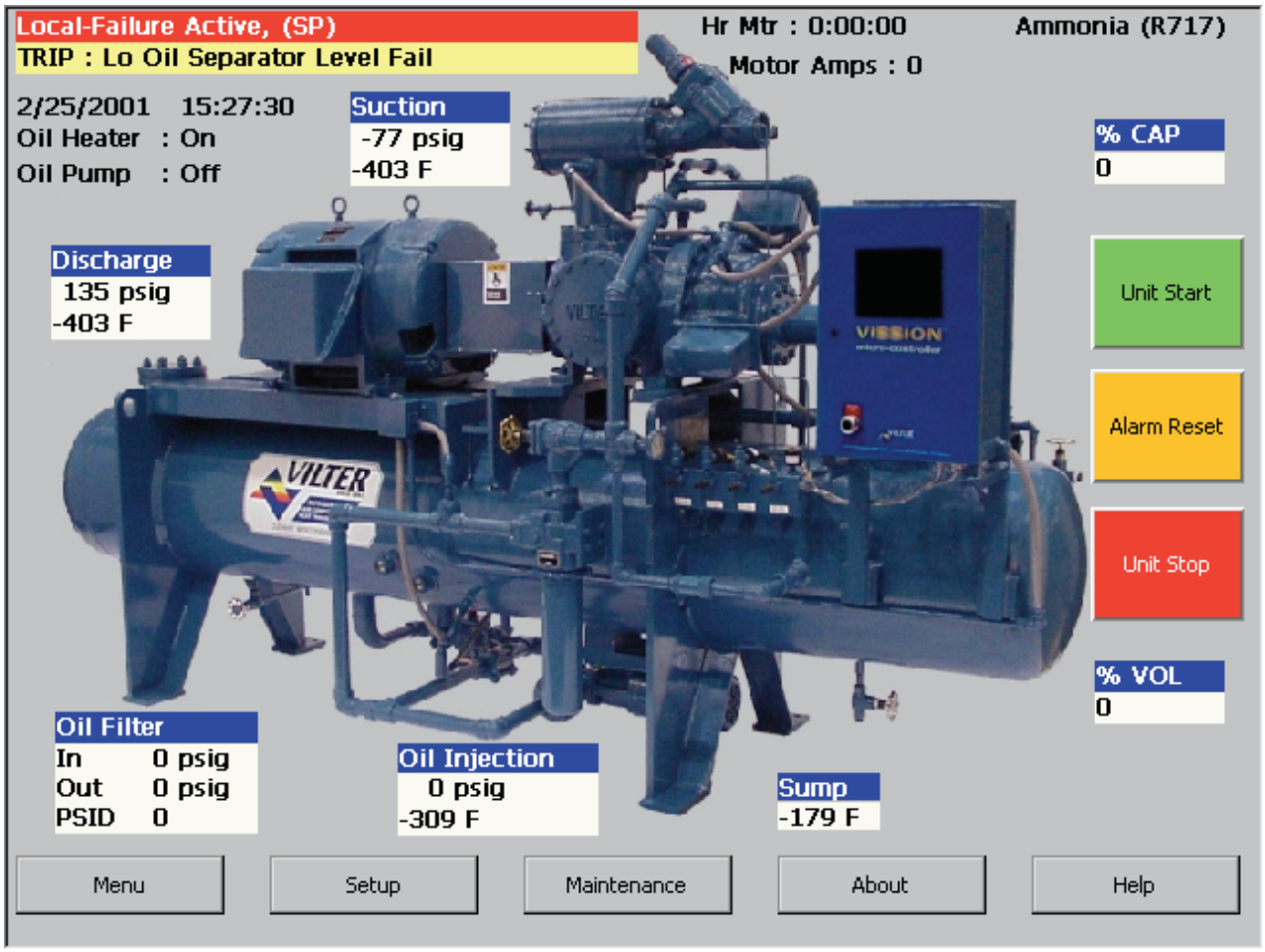
VILTER MANUFACTURING CORPORATION



VISSION / VANTAGE

MICRO-CONTROLLER OPERATING MANUAL

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VILTER MANUFACTURING CORPORATION

VISSION MICRO-CONTROLLER
OPERATING MANUAL

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I. MAIN SCREEN

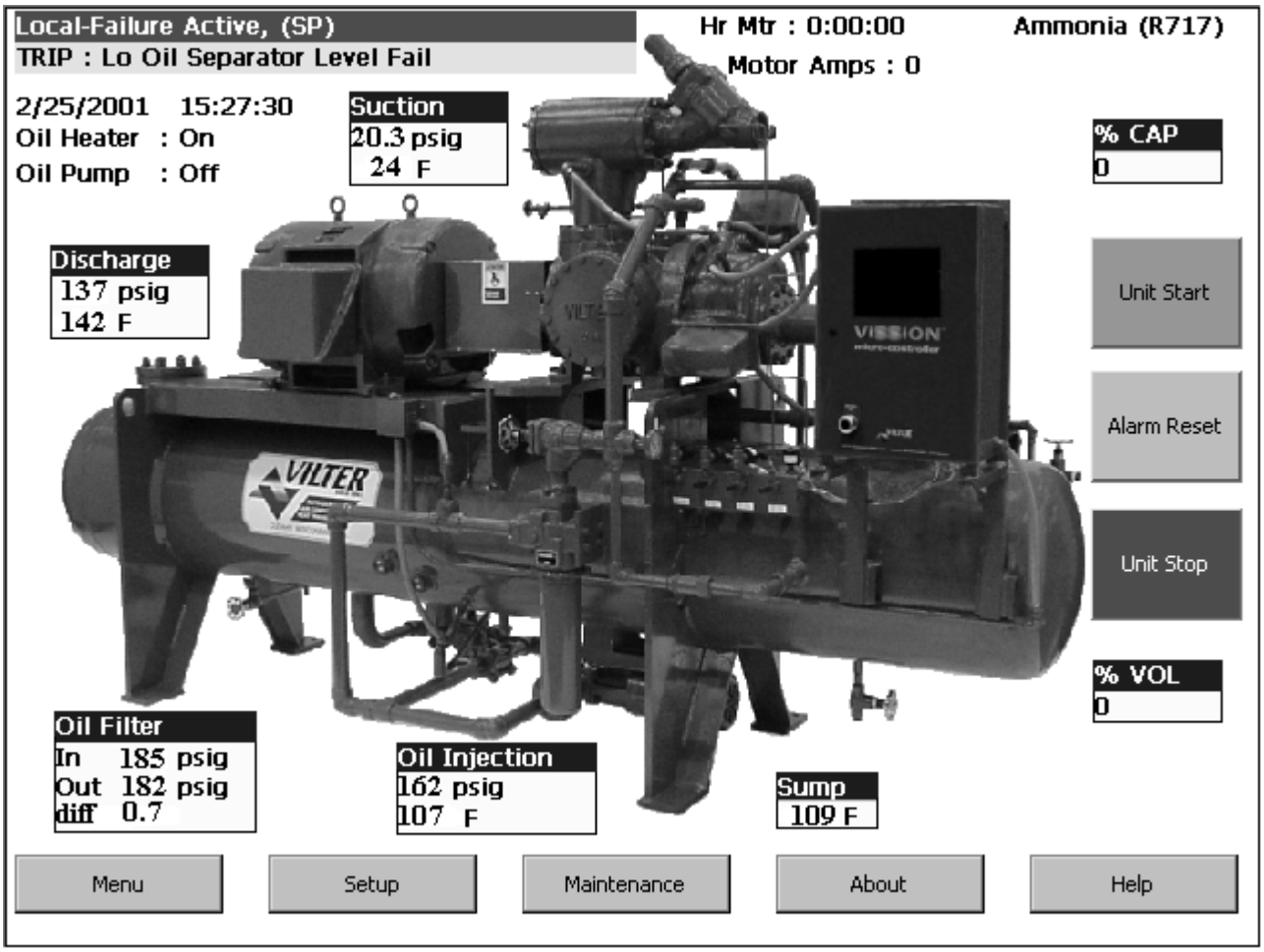


FIGURE 1. MAIN SCREEN

The main screen contains the following items:

- *Buttons to navigate to setpoint, setup and maintenance screens.*
- *Status information on the compressor, oil pump, oil heater and run mode.*
- *Start/Stop buttons.*
- *Hour meter.*
- *Motor amperage.*
- *Refrigerant.*
- *Real time compressor and package operating conditions.*
- *Volume and Capacity Slide locations.*

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. The data on the screen is updated every ½ second. Status information such as Alarms and Trips are displayed on the screen.

A. TROUBLESHOOTING GUIDE

Before applying power to the VISSION MicroController panel, all wiring to the panel should be 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.

In the event of a problem with the Vilter VISSION MicroController, the help screen, along with your electrical drawings, will help to determine the cause.

PROBLEM	POSSIBLE SOLUTION
1. *Vission MicroController does not boot up, no lights on any boards.*	a) *Check to make sure 120VAC is run to "L1" on the Relay board. This is the board on the inside left back of the panel. "L1" is the fifth connector down from the top and the top terminal. The neutral should be brought to any "N" on the relay board.* b) *Check F1 fuse on relay board.* c) *Check F1 fuse on the power supply, located on the front of the door. If all of the above is okay, the power supply may be bad. Check DC voltages on the single board computer interface board, which is the big green board above the power supply. Along the right edge of this board, just above the power supply connector J14, are test points. If proper voltages are not located at these test points, the power supply may be faulty.*
2. *Vission MicroController appears to be booted, lights seen on boards and E-stop switch, but no touch screen is evident.*	a) *Check cable connections located on the LCD Inverter board. This board is located inside the door on the LCD touch screen back plane above the single board computer. The connector with the pink and white wires, located on the left center of the board is the power supply to the board. The connector on the top right of the board with the black wires has the data wires. If these are inserted correctly, the problem could be bad solder joint on the LCD Inverter board or a component failure.*
3. *Vission MicroController boots up but all data temperatures and pressures are zeroed and do not update.*	a) *Check Analog board jumpers J41 & J46. They should be on pins 1 & 2 (center and right pins).* b) *Check the upper DIP switch on the analog board. This identifies the node address of the Analog board. Only switch #1 should be on, the rest off.* c) *The Vission MicroController has (2) boards running separate programs. The Analog board located inside the panel on the back right calculates pressures, temperatures, amps and monitors inputs. The single board computer requests this data for action and display. The single board computer will instruct the Analog board to activate outputs or relays as needed. Communication between the boards is RS-485 running at 115200 baud. The cable is basically phone cable with phone jack style connectors. The*

	connector to the single board computer is on the touch screen back panel and is labeled RS-485 Com2 to Analog Bd. The connector on the Analog board is located on the bottom of the board. There are 2 connectors on the analog board, either one can be used. *If this cable is open or disconnected, there will be no communications between the boards. The top two green lights on the Analog board (D10 & D11), located on the bottom left of the board, will be off. The pressures and temperatures will not update. Ensure the cable is plugged in correctly. Try rebooting again. If the problem persists, try moving the cable on the Analog board to the other connector. If not successful, try a different cable on the Analog board to the other connector on the board. If not successful, try a different cable. Any phone style cord should work. If neither of these help, contact the Vilter Home Office.*
4. On Bootup, the message "The directory entry for VSSPROG.ret specifies an incorrect file size". Do you want this problem automatically repaired now?	*a) Select "YES" and the program will continue booting.*
5. A bank of pressure or temperature channels no longer function.	*a) There are four fuses on the Analog board that limit the current on the 24VDC to the Analog channels. The fuses are 500 milliamp, located near the power supply connectors and brown in color. LEDs next to the fuses give a visual indication of the status of the fuse, however, it is best to pull the fuse and check them with an ohmmeter. If any are blown, find the shorted device that is responsible for the blown fuse and replace.* *F1 protects the +24VDC supply to the pressure transducers and relays.* *F2 protects the –12VDC supply which is subregulated to –5VDC required for multiplexers, analog to digital converts and temperature channels.* *F3 protects the +12VDC supply which is subregulated to +5VDC, required for multiplexers, analog to digital converters, and temperature channel.* *F4 protects the main +5VDC supply required for most of the components on the analog board.* *If F1 blows, the pressure transducers will produce*

	erroneous readings and the relays on the relay board will drop out (de-energize). If F2, F3 or F4 blows, all analog readings will be affected.
6. A pressure channel reads a negative number over –140".	*a) This indicates the transducer wiring or transducer is either open or shorted. Check wiring to print.* *b) Check fuses F1, F2, F3 and F4 on analog board.*
7. A temperature channel reads a large negative value over –400°.	*a) This indicates the RTD wiring or RTD is open. Check wiring to print.* *b) Check fuses F1, F2, F3 & F4 on analog board.*

II. SETUP SCREEN

From the **Main** *screen (Figure 1), touch the Setup button. After entering an authorized password, the screen pictured in Figure 2 will appear.*

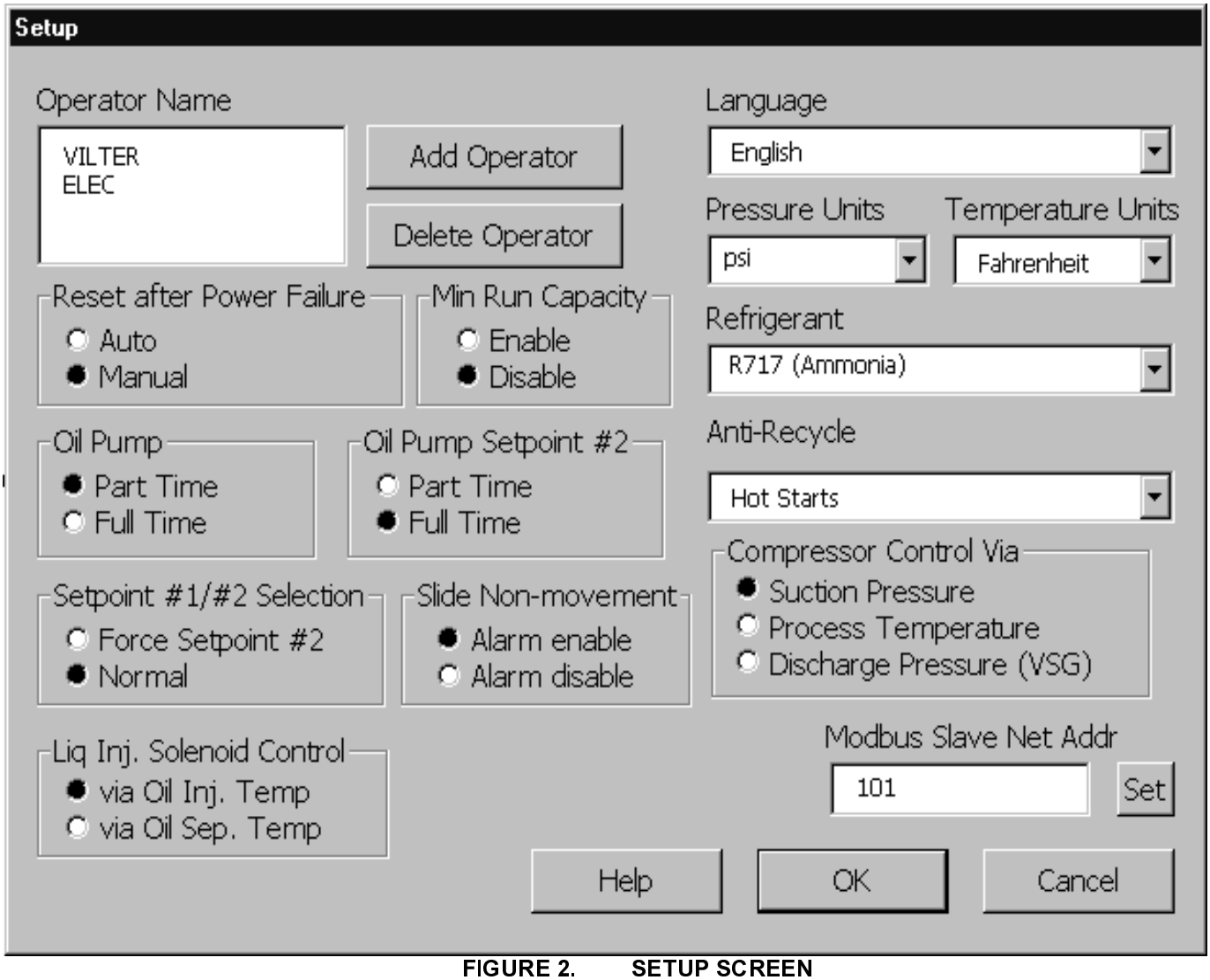


FIGURE 2. SETUP SCREEN

- ***Operator Name*** *- This is the same list that appears in the login dialog. Names in this list can be selected for deletion. To change a name or password, you delete the name and enter a new name/password pair. The VILTER operator name cannot be deleted. Emergency passwords provided by a Vilter representative for the VILTER name are good only on the date for which they are issued. They are intended to permit navigation to this screen for setup or repair of this list.*

- ***Language*** *– The user screens can be seen in English, French, and Spanish, depending on the option selected. Some text will still display in English even when another language is selected.*

- ***Pressure Units*** *– Select units of measure for pressure readings. Choices are psi, kg/cm^2 and kPa. Affects pressures displayed on main screen. On other screens, units are displayed in psi. On the main screen with psi selected, negative gauge pressures will display as inches of mercury vacuum with the unit "Hg. On other screens, negative numbers are scaled as "Hg.*

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

- ***Refrigerant*** *– Select type of refrigerant used in compressor. Current choices are R717 (Ammonia), R22, R134A and R290 (Propane).*

- ***Anti-Recycle*** *– The operator can select from the following AntiRecycle 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.*

- ***Delete Operator*** *– Operator can choose to delete operator names from the authorized operator listing. A name in the list is selected by touching it. The selected name will be deleted from the list when this button is pushed. If you delete all the names (besides VILTER), be sure you add at least one before leaving this screen.*

- ***Add Operator*** *– This button will take you to the screen pictured in Figure 2. The button opens a dialog for entry of a new name/password pair. Nothing (leaving the password text box blank) is a legal password. The password is not obscured as it is typed in, so untrusted parties should not be permitted to view the screen during entry. The password is not confirmed with a repeat entry, so verify it visually before pressing okay. Up to 25 name/password pairs can be added. The Operator Name list box will acquire a scroll bar when it fills.*

- ***Modbus Slave Network Address*** *– When multiple Vission MicroControllers are connected on a Modbus Network, each controller must have a unique address from the other Vissions on the network. Duplicate node addresses are not allowed. The node address of each Vission is determined through the* **SETUP** *menu. The Vission that will initiate all conversation on the network MUST be defined as node 100 (this is defined as the "master" node). All other node numbers should be in the range of 101 through 174.*

  This must be set when the extra special port (Com4) is used to control or monitor the compressor via Modbus. It also must be set when the multi-compressor sequencing

feature is used. Even though Ethernet is used for the comms, this address establishes the compressor's identity and role in the sequencing logic.

- ***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.*

- ***Setpoint #1 Oil Pump, Setpoint #2 Oil Pump*** *– For single stage and high stage operation, part time or normal oil pump function is used. The oil pump is shut off after discharge pressure has risen sufficiently to drive oil injection. Oil pump operating mode is independently settable for setpoint groups #1 and #2.*

- ***Liq Inj Solenoid Control*** *– Determines which measured temperature is used for control of the liquid injection solenoid. This setting only applies when liquid injection is used for oil cooling.*

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

III. MAINTENANCE SCREEN

From the **Main** *screen (Figure 1), touch the Maintenance button. This will bring up the screen pictured in Figure 4.*

This screen shows the chart of routine maintenance to be performed on the machine at hourly intervals from 200 hours to 120,000 hours.

