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TGT 7000 Series Dispenser

Operations Manual

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Micro Motion[®] Transmitter Model 1700 and 2700 Installation Instructions
CSA-D-IS Instructions, MVD Transmitters
ModBus[®] Mapping Assignments for Micro Motion[®] Transmitters
Micro Motion[®] Series 1000 and 2000 Transmitters Operation Manual

TGT Pre-Delivery Inspection Certification(PDIC)

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TECHNICAL AND INSTALLATION INFORMATION 7000-CNG50 SERIES DISPENSER

OVERVIEW

Tulsa Gas Technologies' dispensers are manufactured with service and ease of installation. Before you service or install the dispenser, open both lower doors and familiarize you with the contents of the dispenser.

The 7000-CNG50 dispenser is a two hose dispenser that will meter the gas separately to two hoses independently from each other and provide a display for the volume and amount of money dispensed. This dispenser will sequence up to three separate banks of gas and temperature compensate the fill to either 3000 psi @70F or 3600psi @70F. The dispenser will supply an output pulse that is scaled to the volume. The mechanical relief valve inside the dispenser is set at 125% of nozzle operating pressure. Each hose has a pressure gauge that will show the vehicle pressure when the product valve is open. Removing power to the dispenser will stop gas flow to the vehicle through the dispenser.

Locate the main junction box inside the dispenser behind the lower doors. As you are facing the lid of the main junction box, we will always refer to this side of the dispenser as the front. The control electronics (Motherboard) is inside a box in the area behind the display. The keypad that is used for price changes and function changes is attached to the door of the box containing the control electronics.

1. Maximum Allowable Working Pressure (MAWP) is 5000psig. Relief valve setting is 125% of nozzle operating pressure.
2. Operating temperature range is -40 C (-40 F) to 66 C (150 F).
3. Electrical rating is 100 - 240V AC, 3 AMPS maximum; 50/60HZ, Class I, Division I, Group D.
4. Micro Motion CNG50 meter is rated for 5000psi and 170lbs./minute fill rate (4627Kg/h). This dispenser maximum flow is 1500 scfm.
5. This dispenser shall only be installed with a listed or approved overflow protection system.
6. This dispenser is "For Use With Natural Gas Only".
7. TGT dispensers are manufactured under the following guidelines:

NFPA 52

ANSI B31.3

AGA 4.1/CGA 12.5 STANDARD (Proposed to be in effect 01-01-97)

ANSI/IAS NGV 4.2-1999 Standard for Hoses for Natural Gas Vehicles and Dispensing Systems

NEC NFPA 70

NIST Handbook 44

INSTALLATION

1. Pour concrete to be flush with the top of the TGT Island Box. The dispenser will mount to this island box with 1/2" bolts through pre-punched holes in the island box and the dispenser. The island box needs to be self-supporting and not dependent on the electrical conduits or piping going to the dispenser for its support.
2. Note the rough-in heights of the conduits on the electrical drawing. The junction box is low in the cabinet; so make sure to leave plenty of room for the sealoffs and unions. The top of the sealoff should be flush with the top of the island box. You must leave access to all sealoff for packing and sealing.
3. It is recommended that an isolation valve be installed upstream of the dispenser so that the dispenser can be removed or serviced without having to undo any pipefittings. When the dispenser is removed, the isolation valve will stay with the piping, not the dispenser.
4. The vent line is located inside the dispenser cabinet and is a 1/4" tube fitting. You will need to connect this to the vent location that is on your site. An optional location for the vent line is up the retractor pole.
5. The TGT dispenser can be configured so that the solenoid valve inside the dispenser serves as the temperature compensation valve. If this is done, there MUST be a pressure relief valve (as specified in NFPA 52, AGA NGV 4.1/CGA 12.5 Standard for NGV Dispensing Systems, Article 1.11.3, Item A) downstream of this valve.
6. The user, installation, service, and technical manuals, as applicable, shall be left with the appropriate person. Access to this material by service personnel is required.
7. Grounding is very important to the safe use of this dispenser. Grounding is needed for static discharge of electricity that can build up. Grounding should be done in accordance to NPFA 70 (NEC) All conduits whether high voltage or low voltage shall have a minimum of #12 earth ground pulled separately in with the wires.

8. The installation shall be in accordance with the following: The requirements of the authorities having jurisdiction, in accordance with the provisions of either the CAN/CGA-B108-M95 NGV Refueling Stations installation Code, or the NFPA 52 Standard for Compressed Natural Gas (CNG) Vehicular Fuel Systems, and;

The CAN/CSA-C22.1-1990 Canadian Electrical Code, Part 1, and NFPA 70 National Electrical Code, and;

The dispenser system is intended for use with gas composition specified by SAE J1616 Recommended Practice for Compressed Natural Gas Vehicle Fuel Composition, unless additional precautions are taken, and;

The dispensing device shall be installed as recommended by the manufacturer, and;

The maximum allowable working pressure (MAWP) of the dispenser is 5000psig.

9. Select the NGV1 nozzle for the delivery pressure of the vehicle and it shall be in accordance with AGA NGV 4.1/CGA 12.5 Standard for NGV Dispensing Systems, Article 1.9.3.
10. Three lines from the bank storage should be run to the dispenser with tubing sized to handle the flow rate of both sides.
11. It is recommended to put ESD valves back at the storage to minimize the available gas to the dispenser in an ESD situation.

READING TOTALIZERS

Open the display face door that is on the front side of the dispenser. The front is the side with the termination junction box. If you open the wrong side the keypad and alpha/numeric display will be located on the opposite side. When the front display face door is opened, you will find the keypad and alpha display mounted on the door of the box that contains the control electronics. The following information is representative of the information that will be displayed.

H1 TOTAL	FR	PRESS	END CODE	TEMP
0000123	00.00	+3157	STOP SWITCH	+0000
H2 TOTAL	FR	PRESS	END CODE	
0002345	00.00	+3617	NORMAL	

The above information provides data about both hoses. The left side of the display has data for hose # 1 and the right side has data for hose # 2. H1 TOTAL is the total quantity of gas that has been dispensed through hose # one. This quantity is in whole units. That is if the gas is being dispensed in gasoline gallon equivalent the total being displayed is whole gallons. Fractions of a gallon will not be displayed from this totalizer. The same will be true if the unit of measure is pounds, kilograms, or cubic meters. The next item is FR. This is the flow rate of the gas being dispensed and will be shown as gallons and fractions of a gallon, pounds and fractions of a pound, kilograms and fractions of a kilogram, or cubic meters and fractions of a cubic meter. The next item is the pressure in PSI (pounds per square inch and will be indicated with either a + or a – sign). As previously stated, the right side of the display has the same information for hose # two.

PRICE SETTING

Open the display face door that is on the front side of the dispenser. The front is the side with the termination junction box. If you open the wrong side the keypad and alpha/numeric display will be located on the opposite side. When the front display face door is opened, you will find the keypad and alpha display mounted on the door of the box that contains the control electronics. The following information is representative of the information that will be displayed.

H1 TOTAL	FR	PRESS	END CODE	TEMP
0000123	00.00	+3157	STOP SWITCH	+0000
H2 TOTAL	FR	PRESS	END CODE	
0002345	00.00	+3617	NORMAL	

When the access code for level one has been entered via the keypad, the following main menu will be displayed.

MAIN MENU

01 = CONFIG MENU	04 = DISPLAY MENU A
02 = SETUP MENU A	05 = DISPLAY MENU B
03 = SETUP MENU B	CANCEL KEY = EXIT

Select 02 SETUP MENU A (from main menu)

When item 02 is selected from the MAIN MENU the following menu will be displayed.

