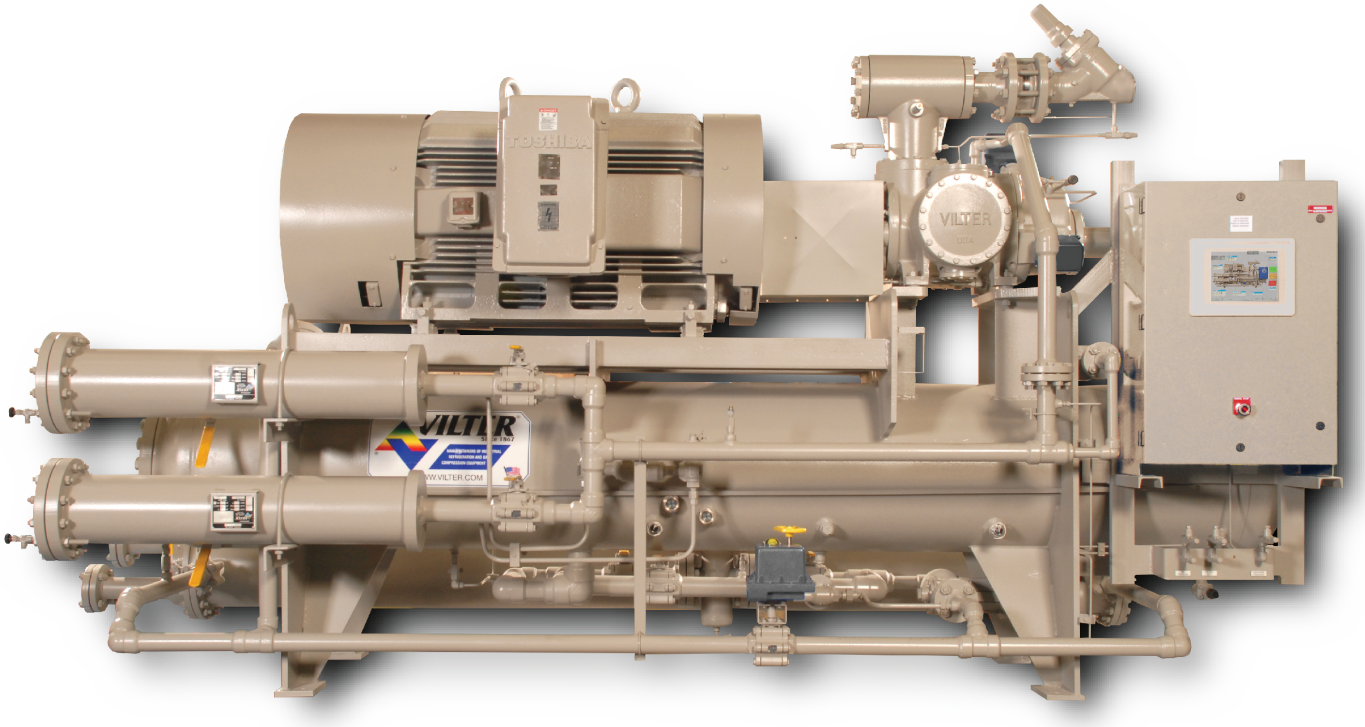
VSG & VSSG
Single Screw Compressor
Software Manual

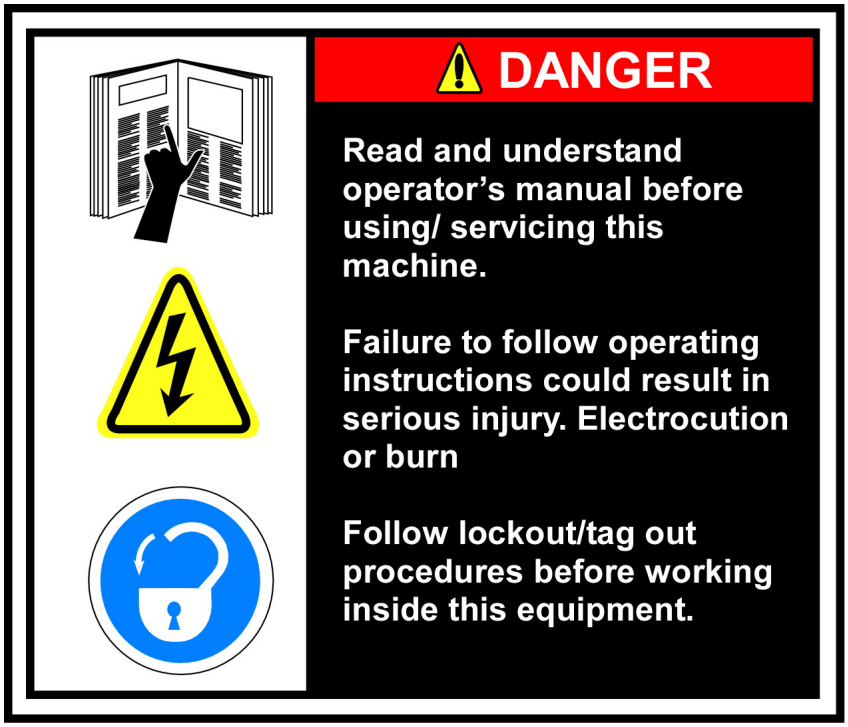


Compact Logix PLC

VILTER®
Since 1867

EMERSON™
Climate Technologies

Important Note



Before applying power to the control panel, all wiring to the panel shall be installed per NEC. Specifically check for proper voltage and that the neutral is grounded at the source. An equipment ground should also be run to the panel.

*See Wiring Instructions and Diagrams before proceeding.

NOTES:

- **Before start-up you need to enter all system values and options, see section on Setpoint Values.**
- **Power circuits entry on left side of enclosure**
- **Instrument circuits entry on right side of enclosure**

Electrical installation shall be completed by a licensed electrician qualified in field wiring located in Class 1 Div 2 Hazardous Locations per the National Electric Code (NEC).

Table of Contents

VSG STANDARD VILTER WARRANTY STATEMENT

Seller warrants all new single screw gas compression units and bareshaft single screw compressors manufactured by it and supplied to Buyer to be free from defects in materials and workmanship for a period of (a) eighteen (18) months from the date of shipment or (b) twelve (12) months from the date of installation at the end user's location, whichever occurs first.

If within such period any such product shall be proved to Seller's satisfaction to be defective, such product shall be repaired or replaced at Seller's option. Such repair or replacement shall be Seller's sole obligation and Buyer's exclusive remedy hereunder and shall be conditioned upon (a) Seller's receiving written notice of any alleged defect within ten (10) days after its discovery, (b) payment in full of all amounts owed by Buyer to Seller and (c) at Seller's option, Buyer shall have delivered such products to Seller, all expenses prepaid to its factory. Expenses incurred by Buyer in repairing or replacing any defective product (including, without limitation, labor, lost refrigerant or gas and freight costs) will not be allowed except by written permission of Seller. Further, Seller shall not be liable for any other direct, indirect, consequential, incidental, or special damages arising out of a breach of warranty.

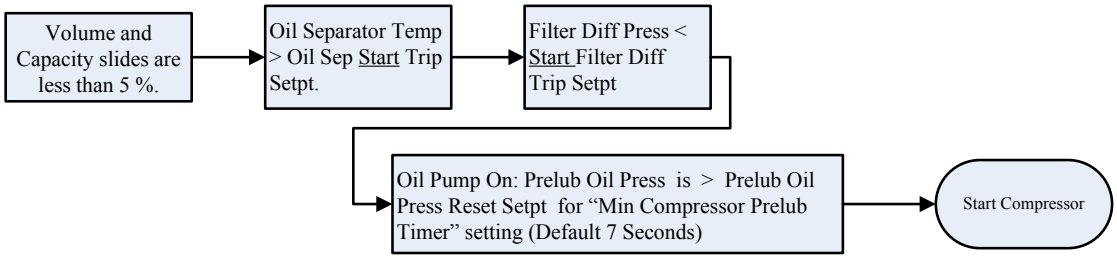
This warranty is only applicable to products properly maintained and used according to Seller's instructions. This warranty does not apply (i) to ordinary wear and tear, damage caused by corrosion, misuse, overloading, neglect, improper use or operation (including, without limitation, operation beyond rated capacity), substitution of parts not approved by Seller, accident or alteration, as determined by Seller or (ii) if the product is operated on a gas with an H2S level above 100 PPM. In addition, Seller does not warrant that any equipment and features meet the requirements of any local, state or federal laws or regulations. Products supplied by Seller hereunder which are manufactured by someone else are not warranted by Seller in any way, but Seller agrees to assign to Buyer any warranty rights in such products that Seller may have from the original manufacturer. Labor and expenses for repair are not covered by warranty.

THE WARRANTY CONTAINED HEREIN IS EXCLUSIVE AND IN LIEU OF ALL OTHER REPRESENTATIONS AND WARRANTIES, EXPRESS OR IMPLIED, AND SELLER EXPRESSLY DISCLAIMS AND EXCLUDES ANY IMPLIED WARRANTY OF MERCHANTABILITY OR IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

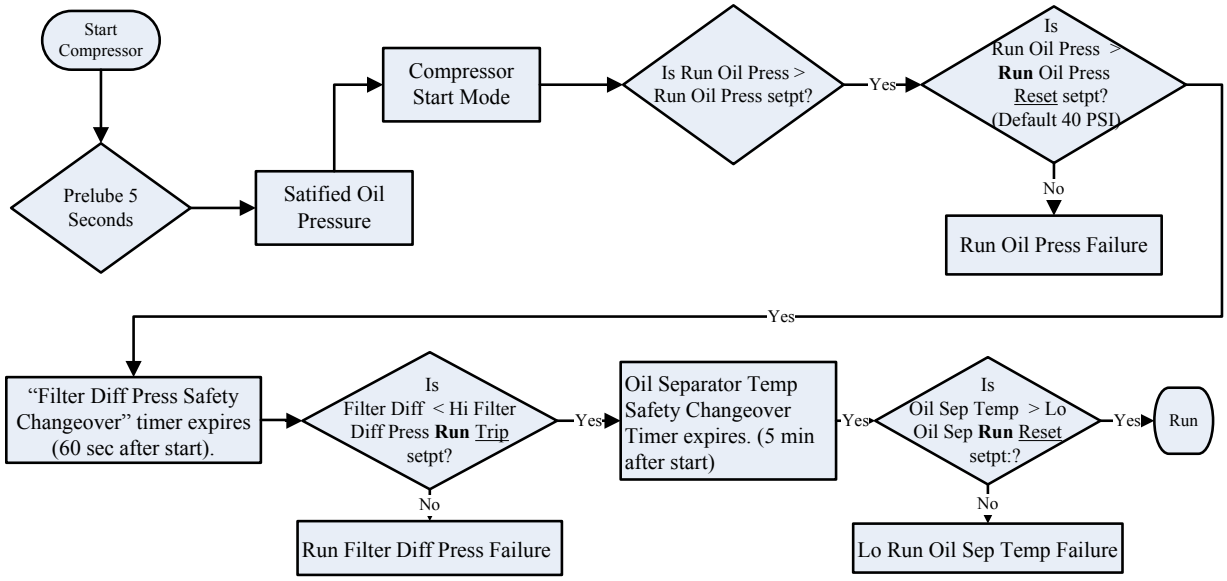
Any description of the products, whether in writing or made orally by Seller or Seller's agents, specifications, samples, models, bulletins, drawings, diagrams, engineering sheets or similar materials used in connection with Buyer's order are for the sole purpose of identifying the products and shall not be construed as an express warranty. Any suggestions by Seller or Seller's agents regarding use, application or suitability of the products shall not be construed as an express warranty unless confirmed to be such in writing by Seller.

Operational Flow Charts

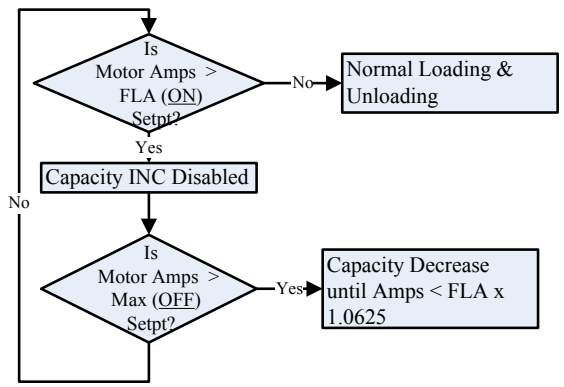
Requirements to Start Compressor



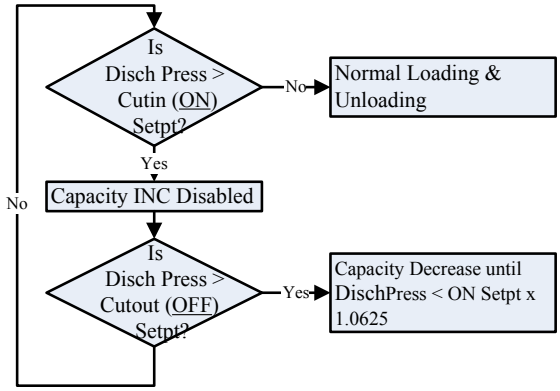
Critical Compressor Run Logic @ Compressor Start



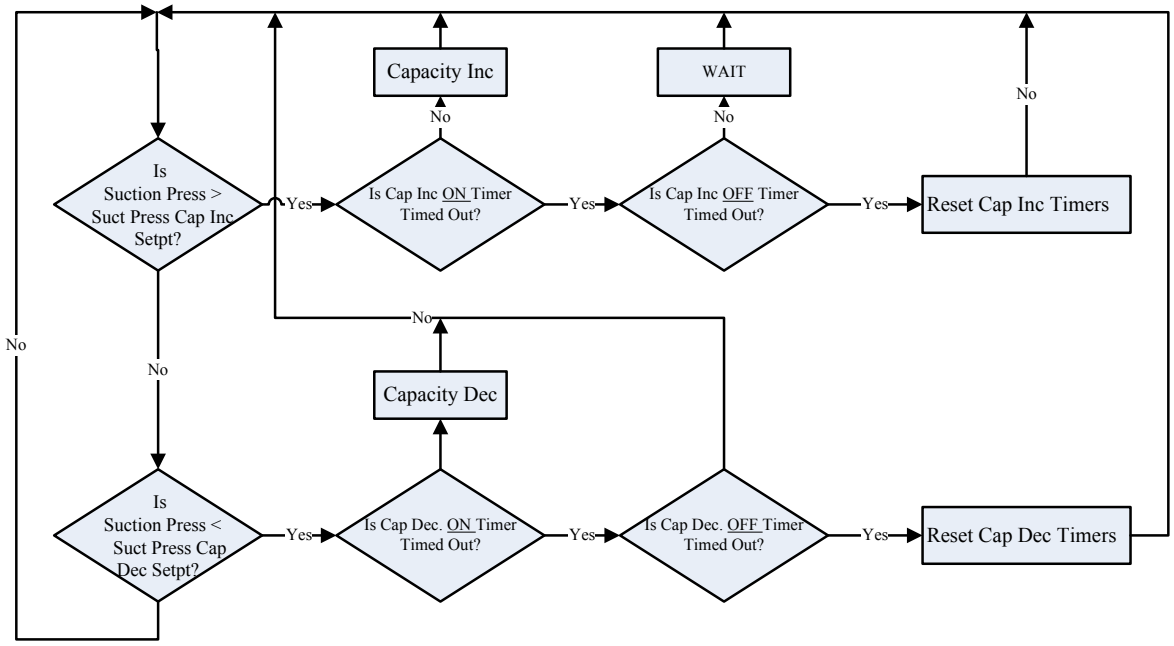
Compressor Amperage Load Limiting



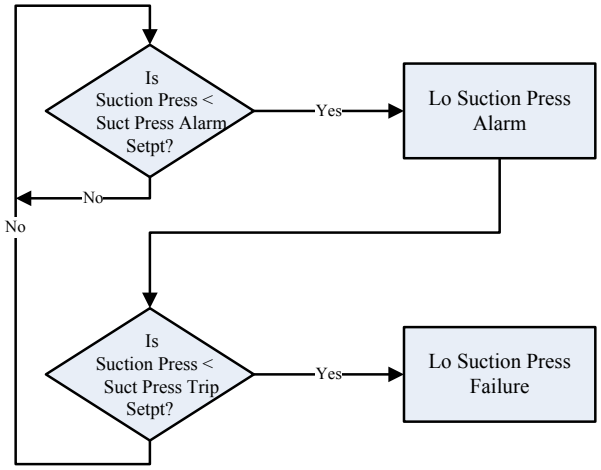
High Disch Pressure Load Limit

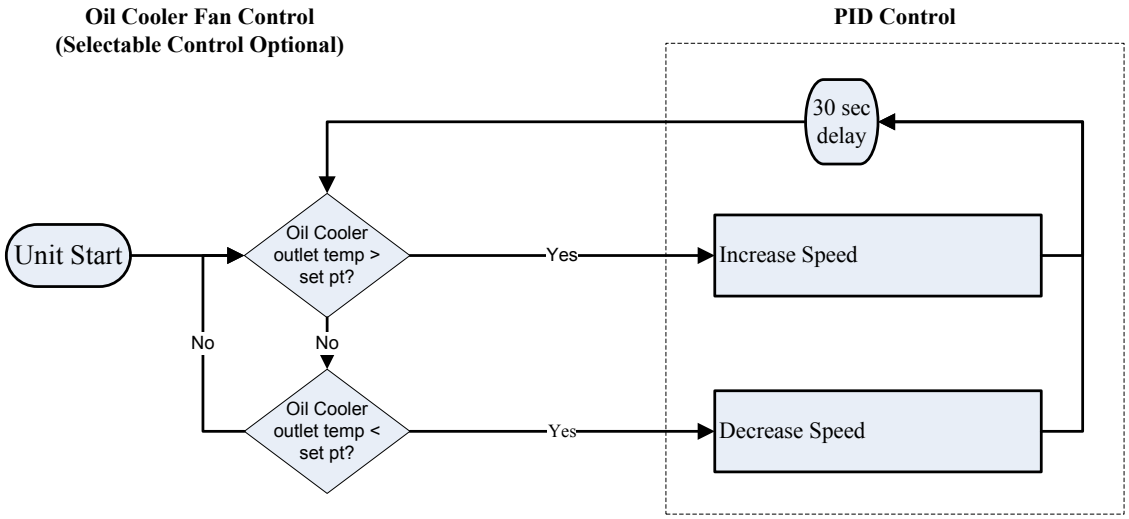


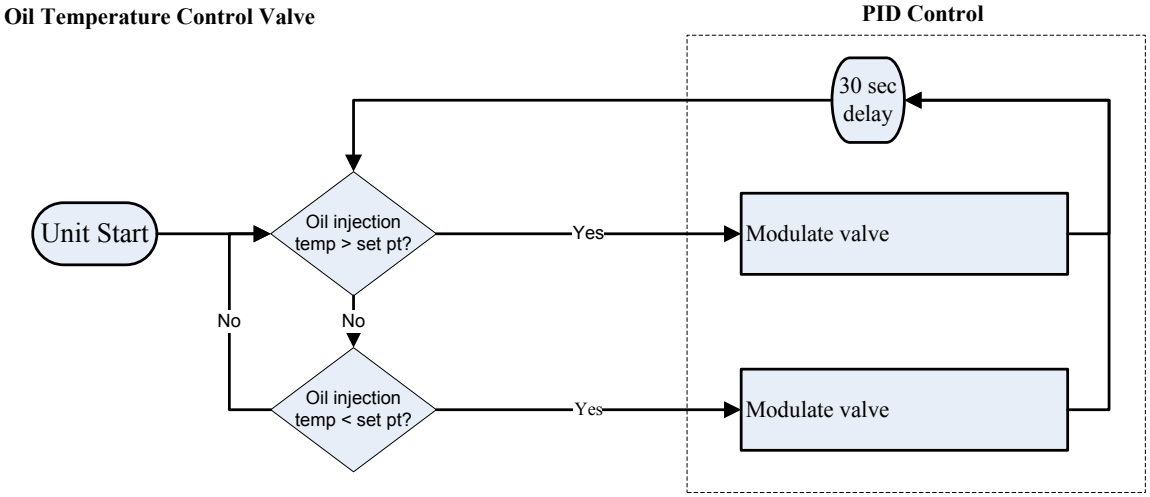
Suction Pressure Control



Suction Pressure Safety



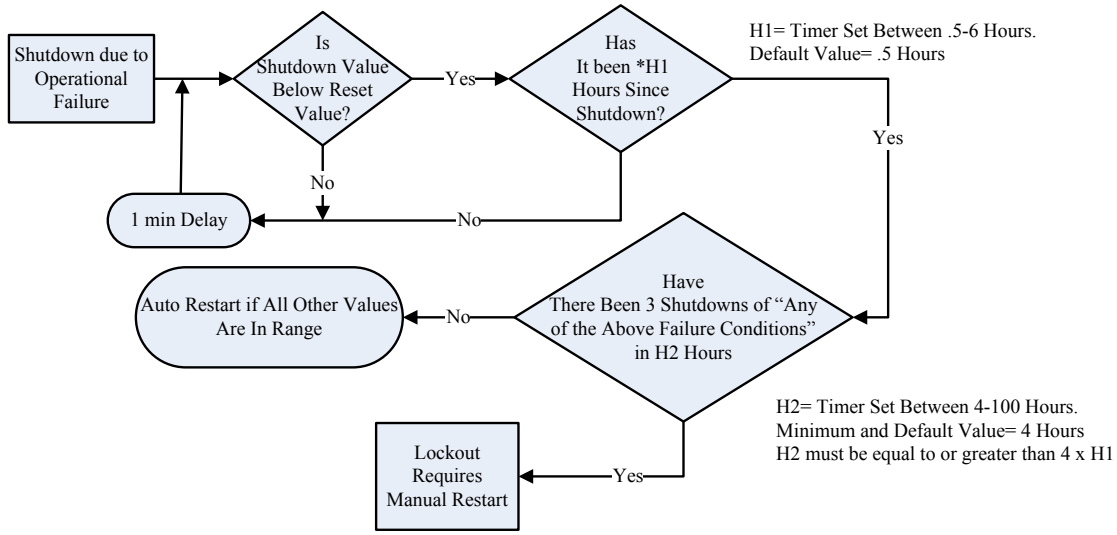

Oil Cooler Fan Control
(Selectable Control Optional)
PID Control
30 sec
delay
Unit Start
Oil Cooler
outlet temp >
set pt?
Yes
Increase Speed
No
No
Oil Cooler
outlet temp <
set pt?
Yes
Decrease Speed


Oil Temperature Control Valve
PID Control
30 sec
delay
Unit Start
Oil injection
temp > set pt?
Yes
Modulate valve
No
No
Oil injection
temp < set pt?
Yes
Modulate valve

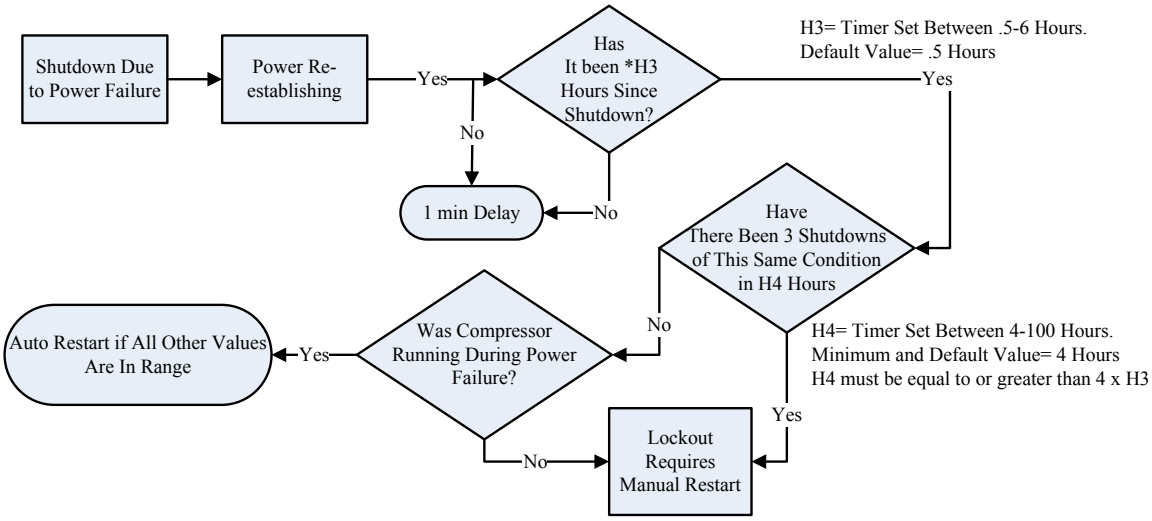
Delayed Lockout Timers

WARNING: FOR THE FOLLOWING SHUTDOWNS, A DELAYED RESTART MAY OCCUR:

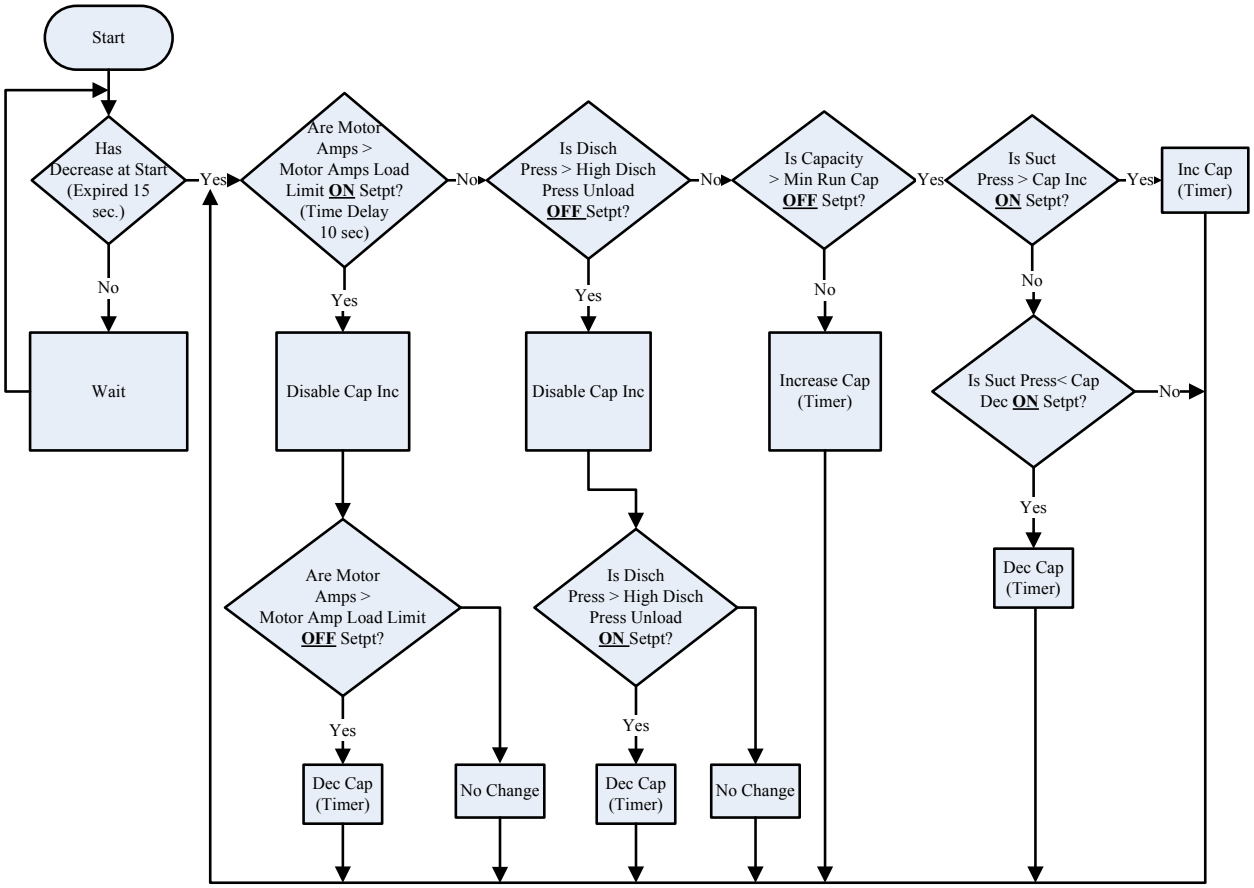
High Discharge Pressure Failure
High Compressor Discharge Temp Failure
High Package Outlet Temp Failure
High Oil Injection Temp Failure



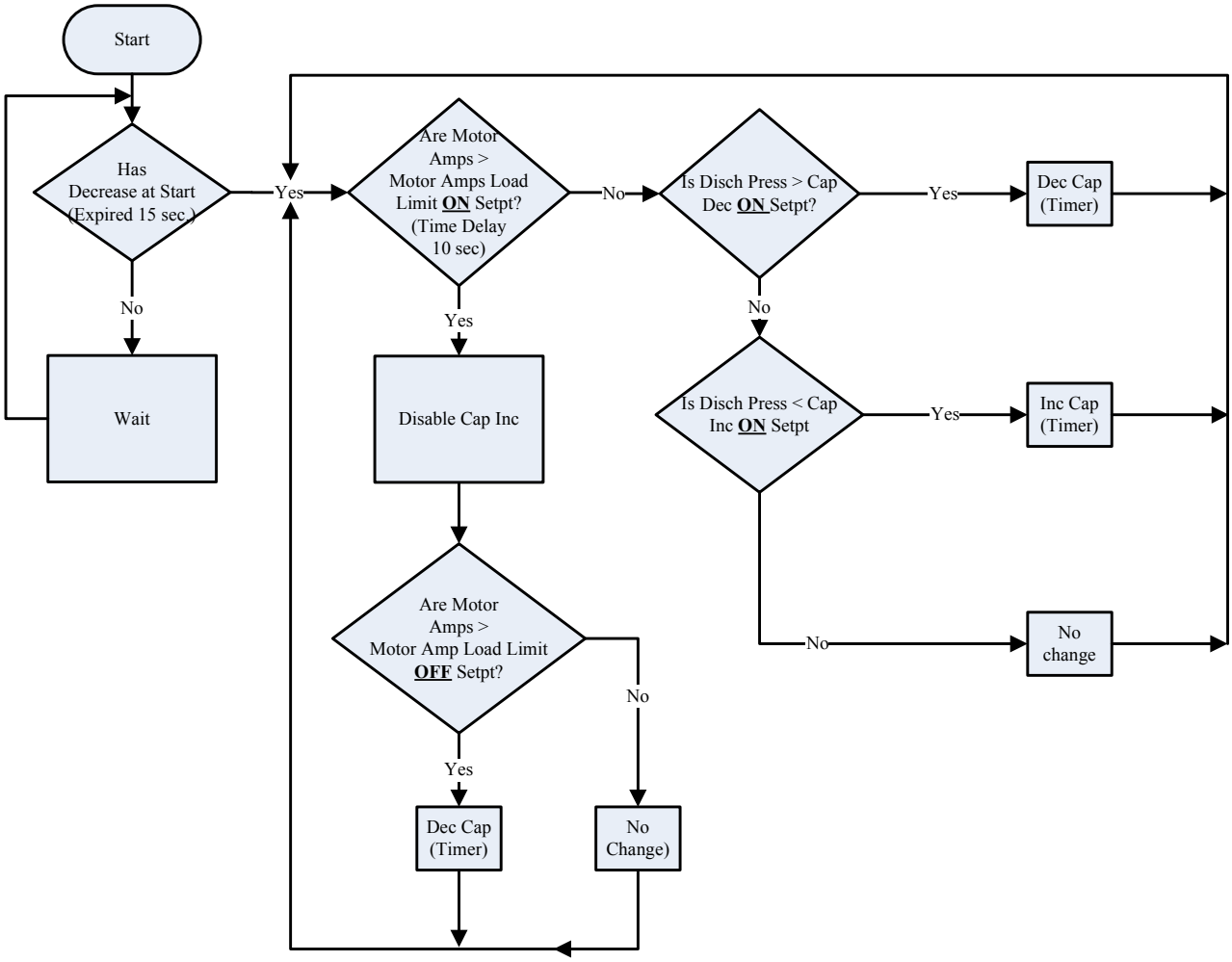
WARNING: INCASE OF A POWER FAILURE A DELAYED RESTART MAY OCCUR:



