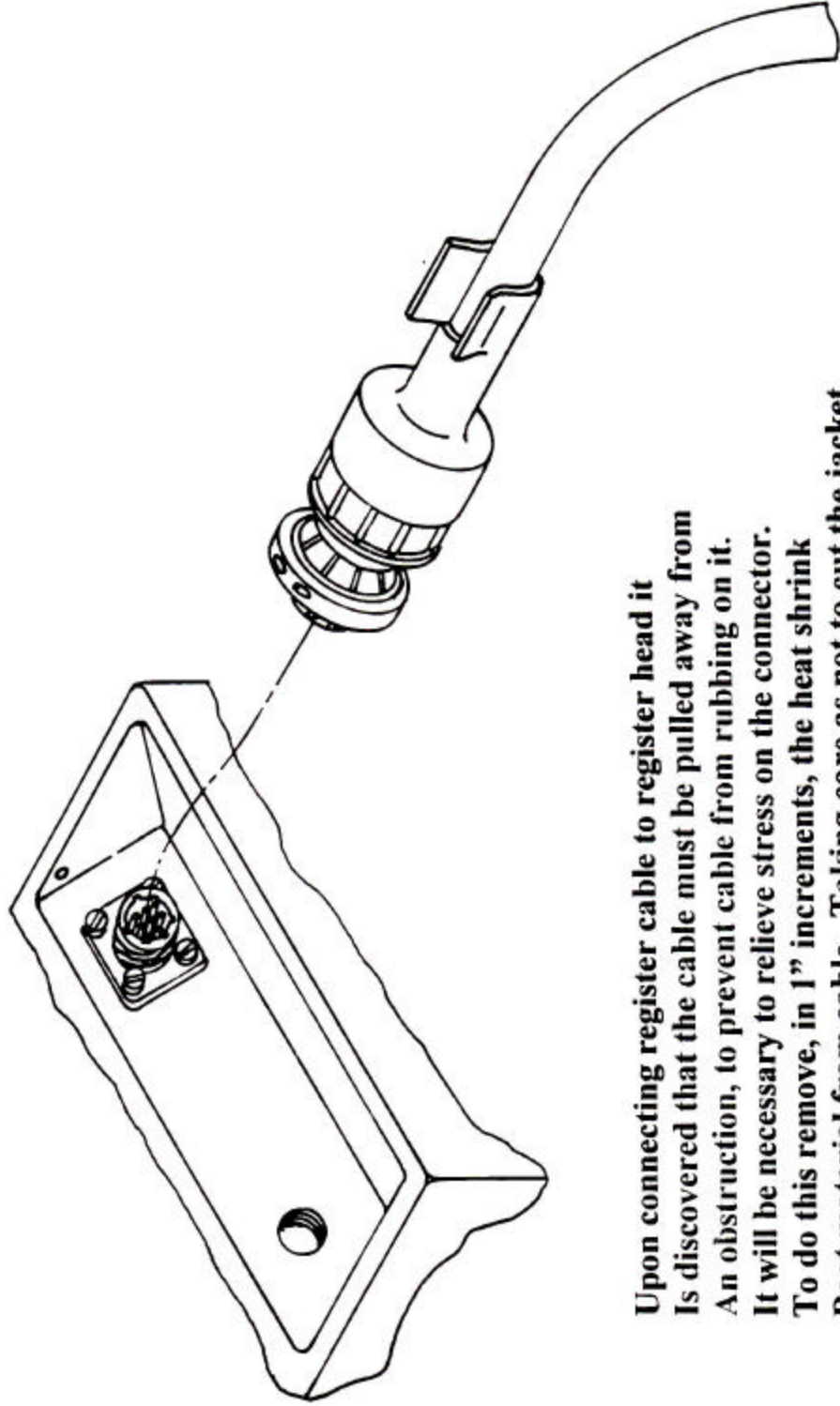
- STEP 1) PLACE 1/4" WRENCH ON SLUG AND INSERT ALLEN WRENCH
- STEP 2) WHILE HOLDING ONTO SLUG, LOOSEN SET SCREW 2 TURNS
- STEP 3) TO INCREASE LINE SPACING TURN SLUG COUNTER CLOCKWISE  
TO DECREASE LINE SPACING TURN SLUG CLOCKWISE
- STEP 4) RETIGHTEN SET SCREW WHILE HOLDING WRENCH ON SLUG  
( 1/2 TURN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



**\*IMPORTANT\***

WHEN ADJUSTING THE LINE SPACING, THE 1/4" WRENCH AND THE 5/64 ALLEN WRENCH MUST BE USED TOGETHER.