SET UP MENU A

01 = DATE & TIME	04 = PRICE PER UNIT
02 = FLOW RATES	05 = DISPLAY UNIT
03 = TIME DELAYS	06 = LOAD DEFAULT VALUES

Select 04 PRICE PER UNIT

Selecting item 04 from the SETUP MENU A will cause the following message to be displayed.

ENTER NEW PRICE PER UNIT
MINIMUM 1 DIGIT MAXIMUM 4 DIGITS

0000

The system will automatically know where the decimal needs to be, therefore enter just the price without a decimal. When the programming mode is exited the new price will appear on the price display. Once the price has been entered, the display will return to the SETUP MENU A.

Press the CANCEL key to exit the programming mode.

**ELECTRICAL CONNECTIONS
AND
GENERAL INFORMATION**

All wiring must be installed in accordance with national and local electrical codes.

-WARNING-

SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.

The customer leads are located in the bottom of the dispenser in the explosion-proof box. All unused wires must be capped or taped off.

WIRE COLOR	WIRE NUMBER	DESCRIPTION
Black 18 AWG	1	120 VAC head power hot line. If power is interrupted on this line, The head will go into standby and Power-fail modes. If an ESD system is used, removing voltage from this line will disable all dispenser functions.
White 18 AWG	2	Common for dispenser power and main board authorize/authorize request circuit.
Green 14 AWG	3	Earth Ground This line is connected internally to the casting and must be connected to the service ground. Per NFPA 70 (NEC)
Brown 18 AWG	14	Authorize input. Application of 120 VAC will authorize the electronic head to dispense product, if 120 VAC is not present when the handle switch is turned on the dispenser will not authorize until voltage is present.

WIRE COLOR	WIRE NUMBER	DESCRIPTION
Red 18 AWG	8	Solenoid valve output. When the electronic head is ready to dispense product, voltage will be applied to this line. This is normally connected to the solenoid valve. This wire is also used as an IN USE signal, after the reset has completed. This voltage will go away if the handle is shut off (120VAC). This is used in most common card readers and consoles.
Red 18 AWG	80	This is the wire directly from the solenoid valve. In normal operation there is a jumper from #8 to #80. Some card readers will switch this line to control gas from the card reader.

LOW VOLTAGE LINES

THE PULSER OUTPUT IS AN OPTICALLY COUPLED OPEN COLLECTOR TRANSISTER. THIS TRANSISTER IS CAPABLE OF SWITCHING UP TO 40V DC AT 100mA.

Yellow 18 AWG	4	Emitter: if the transistor needs to sink the pulse signal, this line needs to be connected to the pulser power supply common. If the transistor needs to source the pulse line, this line is the pulse output.
Blue 18 AWG	18	Collector: if the transistor needs to sink the pulse signal, this line is the pulse output. If the transistor needs to source the pulse signal, this line is to be connected to the pulser power supply positive line.

PROGRAMMING

This part of the manual is broken down into sections that will follow the menus of the system. The manual will start with the main menu and will discuss the subjects of the menu as they appear in the menu from top to bottom. Sub-menus will be addressed in the order in which they are encountered in the menu.

GETTING STARTED

The dispenser covered by this manual can be programmed (i.e. change any operating parameter that is changeable or loadable) by either of two methods. One method is via a lap-top computer, the other is via a keypad and alpha/numeric LCD display. The keypad and display is normally supplied with the dispenser and this method will be discussed first. In either case the programming feature is a menu driven function. There are a few features that are available via the lap-top computer that are not available via the keypad and display. These items will be discussed in the section covering the computer method.

KEYPAD USE

The information that will be seen on the alpha / numeric display when power for the dispenser has been turned on will look similar to the following. For the purposes of this manual, we will assume that no gas is being dispensed at the start of this procedure.

```
H1 TOTAL  FR  PRESS  END CODE  TEMP
0000123  00.00 +3157  STOP SWITCH +0079
H2 TOTAL  FR  PRESS  END CODE
0002345  00.00 +3617   NORMAL
```

The above information provides data about both hoses. The left side of the display has data for hose # 1 and the right side has data for hose # 2. H1 TOTAL is the total quantity of gas that has been dispensed through hose # 1. This quantity is in whole units. That is if the gas is being dispensed in gasoline gallon equivalent the total being displayed is whole gallons. Fractions of a gallon will not be displayed from this totalizer. The same will be true if the unit of measure is pounds, kilograms, or cubic meters. The next item is FR. This is the flow rate of the gas being dispensed and will be shown as gallons and fractions of a gallon, pounds and fractions of a pound, kilograms and fractions of a kilogram, or cubic meters and fractions of a cubic meter. The next item is the pressure in PSI (pounds per square inch and will be indicated with either a + or a - sign). As previously stated, the right side of the display has the same information for hose # 2.

The bottom two lines of the display is a message indicating what must be done in order to gain access to system parameters. There are two levels of access to system parameters. For discussion purposes these are identified as level zero (0) and level one (1). Level 0 is restricted to viewing parameters and data only. No parameter may be changed from this level. Level 1 will allow any parameter to be changed. The dispenser will be shipped with a known access code that will allow the owner to have full access. Once the dispenser has been installed and started up, it is highly recommended that the access codes be changed so that only authorized personnel can have access to level one.

When the access code for either level has been entered via the keypad, the following main menu will be displayed.

MAIN MENU

01 = CONFIG MENU 04 = DISPLAY MENU A
02 = SETUP MENU A 05 = DISPLAY MENU B
03 = SETUP MENU B CANCEL KEY = EXIT

To access any of these sub-menus, enter the two digit menu number followed by the ENTER key. If the code for level 0 was entered, the only sub-menus available are 04 and 05. If any other menu is selected the following message will appear on the display.

NOT A VALID SELECTION
PRESS CLEAR KEY TO CONTINUE

Pressing the CLEAR key will take you back to the main menu. Regardless of where you are in the menus, pressing the CLEAR key will always take you back to the previous menu. Pressing the CANCEL key will always cause an exit from the programming mode of operation.

01 CONFIG MENU

When you select item 01 the following menu is displayed.

CONFIGURATION MENU

01 = CAL PSI SENSORS
02 = PULSES PER UNIT
03 = MASS FACTOR

Menu item 01 should be selected when it is desired or is necessary to calibrate the pressure sensors. The procedure for calibrating the sensors can be found in APPENDIX A (page 46). Only the use of the menu is explained here.

01 CAL PSI SENSORS

When menu item 01 is selected the following sub-menu will be displayed.

PRESSURE SENSOR CALIBRATION MENU

1 = HOSE # 1 ZERO 2 = HOSE # 1 SPAN
3 = HOSE # 2 ZERO 4 = HOSE # 2 SPAN

When you are at this menu level, entering the number for any of the selections will take you immediately to the following display.

ENTER NEW CALIBRATION VALUE

MINIMUM 1 DIGIT MAXIMUM 4 DIGITS
USE THE DEBIT KEY FOR A MINUS SIGN
0000

At this point the necessary data should be entered. The data that is entered will be reflected in the area where the four zeros are displayed. As the data is entered, it will be shifted from the right to the left on the display and in all cases the most significant digit must be entered first. The minus sign is used only when it is necessary to enter negative data for the zero value of either sensor. The data is always considered to be positive unless a minus sign precedes the data (i.e. a positive sign is not used with this data). Please refer to APPENDIX A (page 46) for the calibration procedure. When the data has been entered and the ENTER key pressed, the data will be stored and the display will return to the configuration menu. The calibration menu can be selected again or another menu item can be selected.