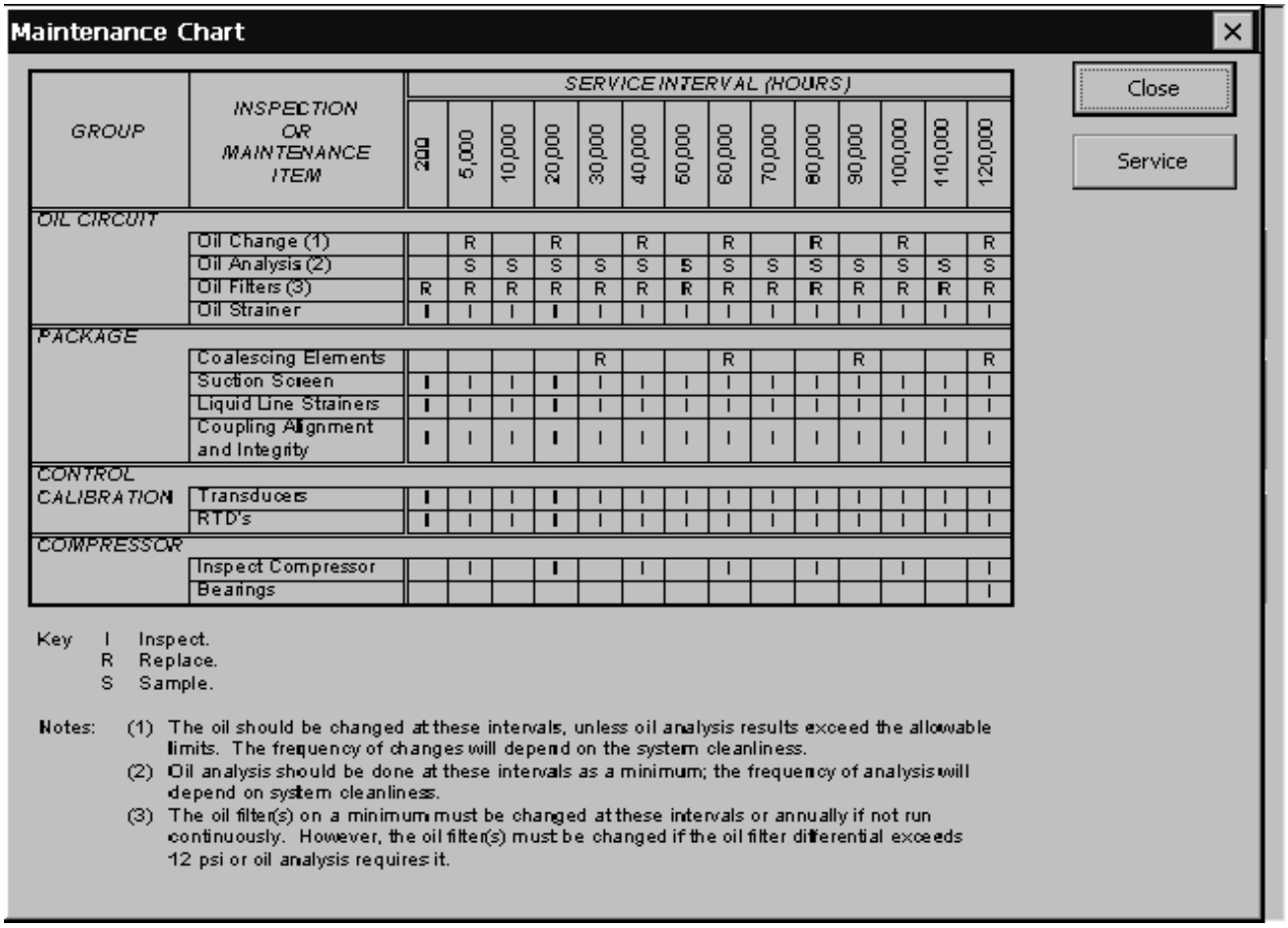


FIGURE 3. MAINTENANCE CHART SCREEN

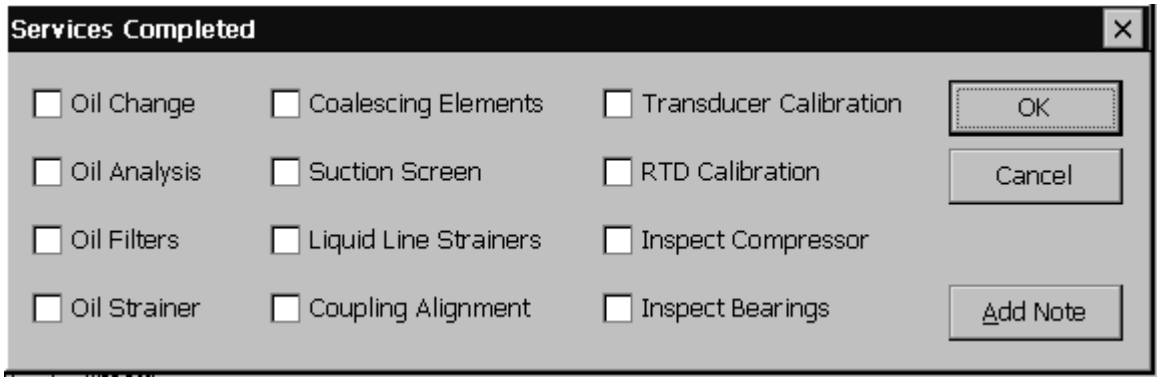


FIGURE 4. SERVICES COMPLETED SCREEN

- *Services – This button will take you to Services Completed (Figure 5).*

IV. MENU SCREEN

At the bottom of the **Main** *screen (Figure 1), touch the Menu button to bring up the screen shown in Figure 6.*

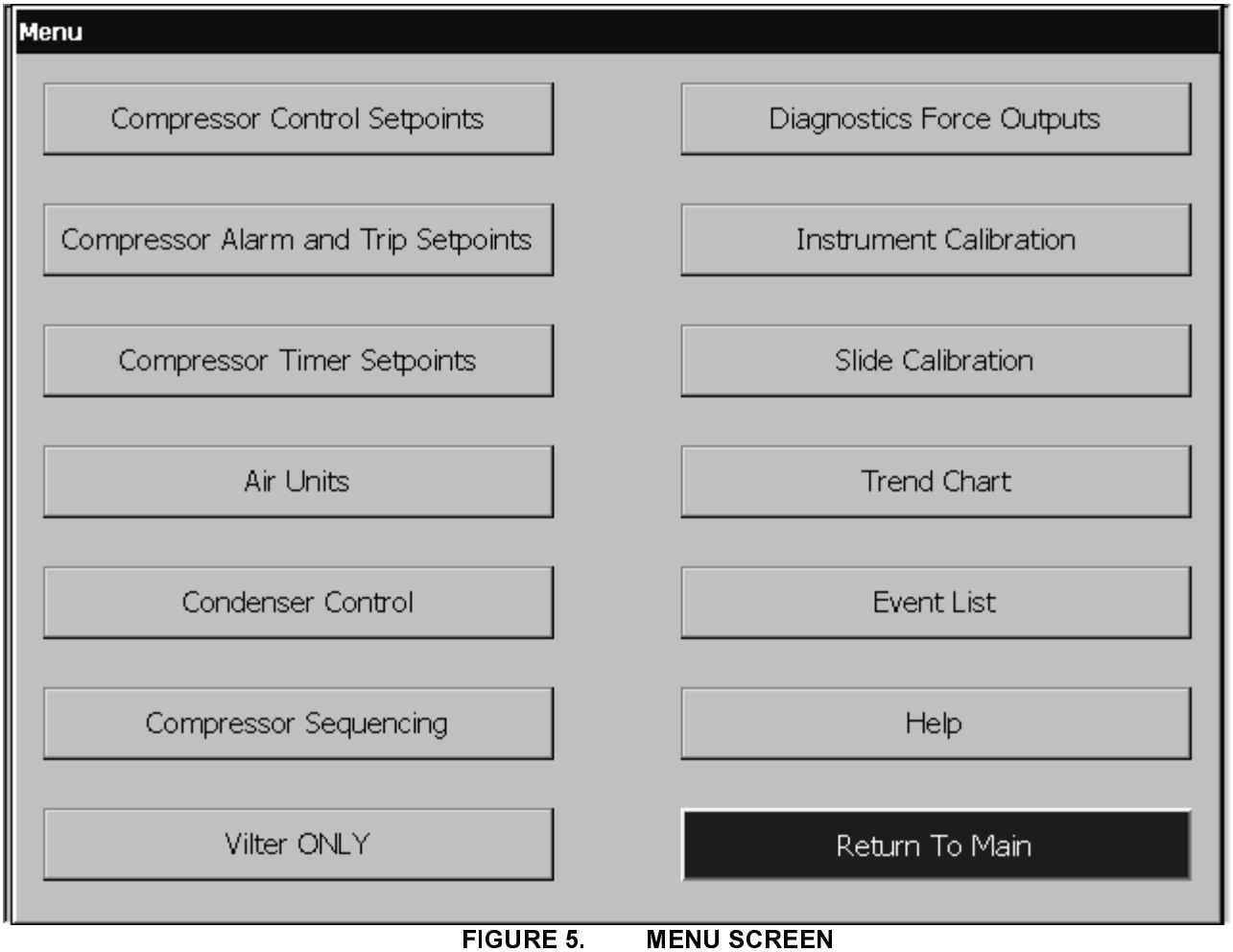


FIGURE 5. MENU SCREEN

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

A. Common Buttons

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

- ***Return to Menu*** *– This button always returns you to the* **Menu** *screen (Figure 5).*

- ***Logon To Edit*** *– The user is allowed to view data at all screen levels but cannot edit data until a login has occurred. In order to logon, the user must select their name and type in the password. See Figure 7.*

- ***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 operator of the microprocessor.*

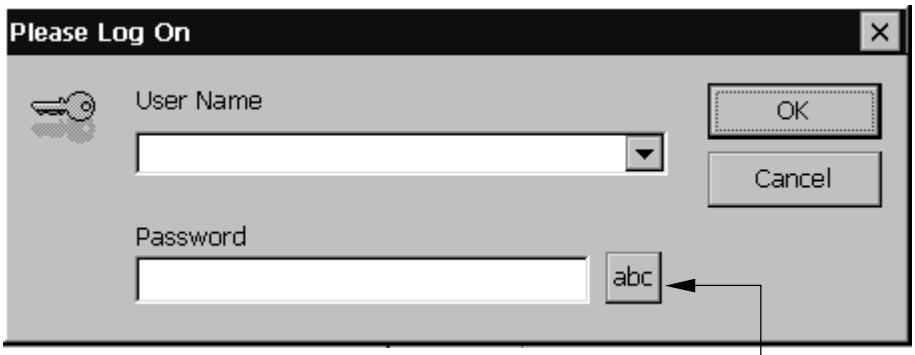


FIGURE 6. LOG ON SCREEN

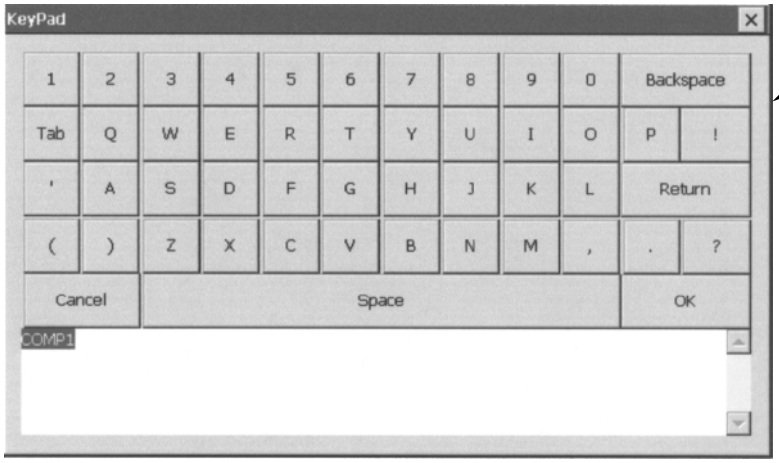


FIGURE 7. ALPHA KEYPAD

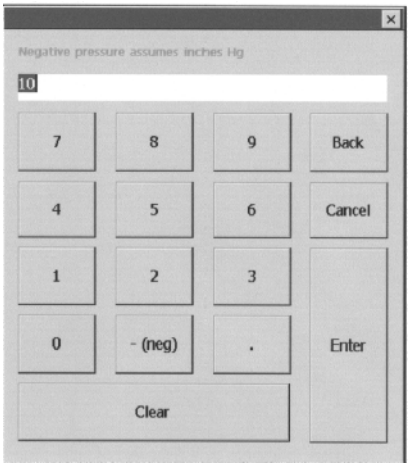


FIGURE 8. NUMBER KEYPAD

V. SETPOINTS SCREEN

A. Level 1 Access – Compressor Control Setpoints

From the **Menu** *screen (Figure 5), press the Compressor Control setpoints button. The compressor control setpoints screen (Figures 9 or 10) will now be shown.*

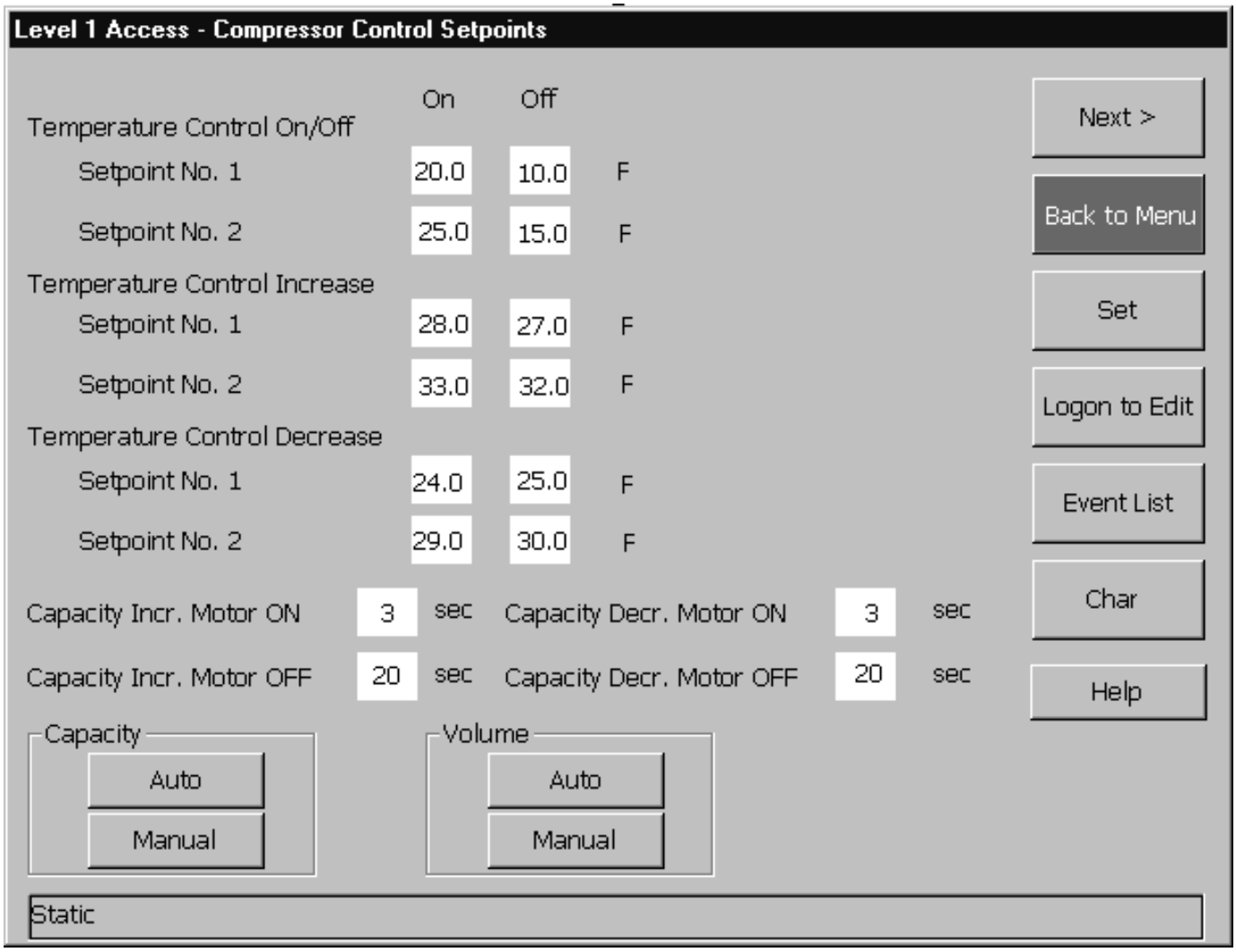


FIGURE 9. COMPRESSOR CONTROL SETPOINTS SCREEN - PRESSURE

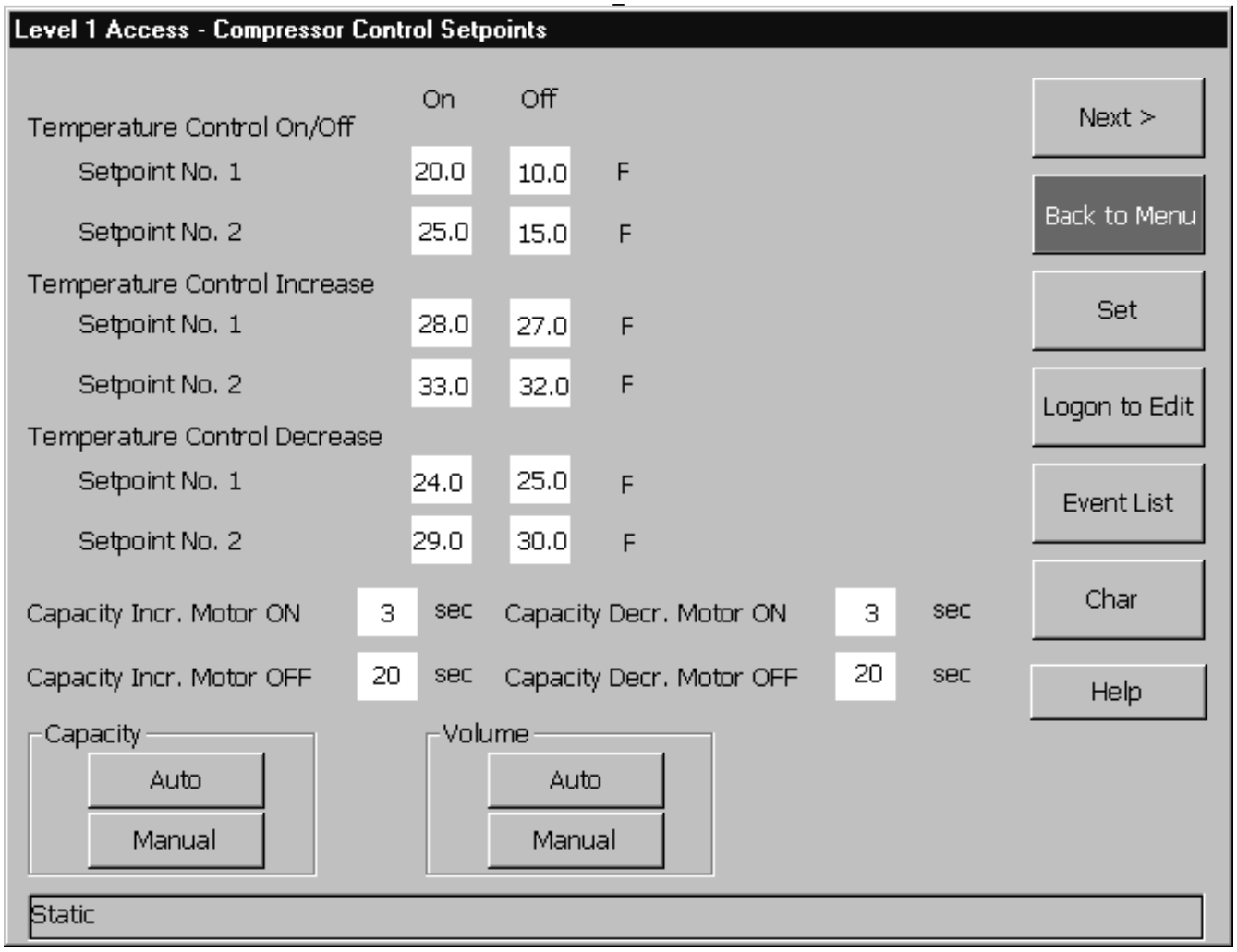


FIGURE 10. COMPRESSOR CONTROL SETPOINTS SCREEN - TEMPERATURE

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

From the **Setup** *screen (Figure 2), the operator can choose the method or mode of compressor control:*

Compressor Control Via Suction Pressure
Process Temperature
Discharge Pressure

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.

