

Tech-Trol GasFlow™ 7250 Programmable  
Controller  
Users Manual - VRU Model (Gas Drive Unit)  
with  
RPM Speed Control



Distributed by:



TechTrol, Inc.

Pawnee, OK 74058

[www.techtrol-usa.com](http://www.techtrol-usa.com)

918 762-1050

# Table of Content

---

## Table of Contents

Table of Contents .....	3
Introduction:.....	4
The Main Menu (Home Screen): .....	4
Home Screen Button Options: .....	5
PRESS TO START .....	5
SET POINTS.....	7
SET SYSTEM PARAMETERS .....	8
DISPLAY SENSOR DATA .....	10
ZERO SUCTION .....	11
RUN MODE: .....	12
SHUTDOWN MODE.....	13
NOTES:.....	14
APPENDIX A.....	15
Suction Delay .....	15
Suction Relay .....	15
Auto Start .....	16
Variable RPM.....	16
Crank Time/Crank Attempts.....	17
Number of Teeth .....	17

# TechTrol GasFlow™ 7250 Programmable Controller Users Manual

## **Introduction:**

The TechTrol GasFlow™ programmable controller will continuously monitor and control critical conditions on the gas compressor. The 7250 model is specific to the gas drive units and controls the RPM of the gas drive based on input suction, in addition to other critical parameters.

Features of the controller include a high-resolution graphics "Touch" screen, menu driven user selectable commands and a variety of control features selectable by the user to help maintain suction in the vapory recovery mode.

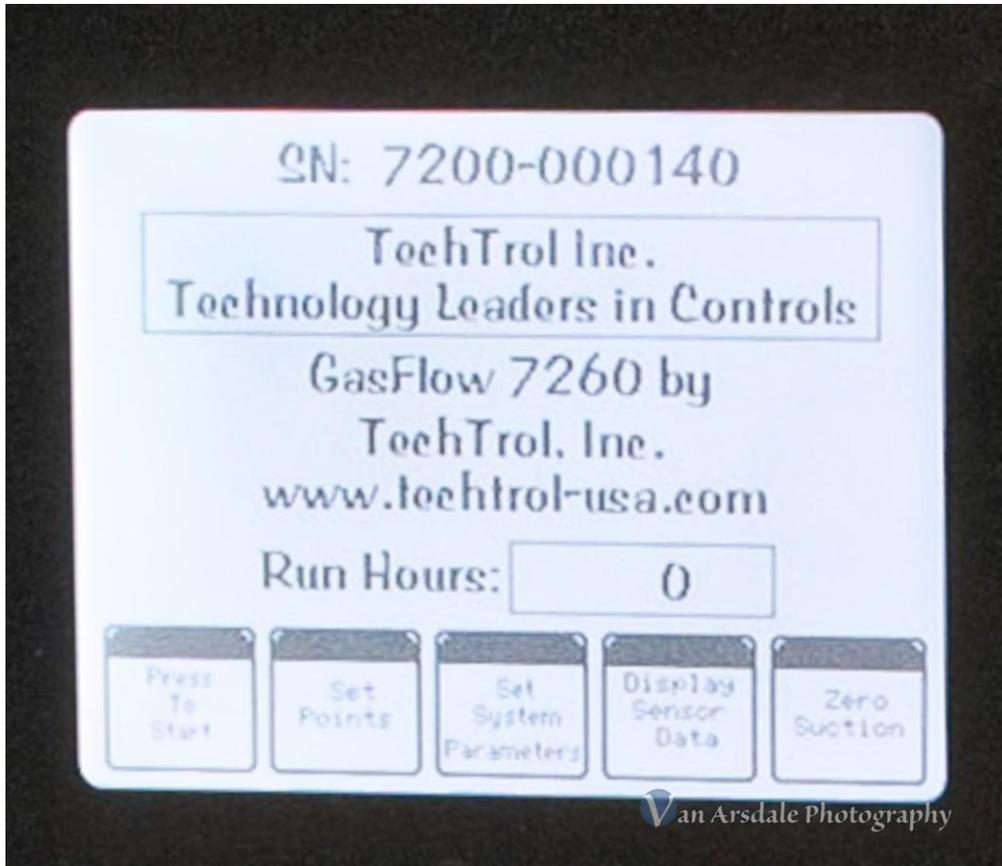
The user can set parameters that will be discussed later, that will allow the controller to precisely control the suction of the vapor recovery of tanks and other similar operations. Multiple control features will allow for fine-tuning of almost any vapor recovery system.