02 PULSES PER UNIT

Selecting item 02 from the CONFIGURATION MENU will cause the following sub-menu to be displayed.

PULSES PER UNIT OF MEASURE

1=H1 1 – 1 2=H1 10 – 1 3=H1 100 – 1

4=H2 1 – 1 5=H2 10 – 1 6=H2 100 – 1

MAKE YOUR SELECTION

An explanation of these selections follows. The selections with H1 are used for hose 1 (A) and H2 are used for hose 2 (B). “1 – 1” means the dispenser will output one pulse for each pulse that it receives from the Micro Motion meter. “10 – 1” means the dispenser will output one pulse for each ten pulses that it receives from the Micro Motion meter. “100 – 1” means the dispenser will output one pulse for each one hundred pulses that it receives from the Micro Motion meter.

When one of the six items listed is selected, that information is stored in the system and the display returns to the CONFIGURATION MENU. You may now make another selection from this menu or return to the MAIN MENU.

03 MASS FACTOR

Selecting item 03 from the CONFIGURATION MENU will display the following message.

ENTER NEW MASS FACTOR

MINIMUM 1 DIGIT

MAXIMUM 3 DIGITS

0000

The value that is entered **must match the mass value that is set up in the Micro Motion meter.** After the initial set up of the dispenser, this value will rarely need to be changed. Once the value needed has been entered followed by the ENTER key the display will return to the CONFIGURATION MENU.

02 SETUP MENU A (from main menu)

When item 02 is selected from the MAIN MENU the following menu will be displayed.

SET UP MENU A

01 = DATE & TIME 04 = PRICE PER UNIT
02 = FLOW RATES 05 = DISPLAY UNIT
03 = TIME DELAYS 06 = LOAD DEFAULT VALUES

Selecting 01 from the SETUP MENU A will cause the following message to be displayed.

ENTER DATE-TIME IN THE FOLLOWING FORMAT

YEAR = YY MONTH = MM DAY OF MONTH = DD

HOUR = HH MIN. = MM ENTER DATA

0000000000

The date or the time cannot be set separately. You must always enter data for both. As the message indicates, two digits for year must be entered first followed by two digits for the month (January being 01 and December being 12), two digits for the day of the month, two digits for the hour (the clock is a 24 hour clock i.e. 1:00pm will be 13 for the hour), and two digits for the minutes. Once the data has been entered pressing the ENTER key will cause the date and time to be set. When the ENTER key is pressed the display will return to the SETUP MENU A menu.

02 FLOW RATES

When item 02 is selected from the SETUP MENU A the following menu will be displayed.

FLOWRATES MENU

01=FR#A 02=FR#B 03=FR#C 04=FR#D 05=FR#E
06=FR#F 07=FR#G 08=FR#H 09=FR#I 10=FR#J
11=FR#K 12=FR#L MAKE A SELECTION

Please refer to APPENDIX B (page 47) for a list of the flow rates and their use. This section of the manual only describes how to enter the value of a flow rate. When one of the flow rates has been selected the following message will appear on the display.

ENTER NEW FLOWRATE VALUE

MINIMUM 1 DIGIT MAXIMUM 4 DIGITS

0000

When this message is displayed, enter the value that is needed for the flow rate that was selected. As always the most significant digit must be entered first. As the data is entered it will appear on the display where the “0000” is located and will be shifted from right to left as the data is entered. Once the correct data has been entered, pressing the ENTER key will store the value entered into the appropriate place in memory. The display will then revert to the FLOWRATES MENU. Another flow rate can now be selected or pressing the CLEAR key will take you back to SETUP MENU A.

03 TIME DELAYS

Selecting item 03 from the SETUP MENU A list will cause the following menu to be displayed.

TIMER VALUE CHANGE MENU

1 = TIMER # 1 4 = TIMER # 4
2 = TIMER # 2 5 = TIMER # 5
3 = TIMER # 3

Refer to APPENDIX C (page 48) for a complete list of the timers and how they are used. This section of the manual only describes how to enter the value of a timer.

When one of the timers has been selected the following message will appear on the display.

ENTER NEW TIMER VALUE
MINIMUM 1 DIGIT MAXIMUM 2 DIGITS

00

Enter the value necessary based on the use of the specific timer selected. After the data has been entered pressing the ENTER key will store the data into memory and the timer menu will again be displayed. Another timer can now be selected or pressing the CLEAR key will take you back to the SETUP MENU A.

04 PRICE PER UNIT

Selecting item 04 from the SETUP MENU A will cause the following message to be displayed.

ENTER NEW PRICE PER UNIT
MINIMUM 1 DIGIT MAXIMUM 4 DIGITS

0000

The purpose of this item may seem obvious but for clarification this is the selling price of gas per unit of measure. This means that if the gas is sold in gasoline gallon equivalents this is the price per gallon. If gas is sold in kilograms, this is the price per kilogram. The system will automatically know where the decimal needs to be, therefore enter just the price without a decimal. When the programming mode is exited the new price will appear on the price display. Once the price has been entered, the display will return to the SETUP MENU A.

05 DISPLAY UNIT

Selecting item 05 from the SETUP MENU A will cause the following message to be displayed.

```
          DISPLAY UNIT OF MEASURE
1 = GGE      2 = CUBIC FEET    3 = POUNDS
4 = KG       5 = CUBIC METERS
          MAKE A SELECTION
```

For those that may not know, there are three units of measure that are most often used as the basis for pricing and measuring gas for sale through a dispenser. These three units of measure are as follows. GGE = gasoline gallon equivalent. In general terms this is the amount of gas that it takes to be the equivalent energy of one gallon of gasoline. In the USA it is generally accepted that it takes 5.66 pounds of gas to be equivalent to one gallon of gasoline. Items 2 and 3, cubic feet and pounds are usually used for test purposes within the USA. KG = kilograms. And CUBIC METERS is just what the term implies. If it is necessary to change the DISPLAY UNIT OF MEASURE after the dispenser leaves the factory, be aware that the Micro Motion setup must also be changed and the MASS FACTOR in the dispenser program must be changed. When a selection is made the information is immediately stored in memory and the display returns to the SETUP MENU A.

06 LOAD DEFAULT VALUES

When this item is selected the program loads a set of default values and displays the following message.

```
DEFAULT VALUES ARE NOW LOADED
```

```
    PRESS CLEAR KEY TO CONTINUE
```

When the CLEAR key is pressed the display returns to the SETUP MENU A. Since this is the last item of the SETUP MENU A pressing the CLEAR key again will return the display to the MAIN MENU.

NOTE

Normally, this feature should only be used at initial startup by the factory. If changes have been made to the dispenser setup, using this feature will undo all of the changes that have been made. Not only will the changes be undone, the transaction memory will also be erased. It is recommended that this feature be used only if it is deemed absolutely necessary.

SET UP MENU B

Selecting item 03 from the MAIN MENU list will cause the following menu to be displayed.

SET UP MENU B

01= ACCESS CODE LEVEL 0

(Factory Code 1 2 3)

02=ACCESS CODE LEVEL 1

(Factory Code 7 8 9)

Access code level “0” is for use by personnel that may need to look at set up information or data but does not need to be able to make changes to the system. Access code level “1” is for use by personnel that have the authorization to make changes to operating parameters in the dispenser program. When either of these items is selected the following message will be displayed.

ENTER NEW ACCESS CODE

MINIMUM 1 DIGIT MAXIMUM 10 DIGITS

As with all other data, the most significant digit should be entered first. As the data is entered it will be displayed on the bottom left of the display and will be shifted from right to left as it is entered. When the desired code has been entered, pressing the ENTER key will store the code in memory and the display will return to the SET UP MENU B.