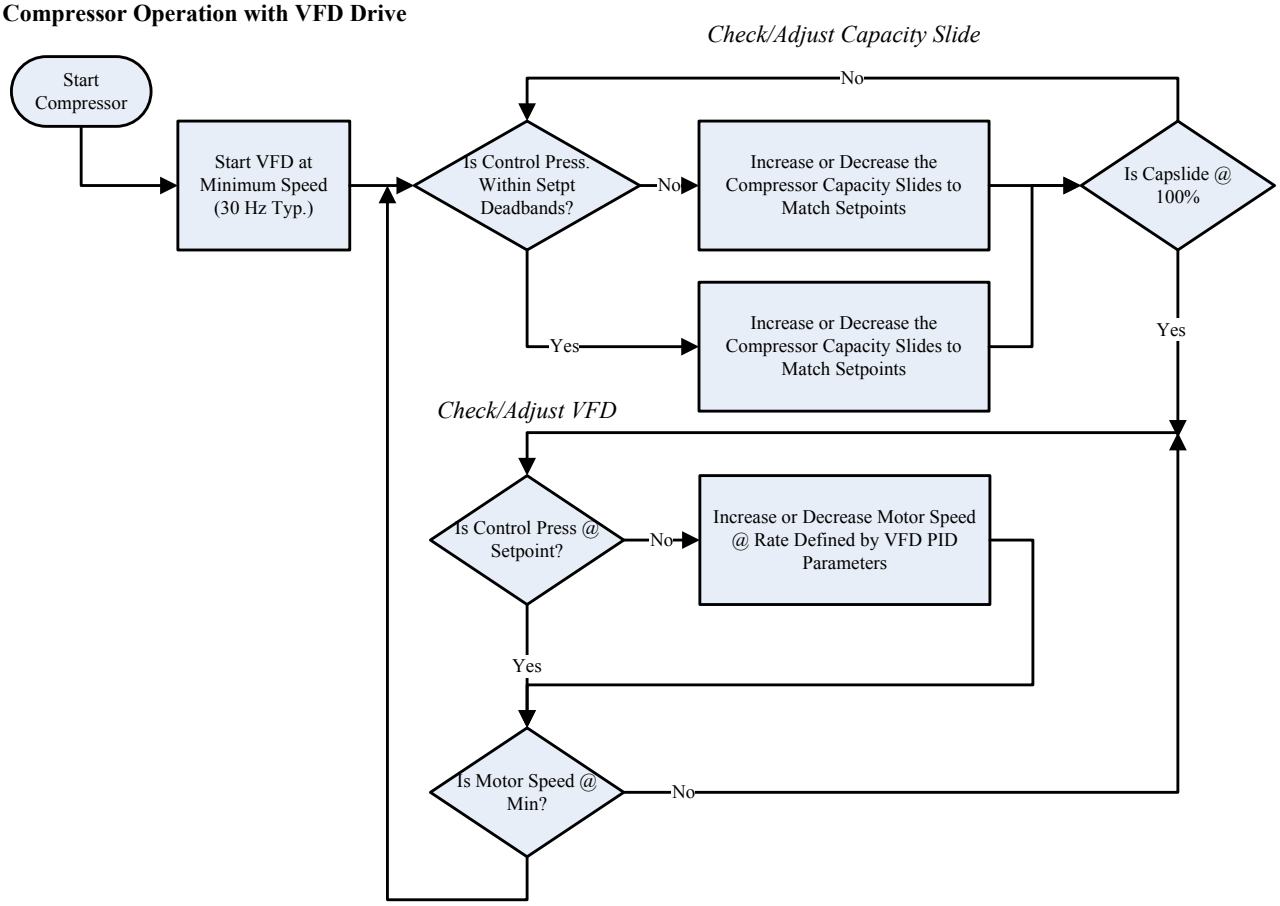
Capacity Control Using Suction Pressure Control Setpoints



Capacity Control Using Discharge Pressure Control Setpoints



Compressor Operation with VFD Drive



Main Screen

This screen has been designed to give the operator an overall view of all operating parameters affecting the compressor package. **This screen should always be displayed when maintenance items and setpoint items are not being performed.**

Status information such as Alarms and Trips are displayed on the screen.

This screen contains buttons to navigate to setpoint setup screens.

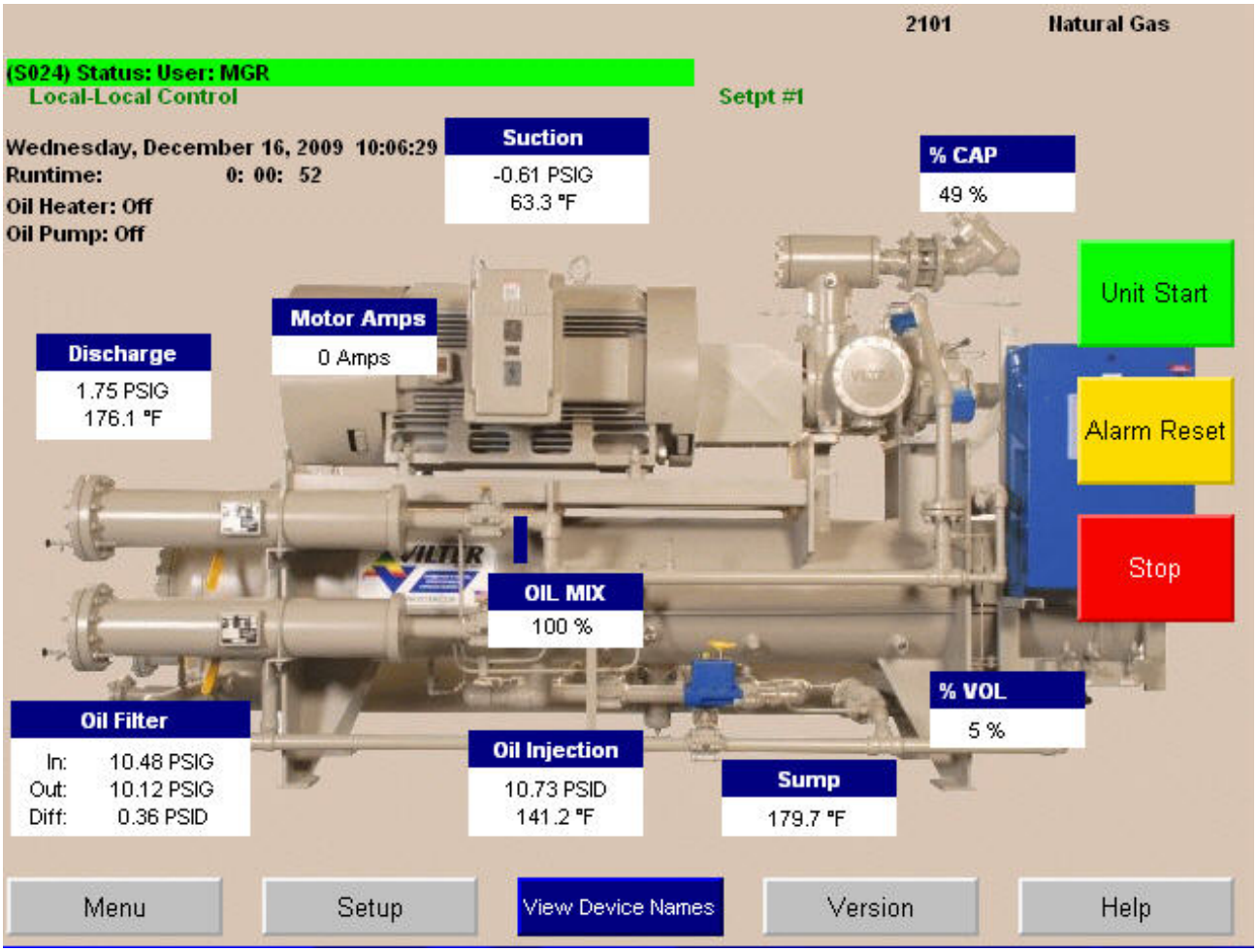
Status information on the compressor, oil pump, oil heater and run mode.

Start/Stop buttons.

Hour meter.

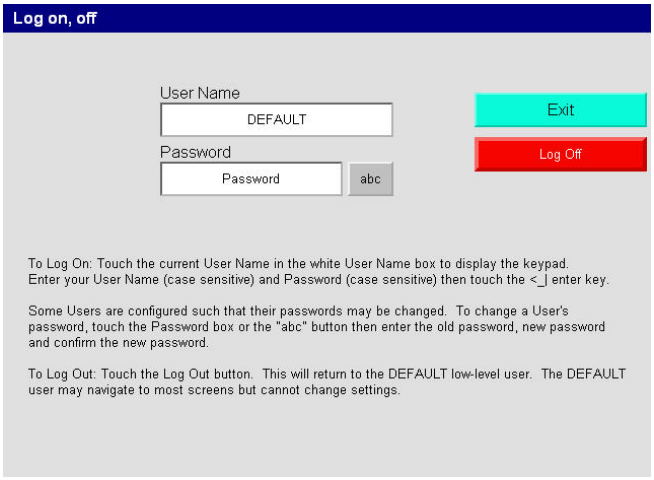
Motor amperage.

Compressor operating conditions.



Log On Screen

Log On or Off



<u>Note:</u> An operator will be automatically logged off after 10 minutes of inactivity.

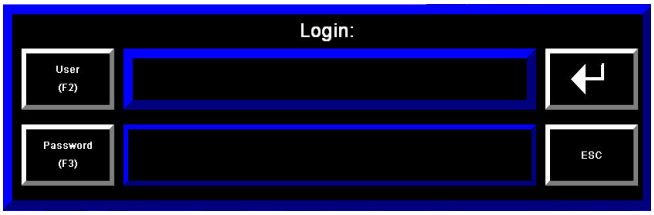
<u>Note:</u> The machine can be run and monitored without logging on. To change the setup or parameters of the machine, the operator must log on.

Press Log on Button and the above screen will appear. When altering setpoints, log on is necessary. Select appropriate user name and enter password to change/access setpoints.

To Log On: Touch the current User Name in the white User Name box to display the keypad. Enter your User Name (case sensitive) and Password (case sensitive) then touch the <_| enter key.

Some Users are configured such that their passwords may be changed. To change a User's password, touch the Password box or the "abc" button then enter the old password, new password and confirm the new password.

To Log Off: Touch the Log Off button. This will return to the DEFAULT low-level user. The DEFAULT user may navigate to most screens but cannot change settings.

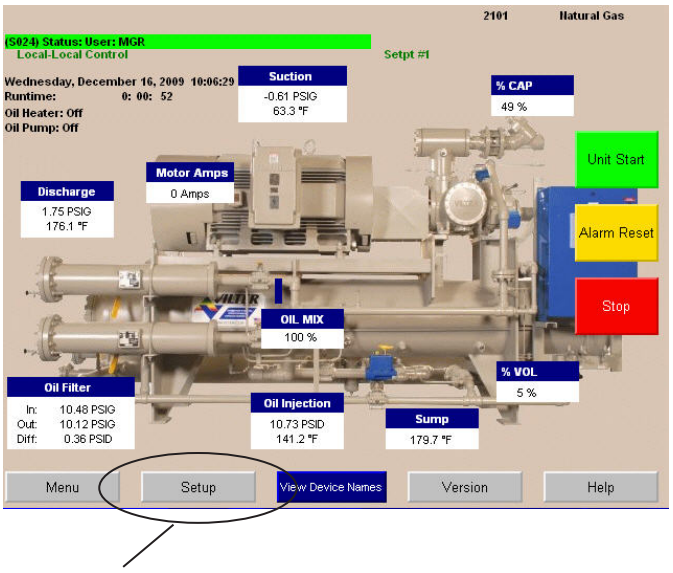


Set Up Screen

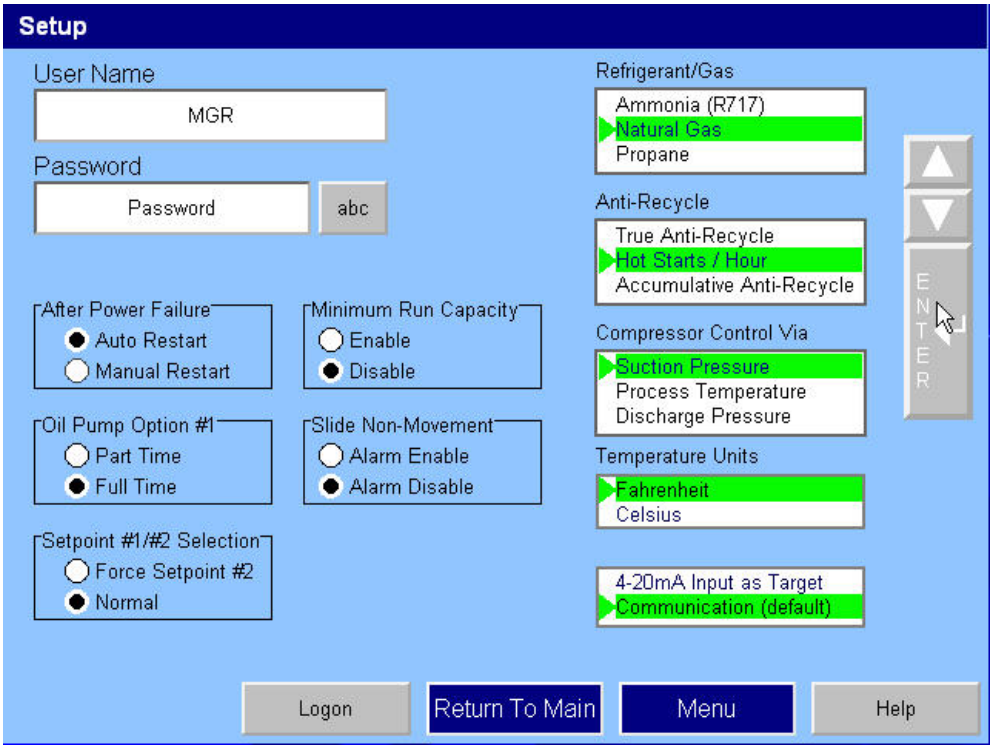
From the **Main** screen, touch the Setup button. After entering an authorized user name and password, the screen pictured below will appear.

Pressure units,Temperature units and Suction/ Discharge Pressure control configurations are list selectable.

To choose a configuration from a list: 1.) Touch the list. 2.) Touch the Up or Down Arrow to move the green cursor ">" along side of the desired configuration. 3.) Touch the Enter button. This will highlight-green the chosen configuration.



Touch Here



- ***Pressure Units*** – Select units of measure for pressure readings. Choices are psi, kg cm^2 and kPa.

- ***Temperature Units*** – Select units of measure for temperature. Choices are Fahrenheit or Celsius.

- ***Anti-Recycle*** – The operator can select from the following Anti-Recycle options: True, Accumulative, Modified, or Hot Starts. These select the strategy used to prevent excessive start/stop cycles of the compressor. Timers and counters used to enforce anti-recycling are adjusted and monitored in the Compressor Timer Settings screen, reached from the **Menu** screen. Help for the Timer Settings screen explains how the different settings and strategies operate.

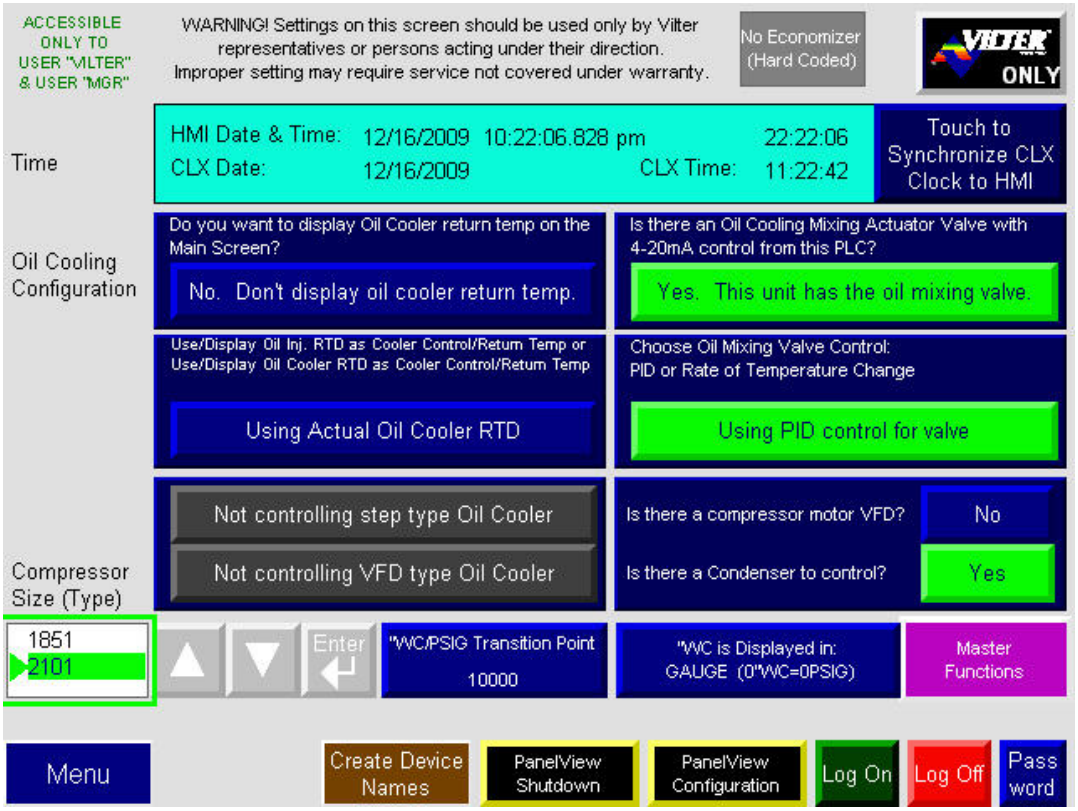
- ***Compressor Control Via*** – Operator can choose the method or mode of compressor control. This determines which measured variable is used in making loading (capacity control) decisions. The choice selected here determines which setpoints are made available for adjustment on the Compressor Control Setpoints screen.

- ***Slide Non-Movement*** – Alarm enable and disable buttons permit selecting whether an alarm should be generated when failure of slides to move is detected.

- ***Reset After Power Fail*** – When Auto is selected, the compressor will attempt to restart on powering up if it was running in 'Auto' when powered down and enabling conditions are met. When 'Manual' is selected, the compressor powers up into the 'Stop' mode and an explicit command to run is required from an operator or comms channel.

- ***Min Run Capacity*** – When enabled, the Minimum Run Capacity setting on the Addition Compressor Setpoints screen operates as described in the help for that screen. When multiple compressor sequencing is used, selecting Disable here does not interfere with use of the Min Run Capacity setting in the sequencing logic.

Vilter Only Screen



To set and synchronize the date and time for the HMI and ControlLogix or CompactLogix processor, first configure the PanelView date and time then, move the PanelView's date and time to the processor

To set the date, time and regional settings in the PanelView Plus HMI:

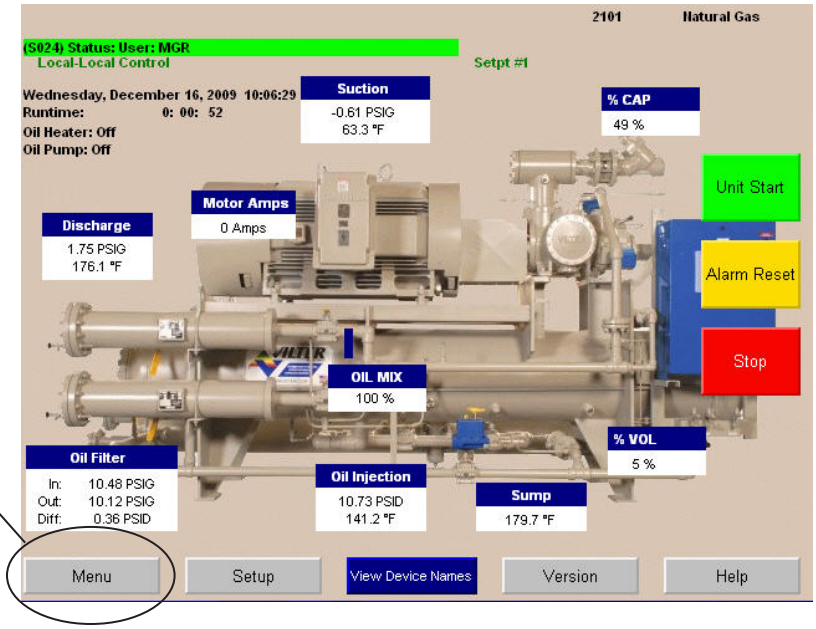
1. Display the Vilter Only Screen (This screen has restricted access).
2. Touch the PanelView Configuration button.
3. Wait approximately 30 seconds while the PanelView application shuts down then loads.
4. Touch the Thermal Settings button.
5. Scroll to or touch the Time/Date/ Regional Settings field then touch the Enter button.
6. Set the Date, Regional Settings. Time and Time Zone as applicable. Touch OK after setting each screens' values to accept the new values.
7. When finished, touch the Close button to exit the Time/Date/Regional Settings screen.
8. IMPORTANT: Clear the log files of the PanelView after changing the PanelView Date and/or time.
   a. Touch or scroll to the File Management field then touch the Enter Button.
   b. Touch or scroll to the Delete Files field then touch the Enter button.
   c. Touch or scroll to the Delete Log Files field then touch the Enter button.
   DO NOT DELETE APPLICATIONS! DO NOT DELETE FONTS!
   d. Touch "Yes" to delete the log files.
   e. Touch the Close button twice to return to the Terminal Settings screen.
9. Touch the Close button twice again to return to the Terminal Settings screen.
10. Touch the Reset button then "Yes" button to reset the PanelView.

To synchronize the ControlLogix or CompactLogix date and time to the PanelView date and time:

1. Display the Vilter Only Screen (This screen has restricted access).
2. Touch the "Touch to Synchronize CLX Clock to HMI" button.

Menu Screen

Touch Here



At the bottom of the **Main** screen touch the Menu button to bring up the screen shown in Figures below.

Use this screen to navigate to the other setpoint screens contained within the program. Each screen has a help button to describe the function of the screen.

There are several buttons that are common for all menu screens:

Return to Menu – This button always returns you to the **Menu** screen

Logon To Edit – The user is allowed to view data at all screen levels but cannot edit data until a login has occurred. Refer to the Logon Instructions on page 21.

Set – To change a value, the operator must first press the SET button and then the text field of the value they want to modify. A number pad will pop up for ease in entry.

Help – This screen will provide more information to the user about the operation of the microprocessor.

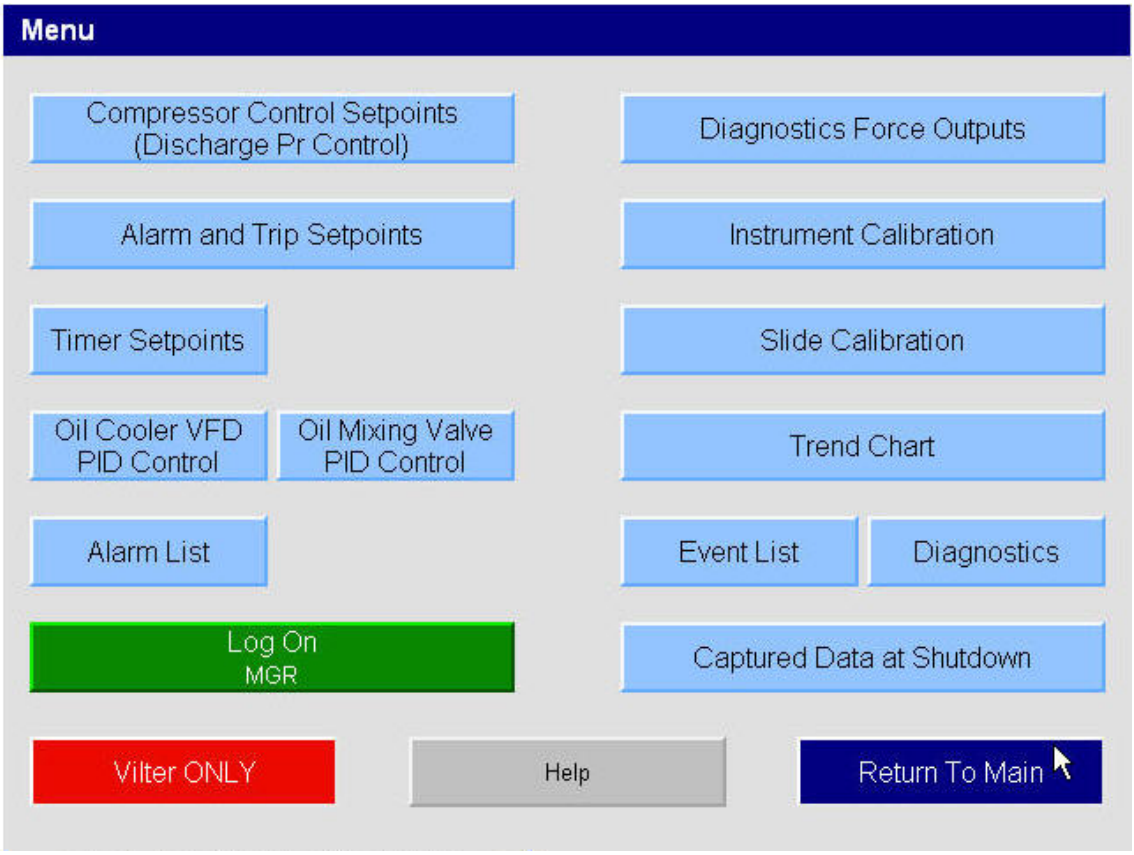
Event List – provides a chronological event listing.

Chart – Provides a line graph showing process values over a range of time.

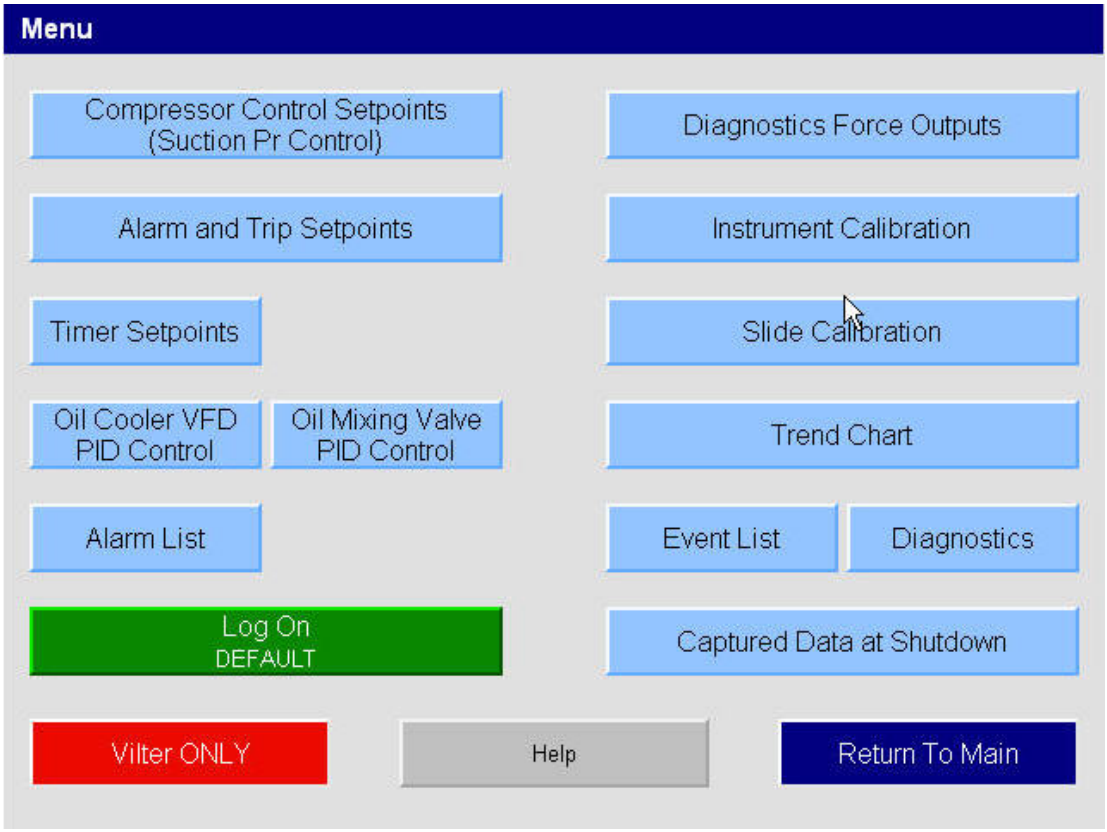
Auto – Places the capacity slides into automatic mode. In automatic mode, the capacity slide moves according to control setpoint information.

Manual – Places the capacity slides into manual mode. In manual mode, the capacity slide moves moves based on input from the operator.