## **The Main Menu (Home Screen):**

The main screen or the "Home" screen is where the user will always start to get to any of the settable parameters on the controller. The Home screen displays the serial number, compressor-company's name, web site address and the "**RUN HOURS**". The "**RUN HOURS**" accumulates whenever the oil pressure is above the low set point. It only accumulates hours. No minutes or seconds are displayed (See Figure 1).

The "Touch" Menu buttons across the bottom of the screen give the user access to all of the functions and settable parameters of the controller. You can return to the "Home" screen from any subordinate screen by touching the "Home Page" button located in the lower right hand corner of all subordinate screens.

Each of the touch buttons across the bottom of the Home Screen will be discussed in detail. Appendix A will cover tips on how to tune the controller to best monitor and control the vapory recovery system.



**Figure one – Home Screen (7260 shown)**

## **Home Screen Button Options:**

From the Home Screen and the “**MAIN MENU**” select one of the buttons across the bottom of the screen as follows:

### ***PRESS TO START***

The “Press to Start” button, by its name is the button you push when you are ready to start the compressor. Once it is pressed, you will see the screen shown in Figure 2. Note the instructions on the screen as follows:

**RESET “RED” EMERGENCY STOP BUTTON (PULL OUT) THEN PRESS ‘START’ BUTTON TO START**

It may seem redundant that you are required to press two start buttons, but it is important that everyone around the compressor is aware that the unit will start. Once the “Press to Start” button is pressed, the system will count down for ten

(10) seconds and the amber light on top of the controller will flash giving warning that the unit is about to start. At the end of the ten-second countdown, the motor will “soft” start provided the red emergency shutdown button on the side of the controller has been cleared, i.e. pulled out, See Figure 2.

*Note: you can kill the unit any time by pressing the red emergency shutdown button.*



**Figure (2) - Start Screen**

At the end of the countdown, the system will engage and start cranking. The user can set the duration of the crank cycle and the number of cranks as will be discussed later.

Once the unit has started, the sensor data display screen will appear and the values of the sensors will show on the display (See Figure 3). Note that because of the flexibility of these controllers, all sensors values for your unit may or may not be displayed in the manual.

At startup, a user programmable lockout timer will be covered later. The sensors values are displayed but they are not monitored for shutdown during the lockout period. The operator will need to manually monitor the equipment during this lockout period. The “**RED EMERGENCY SHUT DOWN SWITCH**” located on the side of the controller can be pushed in the event an emergency kill is required.

SENSOR NAME	VALUE	UNITS
SUCTION PRESSURE	21	PSI
COMP OIL PRESSURE	68	PSI
DISCHARGE PRESSURE	392	PSI
DISCHARGE TEMP	130	F
OXYGEN	49	%
ENGINE OIL PRESSURE	60	PSI
ENGINE TEMP	300	F
VOLTS	1	VDC
RPM	0	RPM

HomePage

**Figure (3) Display Data Screen**

## ***SET POINTS***

The **"SET POINTS"** button. Press this button on the HOME SCREEN to change any of the set points of all sensors. If you are on another subordinate screen, touch the **"Home Page"** button to return to the home screen. The user can set a high and low set-point for all analog sensors. We do this to make the controller more versatile. For example, you may think there is no reason to shut down on "High Compressor Oil Pressure" but it may actually indicate a plugged oil line, and some users will use the "Kill" point.