DISPLAY MENU

The display menus are the means by which the variable parameters that are used by the dispenser program can be viewed.

DISPLAY MENU A

Selecting item 04 from the MAIN MENU will cause the following message to be displayed.

DISPLAY MENU A

01=TARGET PRESSURES	04=DATE & TIME
02=FLOW RATE VALUES	05=HOSE TOTALS
03=TIME DELAYS	06=MASS FACTOR

Selecting item 01 will cause the following information to be displayed.

ASSIGNED HOSE PRESSURES

HOSE #1		HOSE #2	
ASSIGNED TEMP	COMP	ASSIGNED TEMP	COMP
3600	3750	3000	3120

In the USA today there are two pressure ranges that are commonly used. They are 3600psi and 3000psi. These pressure ranges are specified at 70 degrees Fahrenheit. The temperature compensated value is the pressure to which the vehicle will be filled when the temperature is something other than 70 degrees Fahrenheit. In the example above the temperature is above 70 degrees. When the data has been observed and you are ready to view the next data, press the CLEAR key. When the clear key is pressed the display will return to the display menu.

Selecting item 02 will cause the following information to be displayed.

SYSTEM FLOWRATES

FRA=0200 FRB=0150 FRC=0200 FRD=0150
FRE=0075 FRF=7500 FRG=0200 FRH=0150
FRI=0200 FRJ=0150 FRK=0075 FRL=7500

Please refer to APPENDIX B (page 47) for the meaning and use of the flow rates.

Selecting item 03 will cause the following information to be displayed.

SYSTEM TIMER VALUES

TIMER	TIMER	TIMER	TIMER	PULSE
ONE	TWO	THREE	FOUR	TIMER
03	03	03	90	04

Please refer to APPENDIX C (page 48) for the list of timers and how they are used in the system.

Selecting item 04 will cause the following information to be displayed.

SYSTEM DATE AND TIME

YEAR	MONTH	DAY	HOUR	MINUTE
2004	JULY	02	13	41

This display should be self explanatory.

Selecting item 05 will cause the following information to be displayed.

DISPENSER TOTALIZERS

HOSE # 1	HOSE # 2
0000248	0000123

This display shows the total number of whole “units of measure” that have been dispensed through each hose. The totalizer is a 7 digit counter. This provides the ability to display up to 9,999,999 units and then start at zero again.

Selecting item 06 will cause the following information to be displayed.

THE CURRENT MASS FACTOR IS

566

This example indicates that the current mass factor is 5.66. This represents 5.66 pounds per unit of measure, i.e. this is the normal mass used for a “gasoline gallon equivalent”.

DISPLAY MENU B

Selecting item 05 from the MAIN MENU list will cause the following menu to be displayed.

DISPLAY DATA MENU B

01=PRESS CAL VALUES 04=PROGRAM VERSION
02=PULSES PER UNIT
03=DISPLAY UNIT

Selecting item 01 will cause the following information to be displayed.

PRESSURE CALIBRATION VALUES

HOSE #1		HOSE #2	
ZERO	SPAN	ZERO	SPAN
-026	5000	+018	5000

In this example, with no adjustment for zero and with no pressure on the sensors the dispenser was reporting a pressure for hose # 1 (side a) of -026psi and for hose # 2 +018psi. The sensor calibration procedure requires you to enter the pressure reported as the zero offset. With a zero value of -026 loaded, the dispenser will report a pressure of +0000psi for hose # 1 and with a zero value of +018 loaded for hose # 2 the dispenser will report a pressure of +0000psi for hose # 2. The pressure range for both sensors is 0 to 5000psi.

Selecting item 02 will cause the following information to be displayed.

PULSES PER UNIT OF MEASURE	
HOSE # 1	HOSE # 2
1 TO 1	1 TO 1

In this example the dispenser will put out one pulse for each pulse it receives from the Micro Motion meter.

Selecting item 03 will cause the following information to be displayed.

DISPLAY UNIT OF MEASURE IS

CUBIC METERS

This example should be self explanatory.

Selecting item 04 will cause the following information to be displayed.

DISPENSER PROGRAM
VERSION DSP 1.01.02 06-09-2004
MAN MACHINE INTERFACE PROGRAM
VERSION MMI 1.02.02 6-21-2004

This example displays the version number and date of the dispenser control program. It also displays the version number and date of the program that allows you to communicate with the dispenser using the keypad and alpha / numeric display.

COMPUTER USE

Using a computer to communicate with the dispenser program is somewhat different than using the keypad and display. One of the differences is that more data can be displayed at a time. And there are some things that can be done from the computer that cannot be done via the keypad. Communications with a Micron Motion Meter can only be done via the computer. There is a special method of communicating with Micron Motion that will be covered in detail later in this manual. Another thing that can only be done from the computer is a diagnostics routine and that will be discussed in detail later in this manual. Another difference is an access code is not required with the computer. This approach has been taken with the idea that anyone that has access to the internal components of the dispenser and has a computer is authorized to access the operating parameters. The style of communication is the same however. That is the communication protocol is menu driven.

In order to gain access with the computer, you must connect a communications cable from the computer to the main control board connector P13 and the computer must have a communications software program that will allow serial ASCII communications at 9600 baud, 7 data bits, 1 stop bit, and even parity.

Once the computer is connected, access is gained by pressing the “enter” key. If the computer is setup correctly, you should get the following menu.

***** LOCAL MAIN MENU *****

A = DISPLAY DATA

B = SYSTEM CONFIGURATION

C = DIAGNOSTICS

SELECT A MENU ITEM

CTRL + X WILL CAUSE AN EXIT FROM ANY ROUTINE

This section of the manual will follow the menu and sub-menus. When a menu item is selected the “enter” key does not need to be pressed. The “enter” key will be used when data is to be entered.

DISPLAY DATA

When the “A” (upper case or lower case letters may be used) key is pressed the following sub-menu will be displayed.

***** DISPLAY DATA MENU *****

1 = HOSE # 1 STATUS

2 = HOSE # 2 STATUS

3 = DISPLAY UNIT OF MEASURE

4 = DISPENSER TOTALS

5 = LAST TEN TRANSACTIONS

6 = DISPLAY DATE AND TIME

7 = DISPLAY TARGET HOSE PRESSURES

8 = FLOW RATES

9 = TIMER VALUES

SELECT A MENU ITEM

CTRL + X WILL CAUSE AN EXIT FROM ANY ROUTINE

When item # 1 is selected the following information will be displayed.

SWITCHES			VALVES								
AUTH	HNDL	STRT	PSW	DEL	BNK2	BNK3	RESC	PRES	FR	QUANTITY	TEMP
ON	ON	OFF	ON	OFF	OFF	OFF	OFF	0035	0000	0012.34	+076

This information will be displayed and continually updated until the control (Ctrl) key and the X key are pressed at the same time. AUTH represents the authorization input voltage and in this case we are showing it to be on. HNDL represents the handle switch

or “stop” switch as it is sometimes identified. In this representation it is showing to be “on”. This is showing the switch in the position it must be in for the dispenser to dispense gas. If this switch is activated at any time during a dispensing operation that operation will stop immediately. STRT represents the start switch. This switch will always be “off” until it is activated to start a dispensing operation. PSW represents the “over pressure” pressure switch. Should this switch become activated it will stop a dispensing operation immediately or will not allow a dispensing operation to begin until it becomes deactivated. DEL represents the delivery valve. This is the first valve that will be opened in any dispensing operation. You can also think of this valve as the bank #1 (or low bank) valve. BNK2 represents bank #2 (or mid bank) valve. This valve is the second valve opened during a dispensing operation. BNK3 represents bank #3 (or high bank) valve and is the last valve opened in a dispensing operation. RESC represents a condition known as “reset complete”. This condition occurs after a dispensing operation has been initiated and the dispenser has gone through the process of resetting the volume and money counters and is ready to dispense gas. When this happens, a relay is closed which provides a voltage output that can be used by other equipment (such as a card system). PRES is pressure and is the pressure that is sensed on the vehicle side of the delivery valve. If this data is being displayed during a fueling operation, you can watch the pressure rise as the fill process takes place. FR represents flow rate. This is the rate at which the gas is being dispensed and is displayed in the same value as the unit of measure being used for volume.