Also on this screen, the following buttons are displayed:

Event List *– Provides a chronological event listing. This includes log in and setpoint changes performed by operators on the compressor package.*

- ***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 control setpoint information.*

- ***Manual*** *– Places the capacity slides into manual mode. In manual mode, the capacity slide moves direct input from the operator.*

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 (Figure 2). If a compressor shutdown is desired on a suction pressure drop and a manual reset is required, set the OFF value below the Low Safety 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 (Figure 2), it has an override effect when control is via process temperature as described below.*

- ***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 (Figure 2). 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 value. This will shut down the unit and a reset will be required to restart it.*

- ***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 any differential 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 (Figure 2).*

- ***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 be viewed or adjusted by temporarily selecting "Processor Control Via Suction Pressure" on the* **Setup** *screen (Figure 2).*

- ***Capacity Control °F Decrease*** *– The capacity of the compressor will decrease when the process temperature is at or below the ON setpoint and the decrease "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 any differential between the ON and OFF setpoints.*

B. Level 1 Access – Additional Compressor Setpoints

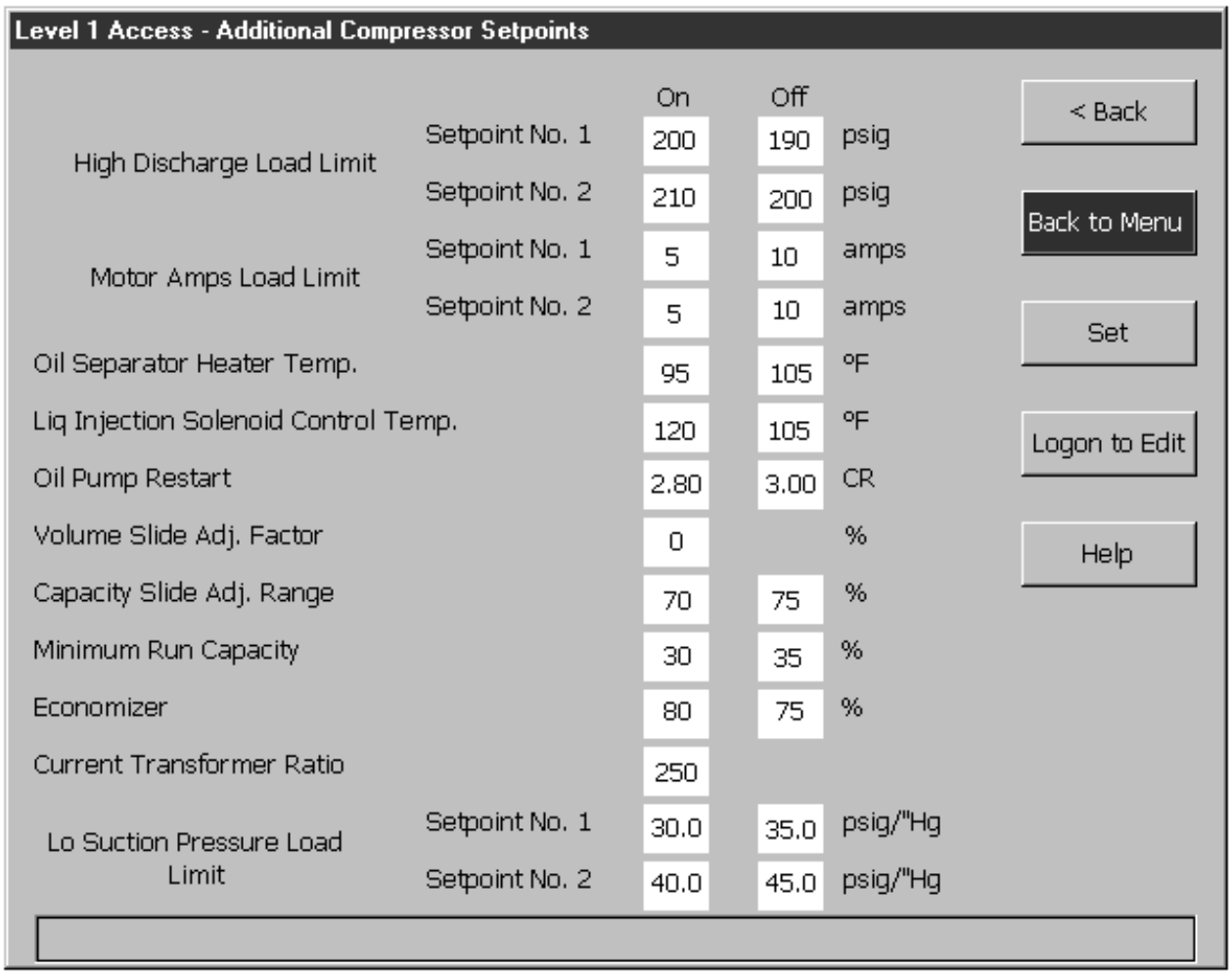


FIGURE 11. ADDITIONAL COMPRESSOR SETPOINTS SCREEN

- ***High Discharge Pressure Unloading Setpoints 1&2*** *– 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 cut-in set point. When the cutout setpoint is reached, the compressor will stop from unloading any further.*

- ***Motor Amp. Load Limit Setpoints 1&2*** *– 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 cut-in setpoint energizes the oil separator heater. On an increase in oil separator temperature above the cutout setpoint, the oil heater is de-energized.*

- ***Oil Pump Restart*** *– To determine cut-in and cut-out 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 cut-in setpoint value, the oil pump will restart and stay on until the pressure ratio increases above the cutout 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 cut-out 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 cutout value of approximately 3.0. This would then be entered for the cutout pressure. Now determine the cutin value, take the absolute discharge pressure (200 PSIA) and divide this by the desired absolute suction pressure (71 PSIA). This results in a cut-in valve of 2.8.*

- ***Capacity Lag Step*** *– The lag step value determines the increment the lag compressor is allowed to load or unload on a call for capacity increase or decrease from the lead compressor. This setpoint is active only when the Lead/Lag Enable operator option is selected.*

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

- ***Economizer Solenoid*** *– This control limit determines when the economizer solenoid is energized. When the percentage of compressor capacity reduces below the Economizer Solenoid cut-out set point, the solenoid is energized.*

- ***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 cutout 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 cut-in set point. It will stop decreasing when the suction pressure rises to a point that is just below the cut-out set point.*

C. Level 2 Access – Compressor Alarm And Trip Setpoints (Page 1 of 2)

From the **Menu** *screen (Figure 5), press the Compressor Alarm and Trip Setpoints button. You will see a screen as pictured in Figure 12.*

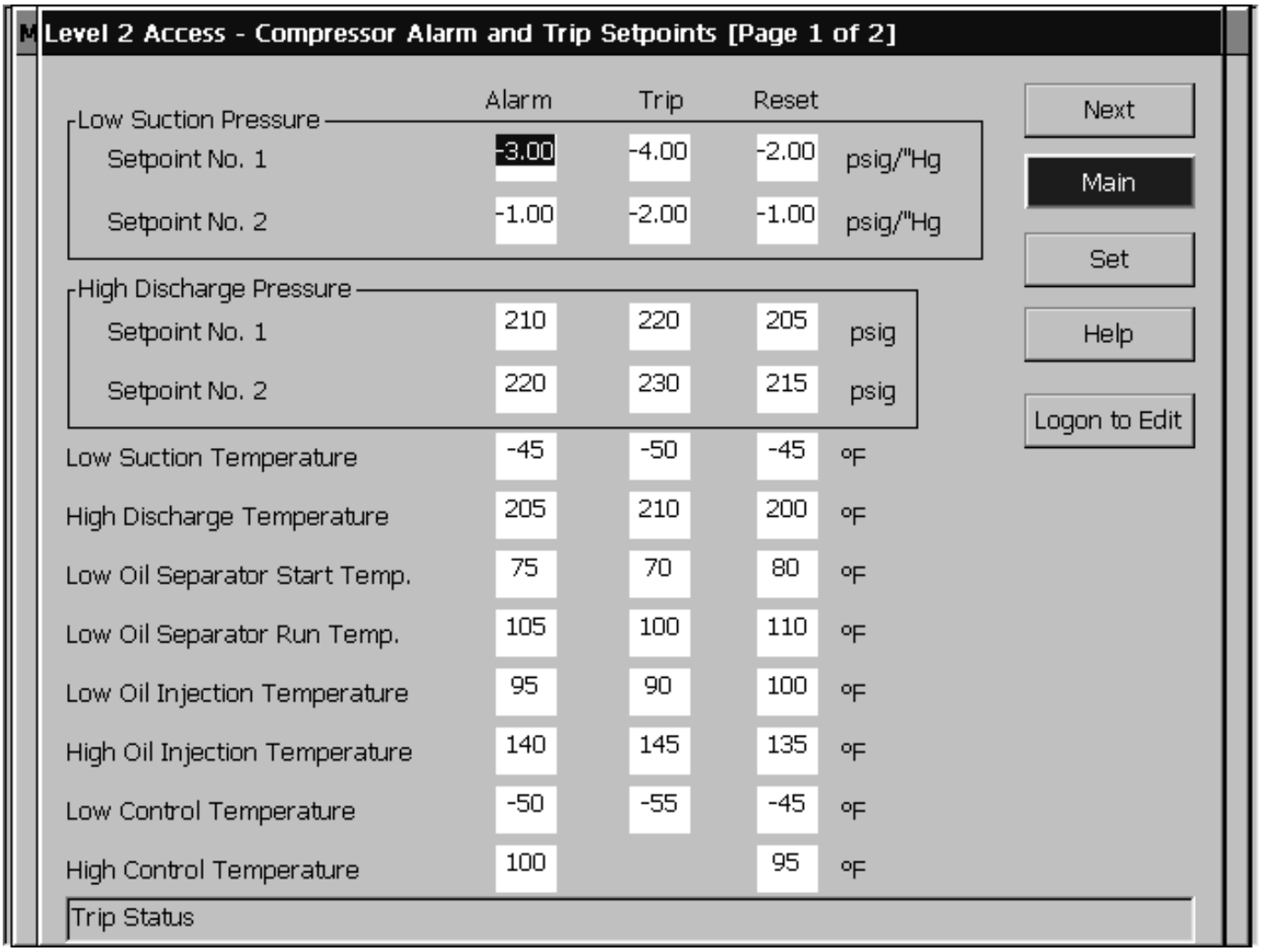


FIGURE 12. COMPRESSOR ALARM AND TRIP SETPOINTS (PAGE 1 OF 2) SCREEN

- ***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 low suction temperature safety. The alarm or trip will be active if the suction temperature should drop below the setpoint value.*

- ***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.*

- ***Low Control Temperature*** *– This is the low control temperature safety. This safety is active when process temperature control has been selected in the* **Setup** *screen (Figure 2). An alarm or trip will be active on a drop in process temperature below the setpoint value.*

- ***High Control Temperature*** *– This is the high control temperature safety. This safety is active when the temperature control has been selected in the* **Setup** *screen (Figure 2). An alarm will be active on an increase in process temperature above the setpoint value.*

D. Level 2 Access – Compressor Setpoints And Alarms (Page 2 of 2)

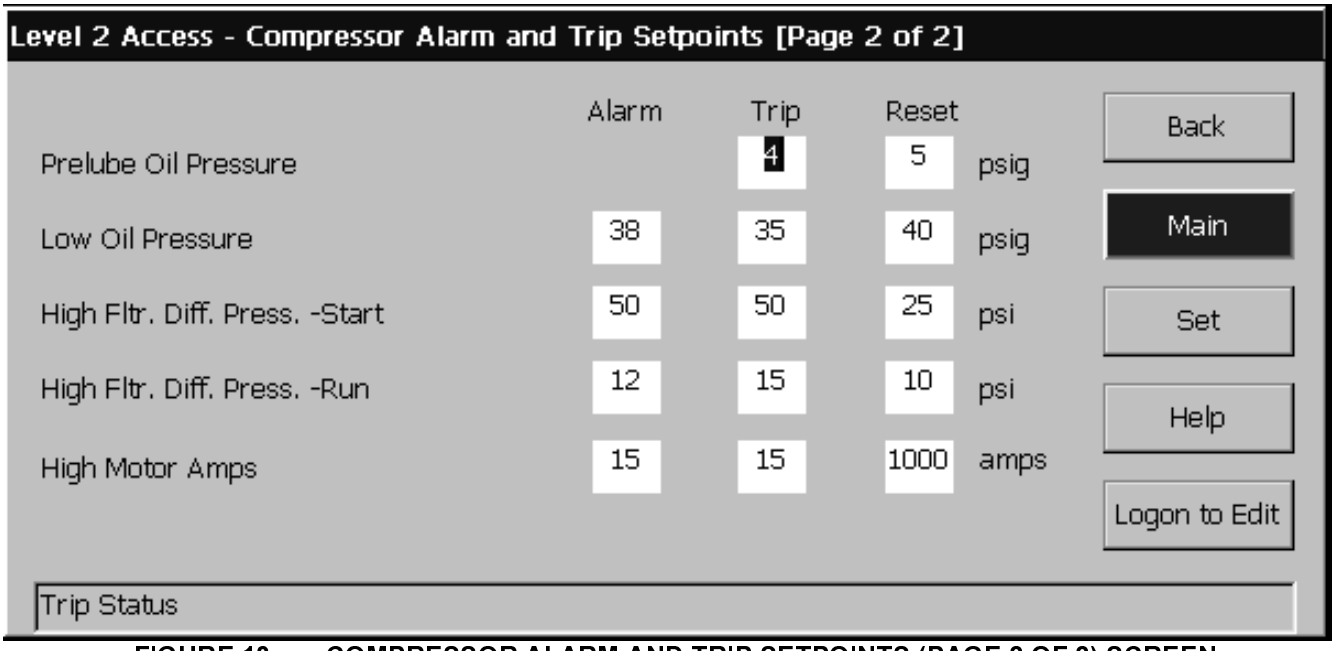


FIGURE 13. COMPRESSOR ALARM AND TRIP SETPOINTS (PAGE 2 OF 2) SCREEN

- ***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.*

E. Level 2 Access – Compressor Timer Setpoints

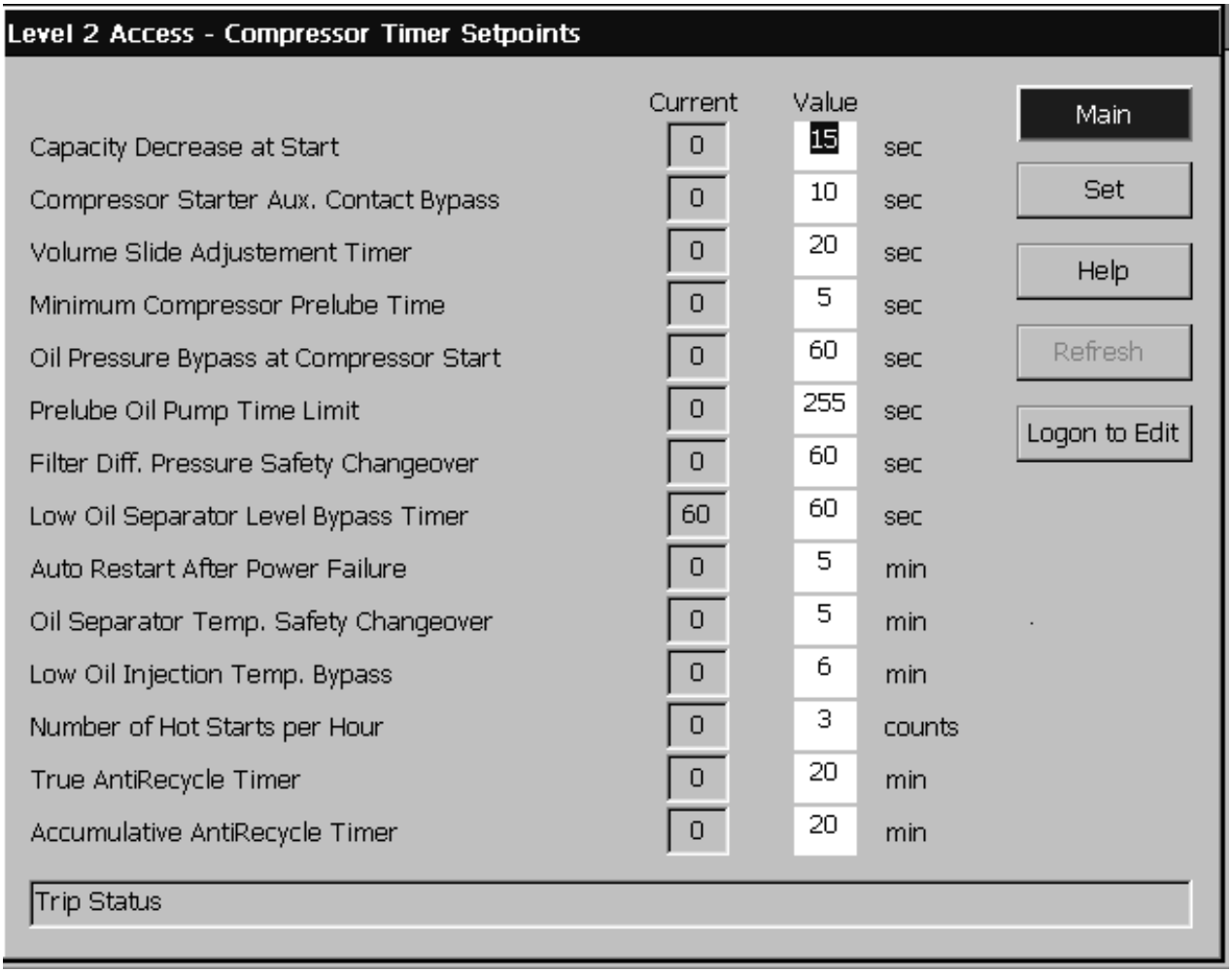


FIGURE 14. COMPRESSOR TIMER SETPOINTS SCREEN

To change a timer setting, you must "Logon to Edit" first. Push the "Set" button then push on the timer setpoint value you wish to change. After the setpoint is changed, press the "Refresh" button. This will refresh the "Current" window, which shows the elapsed time of the timers.

- ***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*** *– The auxiliary motor starter contact is bypassed for this period during startup. If it does not close after the time has cycled, the compressor will shut down and a motor overload failure will be displayed. Likewise if sometime after the delay, the auxiliary contact should open, the same failure screen display will be shown.*

- ***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 (Figure 2) 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.