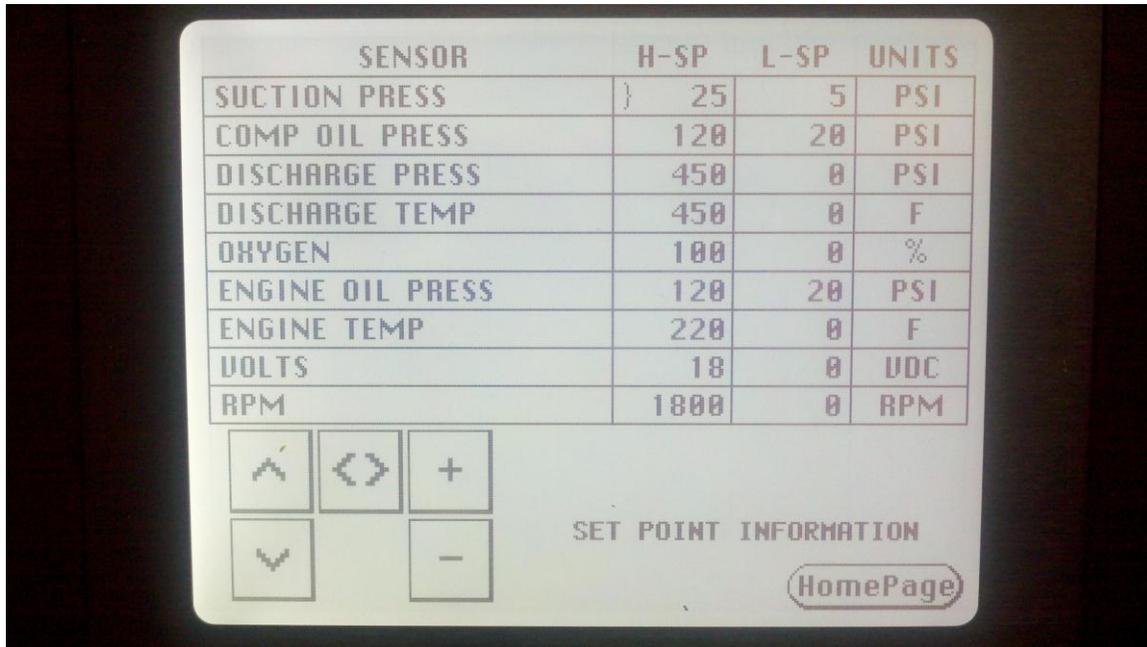
**NOTE: Pressing the "SET POINTS" button during normal running operations will kill the motor and the user will need to go through the start sequence above once sets points are set.**

Once the button is pressed, a screen will appear that allows the user to move in and around each sensor's set point value. Use the **UP (▲)**, **DOWN (▼)**, **LEFT (◀)** and **RIGHT (▶)** arrow keys on the keypad in the lower left hand corner of the display to select the set point to be altered. Then use the "+" key and the "-" key to change the set point. When using the "+" key, the value of the set point will only advance to the maximum value of the sensor rating. Also, the "+" key will advance the values by a factor of "10". This is intentional and speeds the set point settings. When using the "-" key, the value will only decrease to the minimum value of the sensor rating. Also note that the "-" key will decrement the value by "1" (See Figure 4).

The user should assure that the value of the **H-SP** (High Set Point) is greater than the value set to the corresponding **L-SP** (Low Set-Point).

When complete, press the "**Home Page**" button to return to the Home Screen.