When item # 2 is selected, the same information described for item # 1 will be displayed only this time it will be for hose # 2.

When item # 3 is selected, the following message will be displayed.

DISPLAY UNIT OF MEASURE IS

(In this space will be a message line from the following list.)

GASOLINE GALLON EQUIVALENT

CUBIC FEET

POUNDS

KILOGRAMS

CUBIC METERS

The message displayed will depend on how your dispenser is set up.

When item # 4 is selected the following message will be displayed.

DISPENSER HOSE TOTALS

HOSE #1	HOSE #2
0000087	0001234

This represents the total volume that has been dispensed through each hose for all transactions on that hose. The volume shown is always in whole units of measure. Fractions of units of measure are never displayed.

When item # 5 is selected the following data will be displayed. The meaning of the column headings follows. H# is the hose number. QTY (quantity) is the volume of gas dispensed during this transaction. MONEY is the value of the gas dispensed during this transaction. TEMP is the ambient temperature in degrees Fahrenheit. PRES is the ending pressure reading for this transaction. YR is the year portion of the date. MO is the month of the year. DA is the day of the month. H is the hour of the day (remember the clock is a 24 hour clock). M is the minute of the hour. And EC is the ending code for the transaction. The ending code in this format is a numeric number. The meaning of those codes is in the following table.

- 1 = NO START FLOW
- 2 = EXCESS FLOW
- 3 = LOW FLOW (NOT ENOUGH GAS IN STORAGE FOR A COMPLETE FILL)
- 4 = NORMAL
- 5 = STOP SWITCH PUSHED
- 6 = AUTHORIZATION REMOVED
- 7 = PRESSURE SWITCH ACTIVATED
- 8 = OVER PRESSURE (PRESSURE TESTED BY SYSTEM)
- 9 = POWER FAIL

H#	QTY	MONEY	TEMP	PRES	YR	MO	DA	H	M	EC
----	-----	-------	------	------	----	----	----	---	---	----

When item # 6 is selected the following information will be displayed.

YEAR MNTH DAY HOUR MIN
2004 JULY 06 15 42

Please keep in mind that the clock is a 24 hour clock.

When item # 7 is selected the following information will be displayed.

HOSE #1		HOSE #2	
TARGET	TCP	TARGET	TCP
3600	3748	3000	3186

The values listed for target is the pressure that the vehicle would be filled to when the ambient temperature is 70 degrees Fahrenheit. TCP is the TEMPERATURE COMPENSATED PRESSURE to which the vehicle will be filled when the temperature is something other than 70 degrees Fahrenheit. The illustration above indicates that the temperature is above 70.

The following data will be displayed when item # 8 is selected.

FRA	FRB	FRC	FRD	FRE	FRF	FRG	FRH	FRI	FRJ	FRK	FRL
0200	0150	0200	0150	0075	7500	0200	0150	0200	0150	0075	7500

Please refer to APPENDIX B (page 47) for the information on how the flow rates are used.

Selecting item # 9 will cause the timer information to be displayed.

TV1	TV2	TV3	TV4	PT(MS)
03	03	03	90	04

TV represents TIMER VALUE. TV1, TV2, TV3, and TV4 are all in seconds. The range for timers 1 through 3 is one to thirty seconds. The range for timer 4 is ten to ninety seconds. PT represents PULSE TIMER. The pulse timer controls the “on” time of the pulse output measured in milliseconds. The range for this timer is one to twenty milliseconds. Please refer to APPENDIX C (page 48) for more information on the timers and their use.

SYSTEM CONFIGURATION

When item B is selected from the main menu the following sub-menu will be displayed.

***** SYSTEM CONFIGURATION MENU *****

- 1 = SET PRICE PER UNIT
- 2 = ENABLE PROLINK COMMUNICATIONS
- 3 = SET DATE AND TIME
- 4 = SENSORS CALIBRATION
- 5 = LOAD MIN & MAX FLOW RATES
- 6 = LOAD HOSE TARGET PRESSURES
- 7 = LOAD TIMER VALUES
- 8 = LOAD DISPLAY UNIT OF MEASURE
- 9 = LOAD PULSE OUTPUT PER UNIT OF MEASURE
- A = LOAD MASS FACTOR
- B = LOAD DEFAULT SETUP VALUES

SELECT A MENU ITEM

CTRL + X WILL CAUSE AN EXIT FROM ANY ROUTINE

When item # 1 is selected the following message will be displayed.

ENTER PRICE PER UNIT – UP TO 4 DIGITS
FOLLOWED BY THE ENTER KEY

You can now enter the price that is to be the selling price of the gas. When the desired price has been entered, pressing the ENTER key will cause the entered price to be stored in memory. Should a mistake be made entering the price there are three ways to correct the error. One method is to press the ENTER key and then select this item from the menu and enter the correct data followed by the ENTER key. Another method is to enter at least four zeros, enter the correct data, and then press the ENTER key. The reason this second

method is usable is that the last four digits entered are the ones that will be used. The third method is to press the CTRL key and while holding that key press the x key (the x can be either upper case or lower case). This will cause the SYSTEM CONFIGURATION MENU to be displayed and the same item can again be chosen. Once the ENTER key has been pressed the SYSTEM CONFIGURATION MENU will be displayed and another menu item can be selected.

When item # 2 is selected the following message will be displayed.

PROLINK COMMUNICATIONS CAPABILITY IS NOW ACTIVE
REMEMBER CTRL +X MUST BE USED WHEN FINISHED WITH PROLINK

NOTE:

For the purposes of this discussion we will assume that “Hyper Terminal” is being used as the computer communications software package. We will also assume that the person following this procedure has a working knowledge of Prolink and its use.

When the above message appears, follow the procedure below to establish communications with the Micro Motion meter.

1. Using the mouse cursor click on the icon that disconnects the computer from the communications port.
2. Now minimize the Hyper Terminal program.
3. Open the Prolink software package.
4. Establish communications with the desired meter.

When communications with the meter is finished the following procedure **must be followed**. If this procedure is not followed the dispenser will not allow gas to be dispensed. If this occurs power for the dispenser will need to be turned off and then back on for the unit to work.

1. Disconnect communications from the meter.
2. Close the Prolink software program
3. Restore the Hyper Terminal software
4. Using the connect icon, reconnect to the communications port
5. Press the CTRL & X keys together. This will cause the SYSTEM CONFIGURATION MENU to be displayed.

You can now select any other item from the menu that is needed.

Selecting item # 3 will display the following message.

ENTER YEAR YY, MONTH MM, DAY OF THE MONTH DD
HOUR (24 HOUR CLOCK) HH, AND MINUTES MM
IN THE FOLLOWING FORMAT - FOLLOWED BY THE ENTER KEY
YYMMDDHHMM

When the date and time data has been entered and the ENTER key is pressed, the SYSTEM CONFIGURATION MENU will again be displayed. The date and time can always be checked for accuracy by exiting back to the main menu, selecting the display data menu and selecting date and time from that menu.