- ***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.*

- ***Accumulative Anti-Recycle Timer*** *– This timer also forces a specified time between compressor starts. When the compressor starts, the timer reset, 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 (Figure 2). One additional Anti-Recycle Timer that can be selected from the* **Setup** *screen (Figure 2) is the Modified Anti-Recycle Timer.*

- ***Modified Anti-Recycle Timer*** *– Normally, this anti-recycle timer will function as a True Anti-Recycle Timer. However, if the operator presses the stop button, or if a failure occurs, the anti-recycle timer switches functions and acts as an accumulative type anti-recycle timer. It will allow the compressor to restart when the accumulated runtime and the present off time meets or exceeds the setting of this timer.*

F. Level 2 Access – Compressor Sequencing

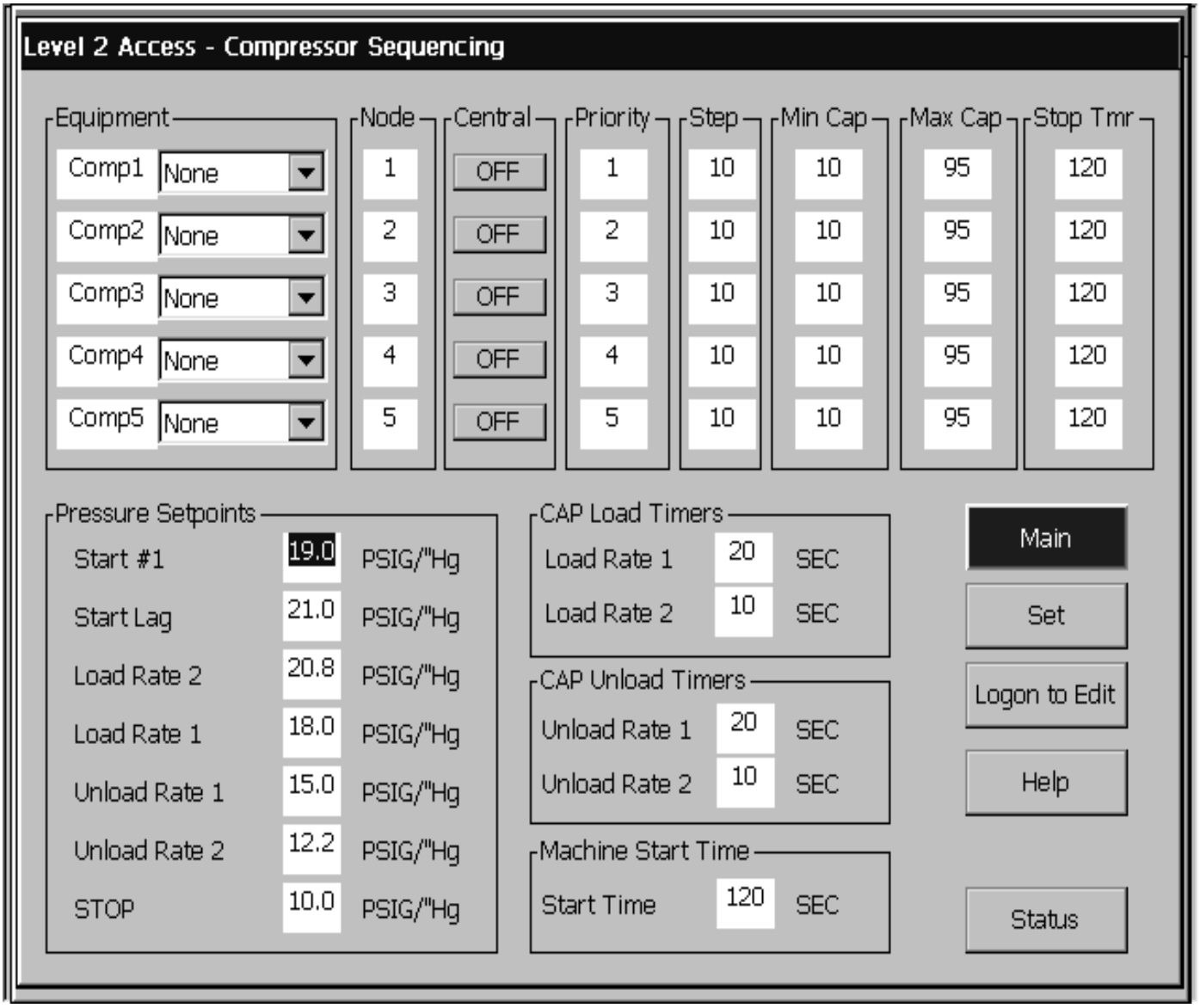


FIGURE 15. COMPRESSOR SEQUENCING SCREEN

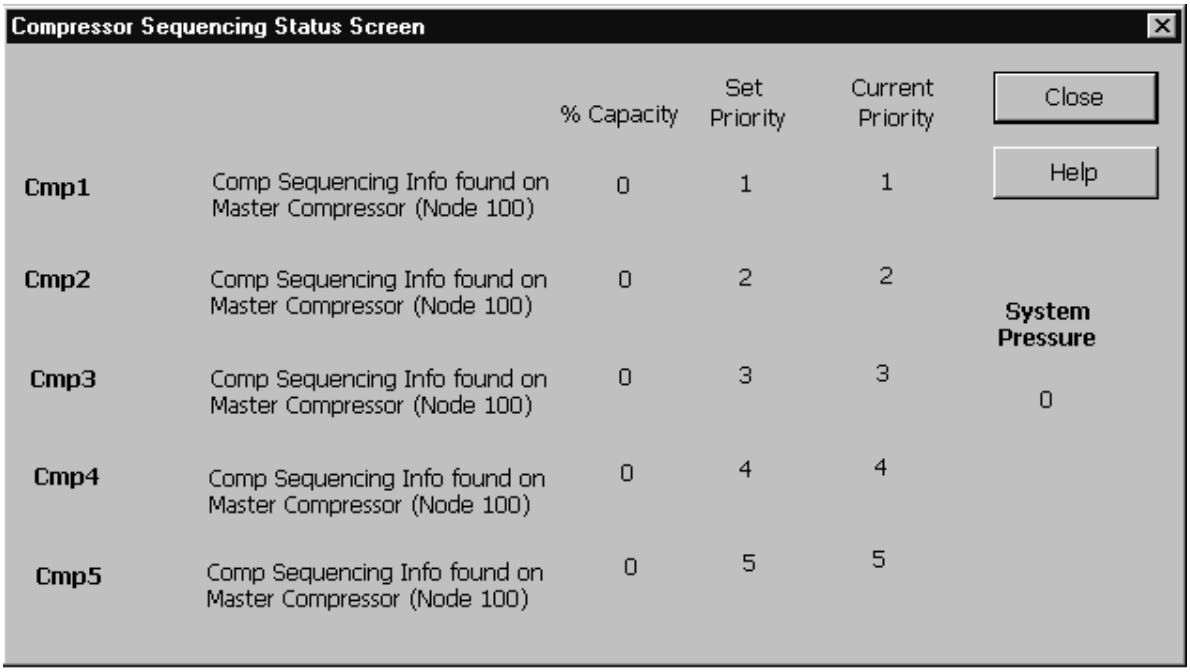


FIGURE 16. COMPRESSOR SEQUENCING STATUS SCREEN

This screen allows the operator to setup a sequencing network. Current, the Vission is capable of sequencing 5 compressors. In order for a Vission to participate on the network, it must have a unique address from the other Vissions on the network. Duplicate node addresses are not allowed. The node address of each Vission is done through the **Setup** *menu (Figure 2).*

The Vission which will initiate all conversation on the network MUST be defined as node 100. This is defined as the "master" node. All other node numbers should be in the range of 101 through 174.

- ***Ethernet Peer To Peer*** *– In addition to having unique node addresses, all compressors on the Ethernet network must have unique IP addresses and unique names. These are entered from the "Think and Do Configuration Utility" screen, accessed from the VILTER ONLY screen. The Ethernet IP addresses of each of the five compressors listed are required to be:*

Equipment:	*Ethernet IP Address*
Cmp#1:	*10.8.0.73*
Cmp#2:	*10.8.0.74*
Cmp#3:	*10.8.0.75*
Cmp#4:	*10.8.0.76*
Cmp#5:	*10.8.0.77*

The Compressor Sequencing screen only needs to be setup on the "Master" node. The elements of this screen are:

- ***Equipment*** *– Allows the operator to select the size of each compressor. This information is used to make sequencing decisions based on the CFM of the compressor. A valid size MUST be chosen for a compressor to participate in sequencing. This field also allows the operator to change the name of each of the five compressors listed.*

- ***Node*** *– These node address fields tell the sequencing algorithm which the Vission will be participating in the sequencing network. Input the node addresses of each Vission, participating on the network, in these fields.*

NOTE:

The node addresses for each Vission panel are defined and entered under the Setup screen (Figure 2) at each individual Vission panel.

- ***Central Off/On Buttons*** *– These buttons indicate whether the compressor has been selected to operate under Central Control. If the button reads "On", the compressor will be included in the Central Control System. If the button reads "Off", the compressor will not be included in the Central Control system. Pushing once on the button will toggle the button between "Off" and "On".*

- ***Priority*** *– The Priority fields are used to assign the compressor priority for Central Control. The lower the priority number, the greater the priority of the compressor. Priority #1 compressor is the highest priority compressor. Compressors with higher priority numbers will be lag compressors. A compressor with a priority of 1 will be considered the "lead" compressor. The suction pressure of priority #1 compressor is used to control the system pressure.*

- ***Step*** *– This field sets the amount of capacity change that will occur when a compressor is loading or unloading.*

NOTE:

Because of the method used to position the slide valve, and the method used to determine when the slide valve position is "close enough" to the target value, the step value should never be less than 5%.

- ***Min Cap*** *– The Minimum Capacity is the lowest capacity, in percentages, that this compressor is allowed to reach during operation. If the system needs to remove additional system capacity, it may shut a compressor off.*

- ***Max Cap*** *– The Maximum Capacity is the highest capacity, in percentage, that this compressor is allowed to reach during operation. If the system needs to increase capacity after this compressor has reached its maximum, it may turn on another compressor.*

- ***Stop Tmr*** *– The Stop Timer (in seconds) is the amount of time the system must hold a compressor at minimum capacity before the compressor can be shut off.*

PRESSURE SETPOINTS:

The 7 pressure setpoints are used to control the system pressure. With the exception of the Start #1 and Start Lag setpoints, all other setpoints must be in decreasing pressures from the previous value.

- ***Start #1*** *– The Start #1 pressure setpoint is the system pressure at which the Priority 1 compressor will be started.*

- ***Start Lag*** *– The Start Lag pressure setpoint will only start the lag compressor, and only after the lead compressor has reached the Max Cap value, and the Machine Start Timer has timed out. The Lead compressor is normally priority, unless it is not available to start due to waiting hot starts, safety trips, etc.*

- ***Load Rate 2*** *– If the system pressure exceeds the Load Rate 2 pressure setpoint for the time specified in the Load Rate 2 Timer, Central Control will attempt to increase the capacity of the system.*

- ***Load Rate 1*** *– If the system pressure exceeds the Load Rate 1 pressure setpoint for the time specified in the Load Rate 1 Timer, Central Control will attempt to increase the capacity of the system.*

- ***Unload Rate 1*** *– If the system pressure falls below the Unload Rate 1 pressure setpoint for the time specified in the Unload Rate 1 Timer, Central Control will attempt to decrease the capacity of the system.*

- ***Unload Rate 2*** *– If the system pressure fails below the Unload Rate 2 pressure setpoint for the time specified in the Unload Rate 2 Timer, Central Control will attempt to decrease the capacity of the system.*

- ***Stop*** *– If the system pressure falls below the Stop setpoint, Central Control will immediately try to shut down the lowest priority lag compressor. If there is only one compressor running, Central Control will shut down.*

- ***CAP Load Timers*** *– These timers are directly related to the setpoint values described above. The timers are the minutes and seconds that the Central Control algorithm will hold before deciding on an action. The CAP Load Rate Timers are related to the appropriate Load 1 and 2 increase setpoints described above.*

- ***CAP Unload Timers*** *– The Capacity Unload Rate Timers are similar to the timers described above, however, they work to decrease system capacity. The CAP Unload Rate Timers are related to the appropriate Unload Rate 1 and 2 decrease setpoints described previously.*

- ***Machine Start Time*** *– This timer is the time the system will wait until another compressor is started in an attempt to increase capacity.*

- ***Force Priority 1 Compressor On Checkbox*** *– When checked, overrides other sequencing logic and priority 1 compressor always run. Pressing the box alternating checks and unchecks it.*

G. Level 2 Access – Diagnostics Force Outputs ON/OFF

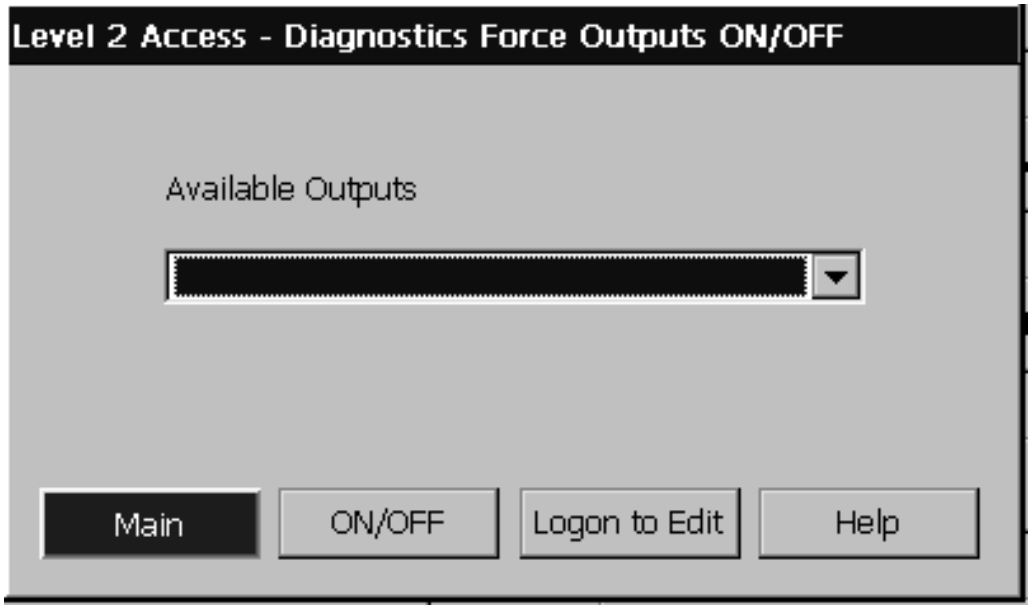


FIGURE 17. DIAGNOSTICS FORCE OUTPUTS ON/OFF SCREEN

- ***On/Off*** *– This will turn the force outputs option On/Off. The force outputs that can be modified are as follows: Main Compressor Motor Starter, Oil Pump Starter, Economizer Solenoid, Remove Alarm, Remote Trip, Minimum Capacity Indicator and Minimum Capacity/Amperage Indicator. You can choose the forced output by pressing the down arrow in the control labeled Available Outputs.*

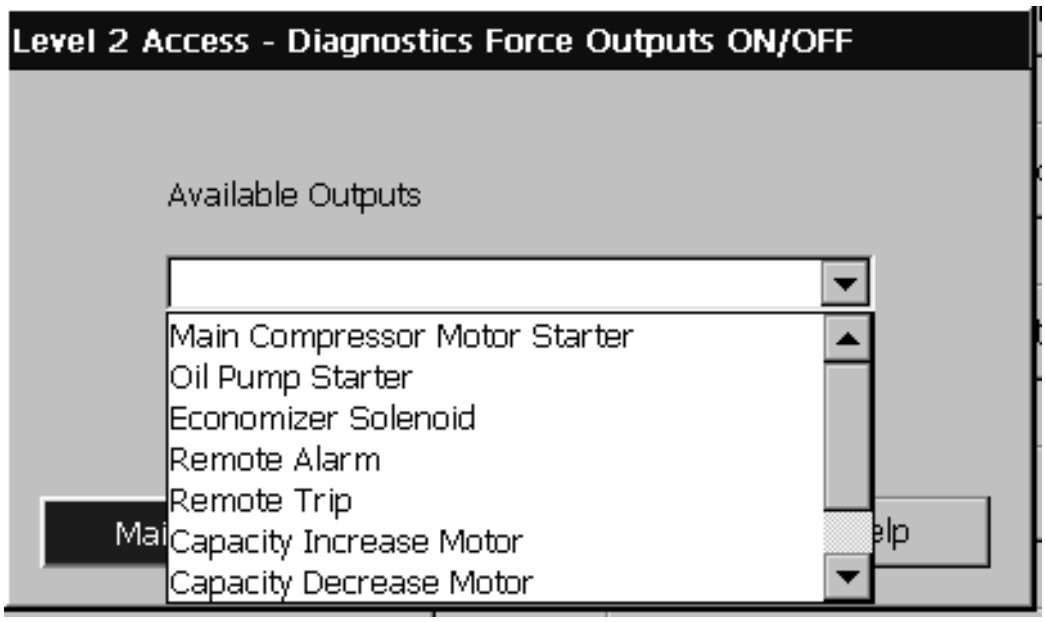


FIGURE 18. SCREEN SHOWING THE FORCE OUTPUT OPTIONS

H. Level 2 Access – Instrument Calibration (Page 1 of 2)

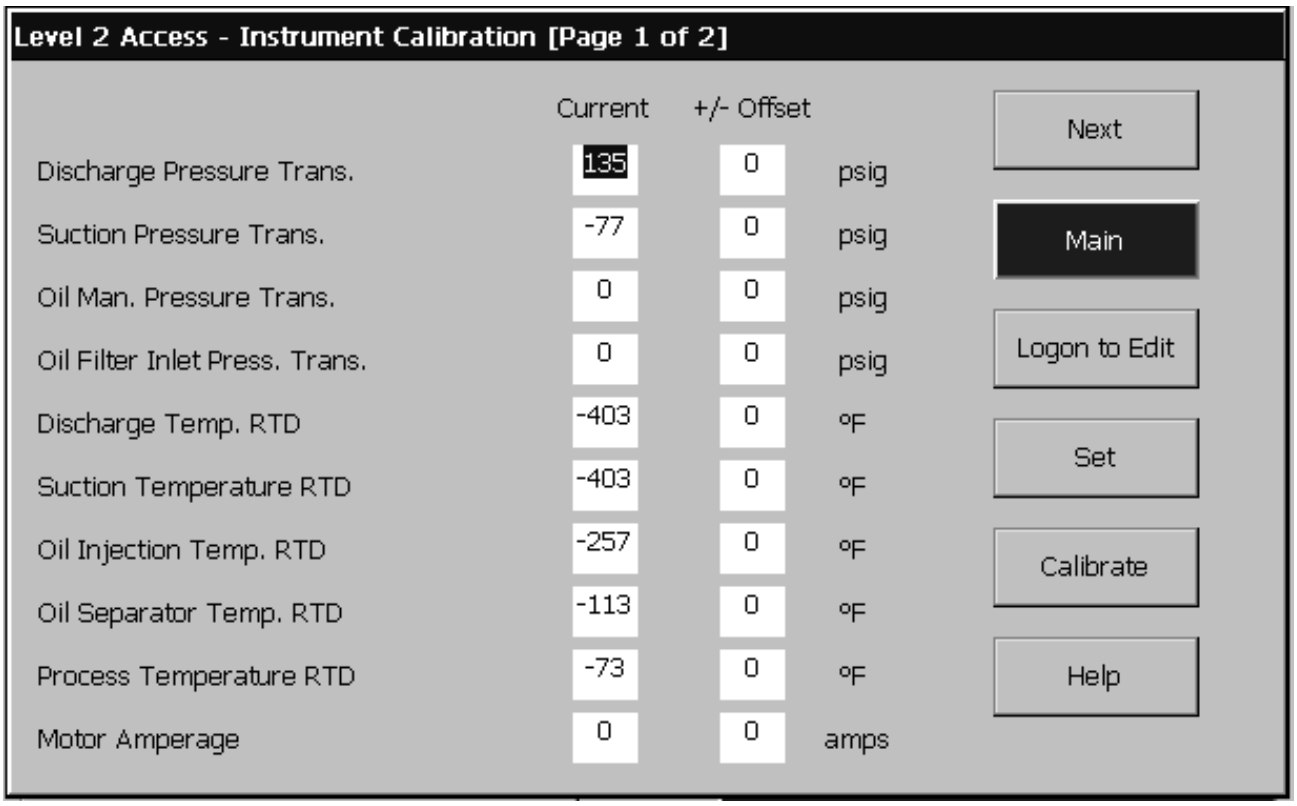


FIGURE 19. INSTRUMENT CALIBRATION (PAGE 1 OF 2) SCREEN

The current values reflect the values presently maintained by the system. The user can perform a one-point calibration by entering an offset value into the respective column. This will automatically adjust the current value and zero out the offset value. Giving max and min values for a respective current value can perform a two-point calibration. The program will automatically adjust the calibration line to meet those values.

The following items can be calibrated at this screen: Discharge Pressure Transducer, Suction Pressure Transducer, Oil Manifold Pressure Transducer, Oil Filter Inlet Pressure Transducer, Oil Manifold Temperature RTD, Suction Temperature RTD, Oil Injection Temperature RTD, Oil Separator RTD, Process Temperature RTD and Motor Amperage.