**Note: By depressing and holding the "+" or "-" button during set-point changes, the set-point will change at an accelerated rate.**



**Figure (4) - Set-Point Screen**

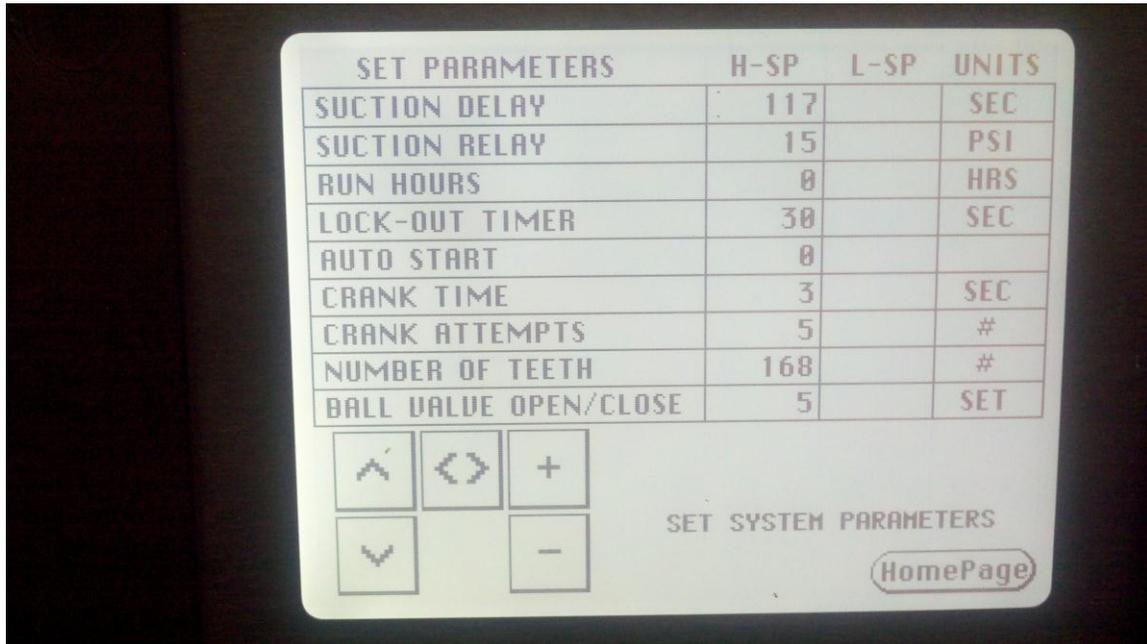
### ***SET SYSTEM PARAMETERS***

Press this button to change the operations of the items detailed below.

**Note: Pressing the "SET SYSTEM PARAMETERS" button during normal running operations will kill the engine and the user will need to go through the start sequence above once maintenance sets points are set.**

Once the button is pressed, a screen will appear that allows the user to move in and around each sensor's or function set point value. Use the **UP (▲)**, **DOWN (▼)**, **LEFT (◀)** and **RIGHT (▶)** arrow keys on the keypad located in the lower left hand corner of the screen to select the set point to be altered. Then use the **+** key and the **-** key to change the set point. When using the **+** key, the value of the set point will only advance to the maximum value of the programmed function or sensor by a factor of "10". When using the **-** key, the value will

only decrease to the minimum value of the programmed function or sensor by a factor of "1" (See Figure 5).



**Figure (5) - Set System Parameters**

**Following are the features the user can set on the "Set System Parameters" screen.**

**"SUCTION DELAY"** – On A vapor recovery system, the suction can change rapidly due to the compressor's ability to quickly evacuate a system. We do not want the compressor to continually shut down on low or high suction, immediately upon a fault. There are other features of the controller that will try to compensate for the low or high suction, that will be discussed later. This allows the user to select a time delay while in suction fault, to delay the shutdown. It works kind of like the lockout timer. The suction delay can be set for up to two minutes (120 seconds) and down to zero minutes. The system will poll the current reading every three (3) seconds while in a fault mode, and if at the end of the delay period the set point is still beyond the set limit the machine will shut down on the "**LOW or HIGH SUCTION**" fault. It will then be displayed in the readout. The value in the left column is the only one that you need to set in the suction delay row. The right column has no affect.