When item # 4 is selected from the SYSTEM CONFIGURATION MENU the following message will be displayed.

1 = HOSE 1 ZERO CALIBRATION VALUE
2 = HOSE 1 SPAN CALIBRATION VALUE
3 = HOSE 2 ZERO CALIBRATION VALUE
4 = HOSE 2 SPAN CALIBRATION VALUE
SELECT A MENU ITEM
CTRL + X WILL CAUSE AN EXIT FROM ANY ROUTINE

When item 1, 2, 3, or 4 in this list is selected the following type of information will be displayed.

1
-0023
AFTER CURRENT VALUE IS DISPLAYED
PRESS SPACE BAR TO NOT CHANGE CURRENT VALUE

This example indicates that item 1 was selected and the current data for hose 1 zero value is a negative 23psi. If this value needs to be changed then enter the new data followed by the ENTER key. If the data does not need to be changed, simply press the space bar and the display will return to the calibration menu. The same philosophy holds true for all the calibration values. See APPENDIX A (page 46) for the calibration procedure.

When item # 5 is selected from the SYSTEM CONFIGURATION MENU the following message will be displayed.

HOSE # 1

FLOWRATES TO USE WHEN HOSE PRESSURE IS LESS THAN TARGET

A = SEQUENCE FROM BANK # 1 TO BANK # 2

B = SEQUENCE FROM BANK # 2 TO BANK # 3

FLOWRATES TO USE WHEN HOSE PRESSURE IS GREATER THAN TARGET

C = SEQUENCE FROM BANK # 1 TO BANK # 2

D = SEQUENCE FROM BANK # 2 TO BANK # 3

FLOWRATES USED FOR ALL PRESSURES

E = FULL STOP FLOWRATE HOSE # 1

F = MAXIMUM FLOWRATE HOSE # 1 (OPEN HOSE CONDITION)

HOSE # 2

FLOWRATES TO USE WHEN HOSE PRESSURE IS LESS THAN TARGET

G = SEQUENCE FROM BANK # 1 TO BANK # 2

H = SEQUENCE FROM BANK # 2 TO BANK # 3

FLOWRATES TO USE WHEN HOSE PRESSURE IS GREATER THAN TARGET

I = SEQUENCE FROM BANK # 1 TO BANK # 2

J = SEQUENCE FROM BANK # 2 TO BANK # 3

FLOWRATES USED FOR ALL PRESSURES

K = FULL STOP FLOWRATE HOSE # 2

L = MAXIMUM FLOWRATE HOSE # 2 (OPEN HOSE CONDITION)

SELECT A MENU ITEM

CTRL + X WILL CAUSE AN EXIT FROM ANY ROUTINE

When any item, A through L, in this list is selected the following type of information will be displayed.

G

0035

This example indicates that item G was selected and the current data for flow rate “G” is 0035. If this value needs to be changed then enter the new data followed by the ENTER key. If the data does not need to be changed, simply press the space bar and the display will return to the flow-rate menu. The same philosophy holds true for all the flow-rate values.

When item # 6 is selected the following information will be displayed.

HOSE TARGET PRESSURES

1 = HOSE # 1 3600psi TARGET PRESSURE

2 = HOSE # 1 3000psi TARGET PRESSURE

3 = HOSE # 2 3600psi TARGET PRESSURE

4 = HOSE # 2 3000psi TARGET PRESSURE

SELECT ONE OF THE CHOICES

CTRL + X WILL EXIT THIS ROUTINE

When any of these items is selected the information is stored and the menu is re-displayed.

When your selections are complete, CTRL + X will return you to the configuration menu.

When item # 7 is selected the following menu is displayed.

1 = TIMER VALUE # 1

2 = TIMER VALUE # 1

3 = TIMER VALUE # 1

4 = NO FLOW TIME DURATION

5 = PULSE TIME DURATION

SELECT A MENU ITEM

CTRL + X WILL CAUSE AN EXIT FROM ANY ROUTINE

When any item is selected from the menu, the item number and the current timer value will be displayed. The following example indicates that item # 2 was selected and the current value is 03.

2
03

If the value is correct simply press the space bar and the value will not be changed and the menu will again be displayed. If however a new value is needed, type the new value followed by the enter key and the new value will be stored and the timer menu will be displayed again. The CTRL and X keys will take you back to the configuration menu.

When item # 8 is selected from the configuration menu, the following menu will be displayed.

DISPLAY UNIT OF MEASURE

1 = DISPLAY "GGE" GASOLINE GALLON EQUIVALENT

2 = CONVERT FROM "GGE" TO "CFM" / CUBIC FEET

3 = CONVERT FROM "GGE" TO "LB/M" / POUNDS

4 = DISPLAY "KG" KILOGRAMS

5 = DISPLAY CUBIC METERS

6 = CONVERT CUBIC METERS TO "KG/M" KILOGRAMS

SELECT ONE OF THE UNITS

CTRL + X WILL EXIT THIS ROUTINE

The first thing that needs to be considered when using this menu is, what is the Micro-Motion meter setup to measure. If the basic setup in the meter is for GGE and item # 4, 5, or 6 is selected, errors will occur. In the same manner, if the meter is setup to measure KG or CUBIC METERS and item # 1, 2, or 3 is selected, errors will occur. When an item from this menu is selected, the information is registered and the configuration menu is re-displayed.

When item # 9 is selected the following menu is displayed.

PULSE OUTPUT CONFIGURATION

1 = HOSE # 1 1 TO 1 PULSES PER UNIT OF MEASURE

2 = HOSE # 1 1 TO 10 PULSES PER UNIT OF MEASURE

3 = HOSE # 1 1 TO 100 PULSES PER UNIT OF MEASURE

4 = HOSE # 2 1 TO 1 PULSES PER UNIT OF MEASURE

5 = HOSE # 2 1 TO 10 PULSES PER UNIT OF MEASURE

6 = HOSE # 2 1 TO 100 PULSES PER UNIT OF MEASURE

SELECT ONE OF THE CHOICES

CTRL + X WILL EXIT THIS ROUTINE

The reason for this menu is to provide output pulses from the dispenser that will be compatible with other data gathering equipment. An example of this need is if the meter is transmitting 1000 pulses for each unit of measure and the other data gathering equipment needs only 100 pulses for each unit of measure. In this example item # 2 or # 5 (depending on the hose) would be selected. In this example the dispenser will transmit 1 pulse for every 10 pulses it receives from the meter.

When item # A is selected from the configuration menu the following message will be displayed. Following the message the current mass factor will also be displayed as follows.

ENTER MASS FACTOR – UP TO THREE DIGITS

FOLLOWED BY THE ENTER KEY

0074

If the current mass factor is correct, use the CTRL + X to exit from this routine. If the current value is not correct, enter the correct value followed by the enter key.

NOTE:

THIS MASS FACTOR MUST MATCH THE MASS FACTOR THAT IS SETUP IN THE MICRO-MOTION METER.

!!!! CAUTION !!!!

Item # B in the configuration menu should be used only on the advice of factory personnel. This item is for use by factory personnel when starting up a dispenser for the first time or when there have been so many changes to the dispenser setup in the field that no one knows what is now in the setup.

Item B will load a set of default parameters that is burned into the program chip. If changes are made to the default setup, it is highly recommended that a record be kept of those changes. Please note that if this feature is used all changes that have been made to the setup will be erased.