J. Level 2 Access – Instrument Calibration (Page 2 of 2)

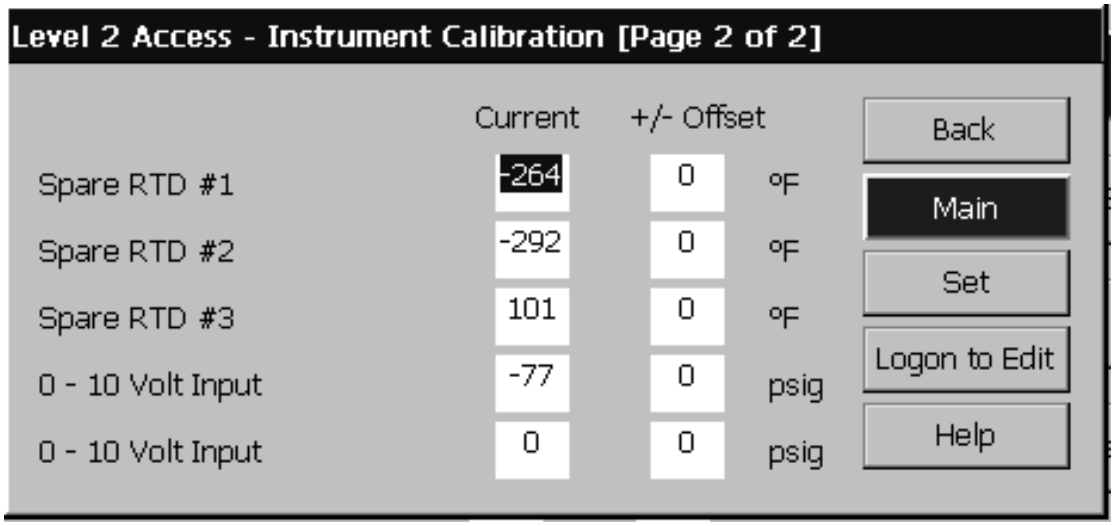


FIGURE 20. INSTRUMENT CALIBRATION (PAGE 2 OF 2) SCREEN

Instrument calibration menu displays the Input channels that can be calibrated to represent the actual values at the sampling points.

The current values reflect the values presently maintained by the system. The user can perform a one point calibration by entering an offset value into the respective column. This will automatically adjust the current value and zero out the offset value. Giving max and min values for a respective current value can perform a two point calibration. The program will automatically adjust the calibration line to meet those values.

The following items can be calibrated at this screen: three (3) spare RTDs and two (2) 0-10 volt input.

K. Level 2 Access – Slide Valve Calibration

*From Figure 5 (***Menu** *screen), touch the Slide Calibration button. The screen pictured in Figure 21 will appear.*

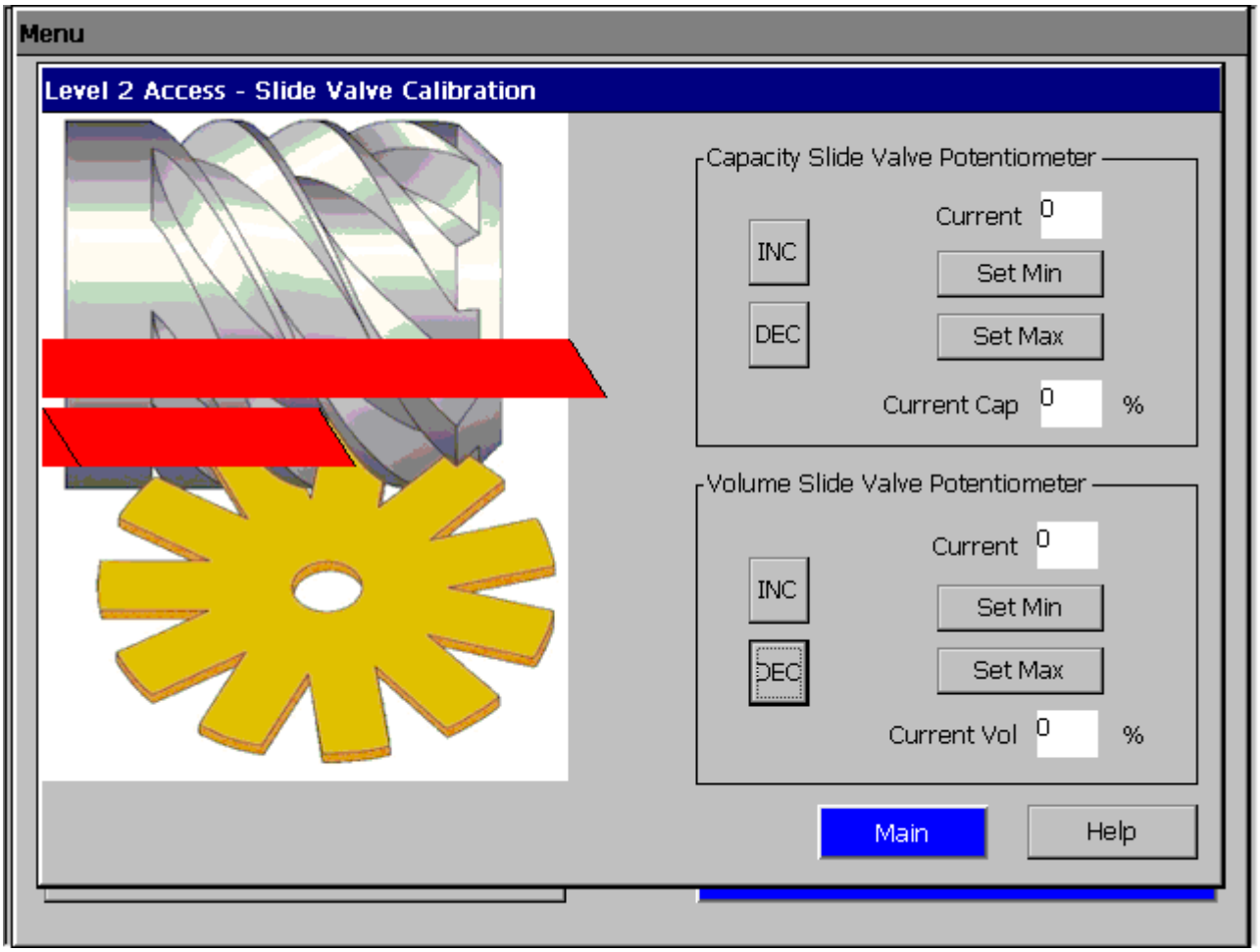


FIGURE 21. SLIDE VALVE CALIBRATION SCREEN

- ***Capacity Slide Potentiometer Calibration*** *– Move the capacity slides to their minimum position. This can be accomplished by either electrically actuating the slide valve motor through the Slide Calibration Screen "INC" and "DEC" buttons or by manually actuating the slide valve motor. To manually actuate the motor, release the brake and turn the hex nut on the gear motor in the proper direction to move the capacity and volume slides to their minimum position (see Table 1). After the slide valves have contacted the internal stop, release the tension in the mechanism by actuating the brake and then manually turn the command shaft back one tooth on the command shaft gear.*

  Remove one of the ¼" (6.35 mm) socket head screws from the potentiometer bracket, loosen the other and turn the potentiometer shaft until a millivolt reading of between 900 and 1100 is displayed in the "Current" window above the Set Min button. Mesh the potentiometer gear with the command shaft gear and replace the 1¼"(6.35 mm) socket

head cap screw. The millivolt reading must remain between 900 and 1100 millivolts. Without changing the gear mesh, remove one ¼" (6.35 mm) screw and apply Loctite 242 to the threads. Reinstall the screw finger tight. Repeat the procedure on the remaining screw. Do not change the orientation of the lockwashers on the screws. The gear lash must be adjusted so there is no side load on the potentiometer shaft. Tighten and torque the ¼" (6.35 mm) socket head cap screw to 16 ft/lbs. Recheck the millivolt reading. It must be between 900 and 1100 millivolts. If not, the gear mesh will have to be readjusted.

At this point, press the "Set Min" button in the Capacity Slide Valve Potentiometer window. Realize that the "Current Ca" window will show a value, but it has no meaning at this point. Now turn the command shaft to the fully loaded position. With the slide valve against the mechanical stop, release the tension in the mechanism by actuating the brake and manually turn the command shaft back one tooth on the command shaft gear. This is the maximum millivolt position. Now press the "Set Max" button. Calibration of the slide is completed AFTER pressing the Main button, to exit the Slide Calibration screen. Now, if you re-enter the Slide Calibration screen, the correct value will be displayed in the Current Cap window and on the **Main** *screen (Figure 5).*

- ***Volume Slide Potentiometer Calibration*** *– Move the volume slides to their minimum position. This can be accomplished by either electrically actuating the slide valve motor through the Slide Calibration screen "INC" and "DEC" buttons or by manually actuating the slide valve motor. To manually actuate the motor, release the brake and turn the hex nut on the gear motor in the proper direction to move the capacity and volume slides to their minimum position (see Table 1). After the slide valves have contacted the internal stop, release the tension in the mechanism by actuating the brake and then manually turn the command shaft back one tooth on the command shaft gear.*

  Remove one of the ¼" (6.35 mm) socket head cap screws from the potentiometer bracket, loosen the other and turn the potentiometer shaft until a millivolt reading of between 900 and 1100 is displayed in the "Current" window above the Set Min button. Mesh the potentiometer shaft until a millivolt reading of between 900 and 1100 is displayed in the "Current" window above the Set Min button. Mesh the potentiometer gear with the command shaft gear and replace the ¼" (6.35 mm) socket head cap screw. The millivolt reading must remain between 900 and 1100 millivolts. Without changing the gear mesh, remove one ¼" (6.35 mm) screw and apply Loctite #242 to the threads. Reinstall the screw finger tight, then repeat the procedure on the remaining screw. The gear lash must be adjusted so there is no side load on the potentiometer shaft. Tighten and torque the ¼" (6.35 mm) socket head cap screw to 16 ft/lbs. Recheck the millivolt reading. It must be between 900 and 1100 millivolts. If not, the gear mesh will have to be readjusted.

  At this point, press the "Set Min" button in the Volume Slide Valve Potentiometer window. Realize that the Current Vol window will show a value, but it has no meaning at this point. Turn the command shaft to the fully loaded position. With the slide valve against the mechanical stop, release the tensions in the mechanism by actuating the brake and manually turn the command shaft back one tooth on the command shaft gear. This is the maximum millivolt position. Now, press the "Set Min" button. Calibration of the slide is completed AFTER pressing the "Main" button, to exit the Slide Calibration screen. If you

re-enter the Slide Calibration screen, the correct value will be displayed in the "Current Vol" window and on the Main screen.

Vilter Slide Valve Actuator Calibration Procedure For Vission And Vantage

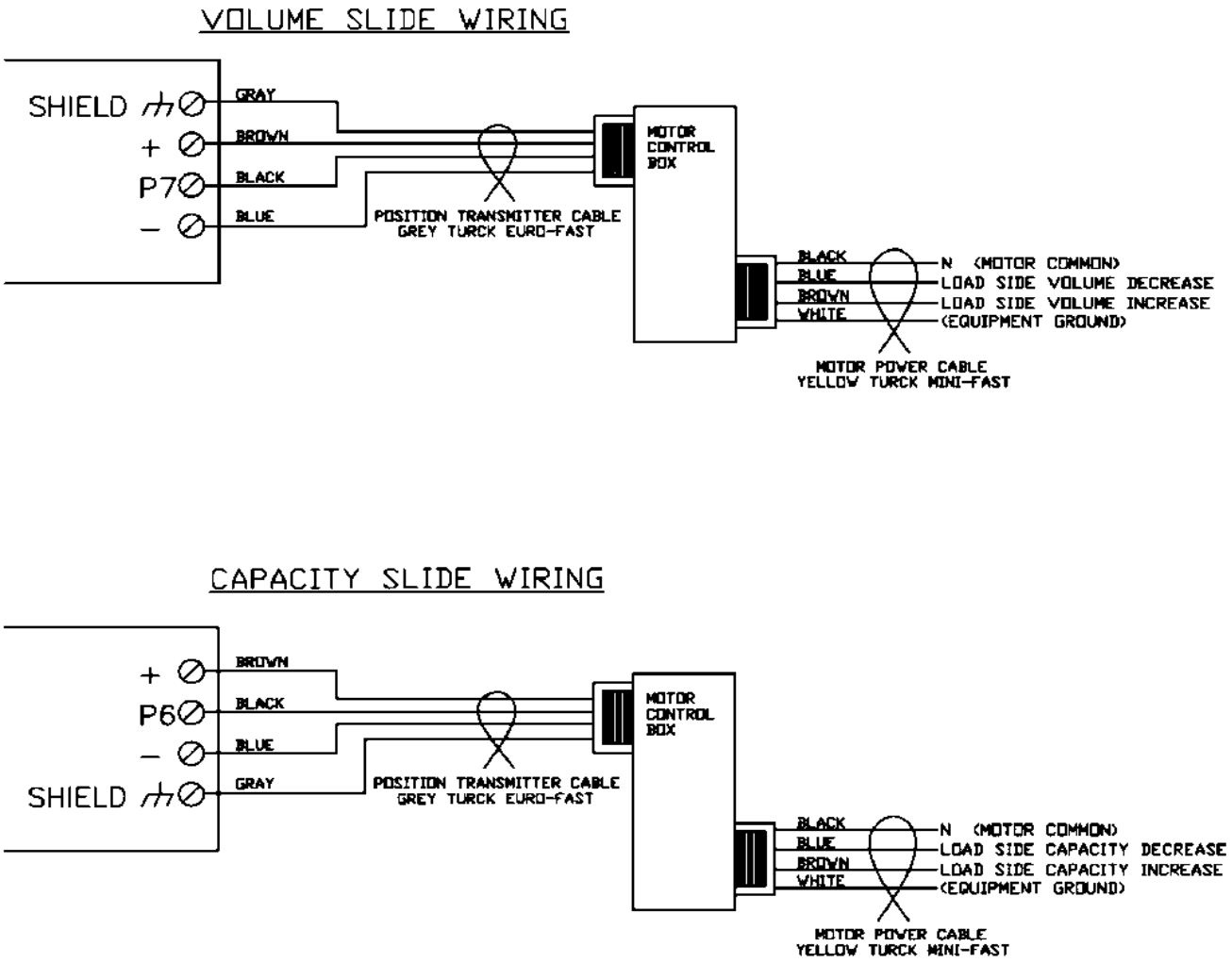


FIGURE 22. VILTER SLIDE WIRING –
MOTOR VPN#25972A TO VISSION FOR VSM-91 TO VSS-601

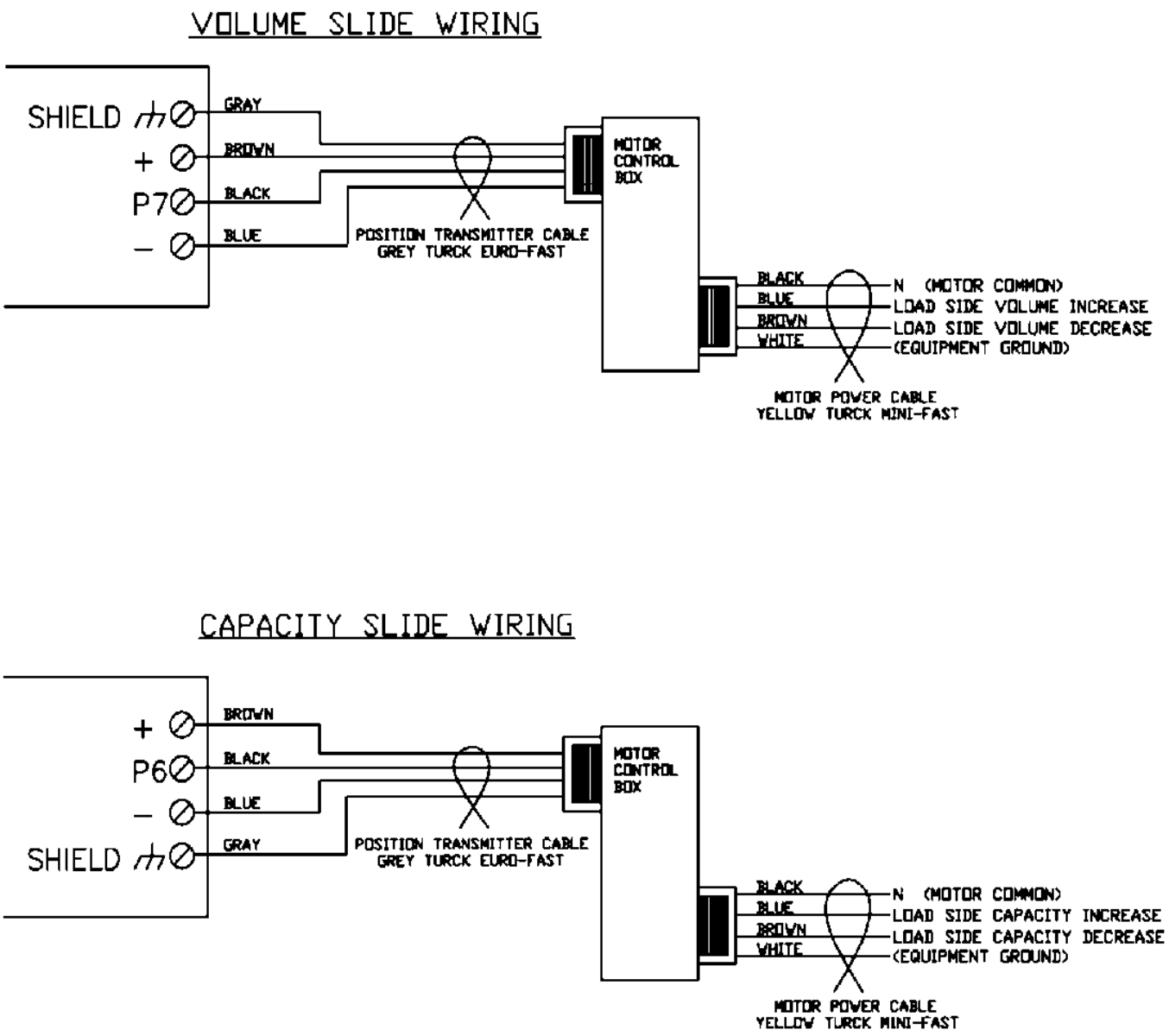


FIGURE 23. VILTER SLIDE WIRING –
MOTOR VPN25972A TO VISSION FOR VSS-751 TO VSS-1801

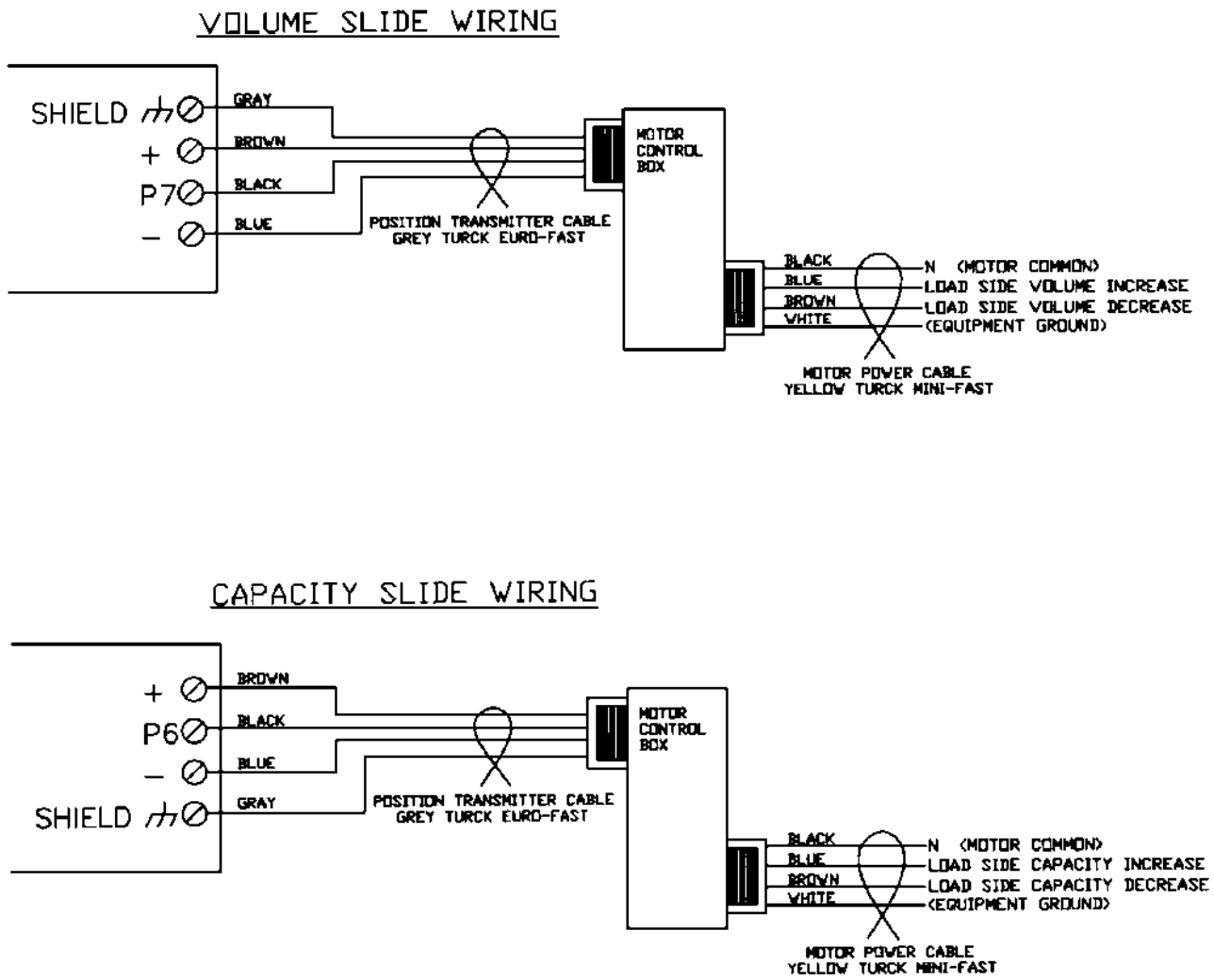


FIGURE 24. VILTER SLIDE WIRING
MOTOR VPN#25972A TO VANTAGE

The calibration procedure of the actuator is done in two steps:

1) *the actuator control module calibration is performed. Instructs the actuator motor control module to the rotation minimum position and rotational maximum position of the motor. The actuator motor control module puts out 0 volts DC at the rotational minimum position of the motor and 5 volts DC at the rotation maximum position of the motor.*
2) *After the actuator motor control module has been calibrated, the micro-controller channel corresponds to the actuator motor. Either the capacity or volume channel has to be calibrated.*

Actuator Motor Control Module Calibration Procedure

1. *Turn power off to micro-controller panel completely.*

2. *With new actuator motors already mounted, wire new actuators per the wiring diagrams shown in Figures 22, 23 or 24. Use the already installed electrical conduit to run the new cables. The old electrical wires can be used to pull the new cables through the conduit from the actuator to the control panel.* **Do not use the same conduit for the DC and AC cables**. *Do not connect the "Power Cables" (Yellow Turck cable) or the "Position Transmitter Cables" (Gray Turck cable) to either of the actuator motors yet.*

   Because the actuator motors have not been calibrated, the transmitter output of the actuator motor will fluctuate wildly until they are calibrated. To prevent damage to actuator motors, do not connect the "Power Cable" (Yellow turck cable) or the "Position Transmitter Cable" (Gray Turck cable) until instructed to do so in this procedure.