**"SUCTION RELAY"** - Bypass Valve Solenoid Relay or ball valve operation – This feature allows you to set the pressure range that will activate the ball valve to either "**bypass**" or "**sale gas**" mode. The left column is the high pressure side in which the bypass valve will go

to the “**sale gas**” mode and will no longer bypass gas. The right column is the low pressure side in which the bypass valve will go into bypass mode and will bypass gas until, i.e. not allow gas to flow to the process line. Once the ball valve is in the bypass mode, it will remain there until one of two situations develop; **1)**. The suction pressure builds up and exceeds the high pressure or “sale” pressure set parameters, or **2)**. The unit runs out of gas for bypass and shuts down on low suction pressure.

If a throttling ball valve is connected to the bypass line, it will attempt to adjust to the upper setting. It gives more control over the bypass mode.

**“RUN HOURS”** - Unit Run Hours – For maintenance purposes the run hours can be reset with every oil and/or filter change. If a cumulative run time is kept, and the unit receives a program upgrade you can reset the run hours to the value on the unit at the time of the upgrade.

**“LOCK OUT TIMER”** – The user can set this variable for the start-up lockout timer. On startup, the sensors will not be monitored for a fault condition until this timer counts down to zero.

**Caution: Do not set this parameter such that you run the machine long enough to cause damage. It is the operator’s responsibility to monitor sensor data and use the “Emergency Shut-Down” switch if necessary during the lock-out mode.**

**“AUTO START”**– This settings allow the user to control the unit based on suction. Setting a “1” in the left column will allow the unit to automatically restart if an only if the unit is automatically killed because of a high or low suction fault. The unit will restart once the suction reaches the value entered under the “Suction Relay, high pressure setting (left) column. The amber light on top of the controller will flash for 10 seconds warning of the impending start.

**“BALL VALVE OPEN/CLOSE”** – The bypass throttling ball valve can be programmed to operate at a relative speed from “1” to “20” The open and close function can be set independently. A setting of “1” will move the ball valve the slowest and a setting of “20” will cause the maximum speed at which the ball valve will operate. The user should experiment with these settings to optimize the control. For example, a slower moving ball valve may allow excess pressure into the bypass.

## ***DISPLAY SENSOR DATA***

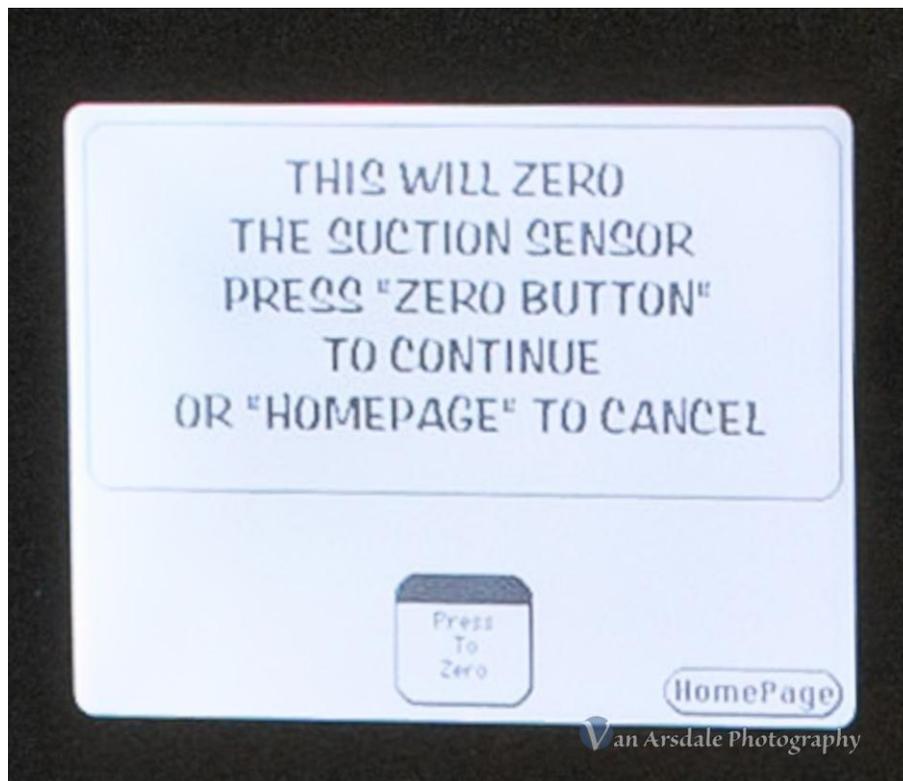
This button on the Home Screen will display the real time sensor values, and the sensor pressure or temperature units. This screen can be accessed while the compressor is running or not running (as long as the power is on). No values can be changed while viewing this screen. You can press the "**Home Page**" button to return to the Home Screen (See Figure 3). This screen is automatically displayed after the start sequence is followed and completed.