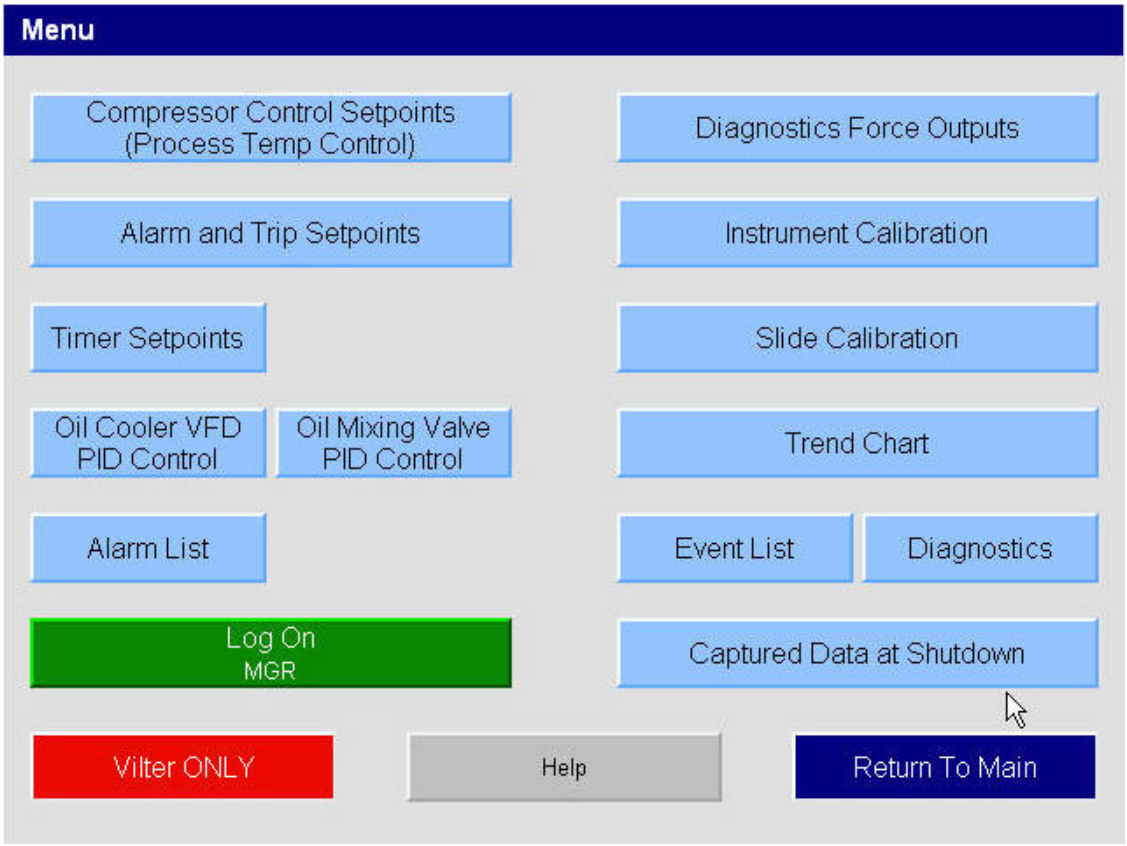
There are three options for the Compressor Control Setpoints:



Discharge Pressure Control

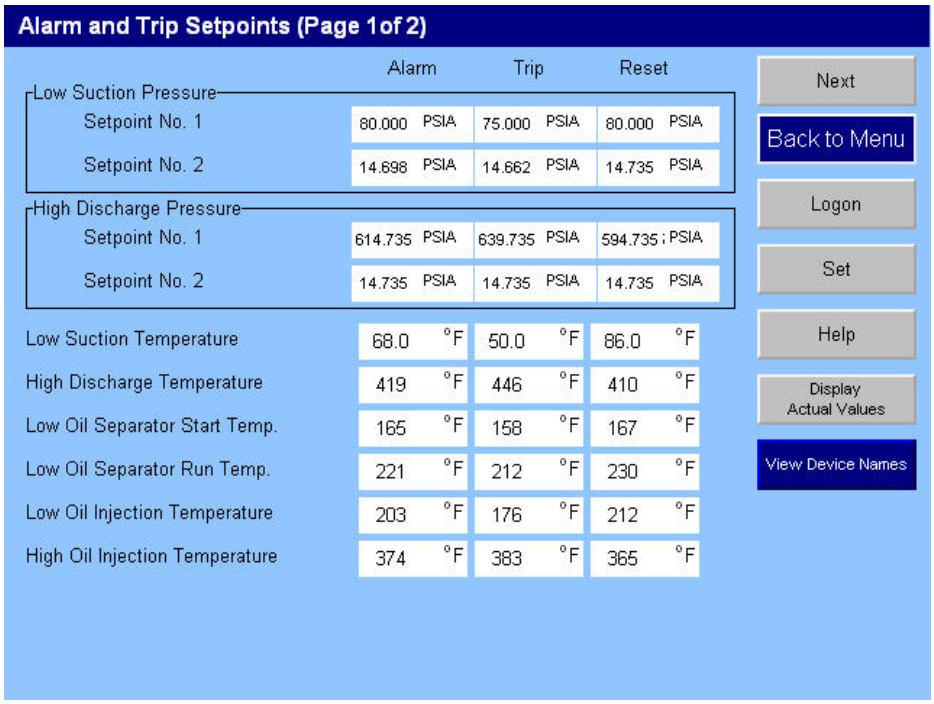


Suction Pressure Control



Process Temperature Control

Compressor Alarm and Trip



- ***Low Suction Pressure Setpoints 1&2*** – This is the low suction pressure safety. This safety is active in both temperature and pressure control modes. An alarm or trip will be active on a drop in suction pressure below the setpoint value.

- ***High Discharge Pressure Setpoints 1&2*** This is the high discharge pressure safety. The alarm or trip will be active on a rise in discharge pressure above the setpoint value.

- ***Low Suction Temperature*** – This is the lowest allowable Suction temperature. The compressor will not be allowed to run if the Suction Temperature is below the trip setting.

- ***High Discharge Temperature*** – This is the high discharge temperature safety. The alarm or trip will be active if the discharge temperature should rise above the setpoint value.

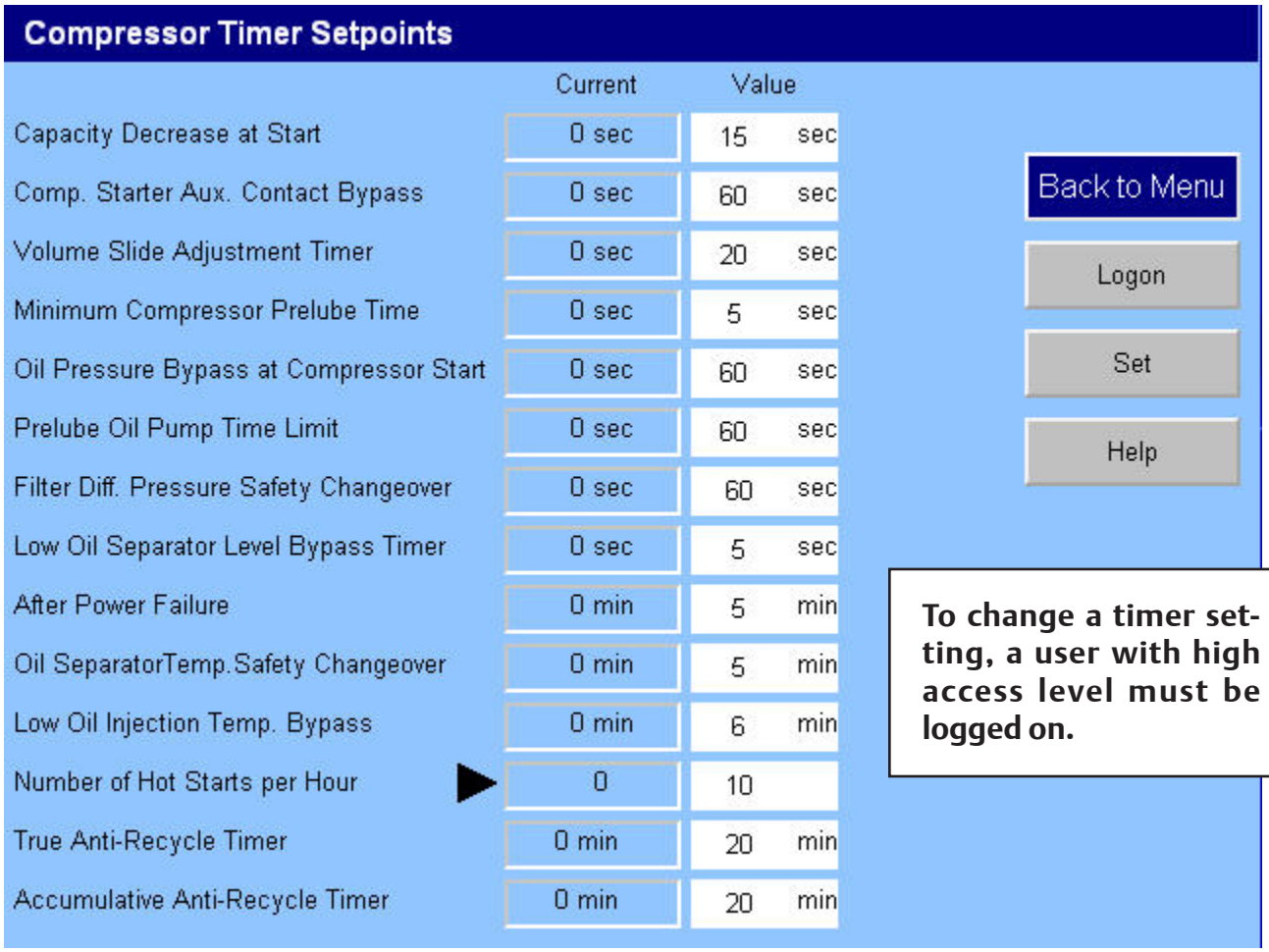
- ***Low Oil Separator Start Temperature*** – This is the starting low oil separator temperature safety. The compressor is prevented from starting or running if the oil in the separator is below the trip value. After a time delay (Oil Separator Temperature Safety Changeover), this safety is deactivated and the Lo Oil Separator Run Temperature is the active setpoint.

- ***Low Oil Separator Run Temperature*** – This is the running low oil separator temperature safety. After a time delay (Oil Separator Temperature Safety Changeover), the Lo Oil Separator Start Temperature is bypassed and Lo Oil Separator Run Temperature is the active setpoint. The alarm or trip will be active if the oil temperature of the separator drops below the setpoint value.

- ***Low Oil Injection Temperature*** – This is the low oil injection safety. The alarm or trip will be active if oil injection temperature drops below setpoint value after a time delay (Oil Injection Temperature Safety Changeover).

- ***High Oil Injection Temperature*** – This is the high oil injection temperature safety. The alarm or trip will be active on a rise in oil injection temperature above the setpoint value.

Compressor Timer Setpoints



- ***Capacity Decrease At Start*** – At compressor startup, the capacity motor is held at minimum position for this time period. After the timer expires, the slide is free to move in accordance to the system demands.

- ***Compressor Starter Auxiliary Contact Bypass*** – This timer is used to bypass the motor amperage input at start. After the timer times out, the program determines if the motor starter has pulled in by testing the amperage channel. If the program determines that the starter did not "pull in", then the compressor will fail on "Motor Starter Fail" message.

- ***Volume Slide Adjustment Timer*** – This timer determines the intervals the volume slide is adjusted. If the volume slide is between 2½% & 7% away from the desired volume ratio, the motor is pulsed once toward the desired volume. If the volume slide is more than 7% away from the desired value, the volume slide motor is continuously energized until the valve is within 2½% of the desired value. If the actual position is within 2½% of the desired value, no adjustment will be made.

- ***Minimum Compressor Prelube Timer*** – This is the length of time the oil pump will run after establishing the Prelube Oil Pressure, to prime oil circuit before starting the compressor.

- ***Oil Pressure Bypass At Compressor Start*** – This timer bypasses the Low Oil Pressure limits. The timer starts when the compressor starts. After the timer has cycled, the Low Oil Pressure setpoint is active.

- ***Prelube Oil Pump Time Limit*** – This timer puts a limit on how long the prelube oil pump is allowed to run without establishing the Prelube Oil Pressure.

- ***Filter Differential Pressure Safety Changeover*** – This timer bypasses the Hi Run Filter Differential Pressure setting during start, to allow the Hi Start Filter Differential Pressure to protect against High Filter Differential during start. After the timer has cycled, the Hi Run Differential Pressure Safety is active.

- ***Low Oil Separator Level Bypass Timer*** – This timer bypasses the low oil level switch for momentary drops in the oil level. If the switch is still open after the Low Oil Separator Level Bypass Timer has timed out, the compressor will be shut down and an alarm will be displayed. This timer is available if the unit is equipped with a low oil separator float switch. The oil level switch is standard on all liquid injection units and optional on all others.

- ***Auto Restart After Power Failure*** – This timer forces the microprocessor to wait for the set time period after a power failure before starting the compressor unit. By staggering the time settings, the compressors can be allowed to start automatically, one at a time, after a power failure. This prevents excessive loads on the power system that could be caused by all of the equipment coming online at the same time. The Power-Up Auto Start operator option must be selected on the **Setup** screen for this option to be active.

- ***Oil Separator Temperature Safety Changeover*** – This timer allows Low Oil Separator Start Temperature Safety setpoint to protect the compressor against cold oil during starting. After the timer has cycled, the Low Oil Separator Run Temperature is then active.

- ***Low Oil Injection Temperature Bypass*** – This timer bypasses the Low Oil Injection Temperature Safety Setpoint during start-up. After the timer cycles, the Low Oil Injection Temperature Safety is set.

- ***Hot Starts / Hr Counter*** – This counter counts compressor starts. After every start, a one-hour timer is reset and starts timing. If the timer times out, the hot starts counter is reset. When the counter reaches it's preset value, it will not allow another compressor start until the one-hour timer times out and resets the counter. In other words, the hot starts counter will be reset when the time between compressor starts total one hour. This counter allows repetitive compressor starts, but once the counter has reached its set point, it requires a one-hour window between compressor starts in order for the counter to be reset. **Note: if this option is chosen an arrow will appear alongside its current value. When active a point will appear.**

- ***True Anti-Recycle Timer*** – Once the compressor turns off, the timer will keep the compressor off for the setting of True Anti-Recycle Timer. This timer is used to prevent short cycling of the compressor. **Note: if this option is chosen an arrow will appear alongside its current value. When active a point will appear.**

- ***Accumulative Anti-Recycle Timer*** – This timer also forces a specified time between compressor starts. When the compressor starts, the timer resets then starts timing and accumulates running time. Once the compressor shuts down, it will not be allowed to restart for the remainder of the time left on the Accumulative Anti-Recycle Timer. Unlike the True Anti-Recycle Timer, if the compressor has run for a time period that exceeds the setpoint of the Accumulative Anti-Recycle Timer, then when the compressor shuts down, it will be allowed to restart immediately. The compressor restart options (Hot Starts or Anti-Recycle Timers) are selected from the **Setup** screen. One additional Anti-Recycle Timer that can be selected from the **Setup** screen is the Modified Anti-Recycle Timer. **Note: if this option is chosen an arrow will appear alongside its current value. When active a point will appear.**

Compressor Control Setpoints

From the **Menu** screen, press the Compressor Control setpoints button. The compressor control setpoints screen will be shown.

These screens enable the operator to view and adjust settings that affect compressor control.

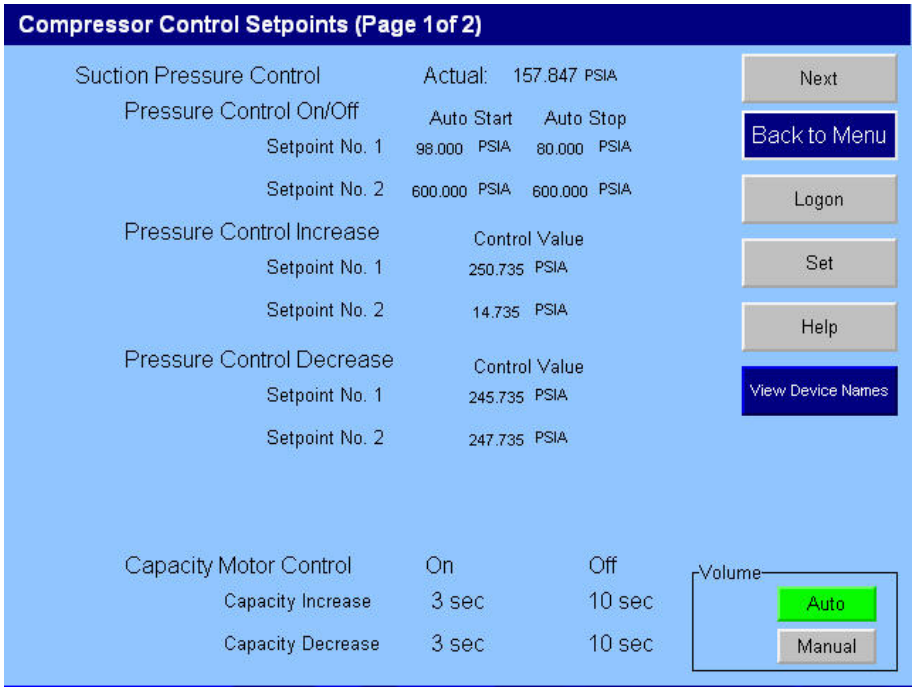
From the **Setup** screen, the operator can choose the method or mode of compressor control:

Compressor Control Via:

1. Discharge Pressure
2. Suction Pressure
3. Process Temperature Control

Once the method is chosen, the appropriate setpoints are then displayed on the Compressor Control Setpoints screen.

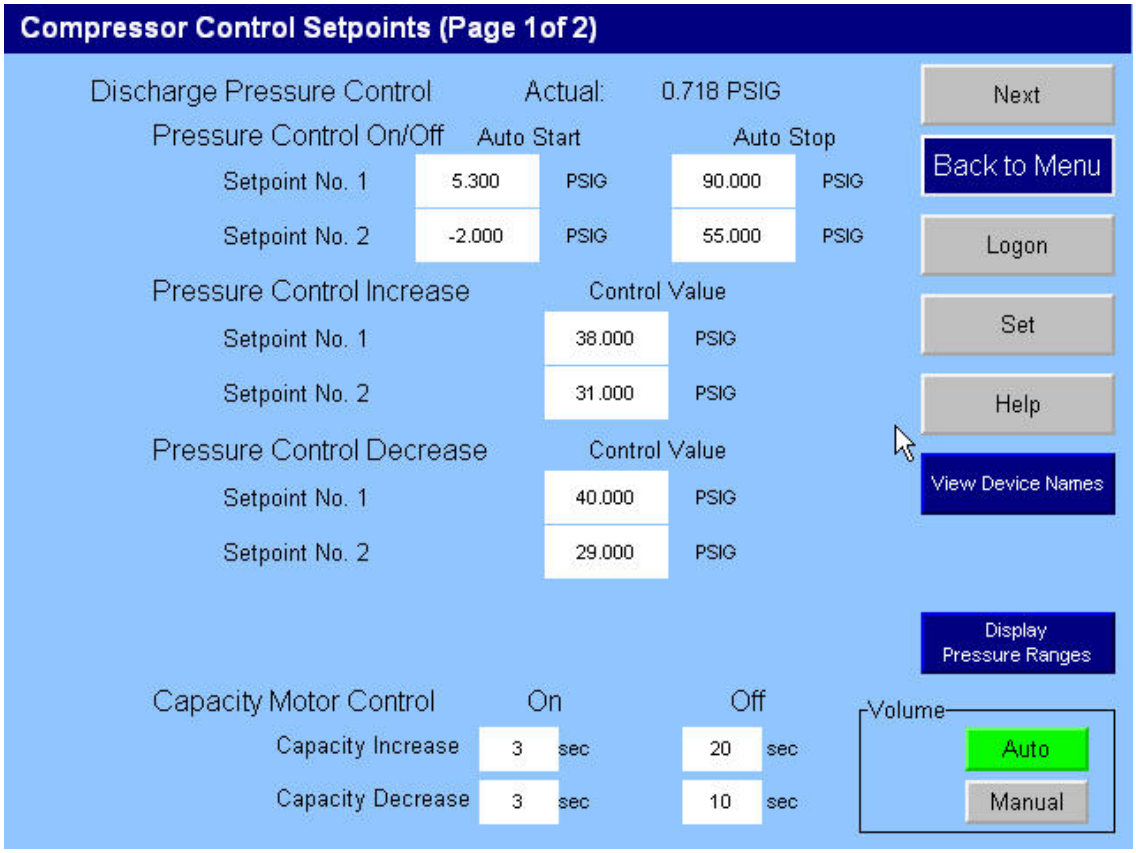
The compressor will decide when to increase or decrease capacity by comparing the controlled variable to the setpoints. The maximum on time and minimum off time settings for slide actuator motors can be used to reduce hunting or improve response time. The default settings of 3 and 20 seconds respectively, provide good operation over a wide range of conditions.



Level 1 Access – Compressor Control Setpoints

From the **Menu** screen, press the Compressor Control setpoints button. The compressor control setpoints screen will be shown.

Discharge Pressure Control



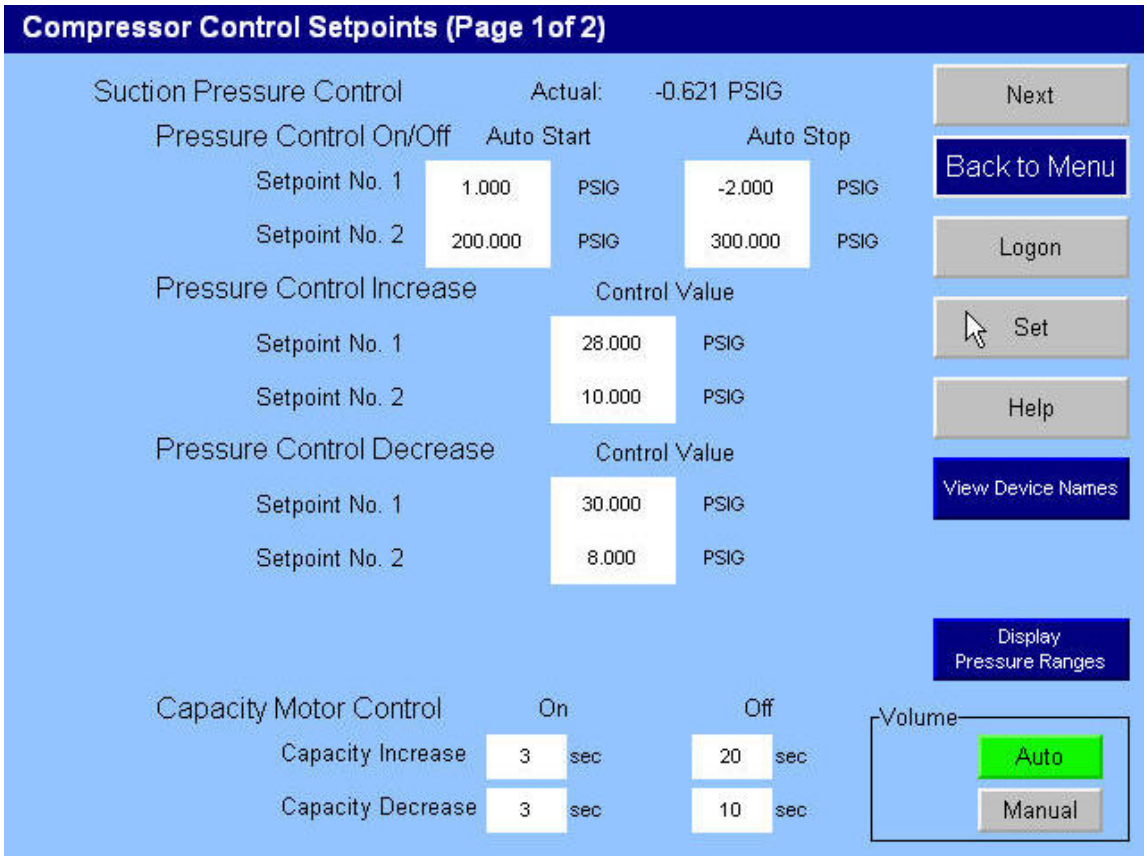
Setpoints on this screen:

- ***Discharge Pressure On/Off*** – The compressor will automatically cycle ON and OFF at the setpoints entered. Discharge Pressure On/Off control is only active if the Compressor Control Via Discharge Pressure option is selected on the **Setup** screen. If a compressor shutdown is desired on a discharge pressure drop and a manual reset is required, set the OFF value below the Low Discharge Pressure Safety Trip value. This will shut down the unit and a reset will be required to restart it.

- ***Discharge Pressure Capacity Increase*** – The capacity of the compressor will increase when suction pressure is at or above the Increase ON setpoint, and the increase "off" timer has cycled. Capacity will continue to increase until the Discharge Pressure Capacity Increase OFF setpoint is reached. If closer system control is desired, set the ON and OFF setpoints at the same values. This will essentially eliminate any differential between the ON and OFF setpoints.

- ***Discharge Pressure Capacity Decrease*** – The capacity of the compressor will decrease when discharge pressure is at or below the ON setpoint, and the decrease "off" timer has cycled. Capacity will continue to decrease until the Discharge Pressure Capacity Decrease OFF setpoint is reached. If closer system control is desired, set the ON and OFF setpoints at the same values. This will essentially eliminate any differential between the ON and OFF setpoints. While this setting is only available for adjustment on the Control Setpoints screen when the Compressor Control Via Suction Discharge option is selected on the **Setup** screen, it has an override effect when control is via process temperature as described below.

Suction Pressure Control



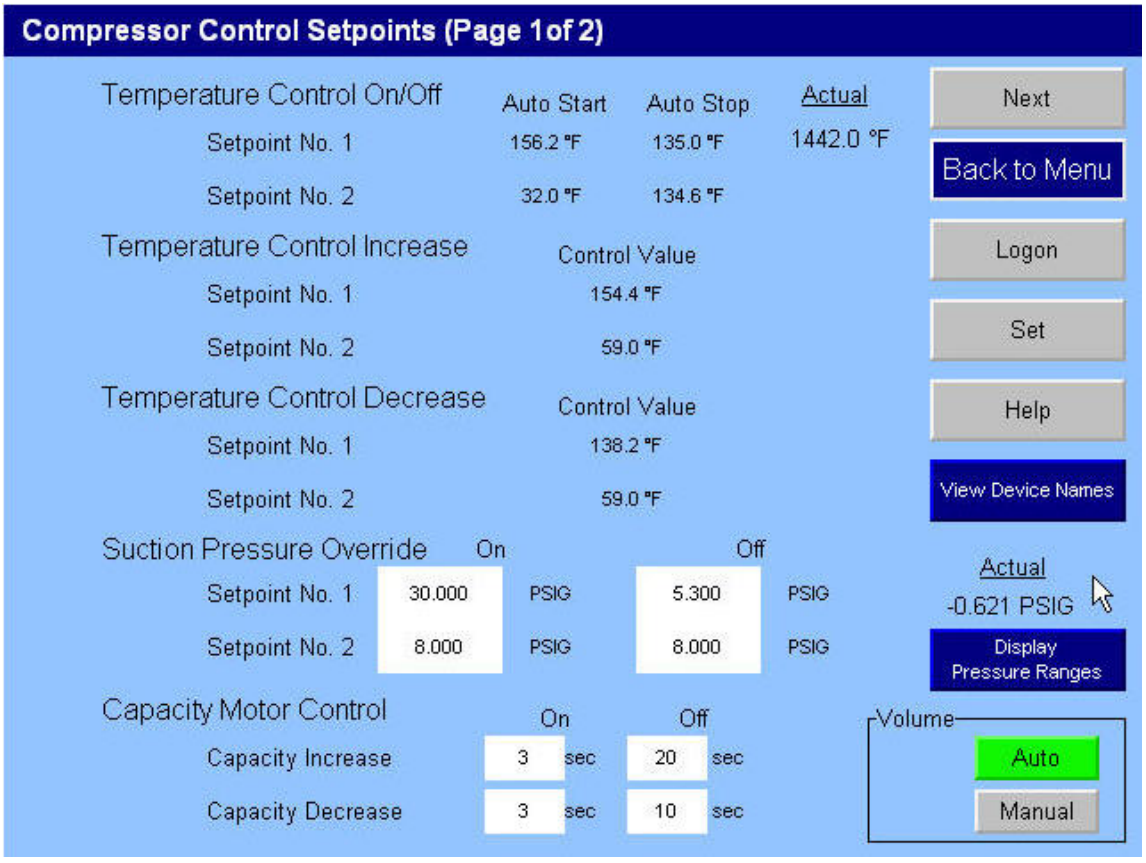
Setpoints on this screen:

- ***Suction Pressure On/Off*** – The compressor will automatically cycle ON and OFF at the setpoints entered. Suction Pressure On/Off control is only active if the Compressor Control Via Suction Pressure option is selected on the **Setup** screen. If a compressor shutdown is desired on a suction pressure drop and a manual reset is required, set the OFF value below the Low Suction Pressure Safety Trip value. This will shut down the unit and a reset will be required to restart it.

- ***Suction Pressure Capacity Increase*** – The capacity of the compressor will increase when suction pressure is at or above the Increase ON setpoint, and the increase "off" timer has cycled. Capacity will continue to increase until the Suction Pressure Capacity Increase OFF setpoint is reached. If closer system control is desired, set the ON and OFF setpoints at the same values. This will essentially eliminate any differential between the ON and OFF setpoints.

- ***Suction Pressure Capacity Decrease*** – The capacity of the compressor will decrease when suction pressure is at or below the ON setpoint, and the decrease "off" timer has cycled. Capacity will continue to decrease until the Suction Pressure Capacity Decrease OFF setpoint is reached. If closer system control is desired, set the ON and OFF setpoints at the same values. This will essentially eliminate any differential between the ON and OFF setpoints. While this setting is only available for adjustment on the Control Setpoints screen when the Compressor Control Via Suction Pressure option is selected on the **Setup** screen, it has an override effect when control is via process temperature as described below.

Process Temperature Control



Setpoints on this screen:

- ***Process Temperature Control*** – Provides for a Suction Pressure Override feature. If the suction pressure should drop below the Suction Pressure Capacity Decrease OFF setpoint, the Suction Pressure Capacity Decrease OFF setpoint will override the Capacity Control F Increase and prevent the compressor capacity from increasing (loading). If the suction pressure should continue to decrease below the Suction Pressure Capacity Decrease ON setpoint, the compressor capacity will be forced to decrease until the suction pressure is just above the Suction Pressure Capacity Decrease ON setpoint. This will help stabilize the suction pressure, allowing for the process temperature to be gradually pulled down. The Suction Pressure Capacity Decrease ON and OFF setpoints can viewed or adjusted by temporarily selecting "Processor Control Via Suction Pressure" on the Setup screen.

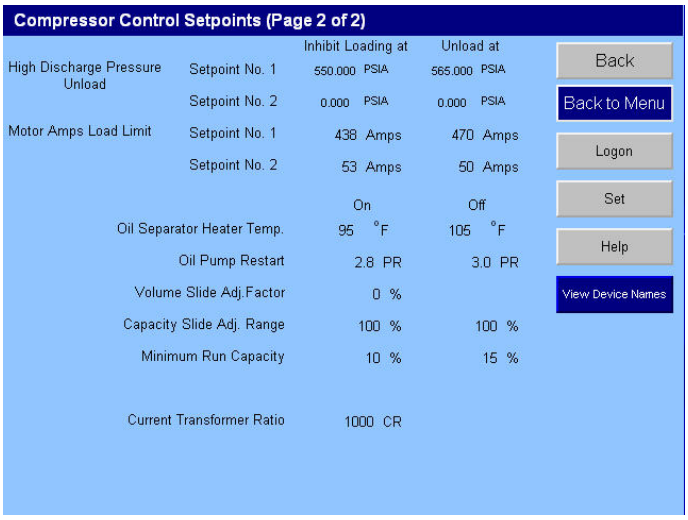
Note: Capacity Control for Refrigeration Only.