# Register Cable Connection



**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.**



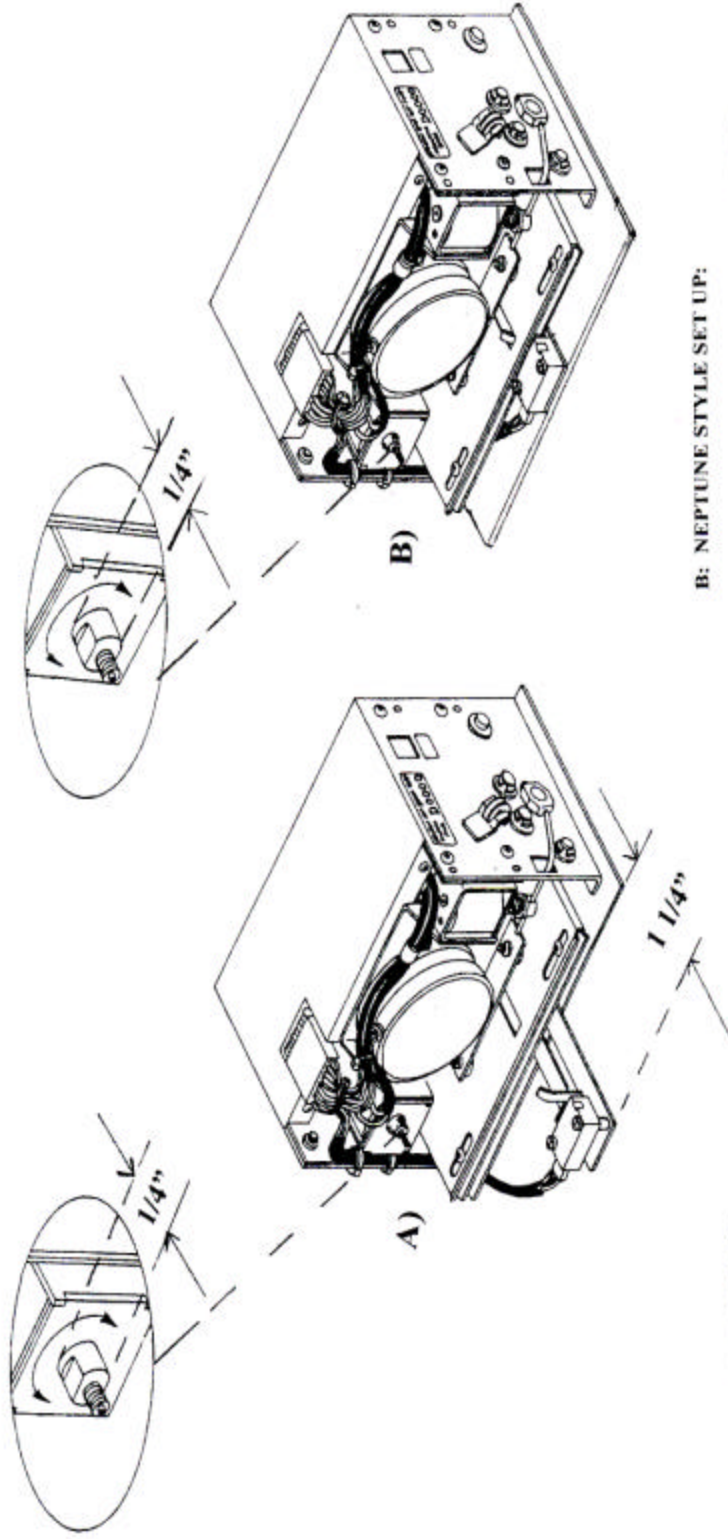
**MID:COM 8000 & SmartLink SLS Computer Register**  
**Ticket Specifications**  
**Model MCR-80 Dot Matrix Printer**

- General Type:** Snap set or continuous form, with or without envelop.
- 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 inch 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 insertion 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 SmartLink is used and number of taxes calculated.
- Construction:** Ticket must be glued on the check against original stub may be removed but does not have to be of 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.

**Caution:**

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 on the print area. Failure to observe these cautions may cause ticket tearing and printer problems, and void warranties.

# PRINTER ADJUSTMENT PROCEDURE FOR SMARTLINK



**A: VEEDER ROOT STYLE SETUP:**  
 TICKET STOP SWITCH MOUNTED UP ON NYLON SPACERS W/PLATE EXTENDED 1 1/4" BACK FROM PRINTERS BASE PLATE. SLUG SHOULD BE EXTENDED (SEE INSERT) 1/4" FROM BACK OF SOLENOID.