TESTING THE UNIT

1. Insure that all the wires are properly connected and that the unit is properly grounded.
2. Apply power to the unit. The LCD displays should come on.
3. Remove the nozzle then push the start button. The unit should go through lamp test. (NOTE: Lamp test is when the displays go to all 8's and then to 0's.) The price display will show a price that is set at the factory. If you press the 'Start' button after you remove the nozzle there will be a short delay while the dispenser checks for all safety and pressures are ready to go.
4. Check valve for proper operation. You should here the solenoid valves click when they energize.
5. Check dispenser for leaks. The dispenser is checked for leaks in the factory but shipment may move things around and you should recheck for leaks.

In the event of a drive off and the hose breaks away from the dispenser:

1. Make sure power is off.
2. Check for leaks and damage that may have resulted from the drive off.
3. De-pressurize the remaining short hose through the bleeder valve in the dispenser. Depressurize the long hose by moving the three-way valve from fill to vent until the pressure is gone.
1. De-pressurize dispenser through bleeder in the dispenser. NOTE: Gauge on dispenser can be used to check for pressure. This gauge is downstream of the product valve.
2. Inspect hose for damage, retest according to hose manufacturer's suggested procedures, and reinstall.
3. Check nozzle for operation and seal.
6. Have a qualified technician inspect the hose breakaway device and reconnect using the manufacture instructions.

SEQUENCE OF OPERATION FOR CNG DISPENSERS

On the dispenser termination board there is duplicate numbers for side A and side B. For this Sequence of Operation we will only be referring to the side 'A' so we will not have the letter 'A' or 'B' with the terminal number.

Before the dispenser can deliver gas there must be an authorize signal to the Authorize Input. This signal has to be either a jumper wire from terminal #L1 to #14 or you will need to loop #L1 through a control device IE: cardreader or console that has a normally open (N/O) switch. When the control device decides that it is OK to fuel it will close the N/O switch sending voltage back to #14 and the dispenser will reset after the nozzle switch is closed and the "Start" button is pushed.

The nozzle switch is located on a button that is behind the dummy nozzle holder. If the nozzle is in the rest position the switch is open, if you remove the nozzle from the rest position it will close the switch and arm the "Start" button. Pressing the "Start" button will start the reset sequence. At this time the dispenser displays will reset going to 88888 then to 00000, then as soon as the dispenser starts the reset sequence it will send a high voltage (120VAC) to output #8. Output #8 will stay high (120VAC) until either the dispenser is finished fueling or the nozzle switch is opened. Wire #8 is a 120VAC output line that is used for an in-use indicator on card readers.

The vehicle valve will open as soon as the reset is complete. The vehicle valve will modulate as needed to control pressure to the vehicle. If at any time the dispenser sees that it is full or the nozzle switch is open, the vehicle valve will shut off and stay off.

If during the fill the minimum flow rate is reached for a given time Bank 2 valve will open. If during the fill Bank 2 valve is open and the minimum flow rate is reached for a given time Bank 3 valve will open.

If at any time the dispenser sees the stop flow rate it will start monitoring the pressure closely by stopping flow and looking at the pressure. The flow will continue if more pressure is needed. The vehicle valve will modulate the pressure to allow the dispenser to look at vehicle pressure. If hose 'B' receives a start sequence it will independently sequence the gas with out any input or consequences from side "A". The only place both hoses are tied together is at the inlet to the dispenser. If the supply tubing is not sized right or the pressure is not sufficient it will have an effect of the dispenser rotating to high bank too fast. If the dispenser ever receives an over pressure the overpressure switch will stop flow. If the pressure drops the switch will open and let flow continue. The over pressure switch setting is set just below the relief valve setting. A pressure transducer inside the dispenser sends the pressure signal to the head via 0 to 5 volt signal. This signal is proportional to the pressure.

The LCD displays will have last sale value. Lift handle and the displays will blank out and reset to zero. Lifting Handle 1 closes Relay marked RL5, this relay stays on till the transaction is complete. Relay marked RL8 is also turned on at the same time, this is delivery valve.

REMOVING THE MAIN BOARD

1. From front of dispenser, open display panel.
2. If possible, read totals and record, using display menu from computer or keypad read and save as many of operating parameters as possible.
3. Disconnect all power to dispenser.
4. Close manual shutoff valve.
5. Open door to enclosure where main board is located.
6. Remove all cables from main board noting where each cable plugs in. Each cable should be marked to match label on control board.

PNEUMATIC OPERATED PRODUCT VALVE (optional)

1. Disconnect all power.
2. Close the manual shut off valve upstream of the dispenser.
3. Remove the pressure on the dispenser by opening the bleeder valve on the tubing for the side that you are on.
4. Close the air supply valve before the air enters the dispenser. Bleed the air off at a fitting slowly. **NOTE:** This pressure could be as high as 120 psi.
5. Disconnect the air tubing to the operator.
6. If you are sure that there is no pressure on the piping to the dispenser loosen the nuts the hold the ferrules tight on the tubing. To re-install the Swagelok fittings see the Swagelok manual for the proper procedure to re-tighten the fittings.

MICRO MOTION SENSOR

1. Disconnect all power.
2. Close the manual shut off valve upstream of the dispenser.
3. Remove the pressure on the dispenser by opening the bleeder valve on the tubing that you are on.
4. Disconnect the wires from the terminals.
5. Remove the conduit fitting from the junction box.
6. Remove the tube fittings at the base of the sensor making sure to use a backup wrench on the tube fittings.

Reverse this process for re-installation. The sensor and transmitter are a matched set and re-programming of the sensor will be required if a different sensor is installed in the same place. (Call TGT for help with re-programming.)

MICRO MOTION TRANSMITTER

Contact the factory or local distributor for these changes. Micro Motion Transmitters communicate through a hand held unit called Rosemont 275 or Micro Motion software called Pro Link. The software and Rosemont 275 can be purchased from the local Micro Motion salesman or Tulsa Gas Technologies.

Call TGT or the local distributor for help. Major re-programming is required for this step. This should only be attempted by factory-trained technicians.

DISPLAY FACE

Use a dispenser key to open the door of the display enclosure. The display is bolted to the inside of the door. Use the plastic standoffs that are provided to give proper spacing and isolation on the board.

HOSES

1. Disconnect all power.
2. Close the manual shut off valve upstream of the dispenser.
3. Remove the pressure on the dispenser by opening the bleeder valve on the tubing for the side that you are on.
4. Remove the hose from the base.
5. Disconnect vent hose by uncoupling the JIC connector at hose base on side of dispenser.
6. Disconnect retractor ball.
To re-install, re-attach coupling and make sure hose is positioned so vent hose can attach to the vent hose connector. Close bleed valve and re-apply pressure. You may need to hold hose in position and apply pressure slowly to maintain the position that is best for the hose. Check for leaks.
7. Fueling system must be properly grounded in accordance with NFPA 70 (NEC) to avoid static discharges which may cause fire or explosion. Check the electrical continuity of the hose assembly monthly or before each use. The total resistance, measured from end to end must not be less than 1 megaohm for assemblies up to 15ft. in length and less than 5 megaohm for any length or combination of lengths greater than 18ft.

FILTER

1. A filter is optional. If a filter is installed, a tag is provided stating **"WARNING - Disconnect electrical power and vent gas before servicing filter."**
2. Bleed the pressure off the dispenser using the valve at the bottom of the filter bowl. Make sure to check and re-check pressure before trying to remove filter bowl. **Serious injury or death can result from taking the filter bowl off with pressure still on the system.**

NOZZLE

1. De-pressurize the hose, vent any pressure that may be in the nozzle and valve and unthread nozzle using a back up wrench on the nipple or hose that the nozzle is attached to. Check the o-ring in the end of the hose that is inserted to the treads of the nozzle and replace as needed. Any time you remove the nozzle check for corrosion on the threads. Good electrical connection at this point is necessary for a ground path back to earth ground.