- ***Capacity Control °F On/Off*** – The compressor will automatically cycle ON and OFF at the setpoints entered. Capacity Control °F On/Off is only active if the Compressor Control Via Process Temperature option is selected on the Setup screen. If compressor shutdown is desired on a process temperature drop and a manual reset is required, set the OFF value below the Low Control Temperature Safety trip valve. This will shut down the unit and a reset will be required to restart.

- ***Capacity Control °F Increase*** – The capacity of the compressor will increase when process temperature is at or above the ON setpoint, and the increase "off" timer has cycled. Capacity will continue to increase until the Capacity Control °F Increase OFF setpoint is reached. If closer system control is desired, set the ON and OFF setpoints at the same values. This will essentially eliminate and difference between the ON and OFF setpoints. Process temperature control of the capacity is active only if the Compressor Control Via Process Temperature option is selected on the **Setup** screen.

- ***Capacity Control °F Decrease*** – The capacity of the compressor will decrease when process temperature is at or below the ON setpoint, and the increase "off" timer has cycled. Capacity will continue to decrease until the Capacity Control °F Decrease OFF setpoint is reached. If closer system control is desired, set the ON and OFF setpoints at the same values. This will essentially eliminate and difference between the ON and OFF setpoints. Process temperature control of the capacity is active only if the Compressor Control Via Process Temperature option is selected on the **Setup** screen.

Additional Compressor Controls



- ***High Discharge Pressure Unloading Setpoints*** – Active in Suction Pressure or Process Temperature Capacity Control mode. These setpoints limit the compressor from loading at high discharge pressure conditions. They override the Suction Pressure or Process Temperature Capacity Control setpoints. The capacity of the compressor will decrease when the discharge pressure is at or above the ON set point. When the OFF setpoint is reached, the compressor will stop from unloading any further.

- ***Motor Amp. Load Limit Setpoints*** – This control limit is the motor full load current draw and the maximum current draw. This control limit will only prevent the compressor from loading and does not shut down the compressor if the maximum current draw setpoint is exceeded. The actual values entered may depend on particular circumstances. The function of the setpoint is as follows:

  If the motor is operating at the full load amperage (FLA) setting, the compressor is prevented from loading. If the motor amps exceed the MAX setpoint, the compressor is forced to unload until the current is at 1.0625 times above the FLA setting. If the motor being used has a service factor below 1.0625, use a value for the FLA that is 10% lower than the MAX value.

- ***Oil Separator Heater Temperature*** – This control limit determines when the oil separator heater is energized. A decrease in oil separator temperature below the ONsetpoint energizes the oil separator heater. On an increase in oil separator temperature above the OFF setpoint, the oil heater is de-energized.

- ***High Discharge Pressure Unloading Setpoints*** – Active in Suction Pressure or Process Temperature Capacity Control mode. These setpoints limit the compressor from loading at high discharge pressure conditions. They override the Suction Pressure or Process Temperature Capacity Control setpoints. The capacity of the compressor will decrease when the discharge pressure is at or above the ON set point. When the OFF setpoint is reached, the compressor will stop from unloading any further.

- ***Motor Amp. Load Limit Setpoints*** – This control limit is the motor full load current draw and the maximum current draw. This control limit will only prevent the compressor from loading and does not shut down the compressor if the maximum current draw setpoint is exceeded. The actual values entered may depend on particular circumstances. The function of the setpoint is as follows: If the motor is operating at the full load amperage (FLA) setting, the compressor is prevented from loading. If the motor amps exceed the MAX setpoint, the compressor is forced to unload until the current is at 1.0625 times above the FLA setting. If the motor being used has a service factor below 1.0625, use a value for the FLA that is 10% lower than the MAX value.

- ***Oil Separator Heater Temperature*** – This control limit determines when the oil separator heater is energized. A decrease in oil separator temperature below the ON setpoint energizes the oil separator heater. On an increase in oil separator temperature above the OFF setpoint, the oil heater is de-energized.

- ***Oil Pump Restart*** – To determine the ON and OFF values for the pressure ratios, take the absolute discharge pressure (PSIA), and divide it by the absolute suction pressure (PSIA). If the pressure ratio is below the ON setpoint value, the oil pump will restart and stay on until the pressure ratio increases above the OFF setpoint. This enables a high stage compressor with a part time oil pump to temporarily operate under conditions requiring a full time oil pump.
  EXAMPLE: *To calculate the OFF value, if the absolute discharge pressure is 200 PSIA and the desired absolute suction pressure of the cut-out point is 67 PSIA, the discharge pressure is divided by the suction pressure. The result is a OFF value of approximately 3.0. This would then be entered for the OFF pressure. Now determine the ON value, take the absolute discharge pressure (200 PSIA) and divide this by the desired absolute suction pressure (71 PSIA). This results in a ON valve of 2.8.*

- ***Capacity Slide Adjustment Range*** – This control limit determines the capacity range the Capacity Slide Adjustment factor will be active. The factor will be active from 0% capacity and will be deactivated when the OFF setpoint is reached. On a decrease in capacity below the ON set point, the factor will be active.

- ***Minimum Run Capacity*** – The Minimum Run Capacity is the minimum capacity the compressor will be allowed to run at. When the compressor is started, it will be loaded to the Minimum Run Capacity control setpoint minus 5%. This is done to prevent the capacity control from hunting if the load is not great enough to keep the compressor capacity at the Minimum Run Capacity setpoint. On a call for unloading, the compressor will unload until it reaches the Minimum Run Capacity control setpoint. It will remain there until the suction pressure reduces and the compressor cycles off on the Suction Pressure On/Off control setpoint.

- ***Volume Slide Adjustment Factor*** – This value is normally zero (0) and will not require changing. However, if the system operating conditions show the volume ratio is not at the optimum value for the system, this value can be adjusted up or down to permit the most efficient positioning of the volume slide valves. To determine the value to enter, first ensure that the system is in a steady operating state and place the volume side in manual. **NOTE:** The volume position setting and increase the volume side position slowly until the lowest amperage level is achieved. If the amperage level rises instead of falls, decrease the volume slide position until the lowest amperage is achieved.
  Record the differential from the original position. This will then be adjustment factor to enter for our system. **NOTE:** Negative numbers can be used for this setting. This setpoint is active on a drop in capacity below the Capacity Slide Adjustment Range cut-in (ON) setting. The adjustment is disabled when capacity rises above the Adjustment Range OFF setting. Normally, the "ON-Off" set points should both be set at 100%, so the volume side adjustment factor will be applied over the full range of 0 to 100%

- ***Current Transformer Ratio*** – The value entered must agree with the Current Transformer Ratio on the current transformer being used. The current transformer is mounted in the compressor motor conduit box. The ratio is stated as the ratio of measured current to a nominal full scale current in the secondary of 5 amps; only the first of these is entered. For example, if the ratio reads 250/5, enter 250.

- ***Low Suction Pressure Load Limit*** – Active in Discharge Pressure Capacity Control mode only. These setpoints limit the compressor from loading at low suction pressure conditions. They override the discharge pressure capacity control setpoints. When the OFF setpoint is reached (at or below setpoint), the compressor will not be allowed to load any further. If the suction pressure continues to fall, the capacity of the compressor will decrease when the suction pressure is at or below the ON set point. It will stop decreasing when the suction pressure rises to a point that is just below the ON set point.

- ***Prelube Oil Pressure*** – If the oil pressure does not rise above the reset setting for a time exceeding the Minimum Compressor Prelube Time and the pump runs longer than the Prelube Pump Time Limit, an alarm or trip will occur. These time limits are set on the Compressor Timer Setpoints screen. Prelube oil pressure is defined as the amount that the oil pump drives manifold pressure above the discharge pressure.

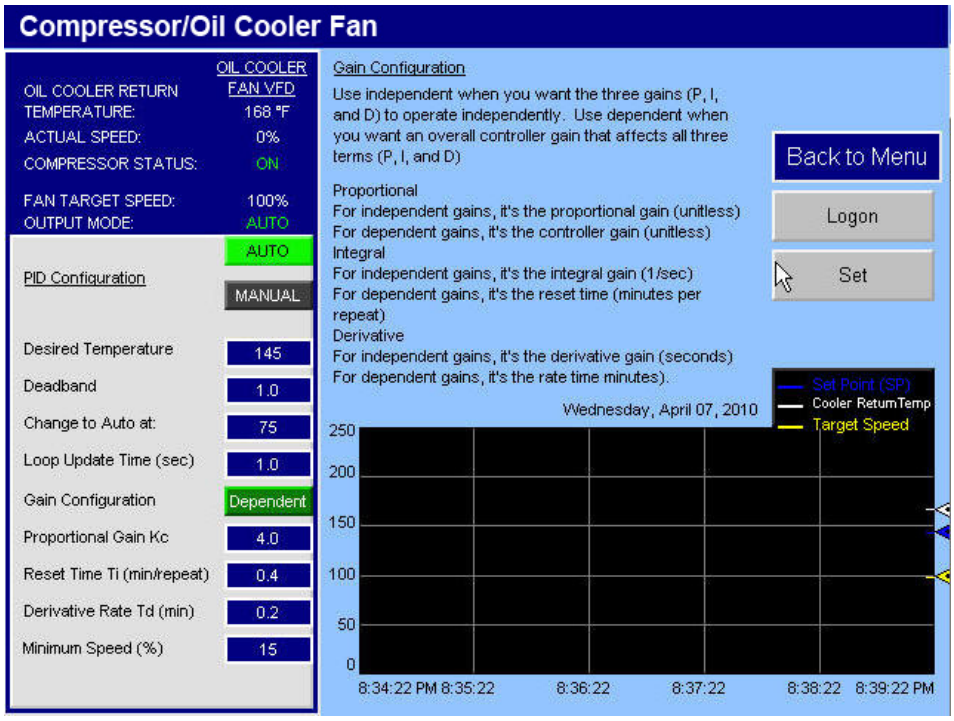
- ***Low Oil Pressure*** – This is the running oil pressure safety. An alarm or trip will be active if the oil pressure should drop below the setpoint value. This occurs once the Oil Pressure Bypass timer has expired. The time limit is set on the Compressor Timer Setpoints screen. For the single screw compressor, oil pressure is defined as manifold pressure minus suction pressure.

- ***High Filter Differential Pressure Start*** – This safety setpoint is active when the compressor is in the start cycle. An alarm or trip will be active if the filter inlet pressure exceeds the filter outlet pressure by the setpoint value.

- ***High Filter Differential Pressure Run*** – This safety setpoint is active when the compressor is in the run cycle. An alarm or trip will be active if the filter inlet pressure exceeds the filter outlet pressure by the setpoint value.

- ***High Motor Amps*** – This safety setpoint is active after the Volume Decrease At Start Timer expires. This timer is not user settable, and in standard applications, is 15 seconds. A trip will occur if the motor amperage exceeds the safety setpoint value. The setpoint should be set at 125% of the motor full load amperage.

Motor Speed Setpoints & Control Screen



VFD SCREEN SETTINGS

Settings:

Auto Button:
Choosing Auto will do the following:

1. While the fan is off the *Output Mode* will be forced to *Manual Mode*.

2. When the fan starts, it will remain in *Manual Mode* at the *Initial Speed* for the period defined as *Delay Auto.*

3. After the *Delay Auto* time expires, the *Output Mode* will change to *Auto Mode.*

4. In *Auto Mode*, the VFD is enabled to increase and decrease speed to maintain the temperature settings.

5. *Increase At:* High setting where an increase of speed is desired.

6. *Decrease At:* Low setting where a decrease of speed is desired

7. *Initial Speed:* Desired forced speed to start the fan at as described above. Note: The PLC will automatically keep this value to at least the *Minimum Speed* setting.

8. *Max Speed Detect:* Setting for PLC program detection of maximum speed. This setting will not limit the speed of the VFD. Generally, this setting is useful only when sequencing of multiple devices is used.

9. *Minimum Speed:* This is the minimum speed that the PLC will send to the VFD. This is active in Manual Mode and in Auto Mode.

Adjustment Limit: This is the maximum amount of change in speed per adjustment. If the *Calculated Adjustment* is greater than the *Adjustment Limit* value, the PLC output will only change the amount of the *Adjustment Limit.* If the *Calculated Adjustment* is less than the *Adjustment Limit* value, the PLC output will change the amount of the *Calculated Adjustment.* The *Adjustment Limit* is used in conjunction with the *Gain* to prevent target overshooting.

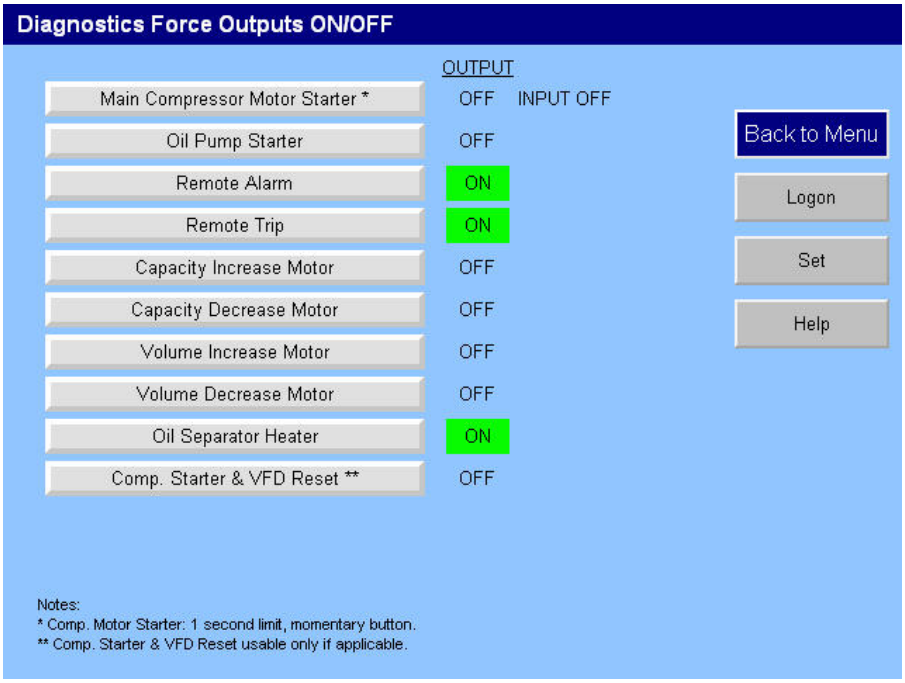
10. *Gain:* This value is factory set to 2.50 but may be set from 0.1 to 99. For VFDs, *Gain* is a multiplication factor used in a calculation to determine an adjustment to the speed each set interval. This interval is defined as the *Increase Rate or Decrease Rate.* Factory settings for *Increase Rate and Decrease Rate* are 2 to 5 seconds.

Manual Button:
Choosing Manual will do the following:
1. The fan *Output Mode* will remain *Manual Mode*.
2. *Manual Speed:* This setting becomes accessible only when the Manual Button is chosen. Enter the desired speed (%) for the VFD.

Stop Button:
Choosing Stop will remove the fan from Auto and from Manual. The VFD will ramp down to a stop. Note: The On/Off status of a VFD is based on a nominal speed feedback from the VFD. Therefore, the *VFD Status* will display “On” until the drive is near zero speed.

Bypass Button:
Choosing Bypass will remove the fan from VFD speed control. The bypass contactor will be used in lieu of the VFD.

Diagnostics Force Output



WARNING: Be sure to remove all outputs from Forced-On mode before exiting this screen!

To force an output, a user with high level access must be logged on first. Without sufficient access, the outputs display without force buttons. Touch the Logon button or Set button to prompt the Logon screen. At the Logon screen, enter the user name (case sensitive) then the user's password (case sensitive) then press the <-| enter button. The currently logged in user's name displays on the Logon screen, on the Logon button (on the main menu and on the Setup screen.

Once a user with sufficient access is logged on, force buttons appear.

To force an output on, touch its button. The "Main Compressor Motor Starter*" button and "Starter Reset" button are momentary-on buttons while the others are maintained buttons. Forced-on buttons display green. On/Off output status displays to the right of each button.

Return all maintained buttons to their off (grey color) state before exiting this screen. Exiting this screen does not automatically remove forces.

Instrument Calibration

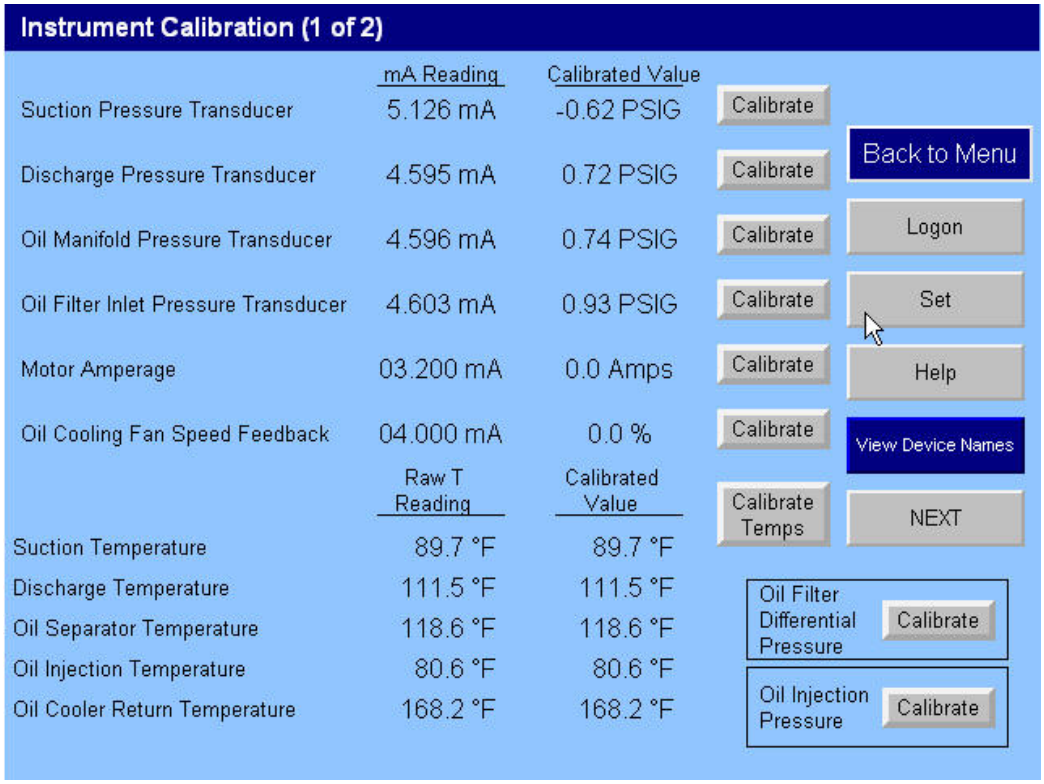
To calibrate, a user with high level access must be logged on first. Without sufficient access, the raw input values and calibrated values display without "Calibrate" buttons. Touch the Logon button or Set button to prompt the Logon screen. At the Logon screen, enter the user name (case sensitive) then the user's password (case sensitive) then press the <-| enter button. The currently logged in user's name displays on the Logon screen, on the Logon button (on the main menu and on the Setup screen.

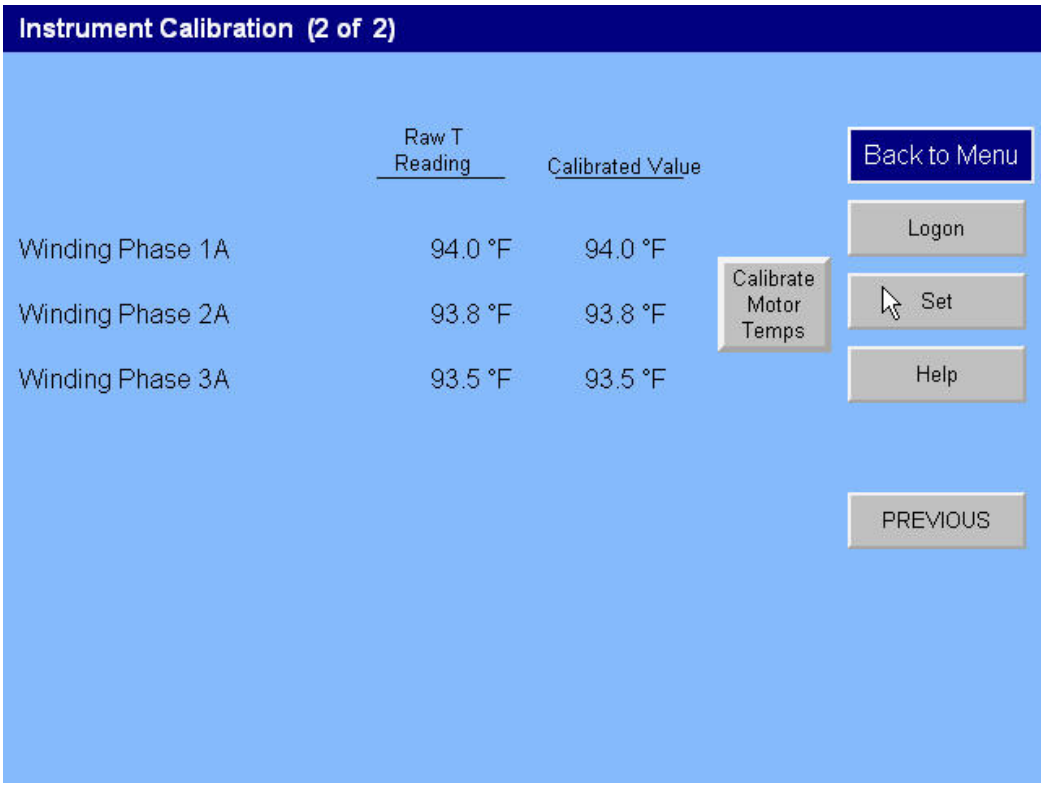
Once a user with sufficient access is logged on, Calibrate buttons appear.

The following items can be calibrated from this screen: Suction Pressure Transducer, Discharge Pressure Transducer, Oil Manifold Pressure Transducer, Oil Filter Inlet Pressure Transducer, Motor Amperage, Oil Cooling Fan Feedback, Suction Temperature RTD, Discharge Temperature RTD, Oil Separator Temperature RTD, Oil Injection RTD.

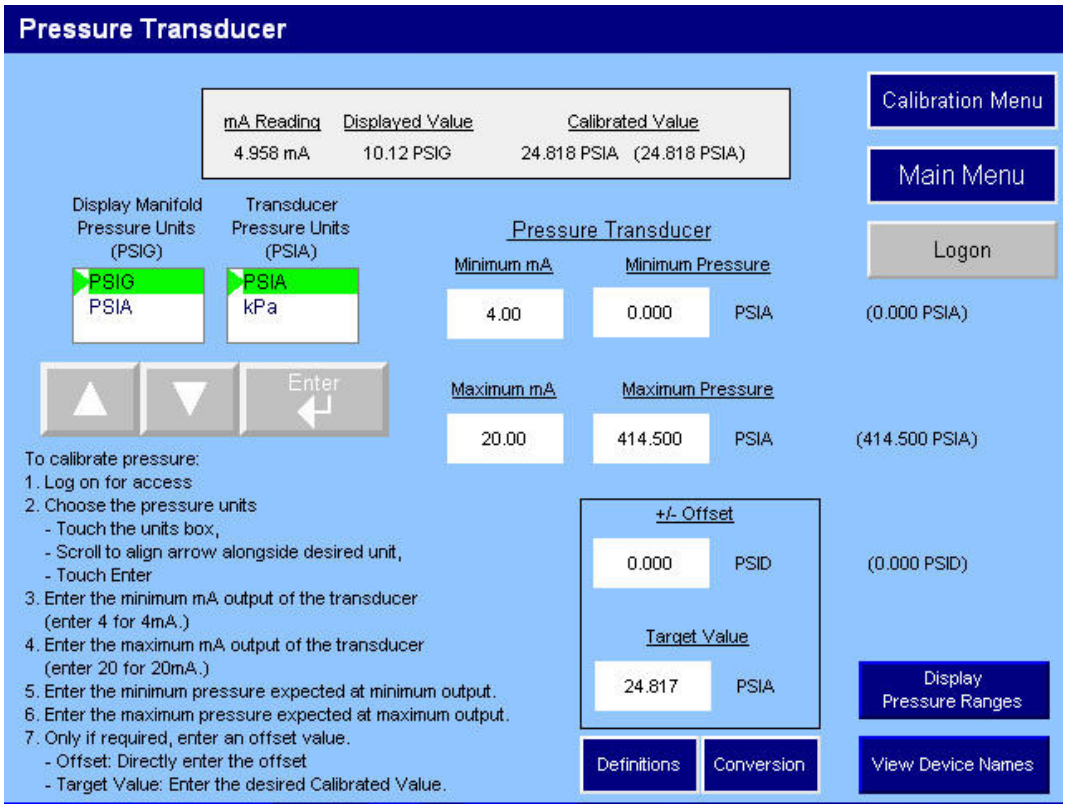
The "Calibrated Values" reflect the values used for control of the system. The user can perform calibration by pressing the respective Calibrate button alongside the value prompting the Calibration screen.

Calibration Instructions are provided on each Instrument Calibration screen.




Instrument Calibration (2 of 2)
Raw T Reading
Calibrated Value
Back to Menu
Logon
Winding Phase 1A
94.0 °F
94.0 °F
Calibrate Motor Temps
Set
Winding Phase 2A
93.8 °F
93.8 °F
Help
Winding Phase 3A
93.5 °F
93.5 °F
PREVIOUS

Instrument Calibration Pressures



Confirm the “mA Reading” value (the raw mA value at the analog module) is correct and stable.

If not already done, set the Minimum mA to 4.00

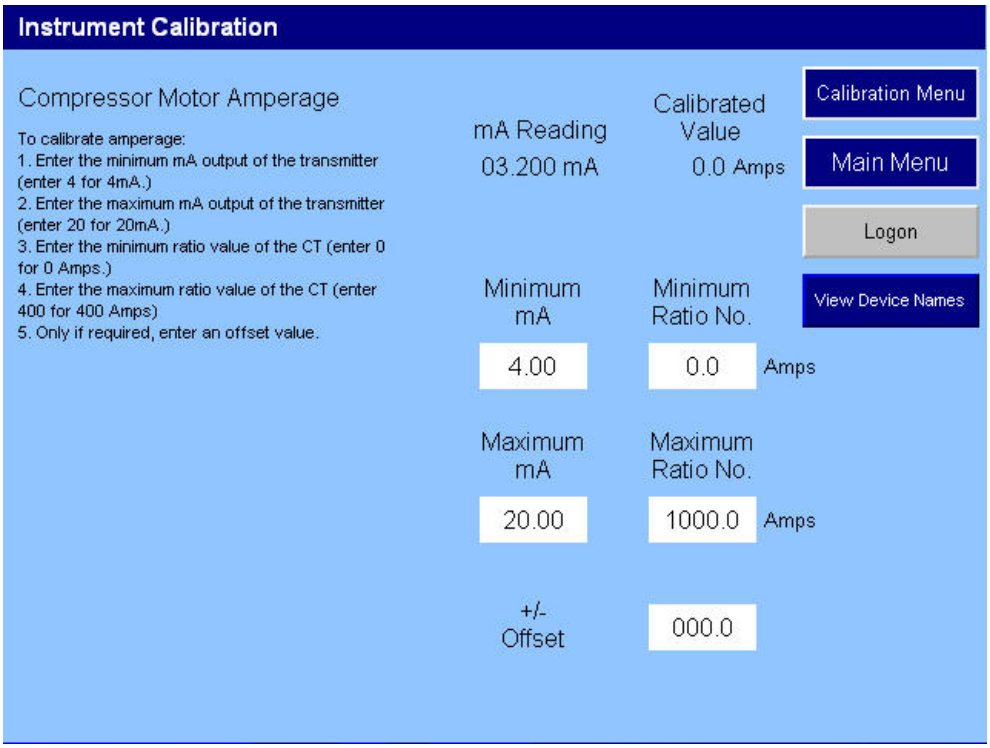
If not already done, set the Maximum mA to 20.00

Set the Minimum Pressure to the actual minimum pressure at 4mA as marked on the transducer.

Set the Maximum Pressure to the actual maximum pressure at 20mA as marked on the transducer.

Set the Offset to zero unless required otherwise. The offset value adds to the resultant linearly scaled value and results in the Calibrated Value which is used for control

Instrument Calibration Motor Amps



Confirm the “mA Reading” value (the raw mA value at the analog module) is correct and stable.

If not already done, set the Minimum mA to 4.00. This is the minimum mA expected from the current transmitter at 0 motor amps.

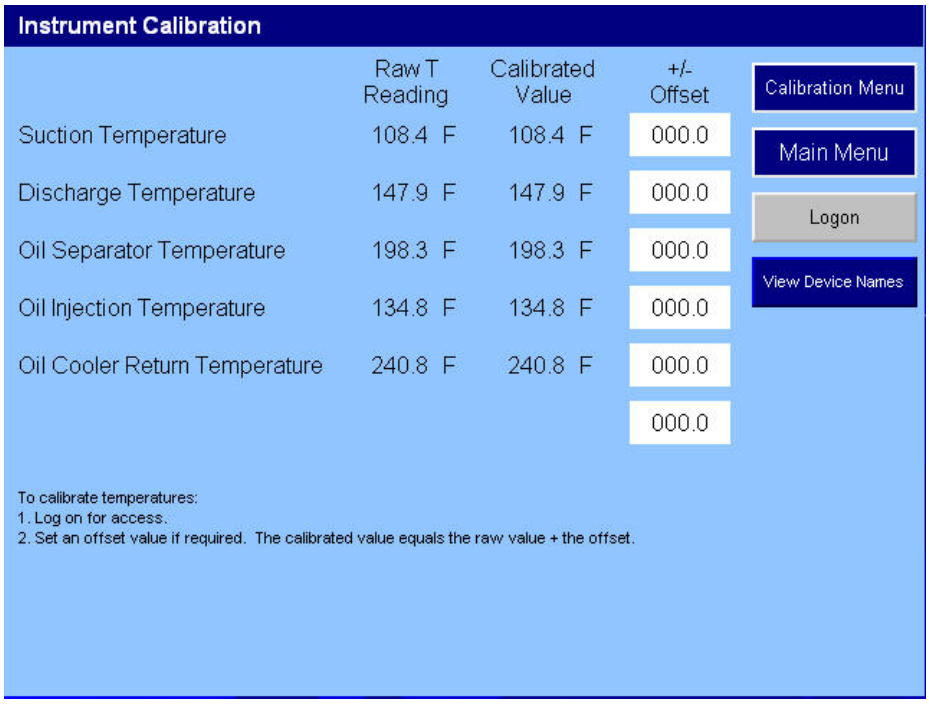
If not already done, set the Maximum mA to 20.00. This is the maximum mA possible from the current transmitter.