Procedure to Calibrate the Capacity Actuator Motor and the Capacity Channel

1. *Open the plastic cover of the capacity motor by removing the four #10 Pan Head Phillips screws. 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 the assembly.*

CAUTION
Handling the cover too aggressively may break the four wires attaching the cover mounted connector to the circuit board.

2. *Go to "Menu" on the main screen, then to "Slide Calibration" screen on the micro-controller.*

3. *At this point, "Slide Valve Calibration" screen appears. Once this menu appears, you can now safely connect the "Power Cable" (Yellow Turck cable) and the "Position Transmitter Cable" (Gray Turck cable) to the Capacity motor. Press INC or DEC to move the slide valves to check the rotation. (See Table 1 for proper shaft rotation.)*

   If for any reason the Increase or Decrease command on the panel does not correspond to the slide increase or decrease, swap the blue & brown wires of the Yellow Turck cable in the control panel to reverse the rotation of the motor.

4. *Quickly press and release the "BLUE CALIBRATION BUTTON" on the actuator motor once. This instructs the actuator motor to enter the "calibration" mode. The red LED will begin flashing.*

5. *Use the DEC button on the micro-controller panel to drive the capacity slide to its minimum "mechanical stop" position.*

CAUTION

DO NOT CONTINUE TO ENERGIZE THE ACTUATOR MOTOR AFTER THE SLIDE HAS REACHED THE MECHANICAL STOP. Doing so may cause mechanical damage to the motor or shear the motor shaft key.

When the slide has reached the mechanical stop position, use the INC button to pulse the motor so the capacity slide is "just off" of its minimum position and there is no tension on the motor shaft.

6. *Quickly press and release the "BLUE CALIBRATION BUTTON" on the actuator motor once. The red LED will now flash at a slower rate. This instructs the actuator motor that this point is the "minimum" slide position. This point will correspond to 0 volts AFTER the actuator calibration procedure completion.*

7. *Use the INC button on the micro-controller to drive the capacity slide to its maximum "mechanical stop" position.*

CAUTION

DO NOT CONTINUE TO ENERGIZE THE ACTUATOR MOTOR AFTER THE SLIDE HAS REACHED THE MECHANICAL STOP. Doing so may cause mechanical damage to the motor or shear the motor shaft key.

When the slide has reached the mechanical stop position, use the DEC button to pulse the motor the capacity slide is "just off" of its maximum position and there is no tension on the motor shaft.

8. *Quickly press and release the "BLUE CALIBRATION BUTTON" on the actuator motor once. The red LED will stop flashing. This now instructs the actuator motor that this point is the "maximum" slide position. This point corresponds to 5 volts. The actuator calibration procedure is complete.*

<u>Now the Capacity Channel can be Calibrated</u>

1. *Use the DEC button to drive the actuator motor back towards its minimum position. Watch the millivolt readout on the micro-controller screen. When the millivolts in the "Current" window above the "Set Min" button reads approximately 500 millivolts, discontinue pressing the DEC button. Now use the DEC and INC buttons to position the slide until a value close to 300 millivolts is on the screen. At this point, press the "Set Min" button in the Capacity Slide Valve Potentiometer window. This tells the micro-controller where the "minimum" millivolt position is. Realize that the "Current Cap" window will show a value, but it has no meaning at this point.*

2. *Use the INC button to drive the actuator motor towards its maximum position. Watch the millivolt readout on the micro-controller screen. When the millivolts read approximately 9200 millivolts, discontinue pressing the INC button. Now use the INC button to pulse the slide until the millivolt readout "saturates" or stops increasing. This is around 9500 millivolts. At this point, pulse the DEC button until the millivolts just start to drop. This is the point where the channel drops out of saturation. Press the "Set Max" button. Calibration of the slide is completed AFTER pressing the "Main" button, to exit the Slide Calibration screen. If you re-enter the Slide Calibration Screen, the correct value will be displayed in the "Current Cap" window and on the Main screen.*

3. *At this point, the capacity motor will energize automatically and drive the capacity slide back to its minimum position. The calibration for the capacity slide is completed.*

4. *Gently lower the plastic cover to where it contacts the base and o-ring seal. After making sure that the cover is not in a bind, gently tighten the four #10 Phillips screws.*

CAUTION
It is possible to crack the plastic cover by overtightening the screws.

Repeat the same procedure for the Volume slide motor.

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

COMP. MODEL	COMMAND SHAFT ROTATION (b) CAPACITY INC	CAPACITY DEC	VOLUME RATIO INC	VOLUME RATIO DEC	COMMAND SHAFT ROTATION ANGLE/TRAVEL CAPACITY	VOLUME RATIO
VSR 111	CW	CCW	CW	CCW	327° / 3.568"	187° / 2.045"
VSR 151	CW	CCW	CW	CCW	327° / 3.568"	187° / 2.045"
VSR 221	CW	CCW	CW	CCW	327° / 3.568"	187° / 2.045"
VSR 301	CW	CCW	CW	CCW	327° / 3.568"	187° / 2.045"
VSS 451	CW	CCW	CW	CCW	327° / 3.568"	187° / 2.045"
VSS 601	CW	CCW	CW	CCW	327° / 3.568"	187° / 2.045"
VSS 751	CCW	CW	CCW	CW	392° / 4.283"	226° / 2.473"
VSS 901	CCW	CW	CCW	CW	392° / 4.283"	226° / 2.473"
VSS 1051	CCW	CW	CCW	CW	440° / 4.777"	266° / 2.889"
VSS 1201	CCW	CW	CCW	CW	440° / 4.777"	266° / 2.889"
VSS 1501	CCW	CW	CCW	CW	490° / 5.325"	295° / 3.200"
VSS 1801	CCW	CW	CCW	CW	490° / 5.325"	295° / 3.200"
VSM 71	CW	CCW	CW	CCW	288° / 3.141"	162° / 1.767"
VSM 91	CW	CCW	CW	CCW	288° / 3.141"	162° / 1.767"
VSM 101	CW	CCW	CW	CCW	288° / 3.141"	162° / 1.767"
VSM 151	CW	CCW	CW	CCW	288° / 3.141"	162° / 1.767"
VSM 181	CW	CCW	CW	CCW	288° / 3.141"	162° / 1.767"
VSM 201	CW	CCW	CW	CCW	288° / 3.141"	162° / 1.767"
VSM 301	CW	CCW	CW	CCW	288° / 3.141"	162° / 1.767"
VSM 361	CW	CCW	CW	CCW	288° / 3.141"	162° / 1.767"
VSM 401	CW	CCW	CW	CCW	288° / 3.141"	162° / 1.767"

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.*

L. Trend Chart

From **Menu** *screen (Figure 5), touch the Trend Chart. The screen pictured in Figure 25 will appear.*

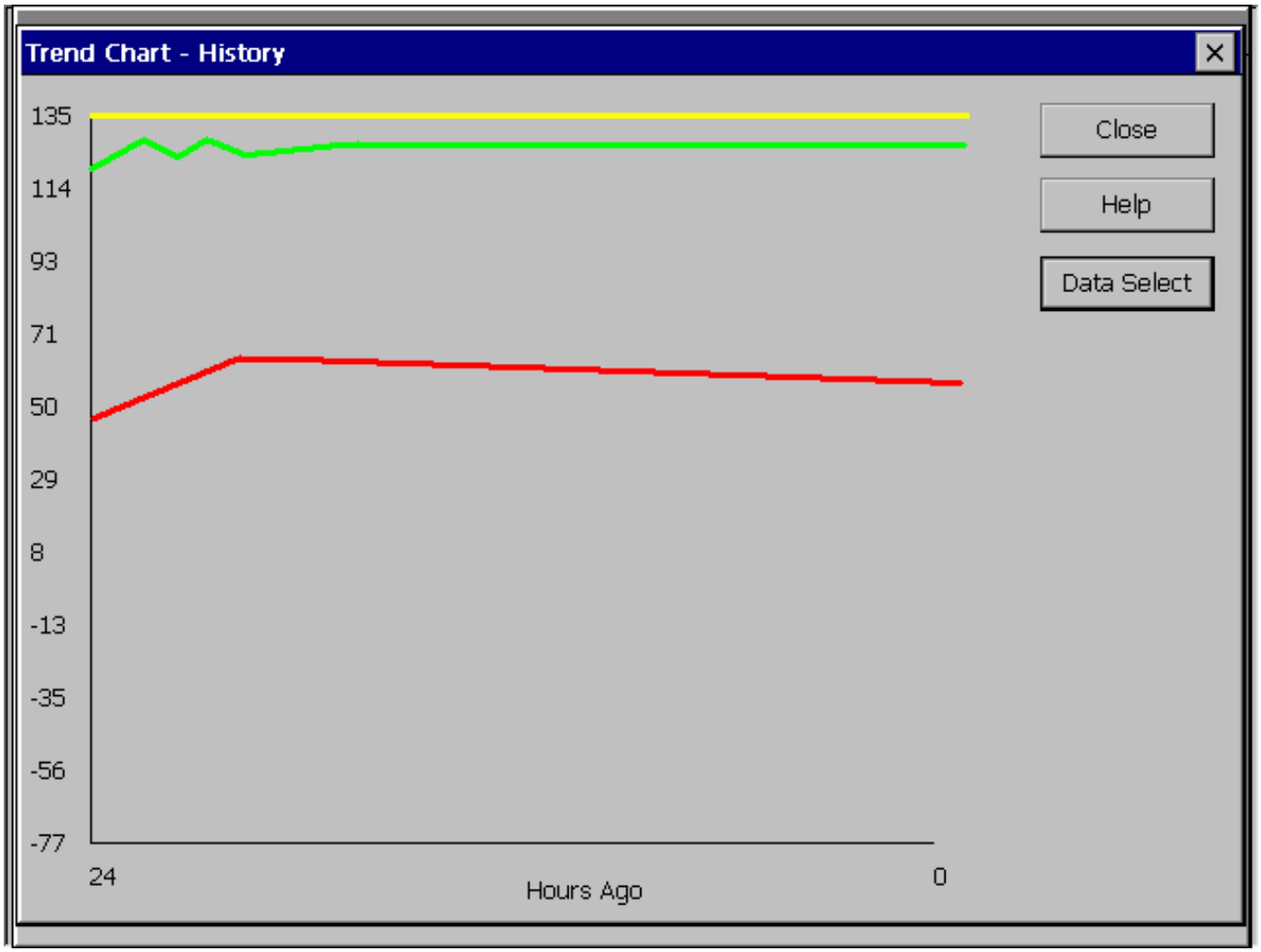


FIGURE 25. TREND CHART – HISTORY SCREEN

The trend analysis screen shows recorded data for the following time frames:

Past Day
Past 7 Days
Past 30 Days
Past 60 Days
Past 90 Days
Past 6 Months
Past Year

The user has the ability to select which value they would like to see displayed on the graph by pressing the Data Select button (Figure 26).

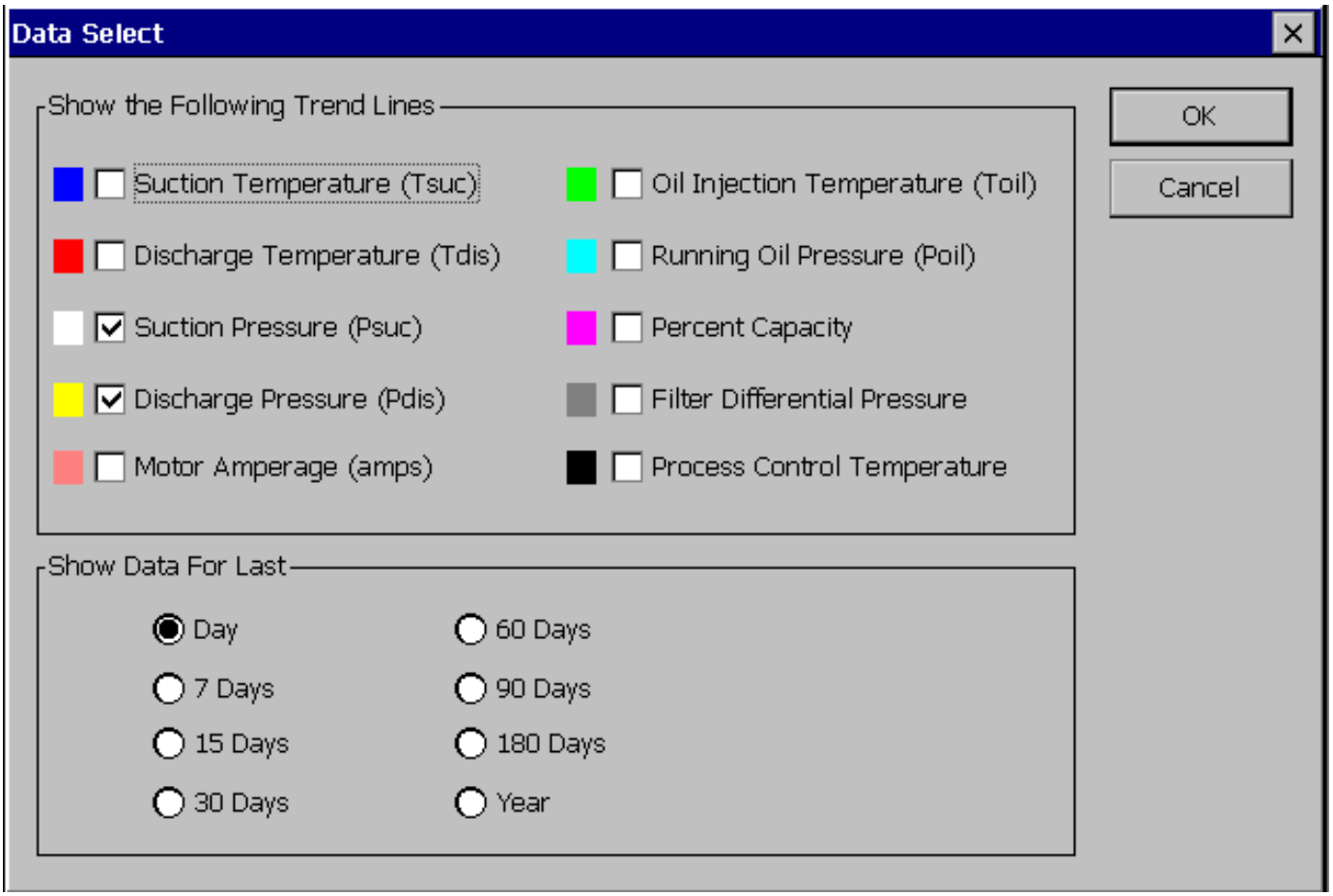


FIGURE 26. DATA SELECT SCREEN

M. Event List

From the **Menu** *screen (Figure 5), touch the Event List button. The screen in Figure 26 will appear. The Event List will give a chronological record of the last 40 events recorded by the controller. These events can be filtered by selecting the Filter box on the upper left of the screen.*

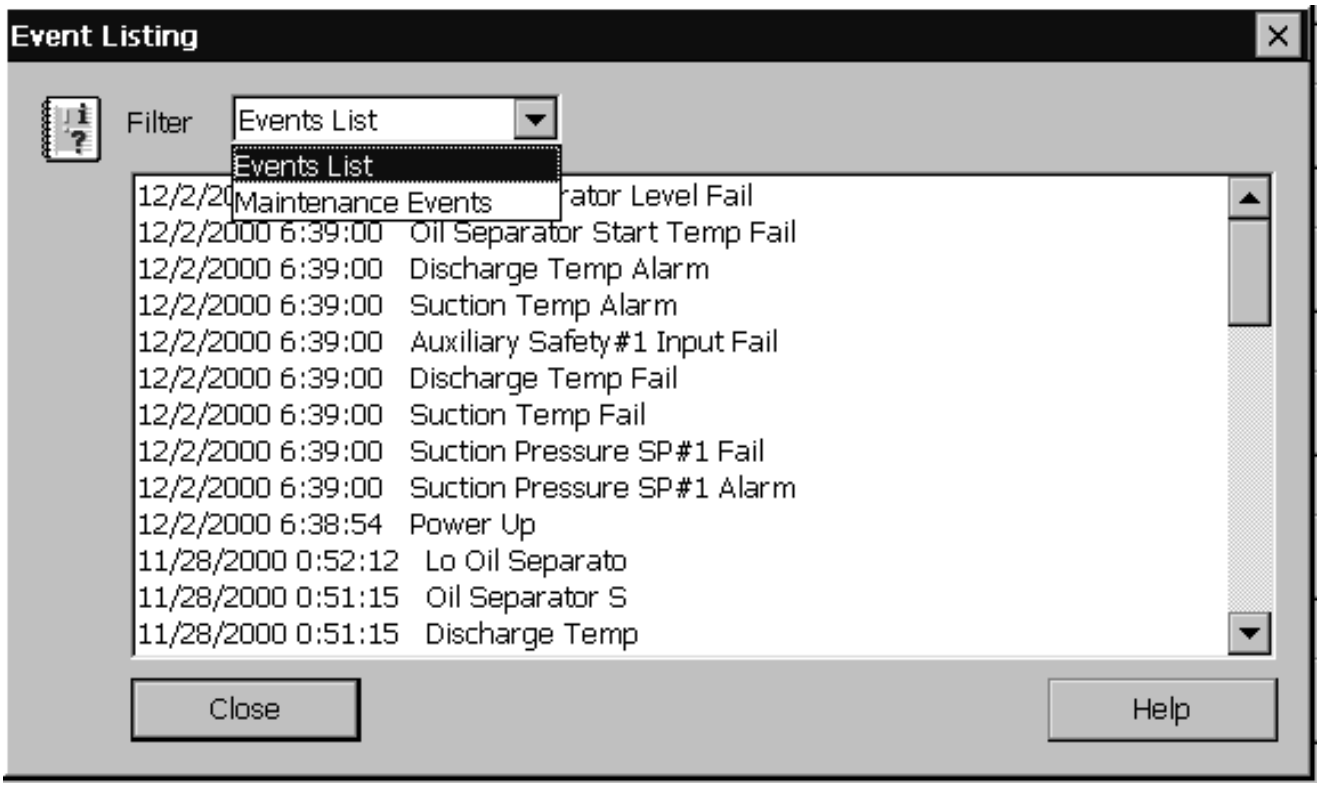


FIGURE 27. EVENT LISTING SCREEN

The values or options in the screen displays shown must be entered before start-up.