## **ZERO SUCTION**

This button pressed from the Home Page will allow the user to zero the value of the suction sensor.

**NOTE: This will kill the motor and the user will need to go through the start sequence above once the suction sensor has been zeroed.**

Press the button and follow the instructions on the screen (See Figure 6):



**Figure (6) - Zero Suction Sensor**

**THIS WILL ZERO THE SUCTION SENSOR PRESS 'ZERO SUCTION' BUTTON TO CONTINUE OR 'EXIT' TO CANCEL**

If the user chooses the 'ZERO SUCTION' button, the current value of the suction sensor will be set in the controller to zero. The user should assure that the suction sensor is properly connected to the controller and then has no pressure or suction on the sensor. It should be at atmospheric pressure before the 'ZERO SUCTION' button is pressed. The user can abort this function by pressing the "Home Page" button. If the "Home Page" button is pressed, the display will return to the Home Screen and the sensor input will not have been changed.

**The suction sensor must be connected during the zero mode. Do not zero the suction sensor while it is disconnected from the cable or controller. This will result in false suction sensor readings.**

**NOTE: For tank applications where the suction is read in inches water column or Ounces the suction sensor should be recalibrated (zeroed) at least every thirty (30) days to insure the accuracy of the suction pressure system.**

***RUN MODE:***

Once the compressor starts, the unit is considered to be in the "RUN MODE". While in the run mode, the "DISPLAY DATA" screen will show the current value of all sensors. While the compressor is running and after the lockout timer expires, the controller will monitor the sensor values. If the values exceed the "HIGH SET POINT" or fall short of the "LOW SET POINT", the controller will deactivate the run relay and kill the compressor. At that time, all faults will be displayed on the screen. The user can correct the faults and restart the compressor

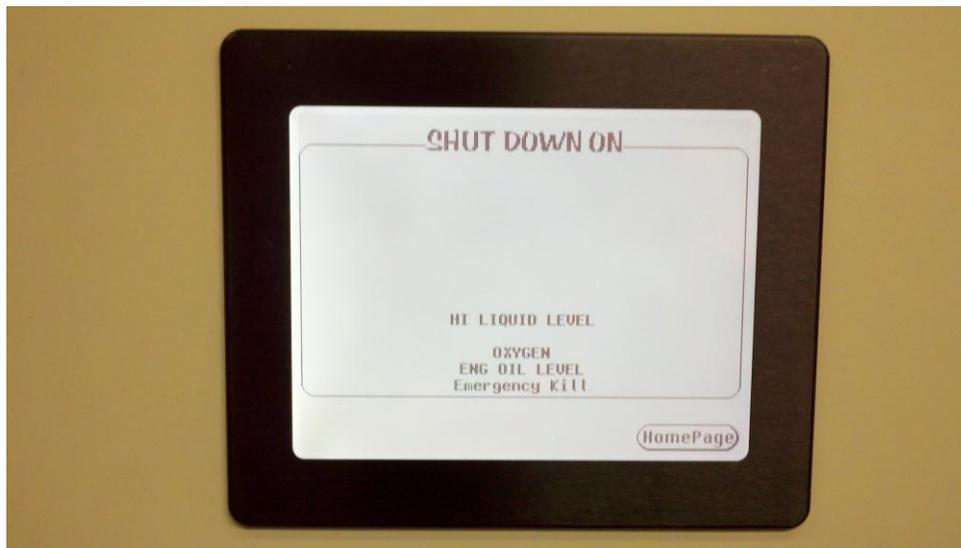
The following is an example of the controller shutdowns, there may be more or less values for your controller:

**HIGH / LOW SUCTION  
HIGH / LOW DISCHARGE  
HIGH / LOW OIL PRESSURE  
EXCESSIVE VIBRATION  
RPM  
HIGH / LOW COMPRESOR OIL PRESSURE  
HIGH / LOW ENGINE OIL PRESSURE  
LOW ENGINE OIL LEVEL  
HIGH ENGINE TEMPERATURE  
HIGH / LOW COMPRESSOR TEMPERATURE**

## ***SHUTDOWN MODE***

If the controller shuts the system down for any reason other than high or low suction, the user should resolve the faults listed and then press the "HOME PAGE" button on the controller. That will take the controller back to the Home Screen. Figure 7 is an example of the shut down screen.

If the controller has the auto-start feature enabled and the controller shuts down on low suction only, the controller will automatically re-start after suction corrects itself. The suction must get above the "High Suction Range" before the unit will re-start. If the auto-start feature is disabled, the controller will not restart automatically even on a suction fault.



**Figure 7 – Shut Down Screen**

NOTES:

## **APPENDIX A**

### **SUCTION CONTROL FEATURES OF THE TECHTROL 7250 CONTROLLER WITH VARIABLE RPM OPTION**

The TechTrol GasFlow™ Controller has multiple parameters that the user can set to control the suction on a vapor recovery unit. The “SET SYSTEM PARAMETERS” section of this manual explains in detail how to set each of the control parameters. The parameters include the following and each will be explained in detail.

1. Suction Delay
2. Suction Relay
3. Auto Start
4. Variable RPM
5. Crank Time
6. Crank Attempts
7. Number of Teeth
8. Automatic Blow Down
9. Throttling Ball Valve

#### ***Suction Delay***

The controller is designed to monitor all variables that are displayed on the Display Sensor Data screen. If any of these parameters exceed or fall short of the set points, the controller will shut down the unit. Suction Delay allows the user to set a delay to shutdown on high or low suction only. This allows time for the controller through control of the ball valve and motor speed control, both of which will be discussed time to bring the suction under control before the controller shuts the system down on suction fault.

Use caution when setting this value. Setting it too long could cause adverse effects on the tanks. Setting it too short will not allow sufficient time for the controller to make the modifications needed. Use this in combination with the other controllable parameters.

#### ***Suction Relay***

This value allows the user to set a high parameter and a low parameter. These values control the bypass ball valve. In normal operation, when the suction is above the low value, the ball valve will be in the sale gas mode. It will allow vapor gas to be sent to the production line. When the suction pressure drops below the low set value, the controller will put the ball valve into the bypass mode and thus stops moving gas. Do not confuse these values with the shutdown set-points. They have a different function. In addition, those will be discussed separately. If the unit drops below the low set value, the ball

valve will remain in the bypass mode until the suction pressure reaches the high set limit. At that time, it will move to the sale gas mode. Set these values far enough apart so that the ball valve does not continue to chatter. This feature really needs to be tuned as a site by site function.

### ***Auto Start***

The user can select the auto start feature by selecting a “1” in the appropriate box. The process is discussed above. If the suction delay is exceeded while the suction is either above or below the shut down set points (not the suction relay set values), the controller will allow the compressor to automatically restart as soon as the suction exceeds the high suction relay value. Note that if the unit shuts down on high suction, it will automatically try to restart. So set the high kill on suction high enough so as not to allow that to happen.