Set the Minimum Ratio value of the current transformer. Enter a 0 for zero amps.

Set the Maximum Ratio value of the current transformer. For example, if the CT has a 250:5 rating, enter 250 as the Maximum Ratio value.

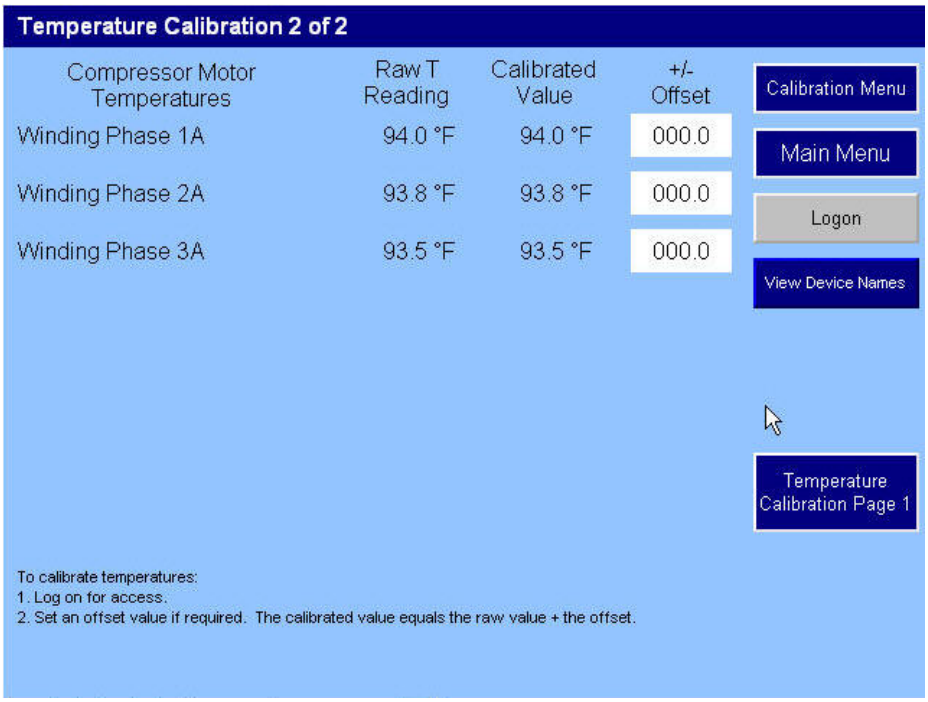
Set the Offset to zero unless required otherwise. The offset value adds to the resultant linearly scaled value and results in the Calibrated Value which is used for control.

Instrument Calibration Temperatures

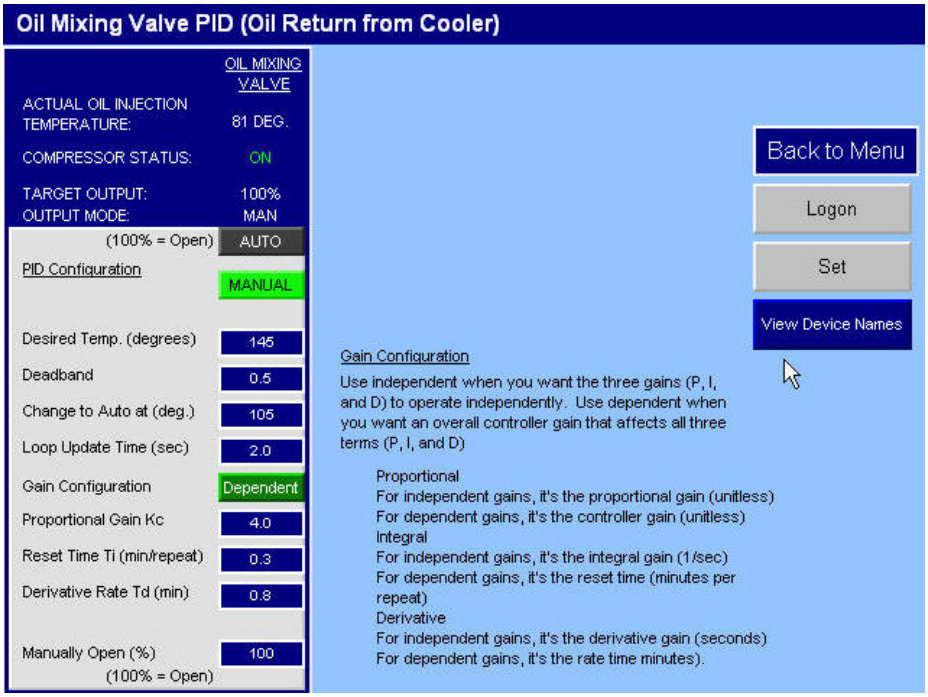


All RTDs are 100 ohm Pt and are scaled as such via hard-coded configuration in the PLC input module. The Raw T Reading is defined as the scaled value from the RTD input module.

Set the Offset to zero unless required otherwise. The offset value adds to the raw temperature reading scaled value to result in the Calibrated Value which is used for control.



Oil Mixing Valve



Various types of oil coolers can be used to maintain the oil injection temperature, usually either a water-cooled shell-&-tube heat exchanger mounted locally or a remotely located air-cooled fan-coil unit. In either case, the oil temperature control valve operates the same.

A two-way ball valve is located in the main oil line between the oil separator and the compressor. The oil cooler is piped in parallel to the oil temperature control valve, which acts as a by-pass valve.

1.0 Installation & Position Indication

1.1 The ball valve is installed with the ball closed.
1.2 The actuator mounts on the ball valve stem. Flats on the ball valve stem indicate the position of the ball:
OPEN – stem flats are with the flow
CLOSED – stem flats are across the flow
1.3 On smaller valves, the ball valve stem flats are nearly hidden between the stem extension and the stem lock nut. The locking tabs on the stem lock nut are across the flow.
1.4 The actuator position indicator stem flats are oriented in the same direction as the ball valve stem flats.
1.5 There is a mechanical position indicator on the top of the actuator cover.

NOTE: The oil temperature control valve comes from the vendor already assembled with the ball closed and the actuator in the CLOSED position.

2.0 Control Action

2.1 The ball valve can rotate through a full 360° arc.
2.2 The actuator restricts the ball to a 90° arc of travel.
2.3 The actuator is powered (120V or 24V) all the time.
2.4 The position target signal from the compressor controller is a 4-20mA analog value.
2.5 There is no feedback position from the actuator.

3.0 Initial Position

3.1 With the electrical power to the valve de-energized, the valve is set to its initial position by ensuring that the ball is in the closed position and that the actuator indicator displays CLOSED.
3.2 When the electrical power to the valve is energized, the valve should rotate to fully OPEN.

4.0 Operation

4.1 When initially installed, the ball must be in the closed position.
4.2 When electrically energized, if the compressor is not running, the compressor controller will turn the valve fully open (100%).
4.3 When the compressor starts, the valve remains fully open (100%) until the oil injection temperature rises above the control setpoint.
4.4 When the oil injection temperature rises above the control setpoint, the oil temperature control valve will begin to close.
4.5 The hot oil from the oil separator begins to divert to the oil cooler, mixing the hot and cooled oil flow streams together downstream of the oil temperature control valve. The valve can fully close (0%) diverting the entire oil flow stream to the oil cooler.
4.6 As the oil injection temperature drops below the setpoint, the oil temperature control valve begins to open so that the oil injection temperature does not become too cold.
4.7 When the compressor stops, the valve returns to fully open (100%).

5.0 Fail Position

The actuator remains in its last position when power is removed.

6.0 Screen Display

The oil temperature control valve, identified as “OIL MIX” on the main HMI display screen, shows a numerical value with “%” as units. This is to be understood as “% OPEN.” It is a direct indication of the position of the ball valve.

6.1 100% OPEN
Oil flow stream is entirely bypassing the oil cooler
6.2 99% to 1% OPEN
Oil flow stream is partially by-passing the oil cooler and partially diverted to the oil cooler
6.3 0% OPEN
Oil flow stream is entirely diverted to the oil cooler

7.0 Control Settings

The oil temperature control setpoints are entered on the compressor controller screen “Oil Mixing Valve PID (Oil Return from Cooler)”.

8.0 Rotating the Actuator for Convenience of Installation

The actuator can be rotated to any one of four positions.

8.1 Remove both 120V and 24V power from the actuator.
8.2 Disconnect electrical leads at actuator.
8.3 Remove four cap screws that fasten the actuator to the valve mounting bracket.
8.4 Lift the actuator off the valve stem.
8.5 Rotate the actuator to the desired position.
8.6 Slide actuator down on the valve stem.
8.7 Secure the actuator to the valve mounting bracket with four cap screws.
8.8 Re-connect the electrical leads at the actuator.
8.9. Restore 120V and 24V power to the actuator.

NOTE: The ball valve and the actuator must always be assembled in the CLOSED position. See Section 3.0 Calibration above.

CAUTION: Be careful not to move the ball stem during this operation. Turning the ball valve 90° in either direction will reverse the control action of the valve and the compressor will experience high oil temperature within minutes. Turning the ball valve 180° has no detrimental effect.

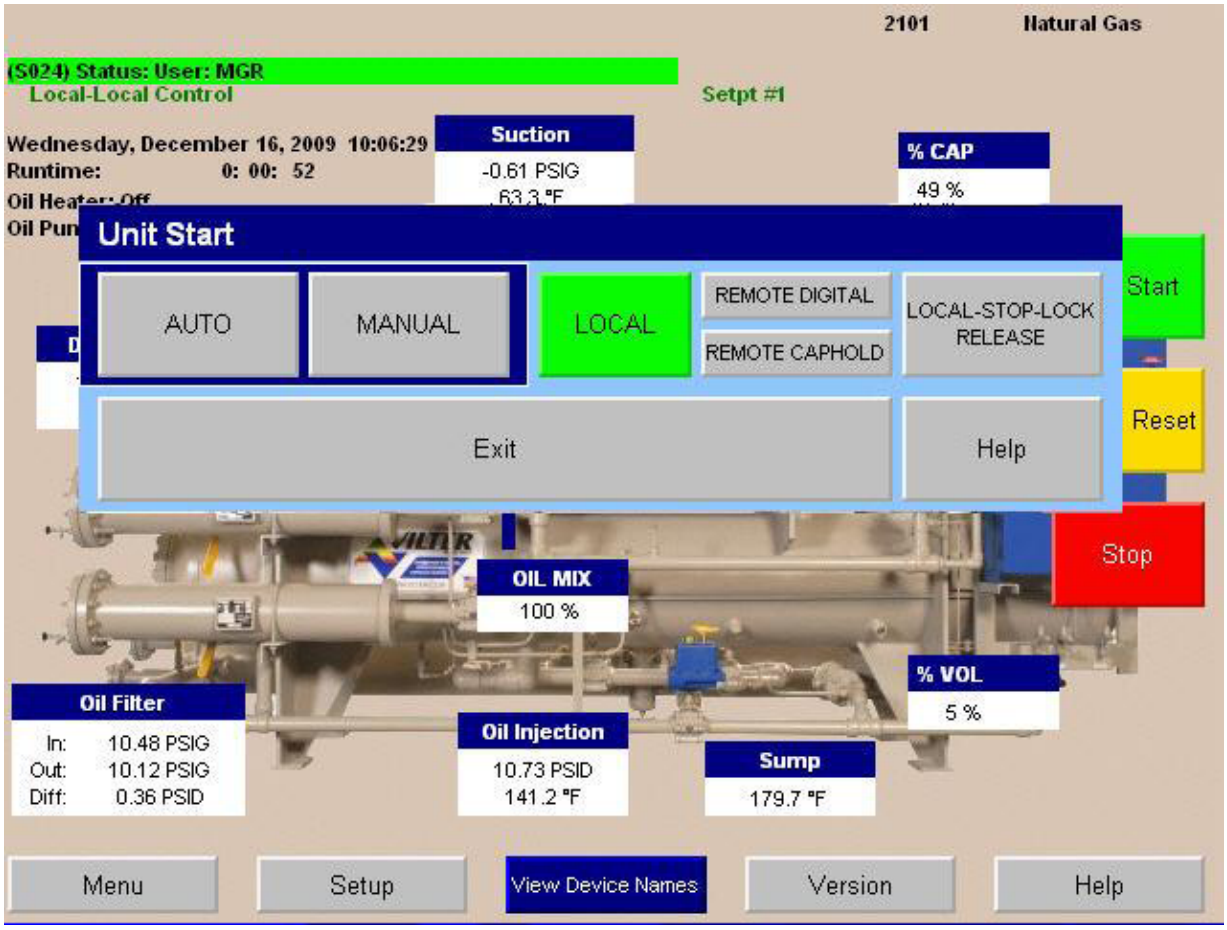
9.0 Manual Override

The actuator has a handwheel that can be engaged to override the electrically determined position of the ball valve.

Push and rotate to engage.

Push a second time to de-clutch.

Unit Start Screen (Start / Stop Logic)



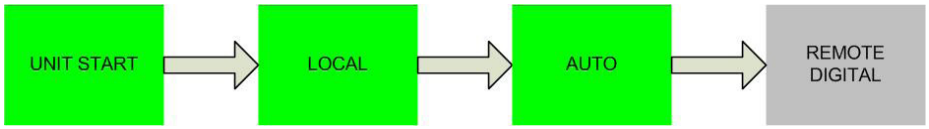
Unit Start Button
Pressing this button will invoke a floating button panel, called Unit Start. The operational mode of the compressor unit can be selected from the Unit Start button panel. The compressor unit does not start when the green Unit Start button, on the main screen, is pressed.

Unit Start Window

Local Button
The Local button is used to put the compressor controller into Local mode. This is the default mode for the compressor controller. In Local mode the compressor unit must be operated in Auto or Manual mode.

Auto Button
In this mode the compressor will respond to its on-board settings for start, stop, load and unload commands.

Manual Button
In this mode the compressor will respond to operator inputs from the HMI screen. They Capacity and Volume Slide Valve Position can be adjusted by the up and down arrows that appear on the main screen. The Position is a value 0% to 100%.



Remote Digital Button
The Compressor Controller must be in Local-Auto in order to activate Remote mode. In Remote Digital Mode the compressor is controlled by digital input signals.

1. Remote Start Input: Permissive Start/Stop for the compressor.
2. Remote Increase Input: Increases the Capacity Slide Valve.
3. Remote Decrease Input: Decrease the Capacity Slide Valve.

Remote Capacity Hold Button
From Local mode, Remote Caphold button can be pressed to put the compressor controller in Central mode. Central mode allows for external capacity control via communications link.

Central Mode
The remote PLC must maintain the Central mode operation by setting a tag in the compressor controller memory at least every 60 seconds. If the Central mode signal is lost during operation, the compressor controller reverts to Local Auto mode.

Stop Button
Pressing this button will stop the compressor unit. If the compressor unit is in Central mode when the Stop button is pressed, the compressor controller enters Local-Stop-Lock mode. The central system controller will no longer be able to command the compressor controller. To return to any operational mode, see the description of Local-Stop-Lock Release Button below.

NOTE: If the compressor unit does not stop, use the Emergency Stop button which is hardwired to the compressor controller. If this does not stop the compressor, then the main power disconnect must be opened.

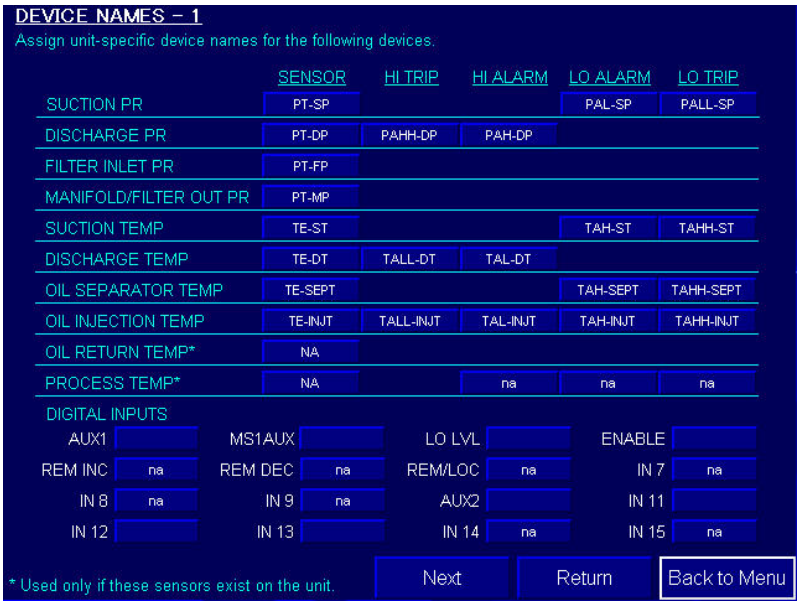
Local-Stop-Lock Release Button
If the Stop key is pressed when in Central mode, the controller goes into Local-Stop-Lock mode. In Local-Stop-Lock the controller prevents the compressor from being remotely started. Press Local-Stop-Lock Release to take the Controller out of Local-Stop-Lock mode. The controller must then be set to the desired mode from the Unit Start button.

Alarm Reset Button
Pressing this button will reset the Alarms.

Exit Button
Pressing this button will close the Unit Start box.

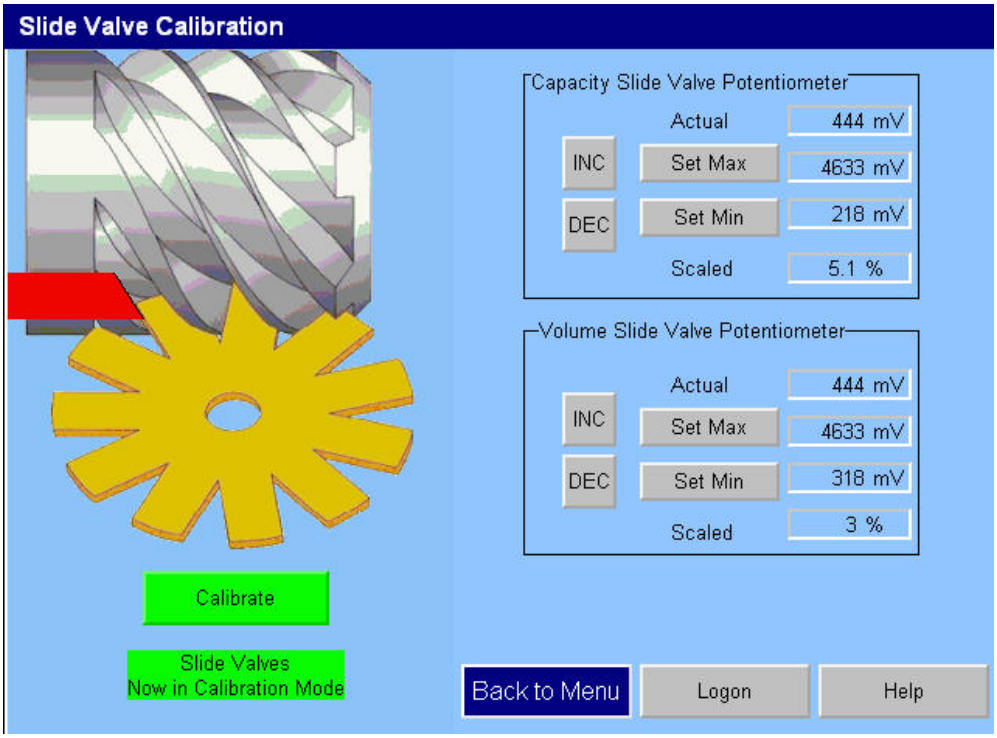
Help Button
Pressing this button will open an additional help screen.

Device Names



To change Device Name, go into the “vilter Only” screen and press “Create Device Names.”

From the Device Name Screen, press the corresponding text window to change the name of the device.



ACTUATOR MOTOR CONTROL MODULE CALIBRATION PROCEDURE

1. Open the plastic cover of the capacity motor by removing the four #10 screws. **Caution: there are wires attached to the connector on the plastic cover. Handling the cover too aggressively could break the wires.**

2. Gently lift the cover and tilt it toward the Turck connectors. Raise the cover enough to be able to press the blue calibrate button and be able to see the red LED on the top of assembly.

3. Press "Menu" on the main screen and then press the "Slide Calibration" button, to enter the slide calibration screen. Logging on with high-level access will prompt the following buttons to appear: Press to Calibrate, Inc. and Dec. (Capacity and Volume.) Touch the Press to Calibrate button – it turns green and states "Calibrate." Set Min and Set Max buttons appear (Capacity and Volume.) If you are re-installing a new optical actuator reconnect the yellow and gray cables.

4. Press INC and DEC to move the slide valve and check for the correct rotation. See Table 1 for Actuator/command shaft rotation specifications.

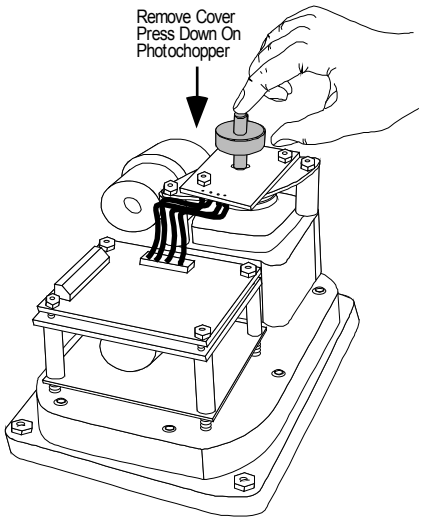
5. Note: If the increase and decrease buttons do not correspond to increase or decrease shaft rotation, swap the blue and brown wires of the "power cable". This will reverse the rotation of the actuator/command shaft.

6. Quickly press and release the blue push button on the actuator one time. This places the actuator in calibration mode. The red LED will begin flashing rapidly.

7. Note: When the actuator is in calibration mode, it outputs 0V when the actuator is running and 5V when it is still. Thus, as stated earlier, the actuator voltage will fluctuate during calibration. After the actuator has been calibrated, 0V output will correspond to the minimum position and 5V to the maximum position.

8. Note: The "Slide calibration" screen on the Control Panel has a "Current" window, which displays twice the actuator output voltage. This value, (the % volume and the % capacity) displayed in the "Current Vol" and Current Cap" Windows are meaningless until calibration has been completed.

9. Use the DEC button on the Control panel to drive the slide valve to its minimum "mechanical stop" position. **Do not continue to run the actuator in this direction after the slide valve has reached the stop. Doing so may cause damage to the actuator or the slide valve.**



Do not touch wires, may cause an electrical shock!

Press down on the photochopper shaft to disengage the brake, releasing tension from the motor mount. Use the INC button to pulse the actuator to where the slide is just off of the mechanical stop and there is no tension on the motor shaft.

10. Quickly press and release the blue button on the actuator again. The red LED will now flash at a slower rate, indication that the minimum slide valve position (zero position) has been set.

11. Use the INC button on the Control Panel panel to drive the slide to its maximum "mechanical stop" position. **Do not continue to run the actuator in this direction after the slide valve has reached the stop. Doing so may cause damage to the actuator or the slide valve.** Press down on the photochopper shaft to disengage the brake, releasing tension from the motor mount. Use the DEC button to pulse the actuator to where the slide is just off of its mechanical stop and there is no tension on the motor shaft.

12. Quickly press and release the blue button on the actuator one more time. The red LED will stop flashing. The actuator is now calibrated and knows the minimum and maximum positions of the slide valve it controls. Now the capacity or volume channel of the PLC can be calibrated.

13. Use the DEC button to move the actuator towards its minimum position while watching the millivolt readout on the Control Panel screen. Discontinue pressing the DEC button when the millivolt reading the "Current" window above the "Set Min" button is approximately 500 millivolts.

14. Now use the DEC and INC buttons to position the slide valve until a value close to 300 millivolts is on the screen. Then, press the "Set Min" button in the capacity or volume slide valve window to tell the controller that this is the minimum millivolt position. Note: The value in the "Current Cap" or "Current Vol" window has no meaning right now.

15. Use the INC button to rotate the actuator towards its maximum position while watching the millivolt readout on the controller screen. Discontinue pressing the INC button when the millivolt reading in the "Current" window is approximately 4800 millivolts. You are nearing the mechanical stop position.

16. Pulse the INC button to carefully move the slide valve until the millivolt readout "saturates", or stops increasing. This is around 4800 millivolts Record millivolt maximum reading.

17. Pulse the DEC button until the millivolts just start to decrease. (This is the point where the channel drops out of saturation). Adjust millivolt value to 300 millivolts below recorded maximum millivolts in step #17.

18. Press the "Set Max" button.

19. Press the "Main" button to complete calibration and exit the "Slide Calibration" screen. The controller will automatically energize the actuator and drive it back to its minimum position (below 5%) for pre-start-up.

20. Note: Now the "Current Cap" or the "Current Vol" value will be displayed in the window on the "Main" screen and the "Slide Calibration" screen.

21. Gently lower the plastic cover over the top of the actuator to where it contacts the base and O-ring seal. After making sure the cover is seated properly, gently tighten the four #10 screws. **Caution: The plastic cover will crack if the screws are over tightened.**

22. Enable the "Slide Non-Movement Alarm" by going to the "Setup" menu and choosing "Alarm Enable" for the "Slide Non-Movement Option".

23. This completes the calibration for this channel either capacity or volume. Repeat the same procedure to the other channel.

Installation Instructions For Replacement Of Optical Actuator

CAUTION: WHEN INSTALLING THE OPTICAL SLIDE MOTOR, LOOSEN LOCKING COLLAR BEFORE SLIDING THE COLLAR DOWN THE SHAFT. DO NOT USE A SCREWDRIVER TO PRY LOCKING COLLAR INTO POSITION.

OVERVIEW

Calibration of an optical slide valve actuator is a two step process that must be done for each actuator installed on the compressor. The steps are as follows.

1. The actuator motor control module, located inside the actuator housing, is calibrated so that it knows the minimum and maximum rotational positions of the slide valve it controls. The calibrated actuator will output 0 VDC at the minimum position and 5 VDC at maximum position.

2. After the actuator motor control module has been calibrated for 0-5 Volts, the controlling channel corresponding to the actuator motor (either the capacity or volume) has to be calibrated. This instructs the PLC to learn the rotational 0% position & rotation 100% position of the slide valve travel.

Please Note:

Because there is an optical sensor on this motor, DO NOT attempt to calibration in direct sunlight.

3. Before applying power to the PLC disconnect the gray and yellow cable.

4. Power the PLC back on.

5. Refer to **Calibration Procedure of Optical Actuators.**

Slide Valve Actuator Theory of Operation

The slide valve actuator is a gear-motor with a position sensor. The motor is powered in the forward and reverse directions from the main computer in the control panel. The position sensor tells the main computer the position of the slide valve. The main computer uses the position and process information to decide where to move the slide valve next.

The position sensors works by optically counting motor turns. On the shaft of the motor is a small aluminum "photochopper." It has a 180 degree fence that passes through the slots of two slotted optocouplers. The optocouplers have an infrared light emitting diode (LED) on one side of the slot and a phototransistor on the other. The phototransistor behaves as a light controlled switch. When the photochopper fence is blocking the slot, light from the LED is prevented from reaching the phototransistor and the switch is open. When photochopper fence is not blocking the slot, the switch is closed.

As the motor turns, the photochopper fence alternately blocks and opens the optocoupler slots, generating a sequence that the position sensor microcontroller can use to determine motor position by counting. Because the motor is connected to the slide valve by gears, knowing the motor position means knowing the slide valve position.

During calibration, the position sensor records the high and low count of motor turns. The operator tells the position sensor when the actuator is at the high or low position with the push button. Refer to the calibration instructions for the detailed calibration procedure.

The position sensor can get "lost" if the motor is moved while the position sensor is not powered. To prevent this, the motor can only be moved electrically while the position sensor is powered. When the position sensor loses power, power is cut to the motor. A capacitor stores enough energy to keep the position sensor circuitry alive long enough for the motor to come to a complete stop and then save the motor position to non-volatile EEPROM memory. When power is restored, the saved motor position is read from EEPROM memory and the actuators resumes normal function

This scheme is not foolproof. If the motor is moved manually while the power is off or the motor brake has failed, allowing the motor to free wheel for too long after the position sensor looses power, the actuator will become lost.

A brake failure can sometimes be detected by the position sensor. If the motor never stops turning after a power loss, the position sensor detects this, knows it will be lost, and goes immediately into calibrate mode when power is restored.

Slide Valve Actuator Troubleshooting Guide

The actuator cannot be calibrated	Dirt or debris is blocking one or both optocoupler slots	Clean the optocoupler slots with a Q-Tip and rubbing alcohol.
	The photochopper fence extends less than about half way into the optocoupler slots	Adjust the photochopper so that the fence extends further into the optocoupler slots. Make sure the motor brake operates freely and the photochopper will not contact the optocouplers when the shaft is pressed down.
	The white calibrate wire in the grey Turck cable is grounded	Tape the end of the white wire in the panel and make sure that it cannot touch metal
	Dirt and/or condensation on the position sensor boards are causing it to malfunction	Clean the boards with an electronics cleaner or compressed air.
	The calibrate button is stuck down	Try to free the stuck button.
	The position sensor has failed	Replace the actuator.
	Push button is being held down for more that ¾ second when going through the calibration procedure	Depress the button quickly and then let go. Each ¾ second the button is held down counts as another press.
The actuator goes into calibration mode spontaneously	The white calibrate wire in the grey Turck cable is grounding intermittently	Tape the end of the white wire in the panel and make sure that it cannot touch metal.
	A very strong source of electromagnetic interference (EMI), such as a contactor, is in the vicinity of the actuator or grey cable	Increase the distance between the EMI source and the actuator. Install additional metal shielding material between the EMI source and the actuator or cable.
	There is an intermittent failure of the position sensor	Replace the actuator.
The actuator goes into calibration mode every time power is restored after a power loss	The motor brake is not working properly (see theory section above.)	Get the motor brake to where it operates freely and recalibrate. Replace the actuator.