TABLE 2. SYSTEM SETPOINTS ALARMS & TRIPS WORKSHEET

SAFETY SETPOINTS	SYSTEM VALUES ALARM TRIP RESET	VALUE LIMITS ALARM	VALUE LIMITS TRIP	VALUE LIMITS RESET	DEFAULT VALUES ALARM	DEFAULT VALUES TRIP	DEFAULT VALUES RESET
LO SUCTION TEMP		-99/300	-99/300	-99/300	-45	-50	-45
HI DISCHARGE TEMP (5)		-30/260	-30/260	-30/260	205	210	200
LO OIL SEP START TEMP		50/200	50/200	50/200	75	70	80
LO OIL SEP RUN TEMP		50/200	50/200	50/200	105	100	110
LO OIL INJECT TEMP		50/160	50/160	50/160	95	90	100
HI OIL INJECT TEMP		-99/160	-99/160	-99/160	140	145	135
LO CONTROL TEMP (2)		-99/210	-99/210	-99/210	-50	-55	-45
HI CONTROL TEMP (2)		-99/210	- - -	- - -	100	- - -	95
LO SUCT PRESS							
SETPOINT #1		30"/300	30"/300	30"/300	3"	4"	2"
SETPOINT #2		30"/300	30"/300	30"/300	1"	2"	1"
HI DISCHARGE PRESS							
SETPOINT #1		30"/350	30"/350	30"/350	210	220	205
SETPOINT #2		30"/350	30"/350	30"/350	220	230	215
PRELUB OIL PRESSURE		- - -	4/300	4/300	- - -	4	5
LO OIL PRESSURE (3)		18/300	18/300	18/300	38	35	40
HI START FLTR DIFF PR (1)		30"/50	30"/50	30"/50	50	50	25
HI OIL RUN FILTER DIFF PR		30"/40	30"/40	30"/40	12	15	10
HI AMPS & <15% CAP (4)		0/1000	0/1000	0/1000	2	2	- - -
HI AMPS LIMIT (5)		0/1000	0/1000	0/1000	15	15	1000

NOTES:

(1) If your unit is equipped with new style filters (Vilter Part #3109B or 3110B), the Alarm should be set at 37 psig, Trip at 40 psig and Reset at 35 psig.
(2) For boosters, set Alarm at 28 psig, Trip at 25 psig, Reset at 30 psig.
(3) Set Alarm at 60% and Trip at 70% of full load motor nameplate amps.
(4) Set Alarm at 120% and Trip at 125% of full load motor nameplate amps.
(5) Set trip approximately 20°F above normal operating temperature at 100% capacity.

The values or options in the screen displays shown must be entered before start-up.

TABLE 3. SYSTEM CONTROL LIMIT VALUES WORKSHEET

CONTROL LIMITS	SYSTEM VALUES		VALUE LIMITS		DEFAULT VALUES	
	CUT IN	CUT OUT	CUT IN	CUT OUT	CUT IN	CUT OUT
SUCTION PRESSURE ON/OFF (1)						
SETPOINT #1			30"/150	30"/150	10	6
SETPOINT #2			30"/150	30"/150	15	11
SUCTION TEMPERATURE ON/OFF (1)						
SETPOINT #1					20°F	10°F
SETPOINT #2					25°F	15°F
SUCT PR CAP INCREASE (1)						
SETPOINT #1			30"/150	30"/150	20	20
SETPOINT #2			30"/150	30"/150	25	25
SUCT TEMP CAP INCREASE (1)						
SETPOINT #1					28°F	27°F
SETPOINT #2					33°F	32°F
SUCT PR CAP DECREASE (1)						
SETPOINT #1			30"/150	30"/150	18	18
SETPOINT #2			30"/150	30"/150	23	23
SUCT TEMP CAP DECREASE (1)						
SETPOINT #1					24°F	25°F
SETPOINT #2					29°F	30°F
HIGH DSCH PRESS UNLD (1)						
SETPOINT #1			0/300	0300	200	190
SETPOINT #2			0/300	0/300	210	200
LIQ INJECTION SOLENOID CONTROL TEMP VIA:			**ON**	**OFF**	**ON**	**OFF**
OIL INJECTION TEMPERATURE			200°F	50°F	120°F	105°F
OIL SEPARATOR TEMPERATURE			200°F	50°F	120°F	105°F
OILPMP RESTART (D/S)			1.0/8.0	1.0/8.0	2.8	3.0
OIL SEPARATOR HEATER			80/130	80/130	95	105
CAP CTRL °F ON/OFF (2)						
SETPOINT #1			-99/200	-99/200	20	10
SETPOINT #2			-99/200	-99/200	25	15
CAP CTRL °F INCR (2)						
SETPOINT #1			-99/300	-99/300	28	27
SETPOINT #2			-99/300	-99/300	33	32
CAP CTRL °F DECR (2)						
SETPOINT #1			-99/200	-99/200	24	25
SETPOINT #2			-99/200	-99/200	29	30
LAG, CAPACITY STEP (3)			0/100	- - -	10	- - -
VOL SLIDE ADJ FACTOR			-100/100	- - -	0%	- - -
MINIMUM RUN CAPACITY			10% / 90%	- - -	30	35%
LEAD, MAXIMUM CAP FLAG (3)			50/100	50/100	95	90
ECONOMIZER SOLENOID			0% / 100%	0% / 100%	80%	75%`
VOL ADJ CAP RANGE			0/100	- - -	100%	100%

Cont'd on next page

TABLE 3. SYSTEM CONTROL LIMIT VALUES WORKSHEET *(cont'd)*

CONTROL LIMITS	SYSTEM VALUES		VALUE LIMITS		DEFAULT VALUES	
	CUT IN	CUT OUT	CUT IN	CUT OUT	CUT IN	CUT OUT
LOW SUCTION PRESS LOAD LIMIT						
SETPOINT #1						
SETPOINT #2						
LOW SUCTION PRESSURE LOAD LIMIT (5)			ON	OFF	ON	OFF
SETPOINT #1					30	35
SETPOINT #2					40	45
	FLA	MAX	FLA	MAX	FLA	MAX
MOTOR AMPS LOAD LIMIT (4)						
SETPOINT #1			0/999	0/999	5	10
SETPOINT #2			0/999	0/999	5	10
CURRENT TRANSFORMER (1)	C/T RATIO		C/T RATIO 100-1000/AMPS		C/T RATIO 250/5 AMPS	

NOTES:

(1) Must be field set.
(2) Set only if temperature is used for capacity control.
(3) Set only if Lead/Lag option is selected.
(4) Set "ON" at FLA and "OFF" at FLA+Service Factor.
(5) Used only with discharge pressure control.

The values or options in the screen displays shown must be entered before start-up.

TABLE 4. SYSTEM TIMER VALUES WORKSHEET

TIMER VALUES	SYSTEM VALUES	VALUE LIMITS	DEFAULT VALUES
AT START CAPACITY DECREASE		0/999 SEC	15 SEC
CAPACITY INCREASE MOTOR ON		0/255 SEC	3 SEC
CAPACITY DECREASE MOTOR ON		0/255 SEC	3 SEC
CMP STARTER AUX CONTACT BYPASS		0/255 SEC	10 SEC
CAP INCREASE MOTOR OFF		0/255 SEC	20 SEC
CAP DECREASE MOTOR OFF		0/255 SEC	20 SEC
VOL SLIDE ADJ TIMER		0/255 SEC	20 SEC
MINIMUM CAP PRELUB TIME		0/255 SEC	5 SEC
RUN CYCLE OIL PRESS BYPASS		0/90 SEC	60 SEC
PRELUB PUMP TIME LIMIT		0/255 SEC	15 SEC
CAPACITY HOLD MOTOR OFF TIME		0/255 SEC	10 SEC
CAPACITY HOLD MOTOR ON TIME		0/255 SEC	2 SEC
FLTR DIFF PR SAFETY CHANGEOVER		0/999 SEC	60 SEC
LO OIL SEP LEVEL BYPASS TIMER		0/120 SEC	60 SEC
AUTO RESTART AFTER POWER FAIL		1/240 MIN	5 MIN
OIL SEP TEMP SAFETY CHANGEOVER		0/15 MIN	5 MIN
LO OIL INJ TEMP SFTY CHANGEOVER		0/15 MIN	6 MIN
ANTIRECYCLE STRT TIMER (MIN) (1)		0/30 MIN	20 MIN
START LAG COMP TIMER (MIN) (2)		0/30 MIN	5 MIN
STOP LAG COMP TIMER (MIN) (2)		0/30 MIN	5 MIN
FORCE START LAG COMP (MIN) (2)		0/60 MIN	30 MIN
HOT STRTS/HR COUNTER (COUNTS) (1)		1/10 COUNTS	3 COUNTS

NOTES:
(1) Must be field set.
(2) Set only if Lead/Lag option is selected.

VI. SPARE PARTS

PART DESCRIPTION	VILTER PART NUMBER	QTY.
Analog Board	*3011A*	*1*
Control Relay, 4PDT	*3011B1*	*1*
Control Relay, DPDT	*3011A1*	*1*
Control Relay, SPDT	*3011Z*	*1*
Input Module	*2895M **	*1*
Main Circuit Board	*2895A*	*1*
Output Module	*2895N **	*1*
Output Module Fuse	*2895P*	*1*
Panel Fuse, ½ Amp	*3011V*	*1*
Panel Fuse, 10 Amp	*3011W*	*1*
Panel Fuse, 4 Amp	*3011U*	*1*
Power Supply Transformer	*3011K*	*1*
Relay Board	*3011B*	*1*
Pressure Transducer	*2783A*	*1*
Resistance Temperature Detector	*2611E*	*1*
Volume Ratio & Capacity Potentiometer	*2935D*	*1*
Fuse Kit	*3011F*	*1*
VISSION SBC Sub-Assembly	*3011M*	*1*
Modbus Cable	*3011X*	*1*
VISSION Cable Kit	*3011Y*	*1*

* *Supplied as 120 VAC. If 240 VAC is required, add –1 suffix to the part number (i.e. 27895M-1 for 240 VAC)*

VILTER

SLIDE VALVE ACTUATOR CALIBRATION PROCEDURE FOR THE MICROPROCESSOR

The calibration procedure of the actuator is done in two steps.

1) The actuator control module calibration is performed. Instruct the actuator motor control module the rotational minimum position and rotational maximum position of the motor. The actuator motor control module puts 0 volts DC at the rotational minimum position of the motor and puts out 5 volts DC at the rotational maximum position of the motor.

2) After the actuator motor control module has been calibrated, the microprocessor channel corresponding to the actuator motor (either the capacity or volume channel) has to be calibrated.

ACTUATOR MOTOR CONTROL MODULE CALIBRATION PROCEDURE

1. Turn off power to microprocessor panel completely. In addition, turn "Control Power" switch on front of Microprocessor Panel to the OFF position.

2. Mount new actuator motors (see "Vilter Actuator Set Up for Capacity and Volume Slide Motors"). Install the 24V external power supply inside the microprocessor box. This AC/DC transformer is provided with two cords. You will have to cut the ends in order to connect the wires in the panel. ***Make sure the +24VDC supply is in the proper location per the attached Wiring Diagram Sketch A. Do not reverse the polarity***. Use the already installed electrical conduit to run the new cables. The old electrical wires can be used to pull the new cables through the conduit from the actuator to the control panel. ***Do not use the same conduit for the DC and AC cables***. Wire the external power supply per the attached wiring diagram. Do not connect the "Power Cables" (Yellow TURCK cable) or the "Position Transmitter Cables" (Gray Turck cable) to either of the actuator motors yet.

   Disconnect the potentiometer wiring at the Capacity Slide Channel and Volume Slide Channel on the Microprocessor. Wire the actuator motor "Power Cable" (Yellow TURCK cable) and the "Position Transmitter Cable" (Gray TURCK cable) per the wiring diagram.

   Because the actuator motors have not been calibrated, the transmitter output of the actuator motor will fluctuate wildly until they are calibrated. To prevent damage to actuator motors, do not connect the "Power Cable" (Yellow TURCK cable) or the "Position Transmitter Cable" (Gray TURCK cable) until instructed to do so in this procedure.

3. Double-check to make sure "Control Power" switch on the front of the Microprocessor panel is in the OFF position. Once you have done this, you can reapply power to the microprocessor panel.

PROCEDURE TO CALIBRATE THE CAPACITY ACTUATOR MOTOR AND THE CAPACITY CHANNEL

1. Go to the "Recalibrate Transducers" menu on the microprocessor, which is located in the third column, third row of the display menus.

2. Open the plastic cover of the capacity motor by removing the four #10 Pan Head Phillips screws. 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 to be able to see the red LED on the top of the assembly.

   CAUTION: HANDLING THE COVER TOO AGGRESSIVELY MAY BREAK THE FOUR WIRES ATTACHING THE COVER MOUNTED CONNECTOR TO THE CIRCUIT BOARD.

3. Enter the password, EDIT,NEXT,NEXT, followed by <ENTER> button. The cursor (a right arrow) will appear to the left of the Channel # character.

4. Press ENTER again. An asterisk will replace the cursor. Use the UP and DOWN arrow keys to select the channel to be calibrated. In this case, we will select channel #11 (Capacity slide motor). After channel #11 is displayed, press the ENTER key. The "right arrow" cursor now replaces the asterisk.

5. Turn "Control Power" switch on the front of Microprocessor Panel to the ON position.

6. Press the NEXT key. The cursor moves to the left of the Channel value. Press ENTER. At this point, a menu appears, instructing you to "Set Pot at MINIMUM mV". Once this menu appears, you can now safely connect the "Power Cable" (Yellow TURCK cable) and the "Position Transmitter Cable" (Gray TURCK cable) to the Capacity motor. Press INC or DEC to move the slide valve to check the rotation. (See attached Table 1 for proper shaft rotation.)

If for any reason the Increase or Decrease command on the panel does not correspond to the slide increase or decrease, swap the blue & brown wires of the Yellow TURCK cable in the control panel to reverse the rotation of the motor.

7. Quickly press and release the "BLUE CALIBRATION BUTTON" on the actuator motor once. This instructs the actuator motor to enter the "calibration" mode. The red LED will begin flashing.

8. Use the DEC button on the microprocessor panel to drive the capacity slide to its minimum "mechanical stop" position.

   CAUTION: DO NOT CONTINUE TO ENERGIZE THE ACTUATOR MOTOR AFTER THE SLIDE HAS REACHED THE MECHANICAL STOP. Doing so may cause mechanical damage to the motor or shear the motor shaft key.

   When the slide has reached the mechanical stop position, use the INC button to pulse the motor so the capacity slide is "just off" of its minimum position and there is no tension on the motor shaft.

9. Quickly press and release the "BLUE CALIBRATION BUTTON" on the actuator motor once. The red LED will now flash at a slower rate. This now instructs the actuator motor that this point is the "minimum" slide position. This point will correspond to 0 volts AFTER the actuator calibration procedure completed.

10. Use the INC button on the microprocessor to drive the capacity slide to its maximum “mechanical stop” position.

    CAUTION: DO NOT CONTINUE TO ENERGIZE THE ACTUATOR MOTOR AFTER THE SLIDE HAS REACHED THE MECHANICAL STOP. Doing so may cause mechanical damage to the motor or shear the motor shaft key.

    When the slide has reached the mechanical stop position, use the DEC button to pulse the motor so the capacity slide is “just off” of its maximum position and there is not tension on the motor shaft.

11. Quickly press and release the “BLUE CALIBRATION BUTTON” on the actuator motor once. The red LED will stop flashing. This now instructs the actuator motor that this point is the “maximum” slide position. This point corresponds to 5 volts. The actuator calibration procedure is completed.

Now the Capacity Channel on the Microprocessor has to be calibrated.

12. Use the DEC button to drive the actuator motor back towards its minimum position. Watch the millivolt readout on the Microprocessor Screen. When the millivolts reads approximately 500 millivolts, discontinue pressing the DEC button. Now use the DEC and INC buttons to position the slide until a value close to 300 millivolts is on the screen. At this point, press the <ENTER> button on the Microprocessor panel. This tells the Microprocessor where the “minimum” millivolts position is.

13. Now use the INC button to drive the actuator motor towards its maximum position. Watch the millivolt readout on the Microprocessor Screen. When the millivolts read approximately 9200 millivolts, discontinue pressing the INC button. Now use the INC button to pulse the slide until the millivolt readout “saturates” or stops increasing. This is around 9500 millivolts. At this point, pulse the DEC button until the millivolts just starts to drop (this is the point where the channel drops out of saturation). At this point, press the <ENTER> button on the Microprocessor panel. This tells the Microprocessor where the “maximum” millivolts position is.

    At this point, the capacity motor will energize automatically and drive the capacity slide back to its minimum position. The calibration for the capacity slide is completed.

14. Gently lower the plastic cover to where it contacts the base and o-ring seal. After making sure the cover is not in a bind, gently tighten the four #10 Phillips screws.

    CAUTION: IT IS POSSIBLE THE CRACK THE PLASTIC COVER BY OVER TIGHTENING THE SCREWS.

Repeat the procedure for the Volume Slide Motor – Microprocessor channel #12.