MAINTENANCE

1. Visual inspection of the hose assembly weekly.
2. Filter element needs to be replaced on the demand of the station.
3. Keeping the dispenser clean will prolong appearance of stainless steel and all moving parts. A compressor that makes oil will build up at the dispenser hose. This should be kept clean at all times.
4. A filter is optional. If a filter is installed, a tag shall be provided stating **"WARNING - Disconnect electrical power and vent gas before servicing filter."**
5. If the system has control air the water separator must be drained on a frequent basis.
6. The nozzle jaws should be looked at daily for wear and replaced as needed.
7. There are very few moving parts on a CNG dispenser; but, as the system is used, small leaks will appear now and then from the expansion and contraction of tubing and fitting. Leaks check the dispenser on a regular basis as needed. **DO NOT USE ANY AMMONIA BASED SOAP.** This will cause corrosion to the stainless steel used in the dispenser.
8. The pneumatic operated ball valves located in the valve panel will require some attention to the stem packing now and then. Slightly snugging the packing nut will stop any leak from this area.

TROUBLESHOOTING

Gas leak inside the dispenser: Use non-ammonia soap or SNOOP© (From SwageLok) to locate the leak. Replace the part or tighten the fitting that is loose. Depressurize dispenser before attempting to re-tighten any tube fitting or pipe fitting.

Dispenser has display but will not reset: Wire #14 is the reset signal to the dispenser. If you are using a POS controller, it MUST send 120v to #14 to reset the dispenser. If you have 120v at #14, check the handle switch for correct operation. If the handle switch is working properly, contact the local service technician for help trouble shooting the Motherboard.

Dispenser will reset, but no gas will flow: First, check to see if the manual shut off valves under the dispenser and on the side of the dispenser are on. You should hear the solenoid valve "click" after reset. (Some card readers control the solenoid valve. The card reader must be in the bypass mode for this test.) If you here a click, make sure the sequence valve panel is sending you gas. If you are sure of gas pressure, remove solenoid valve and see if any debris is in the valve.

NOTE: You do not have to remove the solenoid valve coil to inspect for debris; simply unscrew the nut on top of the coil and remove the valve from the bottom. but DO NOT energize the solenoid valve coil without the valve in place. This will permanently damage the coil.

On a unit with a pneumatic operated ball valve, visually see if the valve pointer is moving when the valve is energized. If the pointer is not moving, check air supply. If it is established that the valve is bad, you may send it to TGT for repair, or order a valve repair kit from TGT.

Hose leaking oil through the jacket: The CNG hoses are made of a thermoplastic and oil will permeate the hose in low quantities. The outer jacket is pin pricked to let the oil escape, along with any pressure that may leak between the jackets. This is not a failure of the hose, but you will need to replace the hose if the oil becomes too much to handle the hose safely.

Dispenser is locked up, i.e.; no response from anything: Sometimes, in an electrical storm, the dispenser will not respond favorably to the sudden off/on electrical surge. If this happens, cycle the power off for 30 seconds, then restart. If no response, call TGT for assistance.

Dispenser resets and flows gas, but no pulser signal to a POS device. Check polarity on pulser. The pulser is an opto-coupler and should be wired per info on page 11 of this manual.

Use a pulse counter on the pulse output to see if you are getting the pulses out, or an analog voltmeter can be used by watching the deflection of the needle for a pulse indication.

No pulse can cause the dispenser to not deliver fuel. After thirty (90) seconds the missing pulse detector will cut off the flow. Also, a low flow rate of less than the rated low flow cutoff flow rate will cause no pulse out of the dispenser.

If there is no response from any test, call TGT or the local service technician for further help with trouble shooting the Motherboard.

APPENDIX A

PRESSURE TRANSMITTER CALIBRATION PROCEDURE

1. Set zero offset value to zero.
2. Set span value to the pressure range of transmitter.
3. Vent pressure port of transmitter to atmosphere
4. Take pressure reading. Make note of reading and if plus or minus.
5. Enter this reading into zero offset value. If reading is minus, a minus sign must be entered preceding the value. A plus sign is assumed if a minus sign is not entered.
6. Close vent port to transmitter and pressurize system.
7. Check pressure reading and compare to gauge reading.
8. If reading is less than gauge, increase span value and recheck reading.
9. If reading is greater than gauge, decrease span value and recheck reading.

APPENDIX B
FLOWRATE VALUES AND HOW THEY ARE USED

FLOWRATES FOR HOSE # 1

Flow rates used when hose pressure is less than target

Flow rate "A" = sequence from bank # 1 to bank # 2

Flow rate "B" = sequence from bank # 2 to bank # 3

Flow rates used when hose pressure is greater than target

Flow rate "C" = sequence from bank # 1 to bank # 2

Flow rate "D" = sequence from bank # 2 to bank # 3

Flow rates used for all pressures

Flow rate "E" = full stop flow rate

Flow rate "F" = maximum flow rate (open hose condition)

FLOWRATES FOR HOSE # 2

Flow rates used when hose pressure is less than target

Flow rate "G" = sequence from bank # 1 to bank # 2

Flow rate "H" = sequence from bank # 2 to bank # 3

Flow rates used when hose pressure is greater than target

Flow rate "I" = sequence from bank # 1 to bank # 2

Flow rate "J" = sequence from bank # 2 to bank # 3

Flow rates used for all pressures

Flow rate "K" = full stop flow rate

Flow rate "L" = maximum flow rate (open hose condition)

APPENDIX C TIMER VALUES

There are four timer values that can be loaded (changed). These timer values are identified as: TIMER VALUE # 1, TIMER VALUE # 2, TIMER VALUE # 3, and TIMER VALUE # 4.

Timer value #1 is used in the sequencing process from low bank (bank 1) to mid bank (bank 2) and from mid bank (bank 2) to high bank (bank 3) when the hose pressure is less than the target pressure. The time allowed for this value is from 1 to 60 seconds.

When the hose flow rate becomes equal to or less than the value of FLOWRATE (A for hose # 1) or (G for hose # 2), a timer is started using timer value # 1. When the flow rate has remained below the value of flow rate "A" or "G" consistently for the length of timer value # 1, the system will sequence from bank # 1 to Bank # 2. Timer value # 1 is also used in the same manner with FLOWRATES (B for hose # 1) or (H for hose # 2) to sequence from mid bank (bank 2) to high bank (bank 3).

Timer value # 2 is used instead of timer value # 1 when the measured vehicle pressure is higher than the target pressure. The time allowed for this value is from 1 to 60 seconds.

Timer value # 3 is used when the system has detected a vehicle full condition. It is the time that the system will wait before retesting the vehicle for a full condition. The time allowed for this value is from 1 to 60 seconds.

Timer value # 4 is used to set the pulser output time duration. The time allowed for this value is from 1 to 20 milliseconds.

**TULSA GAS TECHNOLOGIES, INC.
TULSA, OK**

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2. Misapplication, misuse or neglect;
3. Maintenance, repair, modification or adjustment by other than Tulsa Gas Technologies authorized personnel or their authorized agents;
4. Improper environments, excessive or inadequate heating or air conditioning;
5. Electrical power failures, surges or other irregularities of the electrical power line including interference generated by related or non-related electrical devices elsewhere on the power line system;
6. Interference from radio frequency or microwave transmitting devices;
7. Lightning, flooding, or any other uncontrollable acts of nature; and/or
8. Operation by unauthorized personnel.

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