Slide Valve Actuator Troubleshooting Guide

The actuator does not transmit the correct position after a power loss	The motor was manually moved while the position sensor was not powered.	Recalibrate.
	The motor brake is not working properly	Get the motor brake to where it operates freely and then recalibrate.
	The position sensor's EEPROM memory has failed	Replace the actuator.
There is a rapid clicking noise when the motor is operating	The photochopper is misaligned with the slotted optocouplers	Try to realign or replace the actuator.
	The photochopper is positioned too low on the motor shaft.	Adjust the photochopper so that the fence extends further into the optocoupler slots.
	A motor bearing has failed	Replace the actuator.
The motor operates in one direction only	There is a loose connection in the screw terminal blocks	Tighten.
	There is a loose or dirty connection in the yellow Turck cable	Clean and tighten.
	The position sensor has failed	Replace the actuator.
	There is a broken motor lead or winding	Replace the actuator.
The motor will not move in either direction	The thermal switch has tripped because the motor is overheated	The motor will resume operation when it cools. This could be caused by a malfunctioning control panel. Consult the factory.
	Any of the reasons listed in "The motor operates in one direction only"	See above.
	The command shaft is jammed	Free the command shaft.
	Broken gears in the gearmotor	Replace the actuator.
The motor runs intermittently, several minutes on, several minutes off	Motor is overheating and the thermal switch is tripping	This could be caused by a malfunctioning control panel. Consult the factory.

Slide Valve Actuator Troubleshooting Guide

The motor runs sporadically	Bad thermal switch	Replace the actuator.
	Any of the reasons listed in "The motor will not move in either direction"	See above.
The motor runs but output shaft will not turn	Stripped gears inside the gear motor or the armature has come un-pressed from the armature shaft	Replace the actuator.

Command Shaft Rotation and Travel

TABLE 1. VSS / VSR / VSM COMMAND SHAFT ROTATION AND TRAVEL

COMP. MODEL	COMMAND SHAFT ROTATION CAPACITY INC	CAPACITY DEC	VOLUME INC	VOLUME DEC	NO. OF TURNS / ROTATION CAPACITY TURNS/DEGREES/TRAVEL	ANGLE / SLIDE TRAVEL VOLUME TURNS/DEGREES/TRAVEL
VSSG 291	CW	CCW	CW	CCW	0.91 / 328 / 3.568”	0.52 / 187 / 2.045”
VSSG 341	CW	CCW	CW	CCW	0.91 / 328 / 3.568”	0.52 / 187 / 2.045”
VSSG 451	CW	CCW	CW	CCW	0.91 / 328 / 3.568”	0.52 / 187 / 2.045”
VSSG 601	CW	CCW	CW	CCW	0.91 / 328 / 3.568”	0.52 / 187 / 2.045”
VSG 751	CCW	CW	CCW	CW	1.09 / 392 / 4.283”	0.63 / 227 / 2.473”
VSG 901	CCW	CW	CCW	CW	1.09 / 392 / 4.283”	0.63 / 227 / 2.473”
VSG 1051	CCW	CW	CCW	CW	1.22 / 439 / 4.777”	0.74 / 266 / 2.889”
VSG 1201	CCW	CW	CCW	CW	1.22 / 439 / 4.777”	0.74 / 266 / 2.889”
VSG 1551	CCW	CW	CCW	CW	1.36 / 490 / 5.325”	0.82 / 295 / 3.200”
VSG 1851	CCW	CW	CCW	CW	1.36 / 490 / 5.325”	0.82 / 295 / 3.200”
VSG 2101	CCW	CW	CCW	CW	1.36 / 490 / 5.325”	0.82 / 295 / 3.200”
VSG 301	CW	CCW	CW	CCW	0.80 / 288 / 3.141”	0.45 / 162 / 1.767”
VSG 361	CW	CCW	CW	CCW	0.80 / 288 / 3.141”	0.45 / 162 / 1.767”
VSG 401	CW	CCW	CW	CCW	0.80 / 288 / 3.141”	0.45 / 162 / 1.767”
VSG 501	CCW	CW	CCW	CW	0.91 / 328 / 3.568”	0.52 / 187 / 2.045”
VSG 601	CCW	CW	CCW	CW	0.91 / 328 / 3.568”	0.52 / 187 / 2.045”
VSG 701	CCW	CW	CCW	CW	0.91 / 328 / 3.568”	0.52 / 187 / 2.045”

NOTE: These refer to the old style gear motors and DO NOT apply to the new optical motors. Rotation for the optical motors is the OPPOSITE of what is shown in the chart.

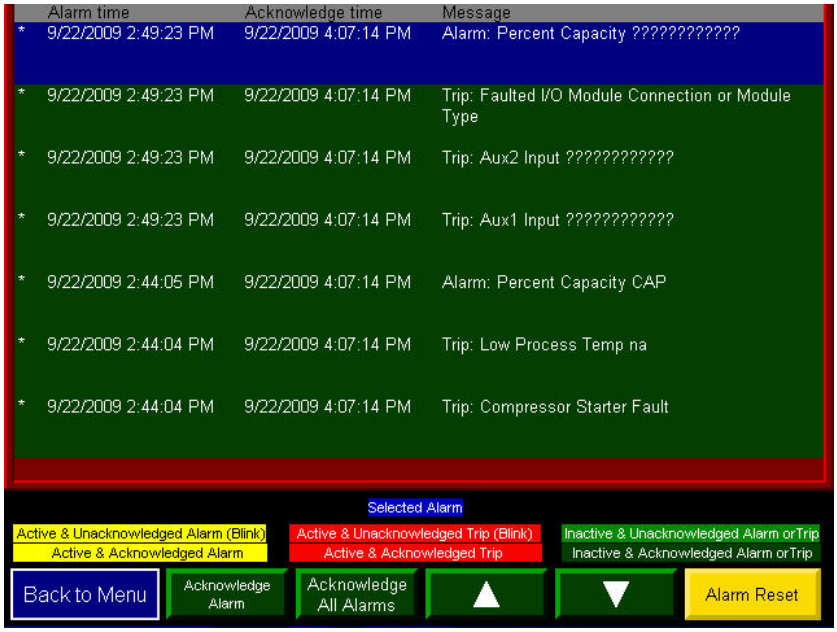
NOTES:

a) The large gear on the command shaft has 50 teeth. The teeth are counted when moving the command shaft from the minimum stop position to the maximum stop position.

b) The manual operating shaft on the gear motor should be turned the **opposite** direction of the desired command shaft rotation.

c) The capacity and volume control motors are equipped with a brake, if it is necessary to operate the control motors manually, the brake must be disengaged. The brake can be disengaged by pushing on the motor shaft on the cone end. The shaft should be **centered** in its travel. Do not use excessive force manually operating the motor or damage may result.

Safety Failure Message



Suction Pressure SP#1 Fail -

This message will appear when the suction pressure falls below the safety setting of the Lo Suction Pressure Trip Setpoint No. 1. In addition, this message will appear when the suction pressure reading rises above 300 PSI, indicating an open transducer or bad analog channel.

Suction Pressure SP#2 Fail -

This message will appear when the suction pressure falls below the safety setting of the Lo Suction Pressure Trip Setpoint No. 2. In addition, this message will appear when the suction pressure reading rises above 300 PSI, indicating an open transducer.

Discharge Pressure SP#1 Fail –

This message will appear when the discharge pressure exceeds the safety setting of the Hi Dsch Press Trip Setpoint No. 1 . In addition, this message will appear when the discharge pressure reading falls below 30" Hg, indicating a shorted transducer.

Discharge Pressure SP#2 Fail –

This message will appear when the discharge pressure exceeds the safety setting of the Hi Dsch Press Trip Setpoint No. 2 . In addition, this message will appear when the discharge pressure reading falls below 30" Hg, indicating a shorted transducer.

Suction Temp Fail –

This message will appear when the suction temperature falls below the safety setting of the Low Suction Temperature Trip setpoint. In addition, this message will appear when the suction temperature rises above 400 degrees, indicating an open RTD.

Discharge Temp Fail –

This message will appear when the discharge temperature rises above the safety setting of the High Discharge Temperature Trip setpoint. In addition, this message will appear when the discharge temperature falls below -30 degrees, indicating a shorted RTD.

Safety Failure Message

Oil Separator Start Temp Fail –

This message will appear when the Oil Separator Temp is below the Low Oil Separator Start Temp Trip setpoint. In addition this message will appear after the Oil Separator Temp Safety Changeover timer times out and the Oil Separator temperature fails to rise above the Low Oil Separator Start Temp Reset after the compressor is started.

Oil Separator Run Temp Fail –

This message will appear when the Oil Separator Temp is below the Low Oil Separator Run Temp Reset setpoint after the Oil Separator Temp Safety Changeover timer times out.

Percent Capacity Fail –

This message will appear if the percent capacity reading exceeds 300% or goes below –15%.

Percent Volume Fail –

This message will appear if the percent volume reading exceeds 300% or goes below –15%.

Low Control Temperature Fail –

This message will appear when the Process Control Temperature falls below the safety setting of the Lo Control Temperature Trip Setpoint. In addition, this message will appear when the Process Control Temperature rises above 300 degrees F, indicating an open RTD.

Low Start Oil Pressure Fail –

This message will appear with the Prelube Oil Pressure (Manifold minus Discharge) has remained below the Prelube Oil Pressure Reset setpoint. The Prelube Oil Pressure must be above the Prelube Oil Pressure for a time period of the Minimum Compressor Prelube time. It will continue to try to do this for a time period of the Prelube Oil Pump Time Limit. When the Prelube Oil Pressure fails to achieve this, then the failure message will occur.

Low Oil Pressure Fail –

This message will appear when the Running Oil Pressure (Manifold minus Suction) has remained below the low Oil Pressure Reset setpoint when the Oil Pressure Bypass at Compressor Start timer times out. This message will also appear when the Running Oil Pressure falls below the Low Oil Pressure trip setpoint after the Oil Pressure Bypass at Compressor Start timer times out.

Low Oil Injection Temp Fail –

This message will appear when the Oil Injection temperature falls below the Low Oil Injection Temperature trip setpoint. This message will also appear when the Oil Injection temperature fails to rise above the Low Oil Injection Temperature reset setpoint after the Low Oil Injection Temp Bypass timer times out.

Hi Oil Injection Temp Fail –

This message will appear when the Oil Injection temperature rises above the High Oil Injection Temperature trip setpoint.

Manifold Pressure Fail –

This message will appear with the manifold pressure rises above 300 PSI or falls below 30” Hg.

Safety Failure Message

Filter Inlet Pressure Fail –
This message will appear with the manifold pressure rises above 300 PSI or falls below 30" Hg.

Start Filter Diff Press Fail –
This message will appear if the Filter Differential pressure rises above the High Fltr Diff Press – Start setpoint before the Filter Differential Pressure Safety Changeover timer times out.

Run Filter Diff Press Fail –
This message will appear if the Filter Differential pressure rises above the High Fltr Diff Press Run setpoint after the Filter Differential Pressure Safety Changeover timer times out.

Maximum Amperage Fail –
This message will appear if the motor amperage rises above the Hi Motor Amps trip setpoint.

Motor Starter Aux Contact Fail –
This message will appear if the Motor Auxiliary contact fails to close before the Compressor Starter Auxiliary Contact Bypass timer times out. Refer to wiring diagram.

Auxiliary Safety#1 Input Fail –
This message will appear when power is removed from the input module that is designated as "Auxiliary #1 Safety" (please refer to your wiring diagram).

Low Oil Separator Level Fail –
This message may appear when power is removed from the input module that is designated as "Low Separator Oil Level Trip" (please refer to your wiring diagram). This safety has an associated delay. The associated delay timer is the Low Oil Separator Level Bypass Timer. This safety will activate only after the oil level has been low after the timer times out.

Version Screen

This screen lists a hard-coded version description of the PanelView-Plus HMI file and active information regarding the ControlLogix processor.

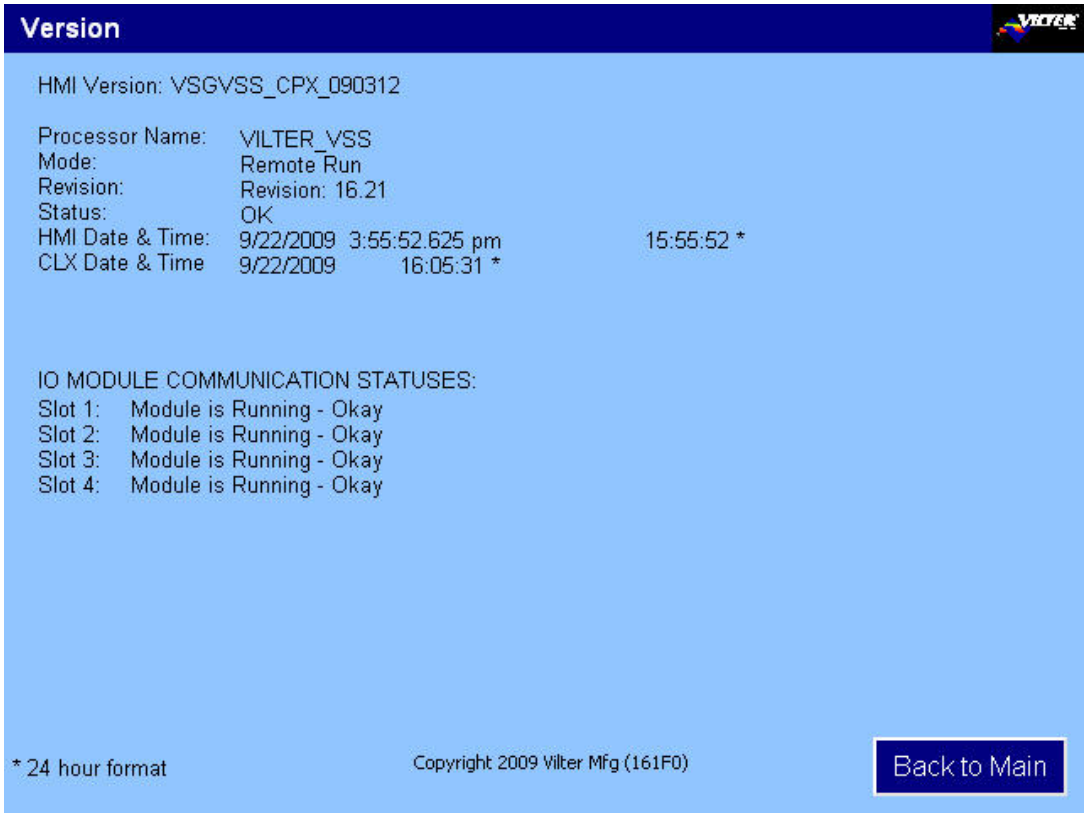
Active Logix processor information are real-time statuses via the Ethernet link between the HMI and the Logix processor.

Logix processor information displayed:

1. Processor Name: Name assigned by Vilter to the Logix processor
2. Mode: Remote Run, Run, Program
3. Revision: Revision of the processor
4. Status: OK, Faulted

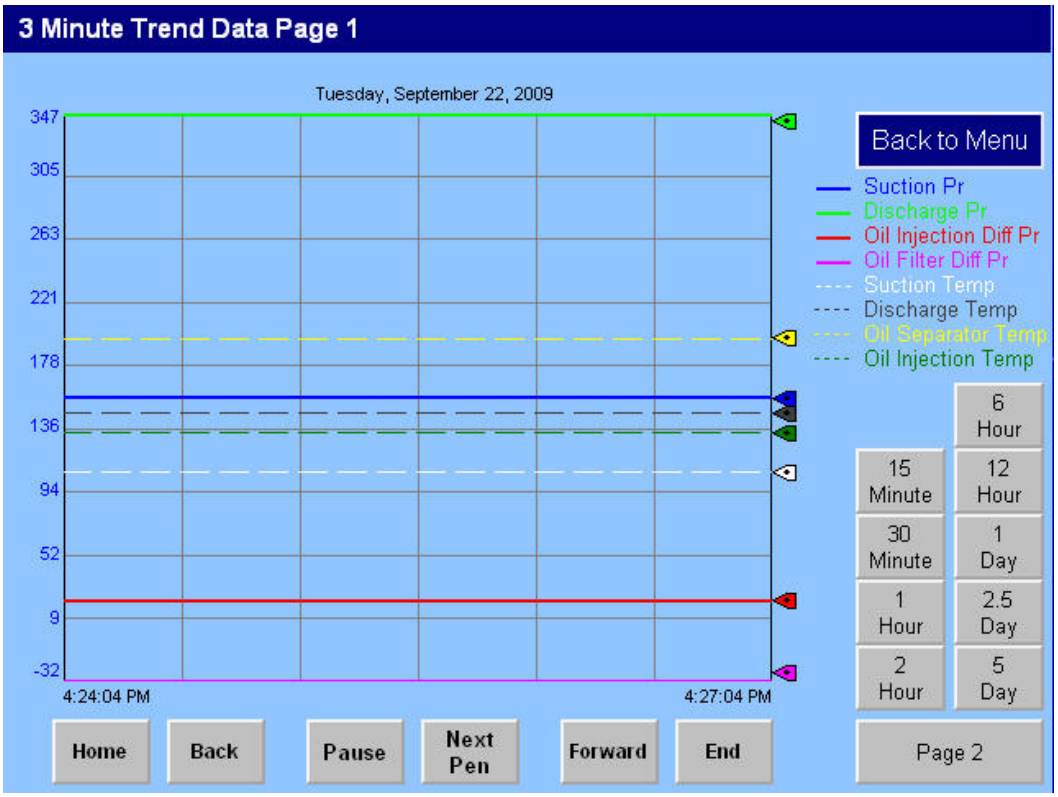
Date and Time of both the PanelView Plus unit and of the Logix processor are displayed here for operator or service technician use. Confirm that the dates and times of the HMI and Logix processor are equal. If unequal, follow instructions for setting the date and time from the Vilter Only screen.

Note: Access to the Vilter Only screen is password protected.



Trend Charts

The trend analysis screens display historic data of the last 300,000 records of analog values.



The following historical chart periods are available by touching the buttons along the right side of the screen: 3 minutes, 15 minutes, 30 minutes, 1 hour, 2 hours, 6 hours, 12 hours, 1 day, 2.5 days, 5 days. *

Back button: Displays chart of previous period. For example, if the current 1 hour period is displayed and the time is 11AM, pressing the Back button will display the logged data from 9AM to 10AM.

Forward button: Displays the chart of the next period. For example, if the 1 hour period of 4PM to 5PM is displayed, pressing the Forward button will display the data of 5PM to 6PM provided that data exists.

Home button: Returns display from any displayed period to current period time with current time oriented to the left side of the chart. For example, if the real time is 7 PM and the chart is displaying the period of 7PM to 8PM. After pressing the End button, the chart will continue to update.

End button: Returns display from any displayed period to current period with current time oriented to the right side of the chart. For example, if the real time is 7PM and the chart is displaying the period of 1PM to 2PM, pressing the End button will display the period of 6PM to 7PM. After pressing the End button, the chart will continue to update with the time period moving later per real time.

Pause button: freezes the chart of period at the current time. Touch the Pause button again to activate the chart to update at the real time.

Next Pen button: Displays the individual scaling of each pen along the Y-axis of the chart. The scaling is colored the same as the pens which are shown on the chart legend. This is useful on Page 2 of the chart of motor amperage, capacity, and volume since the amp scale would typically require a larger range than 0-100 whereas the capacity and volume will remain within 0 to 100 (%.) This allows the viewer to easily observe the relationship between data.

Trend Charts

The standard values recorded are:

Pressures - displayed on page 1:

Suction Pressure	Displayed as a bold, solid blue line
Discharge Pressure	Displayed as a bold, solid bright-green line
Oil Injection Differential Pressure	Displayed as a bold, solid red line
Oil Filter Differential Pressure	Displayed as a bold, solid pink line

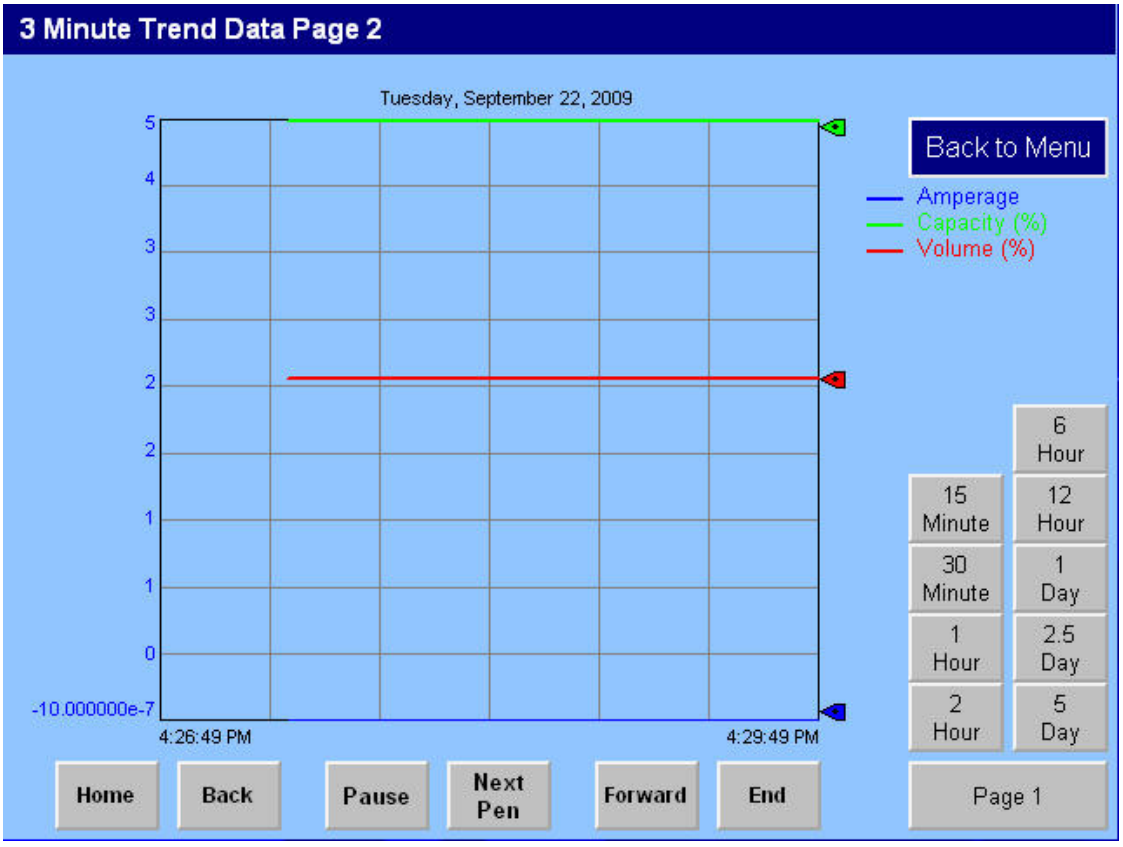
Temperatures - displayed on page 1:

Suction Temperature	Displayed as a dashed, white line
Discharge Temperature	Displayed as a dashed, dark-grey line
Oil Separator Temperature	Displayed as a dashed, yellow line
Oil Injector Temperature	Displayed as a dashed, dark-green line

Other Values - displayed on page 2:

Compressor Motor Amperage	Displayed as a bold, solid blue line
Capacity (%)	Displayed as a bold, solid bright-green line
Volume (%)	Displayed as a bold, solid red line

* As a standard, values of 11 analog items are recorded every 15 seconds. This allocates 27,272 records of each item producing 4.73 days worth of historical data. Addition of items will decrease the total record period. Historical data is stored in the flash memory card located in the back of the PanelView HMI.



Troubleshooting:

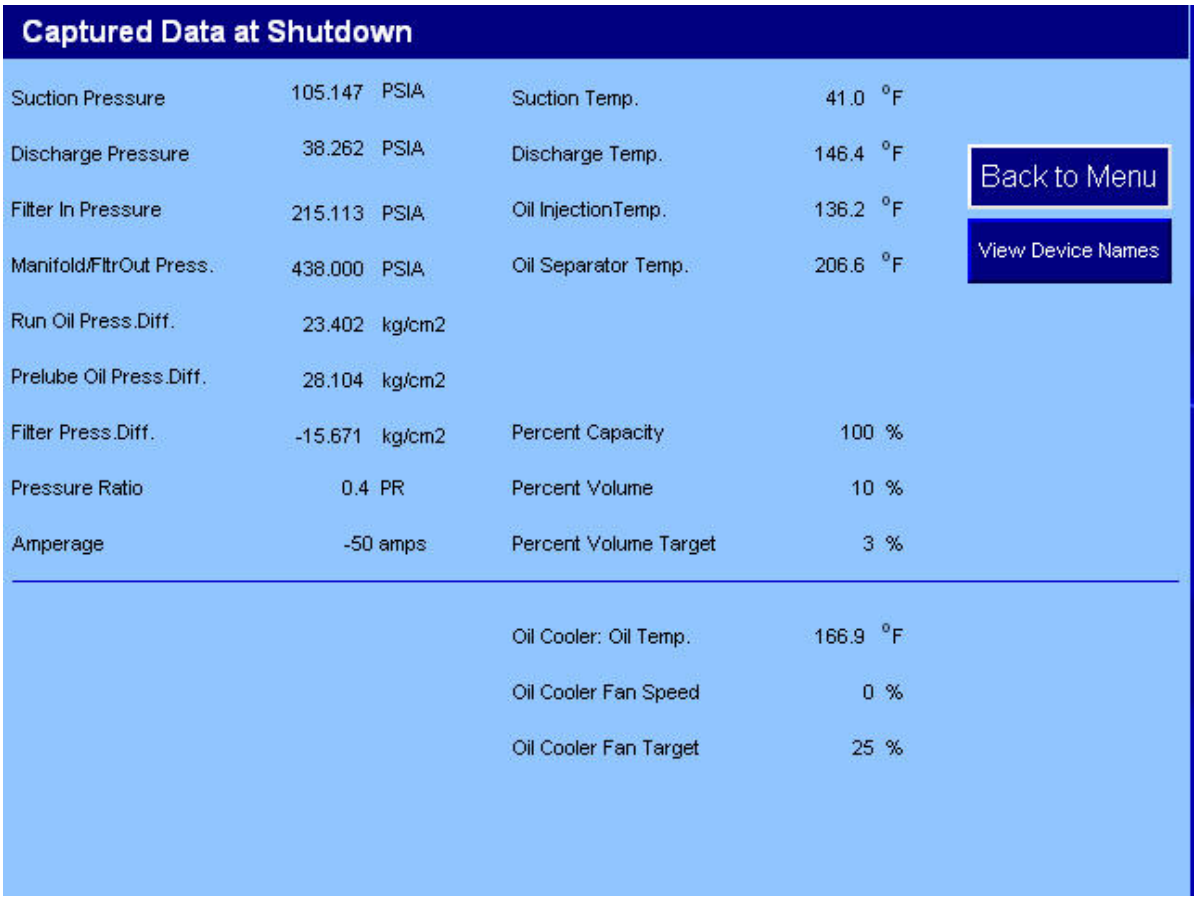
Problem: Trend charts no longer display historical data but only update with real-time data which re-initializes each time the chart is displayed.

Cause: Time and/or Date of HMI was changed so logged data file cannot be sensible.

Solution: From the Vilter Only screen (password protected) Clear the log files of the PanelView.

a. Touch or scroll to the File Management field then touch the Enter button.
b. Touch or scroll to the Delete Files field, then touch the Enter button
c. Touch or scroll to the Delete Log Files field and touch the Enter button.
DO NOT DELETE APPLICATIONS! DO NOT DELETE FONTS!
d. Touch "Yes" to delete the log files.
e. Touch the Close button twice to return to the Terminal Settings screen.
f. Touch the Close button again to exit the Terminal Settings screen.
g. Touch the Reset button then the Yes button to reset the PanelView

Captured Data at Shutdown



The Captured at Shutdown screen shows data captured prior to compressor shutdown.

A Version Slide Valve Actuator Trouble Shooting Chart

A version actuators have two circuit boards connected together by five gray wires.

PROBLEM	CAUSE	SOLUTION
The actuator cannot be calibrated or will not exit calibrate mode	Debris is blocking one or both optocoupler slots	Clean the optocoupler slots with a Q-Tip and rubbing alcohol.
	The nylon spacers separating the small board on top of the motor from the motor bearing mount have relaxed, letting the leads of the small board touch the motor bearing mount.	Space the small board or trim the leads so that they are not making contact.
	The photochopper fence extends less than about half way into the optocoupler slots	Adjust the photochopper so that there is a 0.030 gap between it the top of the optocoupler slots when the armature is depressed all the way.
	The white calibrate wire in the grey Turck cable is grounding	Correct
	Dirt and/or condensation on the position sensor boards are causing it to malfunction	Clean the boards with compressed air. If a solvent is needed, rubbing alcohol may be used.
	The calibrate button is stuck down	Try freeing.
	The position sensor has failed	Replace the actuator.
	The motor was not moved between the high and low limits.	Follow the calibration instructions carefully.
	The grey cable is not making good contact at the terminal block or connector end.	Clean and tighten as necessary.
	The calibrate button is being held down for more that ¾ second during a button press on older models.	Depress the button quickly and then let go. Each ¾ second the button is held down counts as another press.
	The actuator is wired wrong.	Correct.

PROBLEM	CAUSE	SOLUTION
The actuator goes into calibration mode spontaneously	The white calibrate wire in the grey Turck cable is grounding intermittently	Correct.
	A very strong source of electromagnetic interference is in the vicinity of the actuator or grey cable	Increase the distance between the EMI source and the actuator.
		Install additional ferrous metal shielding material between the EMI source and the actuator or cable.
	The voltage regulator IC on the circuit board has a broken lead due to vibration fatigue.	Replace the actuator.
The actuator goes into calibration mode every time power is restored after a power loss	The motor brake is not working properly.	Get the motor brake to where it operates freely and recalibrate. Sometimes, tapping on the zinc die cast bearing mount with a small hammer to get everything is aligned will work.
	The EEPROM memory on the circuit board has failed.	Replace the actuator
The actuator does not transmit the correct position after a power loss	The motor was manually moved while the position sensor was not powered.	Recalibrate.
	The motor brake is not working properly	Get the motor brake to where it operates freely and then recalibrate.
	The position sensor's EEPROM memory has failed	Replace the actuator.

PROBLEM	CAUSE	SOLUTION
There is a rapid clicking noise when the motor is operating	The photochopper is misaligned with the slotted optocouplers	Realign by slightly loosening the mounting screws for the small encoder board and moving the board using finger pressure. Be careful not to over-tighten the mounting screws, they are easily stripped.
	The photochopper is positioned too low on the motor shaft.	Adjust the photochopper so that there is a 0.030 gap between it the top of the optocoupler slots when the armature is depressed all the way..
	A motor bearing has failed	Replace the actuator.
The motor operates in one direction only	There is a loose connection in the screw terminal blocks	Tighten gently.
	There is a loose or dirty connection in the yellow Turck cable	Clean and tighten.
	The circuit board has failed.	Replace the actuator.
	There is a broken motor lead or winding	Replace the actuator.
The motor will not move in either direction	The thermal switch has tripped because the motor is overheated	The motor will resume operation when it cools.
	Any of the reasons listed in "The motor operates in one direction only"	See above.
	The command shaft is jammed	Free the command shaft.
	Broken gears in the gearmotor	Replace the actuator.
The motor runs intermittently, several minutes on, several minutes off	Motor is overheating and the thermal switch is tripping	This could be caused by a malfunctioning control panel. Consult the factory.
The motor runs sporadically	Bad thermal switch	Replace the actuator.
	Any of the reasons listed in "The motor will not move in either direction"	See above.