### ***Variable RPM***

If the user has a variable RPM option, then the engine range also needs to be set at the Govenors of America (GOA) Controller. See the Manual supplied with that unit. This will operate in conjunction with the ball valve (Suction Relay). The best way to explain this is with an example.

Here are the system settings:

1. High suction kill set at 20 psi
2. Low suction kill set at 6 psi
3. High suction Relay set at 15 psi
4. Low suction relay set at 9 psi.
5. High engine range set to 1800 RPM through (GOA)
6. Low motor range set to 1200 RPM through (GOA)
7. Suction Delay 20 Sec

Remember that all sites are different and the system will need to be tuned per site. You should set the High suction kill above the High Suction Relay, the Low Suction Kill below the Low Suction Relay and have a acceptable spread between them.

When the units starts, assume that pressure is above 15 psi and we have exceeded the lockout timer. The ball valve will be in the sale mode. The engine RPM will be at the high setting for the engine range or 1800 RPM. Now that pressure will start dropping. As the pressure drops below 9 psi, the engine RPM will also drop to the low RPM setting of 1200. If the suction continues to drop to below 6 psi, the then the suction delay timer activates. If the suction stays below 6 psi for 20 seconds, the unit will shut down on Low Suction. If the Auto Start is enabled, and no other shut down faults occurred, the compressor will restart once the PSI reaches 15 psi, and the cycle repeats.

### ***Crank Time/Crank Attempts***

This is the time that the engine will try to crank during startup. The PLC will look for engine oil and RPM to determine if the unit has started. If not, it will try again. It will try for the number of attempts entered and if it fails to start, it will fault on crank attempts.

### ***Blow Down Pressure***

Set this pressure to the desired blow down pressure. The controller will blow down to this pressure before attempting to auto start.

### ***Number of Teeth***

Number of teeth should match the number of teeth on the flywheel. This is what the sensor uses to calculate RPM.

### ***Automatic Blow Down***

If the unit is equipped with automatic blow down, there will be a ball valve installed in the blow down line. When the start sequence is started, the PLC will check the discharge pressure. If the pressure is above 20 psi, the ball valve will open until the pressure drops below 20 psi. Once it drops below 20 psi, the start sequence will commence.

### ***Throttling Motorized Ball Valve***

The throttling ball valve is used in the bypass and for automatic blow down when required. See the wiring diagram for your unit for installation.

Generally, the ball valve is operated in the “Auto” mode. The black knob located on the front of the ball valve allows the user to select between “Auto” and “Manual”. When in the manual mode, the handle on top can be used to manually adjust the position of the ball valve. Note the handle direction represents the position of the opening of the ball valve. Do not try to manually adjust the ball valve position when in the “Auto” mode.

From time to time, it may be necessary to calibrate the motorized ball valve. If the ball valve does not go to the “fully closed” position or to the “fully open” position as expected. To complete a calibration of the ball valve, proceed as follows:

This procedure will externally mechanically reset the open and closed position for electric actuators with the DPS module installed when the units gets moved off zero. See Figure 9.

1. Remove the power supply to the actuator. (Remove connector or turn power off) the power connector is the large gray one on the far left side.

2. Remove the small black center connector from the actuator.
3. Place the ball valve in Manual Mode.
4. Adjust the ball valve to the closed position with the handle on top.
5. Turn the ball valve to Auto Mode.
6. On the small black plug “on the actuator”, center connector, short pin 3 to Earth Ground pin. (Use a wire with clips to connect pins)
7. Turn the power back on to the actuator and wait until the LED goes solid.
8. Remove the short wire between pin 1 and pin E on the DPS plug.
9. The actuator will then go through a mechanical position reset.
10. When the reset is complete (closed to open and back to closed) then turn the power back off.
11. Re-connect small black center connector and turn power back on to test the actuator.



**Figure (9) Throttling Ball Valve**