**B: NEPTUNE STYLE SET UP:**

REMOVE NYLON SPACERS AND DROP SWITCH FLAT DOWN TO PLATE USING 4-40 x 1/2 SCREWS & #4 WASHERS PROVIDED. REMOVE PRINTER BASE PLATE AND LOOSEN SCREWS THAT HOLD SWITCH PLATE. SLIDE SWITCH PLATE IN AS FAR AS POSSIBLE AND RE-TIGHTEN. PLACE BASE PLATE BACK ON PRINTER AND TIGHTEN SCREWS. SLUG SHOULD BE EXTENDED (SEE INSERT) 1/4" FROM BACK OF SOLENOID.  
 NOTE: TANG MUST BE STRAIGHTENED

# 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:

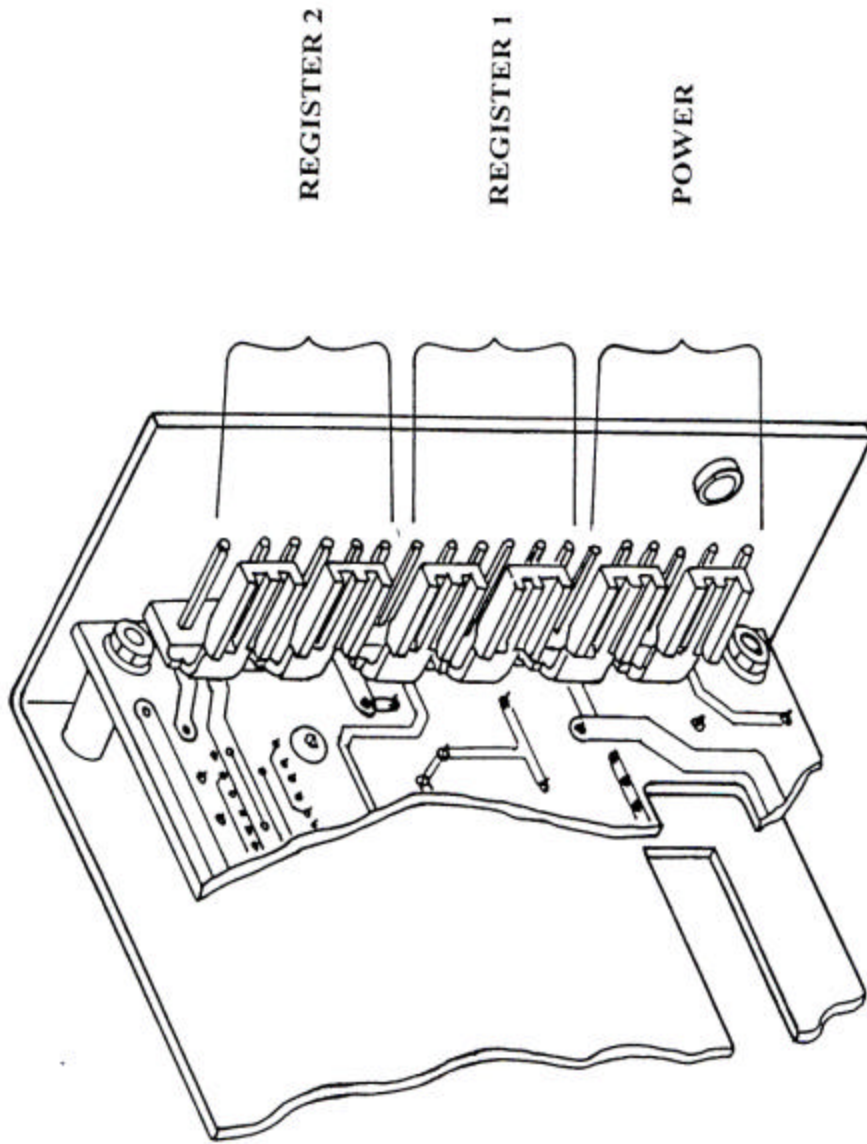
? Mechanical compensators use expanding bellows, which can only approximate the actual characteristics of the product. In the case of propane, it is a very poor match. The MID:COM electronic compensator uses the API Tables to calculate the exact correction for every tenth of a degree from -40 to +160. 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.

SMART LINK SLP-100 CABLE CONNECTIONS



## MID:COM SmartLink SLS Serial Interface Model SLP100 Version 1.2

The MID:COM SmartLink SLS Printer provides a serial interface to PC's hand-held computers and other serial devices via a DB-9 female connector on the back of the unit. The connector is configured as RS-232 DCE. That is, it will connect to a PC or other device configured as DTE with a straight-through cable. Only transmit, receive, and ground [PINS 3, 2, 5] are used, and the port is set for 9600, 8, N, 1.