PROBLEM	CAUSE	SOLUTION
The motor runs but output shaft will not turn	Stripped gears inside the gear motor or the armature has come un-pressed from the armature shaft	Replace the actuator.
The actuator does not transmit the correct position. The actuator output drifts.	The actuator is being operated where a strong infrared light source, such as direct sunlight, is shining on the slotted optocouplers.	Replace the cover, if it is missing, or shade the actuator.
	The nylon spacers separating the small board on top of the motor from the motor bearing mount have relaxed, letting the leads of the small board touch the motor bearing mount.	Space the small board or trim the leads so that they are not making contact.
	The photochopper fence extends less than about half way into the optocoupler slots	Adjust the photochopper so that there is a 0.030 gap between it the top of the optocoupler slots when the armature is depressed all the way.
The actuator does not transmit the correct position and only outputs one of two values.	One of the slotted optocouplers has failed	Replace the actuator
The actuator does not transmit the correct position and only outputs one value.	Both slotted optocoupler have failed	Replace the actuator.
	The actuator is wired incorrectly	Correct.

B Version Slide Valve Actuator Trouble Shooting Charts

B version actuators have a single circuit board. They communicate problems discovered by the internal diagnostics by LED blink codes. Only one blink code is displayed, even though it is possible that more than one problem has been detected.

LED Blink Codes Troubleshooting Chart

Flash Pattern * = on - = off	Meaning
--*-*-*-*-*-*-*-*-	Calibration step 1.
------*---*---*---*---	Calibration step 2.
------------	This indicates a zero span. This error can only occur during calibration. The typical cause is forgetting to move the actuator when setting the upper limit of the span. If this is the case, press the blue button to restart the calibration procedure. This error can also occur if either or both of the slotted optocouplers are not working. If this is the case, the slide valve actuator will have to be replaced. The operation of the slotted optocouplers can be tested as follows: 1. Manually rotate the motor shaft until the aluminum photochopper fence is not blocking either of the optocoupler slots. 2. Using a digital multi-meter, measure the DC voltage between terminal 3 of the small terminal block and TP1 on the circuit board (see note 1). You should measure between 0.1 and 0.2 Volts. 3. Next, measure the DC voltage between terminal 3 and TP2 on the circuit board. You should measure between 0.1 and 0.2 Volts.
*----------	This indicates a skipped state in the patterns generated by the optocouplers as the motor moves. This error means that the slide valve actuator is no longer transmitting accurate position information. The actuator should be recalibrated as soon as possible. This code will not clear until the actuator is re-calibrated. This code can be cause by: 1. The motor speed exceeding the position sensors ability to measure it at some time during operation. A non-functioning motor brake is usually to blame 2. The actuator is being operated where strong infrared light can falsely trigger the slotted optocouplers, such as direct sunlight. Shade the actuator when the cover is off for service and calibration and do not operate the actuator with the cover off.

Flash Pattern * = on - = off	Meaning
----*----------	The motor is overheated. The actuator motor will not run until it cools. Once the motor cools, the actuator will resume normal operation. Motor overheating is sometimes a problem in hot and humid environments when process conditions demand that the slide valve actuators reposition often. Solutions are available; consult your Vilter authorized distributor for details. Another possible cause for this error is a stuck motor thermal switch. The thermal switch can be tested by measuring the DC voltage with a digital multi-meter between the two TS1 wire pads (see note 2). If the switch is closed (normal operation) you will measure 0 Volts.
**********	The 24V supply voltage is low. This will occur momentarily when the actuator is powered up and on power down. If the problem persists, measure the voltage using a digital multi-meter between terminals 3 and 4 of the small terminal block. If the voltage is less than 24V, the problem is in the supply to the board. If the voltage is >= 24V, replace the actuator..
-**********	The EEPROM data is bad. This is usually caused by loss of 24V power before the calibration procedure was completed. The actuator will not move while this error code is being displayed. To clear the error, calibrate the actuator. If this error has occurred and the cause was not loss of 24V power during calibration, then possible causes are: 1. The EEPROM memory is the microcontroller is bad. 2. The large blue capacitor is bad or has a cracked lead.
*****----*----------	Microcontroller program failure. Replace the actuator.

Note 1: TP1 and TP2 are plated through holes locate close to the slotted optocouplers on the board. They are clearly marked on the board silkscreen legend.

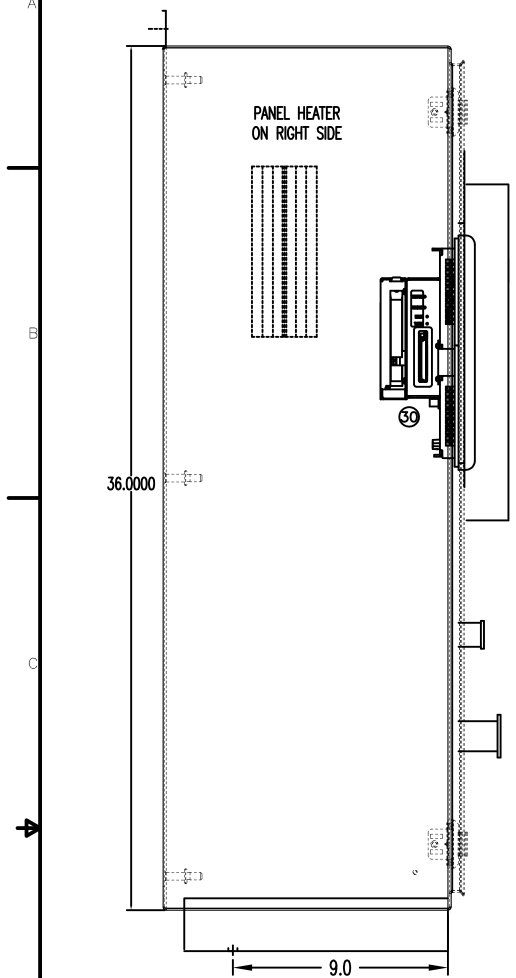
Note 2: The TS1 wire pads are where the motor thermal switch leads solder into the circuit board. They are clearly marked on the board silkscreen legend and are oriented at a 45 degree angle.

Version B Troubleshooting Chart

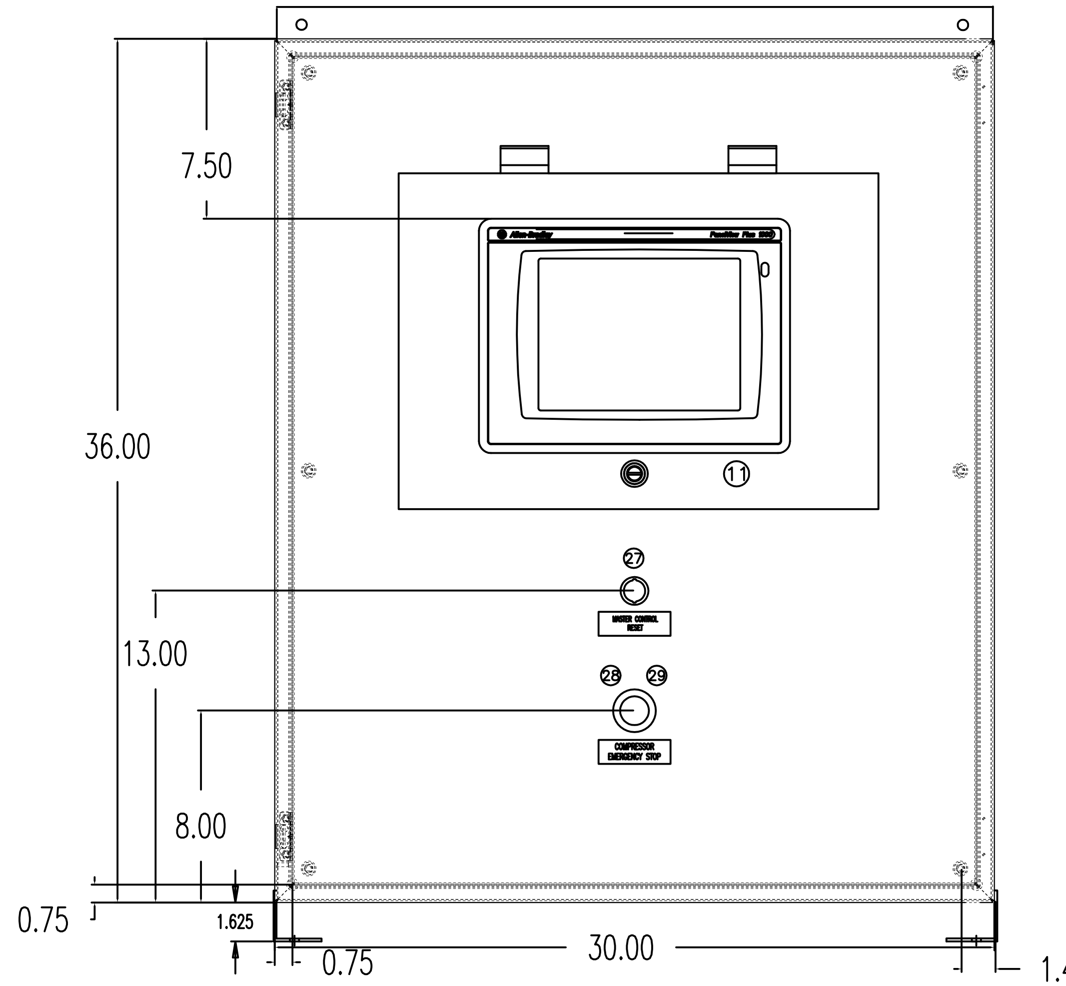
PROBLEM	CAUSE	SOLUTION
The actuator will not calibrate properly, the range is ¼ turn.	Debris is blocking an optocoupler slot	Clean the optocoupler slots with a Q-Tip and rubbing alcohol.
	An optocoupler has failed.	Replace the actuator. See the Blink Code Troubleshooting Chart for test procedure.
The actuator will not exit calibrate mode or behaves oddly during calibration.	The white calibrate wire in the grey Turck cable is grounding	Correct
	The calibrate button is stuck down	Try freeing.
	The grey cable is not making good contact at the terminal block or connector end.	Clean and tighten as necessary.
	The actuator is wired wrong.	Correct.
The actuator goes into calibration mode spontaneously	The white calibrate wire in the grey Turck cable is grounding intermittently	Correct.
	A very strong source of electromagnetic interference is in the vicinity of the actuator or grey cable	Increase the distance between the EMI source and the actuator.
		Install additional ferrous metal shielding material between the EMI source and the actuator or cable.
The actuator goes into calibration mode every time power is restored after a power loss	The motor brake is not working properly.	Get the motor brake to where it operates freely and recalibrate.
	The EEPROM memory has failed.	Replace the actuator
The actuator does not transmit the correct position after a power loss	The motor was manually moved while the position sensor was not powered.	Recalibrate.
	The motor brake is not working properly	Get the motor brake to where it operates freely and then recalibrate.
	The EEPROM memory has failed.	Replace the actuator.

PROBLEM	CAUSE	SOLUTION
Clicking noises when the actuator is moving.	The photochopper is misaligned with the slotted optocouplers	Check that the four screws securing the board and motor are tight and that the motor shaft is not rubbing the board. If the slotted optocouplers have been misaligned on the board for some reason, they can be gently bent back into place.
	The photochopper is positioned too low on the motor shaft.	Adjust the photochopper so that there is a 0.030 gap between it the top of the optocoupler slots when the armature is depressed all the way..
	A motor bearing has failed and the motor shaft is flopping.	Replace the actuator.
	A gear broken teeth	Replace the actuator.
The actuator moves in one direction only	There is a loose connection in the screw terminal blocks	Tighten gently.
	There is a loose or dirty connection in the yellow Turck cable	Clean and tighten.
	There is a broken motor lead or winding	Replace the actuator.
	There is a problem in the control panel.	Correct.
The actuator will not move in either direction	The thermal switch has tripped because the motor is overheated	The motor will resume operation when it cools.
	Any of the reasons listed in "The actuator moves in one direction only"	See above.
	The command shaft is jammed	Free the command shaft.
	Broken gears in the gearmotor	Replace the actuator.
The motor runs intermittently, several minutes on, several minutes off	Motor is overheating and the thermal switch is tripping	This could be caused by a malfunctioning control panel. Consult the factory.

PROBLEM	CAUSE	SOLUTION
The motor runs sporadically	Bad thermal switch	Replace the actuator.
	Any of the reasons listed in "The motor will not move in either direction"	See above.
The motor runs but output shaft will not turn	Stripped gears inside the gear motor or the armature has come un-pressed from the armature shaft	Replace the actuator.
The actuator does not transmit the correct position. The actuator output drifts.	The actuator is being operated where a strong infrared light source, such as direct sunlight, is shining on the slotted optocouplers.	Replace the cover, if it is missing, or shade the actuator if it is being calibrated.
	The photochopper fence extends less than about half way into the optocoupler slots	Adjust the photochopper so that there is a 0.030 gap between it the top of the optocoupler slots when the armature is depressed all the way.
The actuator does not transmit the correct position and only outputs one of two values.	A slotted optocoupler has failed	Replace the actuator.
The actuator does not transmit the correct position and only outputs one value.	The actuator is wired incorrectly	Correct.



LEFT SIDE VIEW

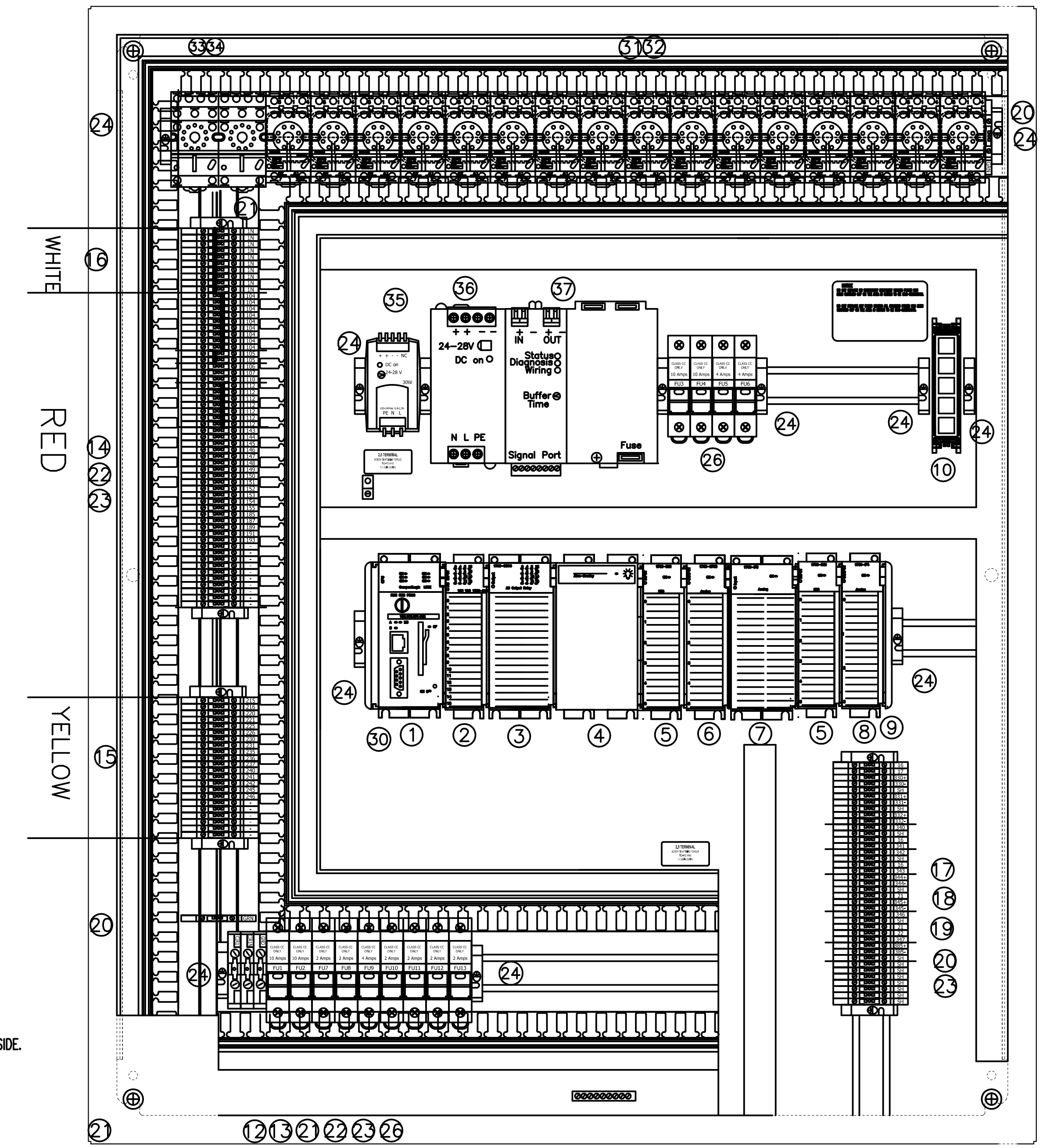


INCOMING 120VAC POWER ENTERS THIS SIDE

CONDUIT TO ENTER BOTTOM OR SIDES OF ENCLOSURE. AVOID CONDUIT ENTRY ON TOP.120 VAC WIRING TO ENTER LEFT SIDE. ANALOG/COMM/NETWORK WIRING TO ENTER RIGHT SIDE.

DC/ANALOG & COMM/NETWORK WIRING ENTERS THIS SIDE.

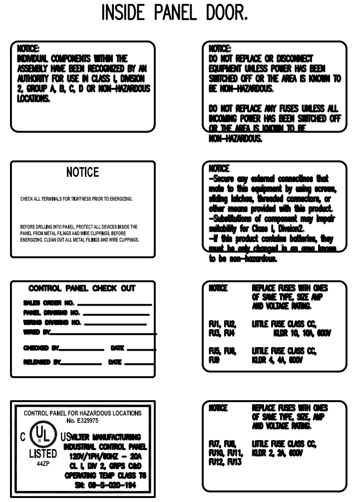
NEMA 4 ENCLOSURE SIZED:
30" WIDE X 36" HIGH X 12" DEEP
PAINTED STEEL (VILTER)
WITH SCREEN COVER



FRONT ENCLOSURE
INTERNAL VIEW

LISTED AND LABELED AS UL1604 FOR CLASS 1 DIVISION 2 RATED AREAS.

UL AND MFG DECALS LOCATED INSIDE PANEL DOOR.



BOM ITEM NUMBER (XX)

COMPONENT IDENTIFICATION					
ITEM	QUANTITY	MANUFACTURE	VILTER PART NUMBER	DESCRIPTION	CL1, DIV 2 APPROVED
1	1	ALLEN BRADLEY	3252AA	COMPACT LOGIX PROSESSOR 1.5M MEMORY WITH ETHERNET	YES
2	1	ALLEN BRADLEY	3252E	COMPACT LOGIX 16 POINT 120VAC INPUT MODULE	YES
3	1	ALLEN BRADLEY	3252K	COMPACT LOGIX 16 POINT RELAY OUTPUT MODULE	YES
4	1	ALLEN BRADLEY	3252P2	COMPACT LOGIX 24VDC POWER SUPPLY	YES
5	2	ALLEN BRADLEY	3252N	COMPACT LOGIX 6 CHANNEL RTD MODULE	YES
6	1	ALLEN BRADLEY	3252Y2	COMPACT LOGIX 8 OUTPUT ANALOG MODULE	YES
7	1	ALLEN BRADLEY	3252M	COMPACT LOGIX 8 CHANNEL ANALOG CUR/VOLT INPUT MODULE	YES
8	1	ALLEN BRADLEY	3252L	COMPACTLOGIX 4 CHANNEL ANALOG CUR/VOLT INPUT MODULE	YES
9	1	ALLEN BRADLEY	3252S	COMPACT LOGIX RIGHT END CAP TERMINATOR	YES
10	1	ALLEN BRADLEY	3252U1	INDUSTRAL ETHERNET SWITCH, 5 PORT RJ45 10/100TX	YES
11	1	ALLEN BRADLEY	3252G1	PANELVIEW 10000, OPERATOR INTERFACE	YES
12	2	ALLEN BRADLEY	3089QB	BLACK TERMINAL BLOCKS	YES
13	2	ALLEN BRADLEY	3089QA	WHITE TERMINAL BLOCKS	YES
14	50	ALLEN BRADLEY	3098AAD	RED TERMINAL BLOCKS	YES
15	24	ALLEN BRADLEY	3089AAE	YELLO TERMINAL BLOCKS	YES
16	10	ALLEN BRADLEY	3089AAF	WHITE TERMINAL BLOCKS	YES
17	15	ALLEN BRADLEY	3089AAG	BLUE TERMINAL BLOCKS	YES
18	1	ALLEN BRADLEY	3089M7	BLUE END BARRIERS	YES
19	15	ALLEN BRADLEY	3089AAH	BROWN TERMINAL BLOCKS	YES
20	16	ALLEN BRADLEY	3089RA	GREEN/YELLOW GROUNDING TERMINAL BLOCK	YES
21	1	ALLEN BRADLEY	3089RB	GROUNDING TERMINAL BLOCKS	YES
22	2	ALLEN BRADLEY	3089M6	GRAY END BARRIERS	YES
23	12	ALLEN BRADLEY	3089SA	PARTITION PLATES	YES
24	16	ALLEN BRADLEY	3089NB	END RETAINERS	YES
25	-	ALLEN BRADLEY	3098E2	PLUG IN JUMMPERS	YES

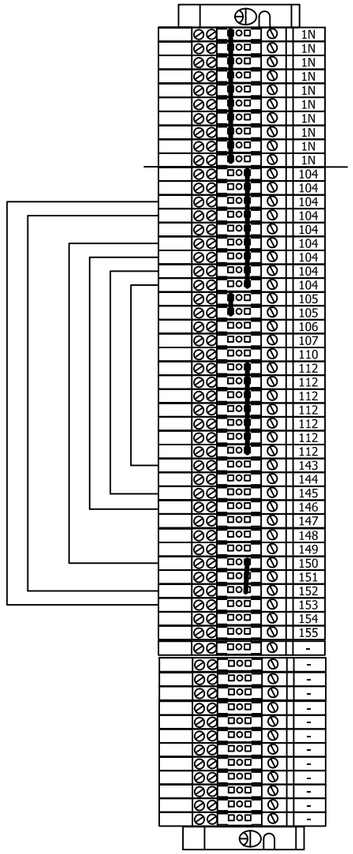
COMPONENT IDENTIFICATION					
ITEM	QUANTITY	MANUFACTURE	VILTER PART NUMBER	DESCRIPTION	CL1, DIV 2 APPROVED
26	14	ALLEN BRADLEY	3090BCD2	FUSE BLOCK TERMINAL	YES
27	1	ALLEN BRADLEY	2011P	MOMENTARY PUSH-BUTTON	YES
28	1	ALLEN BRADLEY	2011N	MANTAINED ILLUMINATED MUSHTROOMED PUSH-PULL BUTTON	YES
29	1	ALLEN BRADLEY	2011G	EXTRA CONTACT FOR E-STOP 1 N.C. AND 1 N.O.	YES
30	2	TRANCEND	3485FC	MEMORY CARDS	YES
31	11	MAGNACRAFT	3091AD2	8 PIN/DPDT 12 AMP RELAY	YES
32	11	MAGNACRAFT	3091BD2	OCTAL 8 PIN RELAY BASE	YES
33	2	MAGNACRAFT	3091EFS	11 PIN/ 3PDT 2 AMP RELAY	YES
34	2	MAGNACRAFT	3091EFS1	OCTAL 11 PIN RELAY BASE	YES
35	1	PULS	3131A	DC POWER SUPPLY, 120VAC INPUT, 24VDC-1.3A OUTPUT, CLASS 2	YES
36	1	PULS	3131K	DC POWER SUPPLY, 120VAC INPUT, 24VDC-10A OUTPUT	YES
37	1	PULS	3131L	UPS 24VDC INPUT, 24VDC-10A OUTPUT	YES

FUSE REPLACEMENT			
ITEM	MANUFACTURE	VILTER PART NUMBER	DESCRIPTION
FU1	ALLEN-BRADLEY	3090DD2	10 AMP TIME DELAY FUSE
FU2	ALLEN-BRADLEY	3090DD2	10 AMP TIME DELAY FUSE
FU3	ALLEN-BRADLEY	3090DD2	10 AMP TIME DELAY FUSE
FU4	ALLEN-BRADLEY	3090DD2	10 AMP TIME DELAY FUSE
FU5	ALLEN-BRADLEY	3090RD2	4 AMP TIME DLAY FUSE
FU6	ALLEN-BRADLEY	3090RD2	4 AMP TIME DLAY FUSE
FU7	ALLEN-BRADLEY	3090BD2	2 AMP TIME DLEAY FUSE
FU8	ALLEN-BRADLEY	3090BD2	2 AMP TIME DLEAY FUSE
FU9	ALLEN-BRADLEY	3090RD2	4 AMP TIME DLAY FUSE
FU10	ALLEN-BRADLEY	3090BD2	2 AMP TIME DLEAY FUSE
FU11	ALLEN-BRADLEY	3090BD2	2 AMP TIME DLEAY FUSE
FU12	ALLEN-BRADLEY	3090BD2	2 AMP TIME DLEAY FUSE
FU13	ALLEN-BRADLEY	3090BD2	2 AMP TIME DLEAY FUSE

REVISION	DRWN. BY	APPR. BY	DATE
IAL RELEASE. ECN: M100044	APF	LHR	3/18/10

COMPACT LOGIX PLC — SYSTEM DESCRIPTION — SHEET 1 OF 4

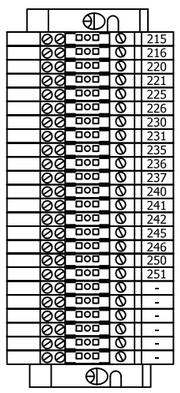
SCALE: N.T.S.
PROPRIETARY: NO
DATE: 3/18/10
DRAWN BY: APF
CONFIDENTIAL PROPERTY OF VILTER MANUFACTURING, LLC. CUDAHY, WISCONSIN, U.S.A.
D
TITLE: TITLE
PROJECT: GAS COMPRESSOR CONTROL PANEL
ORDER NO: ORDER
PART NUMBER: A10M888A-1
REVISION: R0



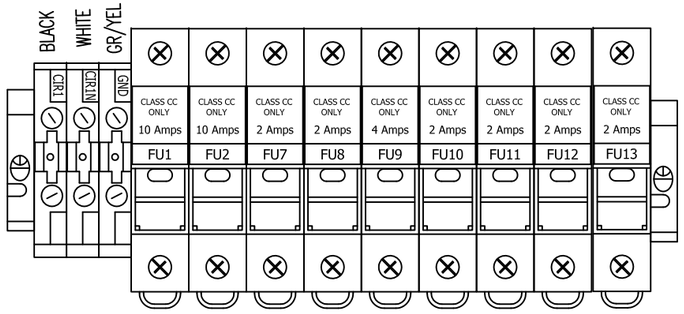
WHITE
TERMINALS

RED
TERMINALS

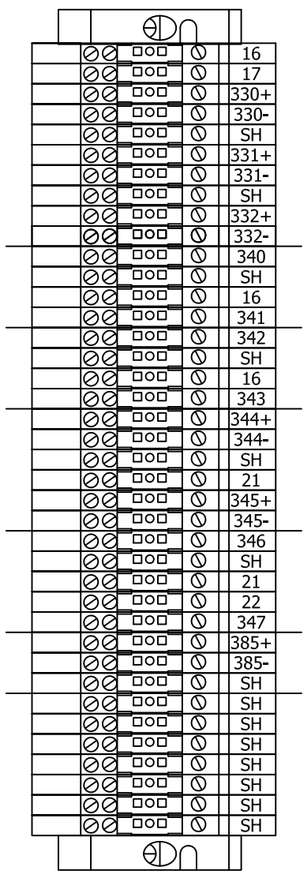
FACTORY JUMPERS
NOTE: JUMPER WIRES
ROUTED THROUGH
WIRE MANAGEMENT



YELLOW
TERMINALS

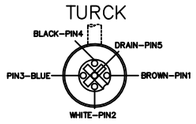


GROUND TERMINALS (SH) – GREEN/YEL
POSITIVE TERMINALS – BROWN
NEGATIVE TERMINALS – BLUE



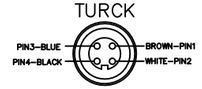
				COMPACT LOGIX PLC	2 OF 4
				N.T.S.	D
				NO	VILTER MANUFACTURING, LLC CUDAHY, WISCONSIN, U.S.A.
				3/18/10	
				APF	
				GAS COMPRESSOR CONTROL PANEL	
				CUSTOMER	
R0	INITIAL RELEASE. SEE ECN: M100644	APF	LRH	3/18/10	ORDER A10M888B-1 R0
ITEM	REVISION	ORIGINATED BY	APPROVED BY	DATE	

CLASS 1, DIV2 HAZARDOUS LOCATIONS
RTDS, TRANSDUCERS, ACTUATORS
ANALOG SIDE(DC)

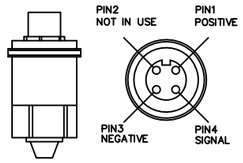


3122L9 10METERS
3122L15 15METERS
TIC/PLTC PUR BLACK
4X22 AWG
105C
6.8MM OD
CABLE #RF51095–M

ACTUATORS–AC SIDE

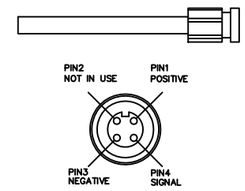


3122K8 4METERS
3122K9 8METERS
3122K10 10METERS
3122K15 15METERS
4X22 AWG
UL: ITC/PLTC/AWM 105C, 300V
CSA: CMG/AWM 105C, 300V



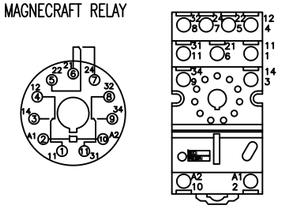
VILTER PART NUMBER	2783D2/2783D4
MANUFACTURE	DANFOSS
MFR PART NUMBER	AKS3000
SUPPLY VOLTAGE	15–30 VDC
SIGNAL OUTPUT	4–20 mA
CLASSIFICATION	CLASS 1 DIV 2

SENSOR TEC RTD



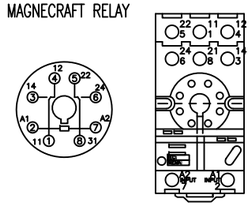
VILTER NUMBER	2611G
MANUFACTURE	SENSOR TEC INC.
MFR PART NUMBER	MP–011408
RESISTANCE	100 W PLATINUM
EUROPEAN	CURVE = 0.00385
CONNECTOR CLASSIFICATION	TURCK FS 4.4 (4 PIN)

MAGNECRAFT RELAY



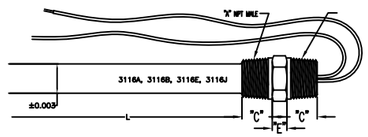
VILTER NUMBER	3091EFS1
MANUFACTURE	MAGNECRAFT
MFR PART NUMBER	70–750DL11–1
VOLTAGE	300VAC
CURRENT	16A
DESCRIPTION	11PIN OCTAL SOCKET FINGER SAFE
CLASSIFICATION	CLASS 1 DIV 2

MAGNECRAFT RELAY



VILTER NUMBER	3091EFS
MANUFACTURE	MAGNECRAFT
MFR PART NUMBER	70–750DL8–1
VOLTAGE	300VAC
CURRENT	16A
DESCRIPTION	8PIN OCTAL SOCKET FINGER SAFE
CLASSIFICATION	CLASS 1 DIV 2

TEMPCO HEATERS

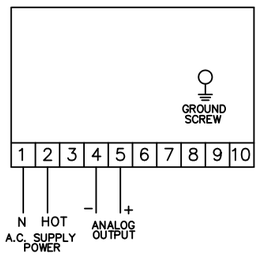


VILTER PART NUMBER		3116B
MANUFACTURE		TEMPCO
MANUFACTURE PART NUMBER		HDC–08300
WATTAGE		1000
VOLTAGE⎓		120V
APPROVAL	CSA	YES
	UL	YES

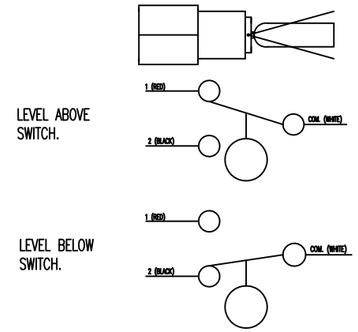
"A" NPT MALE

CLASS1 DIV2 – HEATER SHALL NOT EXCEED 80% OF THE IGNITION TEMP IN DEGREES CELSIUS OF THE GAS OR VAPOR INVOLVED ON ANY SURFACE THAT IS EXPOSED TO THE GAS OR VAPOR WHEN CONTINUOUSLY ENERGIZED AT THE MAX RATED AMBIENT TEMP. IF A TEMP CONTROLLER IS NOT PROVIDED, THESE CONDITIONS SHALL APPLY WHEN HEATER IS OPERATED AT 120% OF RATED VOLTAGE.
NEC CODE 501.135(B)(1) 2008EDITION

FLOW–TEK MOTORIZED VALVE

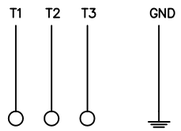


Vilter Part Number
Manufacture
Manufacture Number
Supply Voltage
Wattage
Output
Classification



VILTER PART NUMBER
MANUFACTURE
MFR. PART NUMBER
VOLTAGE
CURRENT
CONTACT

OIL PUMP MOTOR



VILTER PART NUMBER
MANUFACTURE
MFR. PART NUMBER
VOLTAGE
CURRENT
CONTACT

Contact Person	
Salesman	
Project Engineer	
Type of Skid:	
Type of Gas:	
Type of System:	
Classification	
UL Approval	
Power Voltage	
Available Control Voltage	
Estimated Ship Date	
Engineered Set Point Info	
Order Receipt Date	
Job Site Set point Info	

R0	INITIAL RELEASE SEE ECN: M100044	APF	LRH	3/18/10	
ITEM	SYM	REVISION	DRAWN BY	APPR. BY	DATE

COMPACT LOGIX PLC — 3 of 4
N.T.S. — NO — 3/18/10 — APF
PROPRIETARY INFORMATION PROPERTY OF VILTER MANUFACTURING, LLC CUDAHY, WISCONSIN, U.S.A.
GAS COMPRESSOR CONTROL PANEL
CUSTOMER
ORDER A10M888B–2 R0

GENERAL WIRING NOTES:

1. WIRING PER NEMA 4, CLASS 1, DIV 2, GROUPS D
2. PANEL AND WIRING SHALL BE MANUFACTURED PER UL CLASS 1, DIV 2, GROUP D STANDARDS.
3. ELECTRICAL TRANSMISSION, CONTROL AND ALARM WIRING SHALL BE STRANDED COPPER NO SMALLER THAN NO. 16 AWG. ALL OTHER CONTROL COPPER. USE JIC COLOR CODE, UNLESS OTHERWISE NOTED.
4. SLIDE MOTOR WIRING SHOWN FOR VSM-501 THROUGH VSM-701 & VSS/VSG-751 THROUGH VSS/VSG-2101. FOR ALL OTHER SIZES, REVERSE THE BROWN AND BLUE WIRES TO THE CAPACITY AND VOLUME MOTORS.
5. ALL CIRCUITS FROM A SOURCE OUTSIDE OF THIS PANEL ARE TO BE 12AWG YELLOW.
6. ALL NEUTRALS FROM A SOURCE OUTSIDE OF THIS PANEL ARE TO BE 12AWG WHITE YELLOW TRACER.
7. REMOVE JUMPER IF USED.
8. UNUSED DEFINED AS HAVING A PREVIOUS ASSIGNMENT. SPARE DEFINED AS NO PREVIOUS ASSIGNMENT.
9. ALL ANALOG INPUTS ARE TO BE CONNECTED WITH SHIELDED CABLE.
10. ALL ANALOG SIGNAL WIRING SHALL BE GROUNDED AT ONE END ONLY. GROUND SHIELD OF SIGNAL CABLES ON GROUND TERMINAL IN PLC PANEL.
11. ANALOG WIRING MUST BE RUN IN SEPARATE RACEWAYS FROM AC WIRING AND KEPT SEPARATE WITHIN THE ENCLOSURE.
12. USE ALPHA P/N 2423C, 3 COND, 18 AWG, SHIELDED OR APPROVED EQUAL.
13. 120 VAC OUTPUT. INTERPOSING RELAY REQUIRED FOR OTHER VOLTAGE.
14. ONLY ONE CUSTOMER NETWORK CABLE TO SWITCH.
15. ALL EQUIPMENT GROUNDS MUST BE GREEN. APPLY GREEN HEAT SHRINK OR COLOR CONDUCTOR WITH MARKER.
16. ALL HEAT DEVICES SOURSED POWER BY OTHERS.

INCOMING WIRING NOTES:

1. INCOMING 120VAC POWER ENTERS ON HINGED SIDE OF PANEL.
2. DC/ANALOG AND COMMUNICATIONS/NETWORK WIRING ENTERS ON FASTENED SIDE.

ITEM	DWG	REVISION	DRAWN BY	APPR. BY	DATE
R0		INITIAL RELEASE SEE ECN: M100044	APF	LRH	3/18/10

COMPACT LOGIX PLC — 4 OF 4 SHEETS

SCALE: N.T.S.
DRAWING NO.
DATE: 3/13/10
DRAWN BY: APF
CUSTOMER: GAS COMPRESSOR CONTROL PANEL
ORDER: A10M888B-3
SIZE: D
REV: R0

VILTER MANUFACTURING, LLC
CUDAHY, WISCONSIN, U.S.A.

POWER FROM STARTER PANEL PER THE NATIONAL ELECTRIC CODE. 120VAC / 60Hz / 20A SEE NOTE: 4

CIR1 (Y) — PTB-CIR1 (Y) — 101

EMERGENCY STOP ON CONTROL ENCLOSURE SEE NOTE: 4

103 (Y) — (FB-1) FU1 10A (L) — 104 (R) — TB-104 — 104

102 (Y) — (FB-2) FU2 10A (R) — 134

OPTIONAL EMERGENCY SHUTDOWN (ESD) SEE NOTE: 14

105 — TB-105 — 105

OPTIONAL EMERGENCY SHUTDOWN (ESD) SEE NOTE: 14

108 — TB-105 — 108

CUSTOMER SUPPLIED CONTACT (CS) PLANT SEE NOTE: 14

109 — TB-106 — 106

107 — TB-107

PB-1 MCR RESET

110 — TB-110 — 111 — TB-112 — 112

MCRA-1 POWER SUPPLY AUX 3 4 13 14

MCR A 10 2 — 1N — MASTER CONTROL RELAY 1-117, 1-144

MCR B 10 2 — 1N — 2-237

112 — TO LINE 161

CIR1N (W/Y) — PTB-1N — 1N (W/Y) — TB-1N (W) — 1N

PANEL GND LUG — DOOR GND LUG

(BRN) 16 — (BLU) 17 — 24VDC TO SHEET 3&11, LINE 331, 338, 370 (16 BRN AWG) (16 BLU AWG)

PULS CLASS 2 POWER SUPPLY — NEC CLASS 2 24VDC POWER

134 — PULS POWER SUPPLY — L1 L2 — 134

FU3 10A (BRN) — 18 — L1 COM — 1N (BLU) — 24VDC POWER SUPPLY 117

PULS UPS — 19 — 20

FU4 10A (BRN) — 21 — 23 — 24VDC — 22 (BLU) — 24VDC UPS 145, 146

(14 AWG) — 12VDC — UPS 12VDC BATTERY

FU5 4A — 21 — 24 — L1 GND L2/NEU — 22 — COMPACTLOGIX 24VDC POWER SUPPLY — 1N — COMPACT LOGIX POWER SUPPLY

ETHERNET SWITCH — 21 — 22 — ETHERNET SWITCH

FU6 4A — 21 — 25 — PANELVIEW 1000E — 22 — PANELVIEW PLUS WITH ETHERNET

ESTOP — 21 — 26 — 22 — E-STOP LIGHT

24VDC TO SHEET 3, LINE 345

21 (BRN) — 22 (BLU)

TO LINE 131

FROM LINE 130

BANK #1 SLOT 1 — 1769-IA16

131	104	AUX 1 SAFETY	143	TB-143	143	IN 0	I:1/0
132		AUX, MS1	144	TB-144	144	IN 1	I:1/1
133		LOW OIL LEVEL	145	TB-145	145	IN 2	I:1/2
134	104 TB-104	REM. PERMISIVE	146	TB-146	146	IN 3	I:1/3
135	104	REM. INCREASE	147	TB-147	147	IN 4	I:1/4
136	104	REM. DECREASE	148	TB-148	148	IN 5	I:1/5
137	104	REM. / LOCAL	149	TB-149	149	IN 6	I:1/6
138	104 TB-104	OIL COOLER FAN HIGH TEMP BYPASS	151	TB-150	150	IN 7	I:1/7
139	104	OIL COOLER FAN VFD FAULT BYPASS	151	TB-151	151	IN 8	I:1/8
140	104	STARTER FAULT	152	TB-152	152	IN 9	I:1/9
141	104	AUX, NO.2	153	TB-153	153	IN 10	I:1/10
142	104 TB-104	HIGH LEVEL TRIP LSHH	154	TB-154	154	IN 11	I:1/11
143		HIGH LEVEL ALARM LSHH	155	TB-155	155	IN 12	I:1/12
144	104	MCRA-2 3 4	156			IN 13	I:1/13
145	104	UPS STATUS 3 4	157			IN 14	I:1/14
146	104	BATTERY STATUS 5 6	158			IN 15	I:1/15
147						AC COM	
148						AC COM	

TO LINE 131

FROM LINE 130

1N

161	AUXILIARY #1 SAFETY (0=TRIP) SEE NOTE: 7	
162	MOTOR VFD AUXILIARY SAFETY	
163	(UNUSED) LOW OIL LEVEL (0=LOW) SEE NOTE: 7,8	
164	REMOTE PERMISSIVE SEE NOTE: 7	
165	REMOTE INCREASE INPUT	
166	REMOTE DECREASE INPUT	
167	REMOTE/LOCAL CONTROL (0=LOCAL)	
168	(UNUSED) - RESERVED FOR O.C. FAN VFD HIGH TEMP FORCE BYPASS (0=ALARM) SEE NOTE: 7,8	
169	(UNUSED) - RESERVED FOR O.C FAN VFD FAULT FORCE BYPASS (0=FAULT) SEE NOTE: 7,8	
170	(UNUSED) STARTER FAULT SAFETY (0=FAULT) SEE NOTE: 7,8	
171	AUXILIARY #2 SAFETY (0=ALARM) SEE NOTE: 7	
172	(SPARE) HIGH LEVEL SCRUBBER TRIP (0=FAULT) SEE NOTE: 7	
173	(SPARE) HIGH LEVEL SCRUBBER ALARM (0=ALARM) SEE NOTE: 7	
174	MASTER CONTROL RELAY (0=ALARM)	
175	UPS STATUS (1=UPS MODE)	
176	BATTERY STATUS (1=BUFFERING)	
177		
178		
179		
180		
181		
182		
183		
184		
185		
186		
187		

TO LINE 161

FROM LINE 118

BANK #1 SLOT 2 — 1769-OW16

112 — FU7 2A — 161 — VAC-VDC 1

02/0	OUT 0	162	CR 2	COMPRESSOR START 2-231
02/1	OUT1	163	CR 3	OIL PUMP START 2-232
02/2	OUT2	164	CR 4	OIL SEPARATOR HEATERS 2-233
02/3	OUT3	165	CR 5	SPARE SEE NOTE: 8
02/4	OUT4	166	CR 6	123-F-100 OIL COOLER VFD START/STOP 2-234
02/5	OUT5	167	CR 7	SPARE SEE NOTE: 8
02/6	OUT6	168	CR 8	REMOTE ALARM INDICATION RELAY 2-235, 2-235
02/7	OUT7	169	CR 9	REMOTE TRIP INDICATION RELAY 2-236, 2-236

112 — FU8 2A — 170 — VAC-VDC 2

02/8	OUT8	171 CR11-1 172	CR 10	CAPACITY INCREASE RELAY 1-172, 1-183
02/9	OUT9	173 CR10-1 174	CR 11	CAPACITY DECREASE RELAY 1-171, 1-184
02/10	OUT10	175 CR13-1 176	CR 12	VOLUME INCREASE RELAY 1-174, 1-185
02/11	OUT11	177 CR12-1 178	CR 13	VOLUME DECREASE RELAY 1-173, 1-186
02/12	OUT12	179	CR 14	OIL COOLER HEATER 2-238
02/13	OUT13	180	CR 15	SPARE SEE NOTE: 8
02/14	OUT14	181	CR 16	SPARE SEE NOTE: 8
02/15	OUT15	182	CR 17	SPARE SEE NOTE: 8

FROM LINE 149

1N

112 — TB-112 — FU9 4A — 185 — MIXING VALVE — TB-1N — 1N — MIXING VALVE POWER MOV-001

112 — CR10-2 — 186 — FU10 2A — TB-187 — 187 — BROWN / BLACK / M120 / BLUE / WHITE — TB-1N — 1N — VOLUME INCREASE ACTUATOR 121-D-102 SEE NOTE: 4,15

112 — CR11-2 — 188 — FU11 2A — TB-189 — 189 — VOLUME DECREASE ACTUATOR

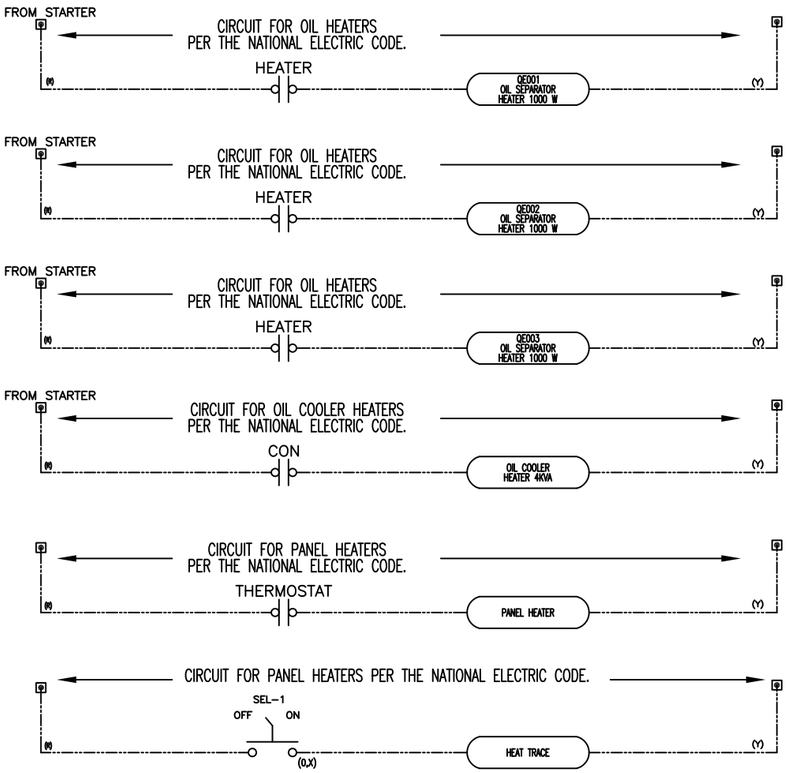
112 — CR12-2 — 190 — FU12 2A — TB-191 — 191 — BROWN / BLACK / M130 / BLUE / WHITE — TB-1N — 1N — CAPACITY INCREASE ACTUATOR 121-D-103 SEE NOTE: 4,15

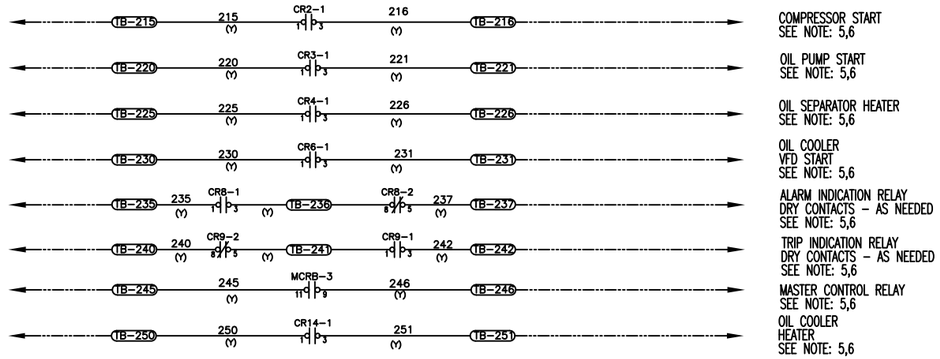
112 — CR13-2 — 192 — FU13 2A — TB-193 — 193 — CAPACITY DECREASE ACTUATOR

(TB-GND)	GROUNDED TERMINAL BLOCK
(TB-GND)	PASS THROUGH GROUND TERMINAL BLOCK
PTB-XXX	POWER TERMINAL BLOCK IN JUNCTION BOX
TB-XXX	TERMINAL BLOCK IN JUNCTION BOX
(TB-X)	TERMINAL ON FUSE
PTB-XXX	POWER TERMINAL BLOCK IN PANEL
TB-XXX	TERMINAL BLOCK IN PANEL
	BRANCH CONNECTION
	BOM ITEM NUMBER
	TERMINAL IN MOTOR STARTER PANEL
	QUICK DISCONNECT
JB	JUNCTION BOX
	INTERNAL PANEL WIRING (FACTORY)
	VILTER SHOP WIRING
	FIELD WIRING (BY OTHERS)
(R)	RED WIRE. 120VAC CONTROL
(Y)	WHITE WIRE. CONTROL NEUTRAL
(BLU)	BLUE WIRE. DC POWER +24VDC
(BLU/W)	BLUE/WHITE TRACER WIRE. DC POWER 0VDC
(BLK)	BLACK WIRE. POWER
(BRN)	BROWN WIRE. TYPICALLY WIRING OF COMPONENT
(Y)	YELLOW WIRE. POTENTIAL POWER FROM REMOTE SOURCE. USE CAUTION.
(W/Y)	WHITE/YELLOW TRACER WIRE. NEUTRAL FROM REMOTE SOURCE.

					COMPACT LOGIX PLC	1 of 3
					N.T.S.	D
					NO	
					2/12/10	
					APF	
					GAS COMPRESSOR CONTROL PANEL	
					CUST NAME	
RO	INITIAL RELEASE. SEE ECN: CM102---		APF	LRH	2/12/09	
ITEM	SYM	REVISION		CHANGE BY	APPVD BY	DATE
S10----	10MAAA-1	RO				

VILTER® MANUFACTURING LLC CEDARH, WISCONSIN, U.S.A.





TB-GND	GROUNDED TERMINAL BLOCK
TB-GND	PASS THROUGH GROUND TERMINAL BLOCK
PTB-XXX	POWER TERMINAL BLOCK IN JUNCTION BOX
TB-XXX	TERMINAL BLOCK IN JUNCTION BOX
FB-X	TERMINAL ON FUSE
PTB-XXX	POWER TERMINAL BLOCK IN PANEL
TB-XXX	TERMINAL BLOCK IN PANEL
	BRANCH CONNECTION
	BOM ITEM NUMBER
	TERMINAL IN MOTOR STARTER PANEL
	QUICK DISCONNECT
JB	JUNCTION BOX
	INTERNAL PANEL WIRING (FACTORY)
	VILTER SHOP WIRING
	FIELD WIRING (BY OTHERS)
(R)	RED WIRE, 120VAC CONTROL
(W)	WHITE WIRE, CONTROL NEUTRAL
(BLU)	BLUE WIRE, DC POWER +24VDC
(BLU/W)	BLUE/WHITE TRACER WIRE, DC POWER 0VDC
(BLK)	BLACK WIRE, POWER
(BRN)	BROWN WIRE, TYPICALLY WIRING OF COMPONENT
(Y)	YELLOW WIRE, POTENTIAL POWER FROM REMOTE SOURCE, USE CAUTION
(W/Y)	WHITE/YELLOW TRACER WIRE, NEUTRAL FROM REMOTE SOURCE.

ITEM	SYM	REVISION	DRWN. BY	APPR. BY	DATE
RO		INITIAL RELEASE. SEE ECN: CMTO-----	APF	LRH	2/12/09

COMPACT LOGIX PLC — 2 OF 3 SHEET

N.T.S.

NO

2/12/10

APF

GAS COMPRESSOR CONTROL PANEL

CUST NAME

S10-----10MAAA-2

RO

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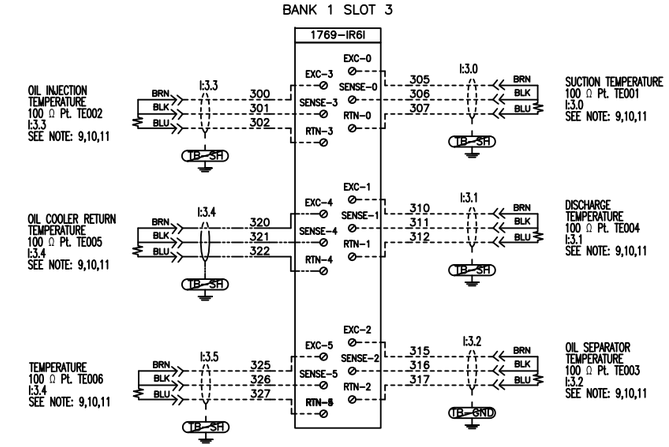

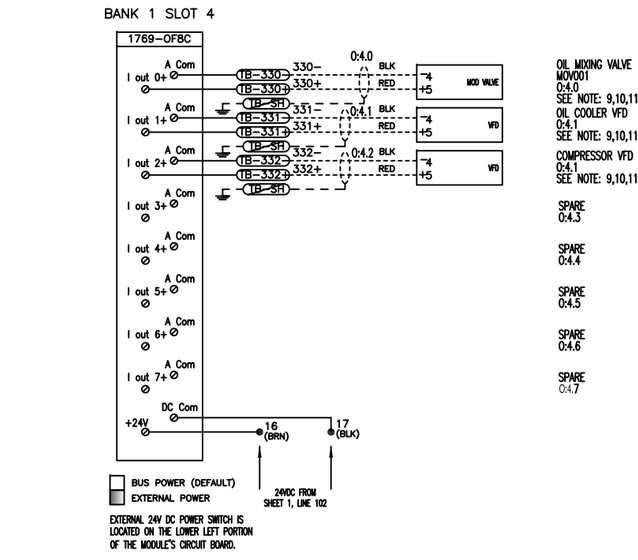

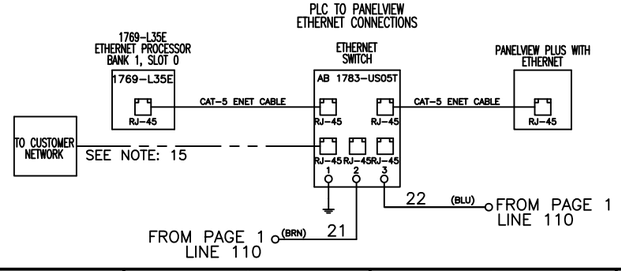

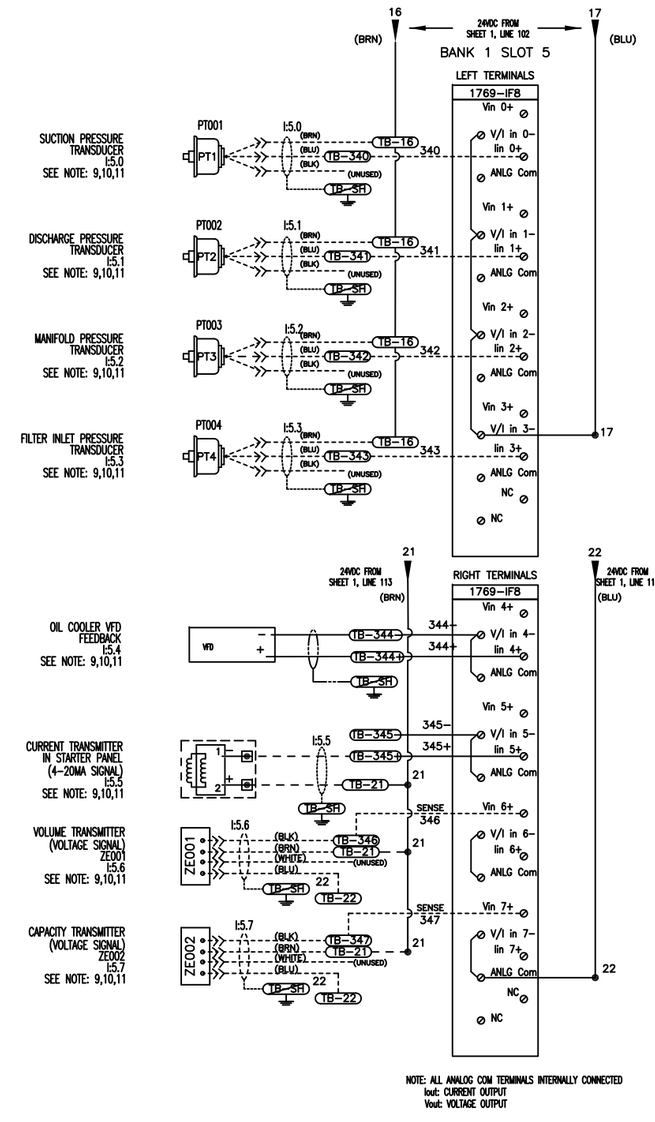

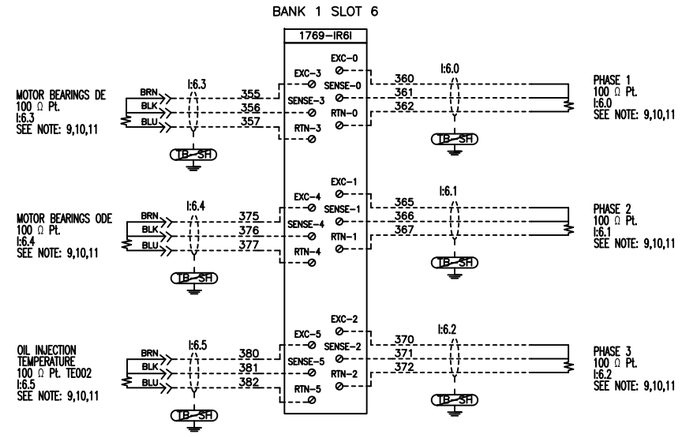

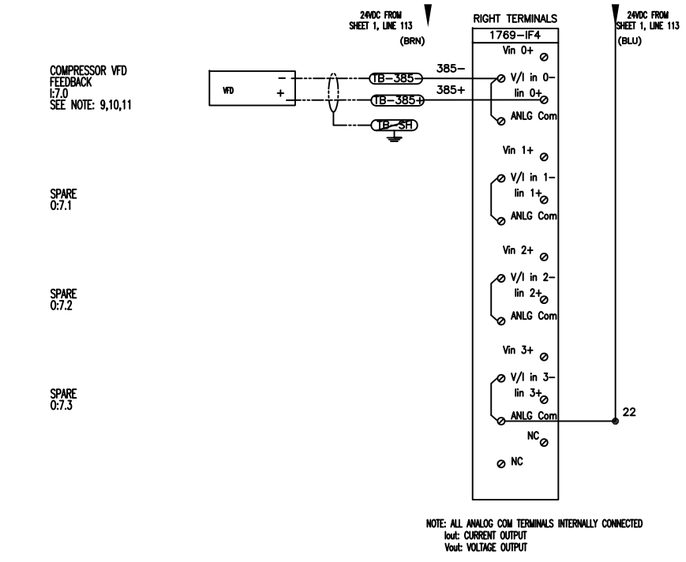

TB-SH GROUNDED TERMINAL BLOCK
TB-GND PASS THROUGH GROUND TERMINAL BLOCK
PTB-XXX POWER TERMINAL BLOCK IN JUNCTION BOX
TB-XXX TERMINAL BLOCK IN JUNCTION BOX
FB-X TERMINAL ON FUSE
PTB-XXX POWER TERMINAL BLOCK IN PANEL
TB-XXX TERMINAL BLOCK IN PANEL
BRANCH CONNECTION
BOX ITEM NUMBER
TERMINAL IN MOTOR STARTER PANEL
QUICK DISCONNECT
JB JUNCTION BOX
MATERIAL PANEL WIRING (FACTORY)
VILTER SHOP WIRING
FIELD WIRING (BY OTHERS)
(R) RED WIRE. 120VAC CONTROL
(W) WHITE WIRE. CONTROL NEUTRAL
(BLU) BLUE WIRE. DC POWER +24VDC
(BLU/W) BLUE/WHITE TRACER WIRE. DC POWER GNDC
(BLK) BLACK WIRE. POWER
(BRN) BROWN WIRE. TYPICALLY WIRING OF COMPONENT
(Y) (W/Y) YELLOW WIRE. POTENTIAL POWER FROM REMOTE SOURCE. USE CAUTION. WHITE/YELLOW TRACER WIRE. NEUTRAL FROM REMOTE SOURCE.

ITEM	SYM	REVISION	DRAWN BY	APPR. BY	DATE
RO		INITIAL RELEASE. SEE ECN: CM10----	APF	LRH	2/12/09

COMPACT LOGIX PLC — 3 OF 3
N.T.S.
NO
2/12/10
APF
GAS COMPRESSOR CONTROL PANEL
CUST NAME
S10---- 10MAAA-3 RO
D

EmersonClimate.com

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www.vilter.com

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