### **Version 1.2 Command Set:**

- [X] Indicates ticket has been inserted
- [P] Initiates printing a line of text
- [I] Interrogates printer for register data
- [Z] Indicates printer is done printing register data
- [ ] Indicates line of text done printing or end of data transmission

### **Operation:**

Refer to the attached example communication dialog as we describe the operation of the SLS.

1. After a ticket is inserted into the printer, the registers are armed to be reset and the printer sends a [X CL LF] to the PC.
2. After the [X] is sent, the PC may send a [P] to print a line. If so, the printer will send [P CR LF] then wait for a string of 25 characters. All 25 must be sent to start printing the line. The printer will be "HUNG" until the 25<sup>th</sup> character is received.

3. After the line is done printing, the ticket is advanced and the printer sends [| CRLF]. A [P] must be issued for each 25 character line. The only limitation to the number of lines that can be printed is the capacity of the ticket (about 20).
4. After the driver prints the delivery out, the printer will send a [Z CR LF] to the PC, indicating it's ready for interrogation. At this point, the PC would send an [I]. The printer will send back [I CR LF], the 7 data fields each followed by [CR LF], then [| CRLF]. Refer to the example for data format.
5. After the interrogation, the PC may do computations on the data and print more lines with the [P] command. Once the ticket is pulled out of the printer the sequence starts over after inserting a new ticket.

**Note:** The commands sent to and received from the SLS are capital letters. The brackets and spaces within the brackets are not a part of the transmission.

The | is the pipe symbol.

**SERIAL INTERFACE EXAMPLE FOR DUAL REGISTERS**

```
X          << FROM SLS - INDICATES TICKET INSERTED
P          << TO SLS - COMMAND TO PRINT A LINE
MIDWEST COMPUTER REGISTER|
P          << TO SLS - 25 CHARACTERS SENT - PIPE FROM SLS
          INDICATES LINE IS DONE PRINTING
DUAL REGISTER TICKET    |
P          << TO SLS - SPACES NEEDED TO PAD TO 25 CHARACTERS
BLANK LINE BELOW.....|
P
Z          |
I          << FROM SLS - INDICATES DELIVERY HAS PRINTED
011898     << TO SLS - COMMAND TO INTERROGATE PRINTER
1410       << FROM SLS - DATE (MMDDYY)
0512       << FROM SLS - MILITARY TIME (HHMM)
000215     << FROM SLS - TRUCK NUMBER
03         << FROM SLS - SALES NUMBER
00011470   << FROM SLS - REGISTER 1 PRODUCT CODE
00011470   << FROM SLS - REGISTER 1 GROSS VOLUME
02         << FROM SLS - REGISTER 1 NET VOLUME
00003940   << FROM SLS - REGISTER 2 PRODUCT CODE
00003920   << FROM SLS - REGISTER 2 GROSS VOLUME
|          << FROM SLS - REGISTER 2 NET VOLUME
P          << FROM SLS - INDICATES INTERROGATION IS DONE
          << TO SLS - COMMAND TO PRINT A LINE
          << TO SLS - 25 SPACES SENT TO DO A LINE FEED
BLANK LINE ABOVE.....|
```

**EXAMPLE TICKET PRINTOUT**

```
MIDWEST COMPUTER REGISTER
DUAL REGISTER TICKET
BLANK LINE BELOW.....

  DATE 01/18/98 TIME 14:10
TRUCK 0512 SALE 000215
PRODUCT GASOLINE
GALLONS START 1 ----- .0
GALLONS FINISH --- 114.7

PRODUCT FUEL OIL/DIESEL
GALLONS START 2 ----- .0
GALLONS FINISH ---- 39.2

BLANK LINE ABOVE.....
```

**PROGRAMMER NOTE:** In a dual register system, the driver has the choice of printing each delivery on a separate ticket or both deliveries on one ticket as in the example above. In either case, the interrogation returns data for both registers. If calculations are to be done on the ticket, the driver should be prompted by the PC as to which delivery was printed; (Register 1, 2, or both). In a single register system, data is still returned for two registers with one set of data being zeroes.



**MID:COM  
SmartLink SLS  
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	_____	_____
_____	707-0029	Front Panel Assy		_____	_____
_____	707-0004	Register Module	G	_____	_____
_____	707-0008	Compensator	H	_____	_____

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

REPORTED PROBLEM: \_\_\_\_\_  
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