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

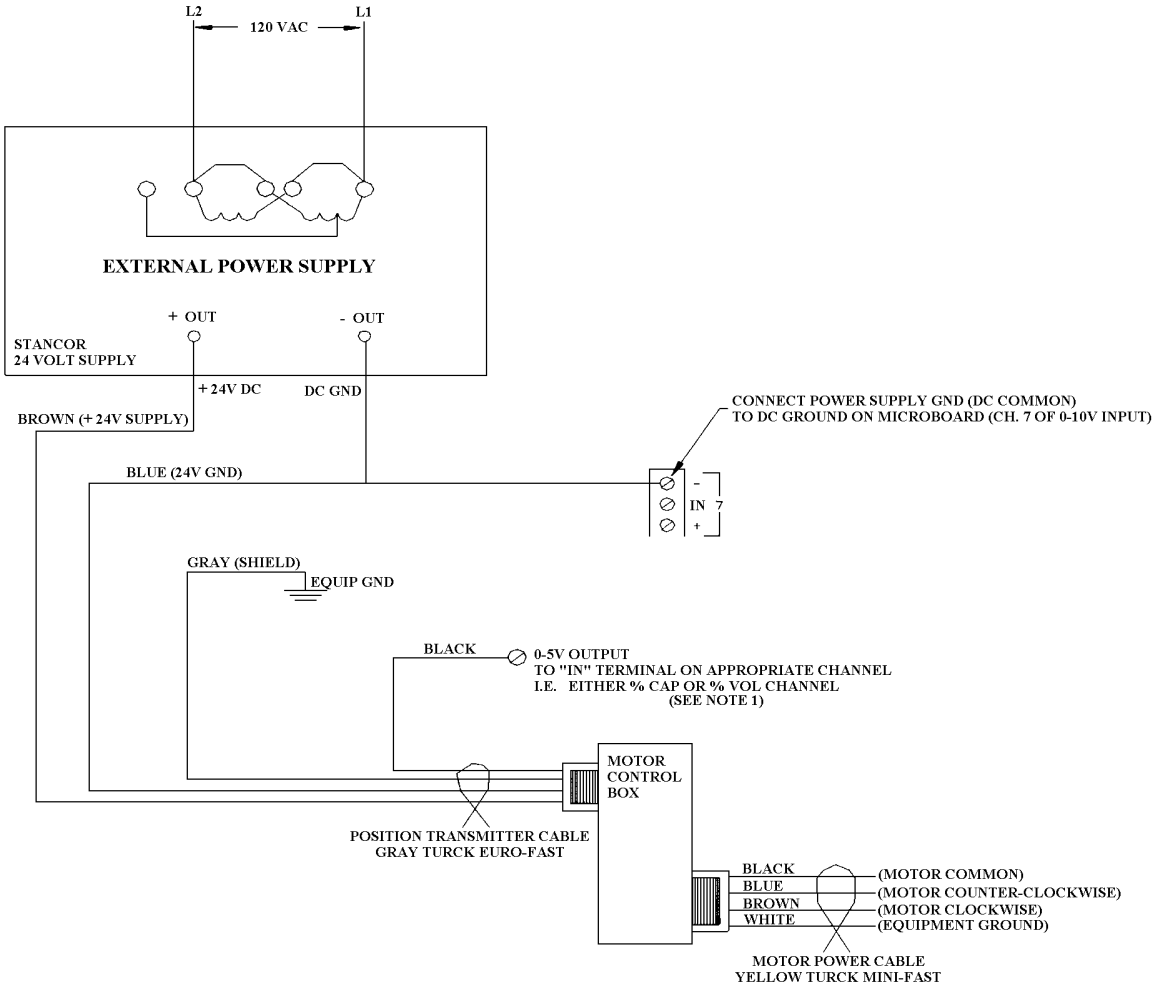
COMP. MODEL	COMMAND SHAFT ROTATION (b) CAPACITY INC	CAPACITY DEC	VOLUME RATIO INC	VOLUME RATIO DEC	COMMAND SHAFT ROTATION ANGLE/TRAVEL CAPACITY	VOLUME RATIO
VSR 111	CW	CCW	CW	CCW	327° / 3.568”	187° / 2.045”
VSR 151	CW	CCW	CW	CCW	327° / 3.568”	187° / 2.045”
VSR 221	CW	CCW	CW	CCW	327° / 3.568”	187° / 2.045”
VSR 301	CW	CCW	CW	CCW	327° / 3.568”	187° / 2.045”
VSS 451	CW	CCW	CW	CCW	327° / 3.568”	187° / 2.045”
VSS 601	CW	CCW	CW	CCW	327° / 3.568”	187° / 2.045”
VSS 751	CCW	CW	CCW	CW	392° / 4.283”	226° / 2.473”
VSS 901	CCW	CW	CCW	CW	392° / 4.283”	226° / 2.473”
VSS 1051	CCW	CW	CCW	CW	440° / 4.777”	266° / 2.889”
VSS 1201	CCW	CW	CCW	CW	440° / 4.777”	266° / 2.889”
VSS 1501	CCW	CW	CCW	CW	490° / 5.325”	295° / 3.200”
VSS 1801	CCW	CW	CCW	CW	490° / 5.325”	295° / 3.200”
VSM 71	CW	CCW	CW	CCW	288° / 3.141”	162° / 1.767”
VSM 91	CW	CCW	CW	CCW	288° / 3.141”	162° / 1.767”
VSM 101	CW	CCW	CW	CCW	288° / 3.141”	162° / 1.767”
VSM 151	CW	CCW	CW	CCW	288° / 3.141”	162° / 1.767”
VSM 181	CW	CCW	CW	CCW	288° / 3.141”	162° / 1.767”
VSM 201	CW	CCW	CW	CCW	288° / 3.141”	162° / 1.767”
VSM 301	CW	CCW	CW	CCW	288° / 3.141”	162° / 1.767”
VSM 361	CW	CCW	CW	CCW	288° / 3.141”	162° / 1.767”
VSM 401	CW	CCW	CW	CCW	288° / 3.141”	162° / 1.767”

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.



NOTE 1

VILTER SLIDE MOTOR (VPN#25972A) POWER WIRING TO MICROPROCESSOR TERMINALS

CAPACITY
WIRE #11 INCREASE - BROWN
WIRE #10 DECREASE - BLUE
WIRE #2 COMMON - BLACK

VOLUME
WIRE #13 INCREASE - BROWN
WIRE #12 DECREASE - BLUE
WIRE #2 COMMON - BLACK

WIRE IS SHOWN FOR VSS/VSR/VSM 91 TO 601, FOR ALL OTHER SIZES, REVERSE THE BROWN AND BLUE WIRES.

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VILTER™ Since 1867

VILTER MANUFACTURING CORPORATION
CUDAHY, WISCONSIN 53110-8904
TELEPHONE No. (414) 744-0111

DRAWN BY:	CHECKED BY:	SCALE:
SLP	JKK	N.T.S
REDRAWN BY:	APPROVED BY:	DATE:
JLP	JKK	6/13/01

TITLE: VILTER SLIDE WIRING MOTOR (VPN#25972A) TO MICROPROCESSOR

FOR:

ORDER NO.

SKETCH A R0

A

VILTER PART #35391ZA
ISSUED DECEMBER 2001

VILTER

SLIDE VALVE ACTUATOR CALIBRATION PROCEDURE FOR THE VISSION AND VANTAGE

The calibration procedure of the actuator is done in two steps.

1) The actuator control module calibration is performed. Instruct the actuator motor control module to the rotational minimum position and rotational maximum position of the motor. The actuator motor control module puts out 0 volts DC at the rotational minimum position of the motor and 5 volts DC at the rotational maximum position of the motor.

2) After the actuator motor control module has been calibrated, the microprocessor channel corresponding to the actuator motor (either the capacity or volume channel) has to be calibrated.

ACTUATOR MOTOR CONTROL MODULE CALIBRATION PROCEDURE

1. Turn off power to the micro-controller panel completely.

2. With new actuator motors already mounted (per "VILTER Actuator Set Up for Capacity and Volume Slide Motors"), wire new actuators per the attached wiring diagrams. Use the already installed electrical conduit to run the new cables. The old electrical wires can be used to pull the new cables through the conduit from the actuator to the control panel. **Do not use the same conduit for the DC and AC cables**. Do not connect the "Power Cables" (Yellow TURCK cable) or the "Position Transmitter Cables" (Gray TURCK cable) to either of the actuator motors yet.

   Because the actuator motors have not been calibrated, the transmitter output of the actuator motor will fluctuate wildly until they are calibrated. To prevent damage to actuator motors, do not connect the "Power Cable" (Yellow TURCK cable) or the "Position Transmitter Cable" (Gray TURCK cable) until instructed to do so in this procedure.

PROCEDURE TO CALIBRATE THE CAPACITY ACTUATOR MOTOR AND THE CAPACITY CHANNEL

1. Open the plastic cover of the capacity motor by removing the four #10 Pan Head Phillips screws. 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 the assembly.

   CAUTION: HANDLING THE COVER TOO AGGRESSIVELY MAY BREAK THE FOUR WIRES ATTACHING THE COVER MOUNTED CONNECTOR TO THE CIRCUIT BOARD.

2. Go to "Menu" on the main screen, then "Slide Calibration" screen on the microcontroller.

3. At this point, "Slide Valve Calibration" screen appears. Once this menu appears, you can now safely connect the "Power Cable" (Yellow TURCK cable) and the "Position Transmitter Cable" (Gray TURCK cable) to the Capacity motor. Press INC or DEC to move the slide valves to check the rotation. See attached Table 1 for proper shaft rotation.

If for any reason the Increase or Decrease command on the panel does not correspond to the slide increase or decrease, swap the blue & brown wires of the Yellow TURCK cable in the control panel to reverse the rotation of the motor.

4. Quickly press and release the "BLUE CALIBRATION BUTTON" on the actuator motor once. This instructs the actuator motor to enter the "calibration" mode. The red LED will begin flashing.

5. Use the DEC button on the microprocessor panel to drive the capacity slide to its minimum "mechanical stop" position.

   CAUTION: DO NOT CONTINUE TO ENERGIZE THE ACTUATOR MOTOR AFTER THE SLIDE HAS REACHED THE MECHANICAL STOP. Doing so may cause mechanical damage to the motor or shear the motor shaft key.

   When the slide has reached the mechanical stop position, use the INC button to pulse the motor so the capacity slide is "just off" of its minimum position and there is not tension on the motor shaft.

6. Quickly press and release the "BLUE CALIBRATION BUTTON" on the actuator motor once. The red LED will now flash at a slower rate. This now instructs the actuator motor that this point is the "minimum" slide position. This point will correspond to 0 volts AFTER the actuator calibration procedure completed.

7. Use the INC button on the microprocessor to drive the capacity slide to its maximum "mechanical stop" position.

   CAUTION: DO NOT CONTINUE TO ENERGIZE THE ACTUATOR MOTOR AFTER THE SLIDE HAS REACHED THE MECHANICAL STOP. Doing so may cause mechanical damage to the motor or shear the motor shaft key. When the slide has reached the mechanical stop position, use the DEC button to pulse the motor so the capacity slide is "just off" of its maximum position and there is no tension on the motor shaft.

8. Quickly press and release the "BLUE CALIBRATION BUTTON" on the actuator motor once. The red LED will stop flashing. This now instructs the actuator motor that this point is the "maximum" slide position. This point corresponds to 5 volts. The actuator calibration procedure is completed.

Now the Capacity Channel can be calibrated.

1. Use the DEC button to drive the actuator motor back towards its minimum position. Watch the millivolt readout on the micro-controller screen. When the millivolts in the "Current" window above the "Set Min" button reads approximately 500 millivolts, discontinue pressing the DEC button. Now use the DEC and INC buttons to position the slide until a value close to 300 millivolts is on the screen. At this point, press the "Set Min" button in the Capacity Slide Valve Potentiometer window. This tells the micro-controller where the "minimum" millivolt position is. Realize that the "current Cap" window will show a value, but it has no meaning at this point.

2. Use the INC button to drive the actuator motor towards its maximum position. Watch the millivolt readout on the micro-controller screen. When the millivolts reads approximately 9200 millivolts, discontinue pressing the INC button. Now use the INC button to pulse the slide until the millivolt readout "saturates", or stops increasing. This is around 9500 millivolts. At this point, pulse the DEC button until the millivolts just starts to drop (this is the point where the channel drops out of saturation). Now press the "Set Max" button. Calibration of the slide is completed AFTER pressing

the “Main” button, to exit the Slide Calibration Screen. If you re-enter the Slide Calibration Screen, the correct value will be displayed in the “Current Cap” window and on the Main screen.

3. At this point, the capacity motor will energize automatically and drive the capacity slide back to its minimum position. The calibration for the capacity slide is completed.

4. Gently lower the plastic cover to where it contacts the base and o-ring seal. After making sure the cover is not in a bind, gently tighten the four #10 Phillips screws.

CAUTION: IT IS POSSIBLE TO CRACK THE PLASTIC COVER BY OVERTIGHTENING THE SCREWS.

Repeat the same procedure for the volume slide motor.

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

COMP. MODEL	COMMAND SHAFT ROTATION (b) CAPACITY INC	CAPACITY DEC	VOLUME RATIO INC	VOLUME RATIO DEC	COMMAND SHAFT ROTATION ANGLE/TRAVEL CAPACITY	VOLUME RATIO
VSR 111	CW	CCW	CW	CCW	327° / 3.568”	187° / 2.045”
VSR 151	CW	CCW	CW	CCW	327° / 3.568”	187° / 2.045”
VSR 221	CW	CCW	CW	CCW	327° / 3.568”	187° / 2.045”
VSR 301	CW	CCW	CW	CCW	327° / 3.568”	187° / 2.045”
VSS 451	CW	CCW	CW	CCW	327° / 3.568”	187° / 2.045”
VSS 601	CW	CCW	CW	CCW	327° / 3.568”	187° / 2.045”
VSS 751	CCW	CW	CCW	CW	392° / 4.283”	226° / 2.473”
VSS 901	CCW	CW	CCW	CW	392° / 4.283”	226° / 2.473”
VSS 1051	CCW	CW	CCW	CW	440° / 4.777”	266° / 2.889”
VSS 1201	CCW	CW	CCW	CW	440° / 4.777”	266° / 2.889”
VSS 1501	CCW	CW	CCW	CW	490° / 5.325”	295° / 3.200”
VSS 1801	CCW	CW	CCW	CW	490° / 5.325”	295° / 3.200”
VSM 71	CW	CCW	CW	CCW	288° / 3.141”	162° / 1.767”
VSM 91	CW	CCW	CW	CCW	288° / 3.141”	162° / 1.767”
VSM 101	CW	CCW	CW	CCW	288° / 3.141”	162° / 1.767”
VSM 151	CW	CCW	CW	CCW	288° / 3.141”	162° / 1.767”
VSM 181	CW	CCW	CW	CCW	288° / 3.141”	162° / 1.767”
VSM 201	CW	CCW	CW	CCW	288° / 3.141”	162° / 1.767”
VSM 301	CW	CCW	CW	CCW	288° / 3.141”	162° / 1.767”
VSM 361	CW	CCW	CW	CCW	288° / 3.141”	162° / 1.767”
VSM 401	CW	CCW	CW	CCW	288° / 3.141”	162° / 1.767”

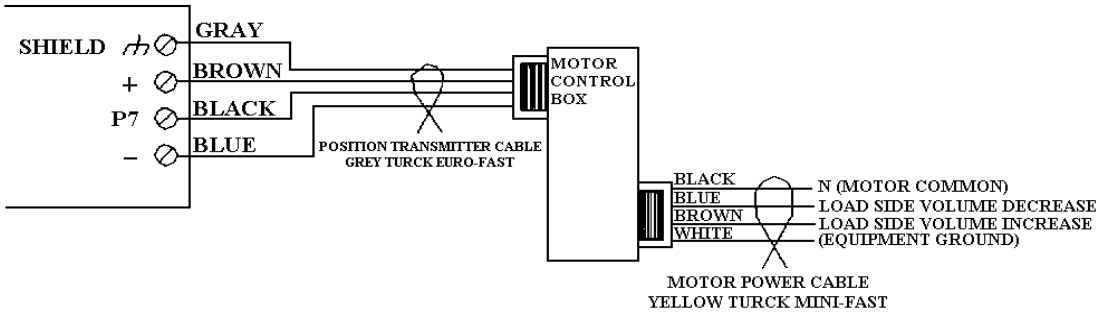
NOTES:

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.

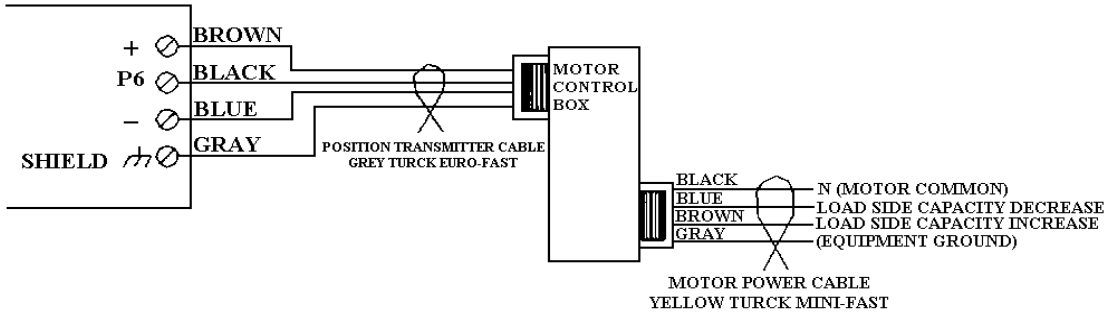
b) The manual operating shaft on the gear motor should be turned the **opposite** direction of the desired command shaft rotation.

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.

VOLUME SLIDE WIRING



CAPACITY SLIDE WIRING



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JLP	MTW	9/4/01

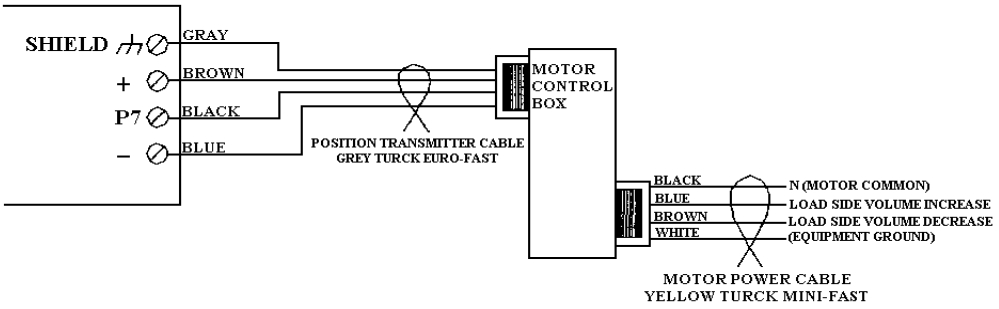
TITLE: VILTER SLIDE WIRING MOTOR (VPN#25972A) TO VISSION FOR VSM-91 TO VSS-601

FOR:

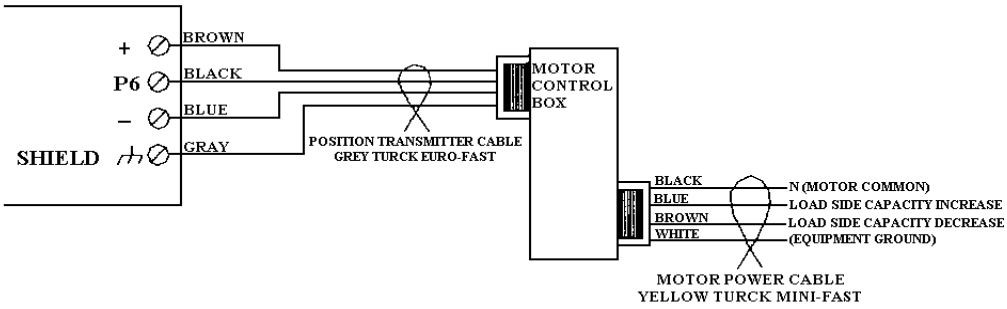
ORDER NO.

SKETCH B R0

VOLUME SLIDE WIRING



CAPACITY SLIDE WIRING



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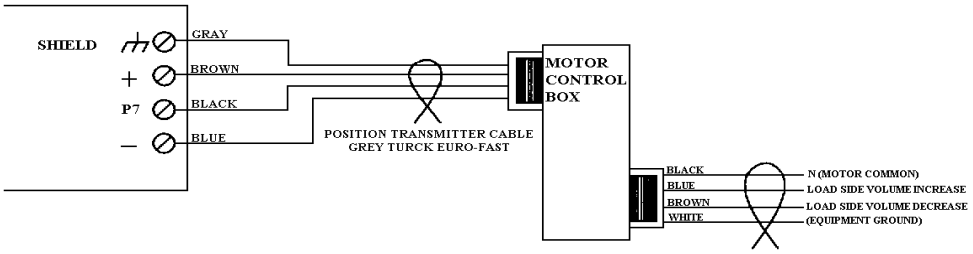
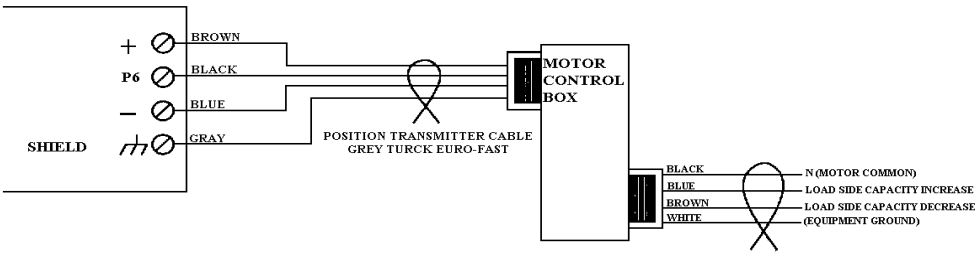
SKETCH C R1

VOLUME SLIDE WIRING



CAPACITY SLIDE WIRING



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JLP	MTW	9/4/01

TITLE: VILTER SLIDE WIRING MOTOR (VPN#25972A) TO VANTAGE

FOR:

ORDER NO.

SKETCH D R0

VILTER PART #35391ZB
ISSUED DECEMBER 2001

VILTER

ACTUATOR SET UP FOR CAPACITY AND VOLUME SLIDE MOTORS

This procedure is the same for the two motors and can be done without the need to remove the charge from the system.

REMOVAL OF THE EXISTING SLIDE ACTUATOR CONTROL ASSEMBLY
(See attached drawing)

1. Turn OFF the microprocessor panel completely.
2. Remove the slide actuator plastic cover (six #10 hex head cap screws).
3. Remove the gasket from the mounting plate.
4. Disconnect the potentiometer and the motor wires.
5. Remove the gear motor assembly (four 5/16" screws under the mounting plate).
6. Remove the ¼" nut, washer, plastic gear and steel gear from the command shaft. Before removing the steel gear, unscrew the socket head cap screw, which locks the gear to the command shaft.
7. Repeat the same procedure for the other motor.

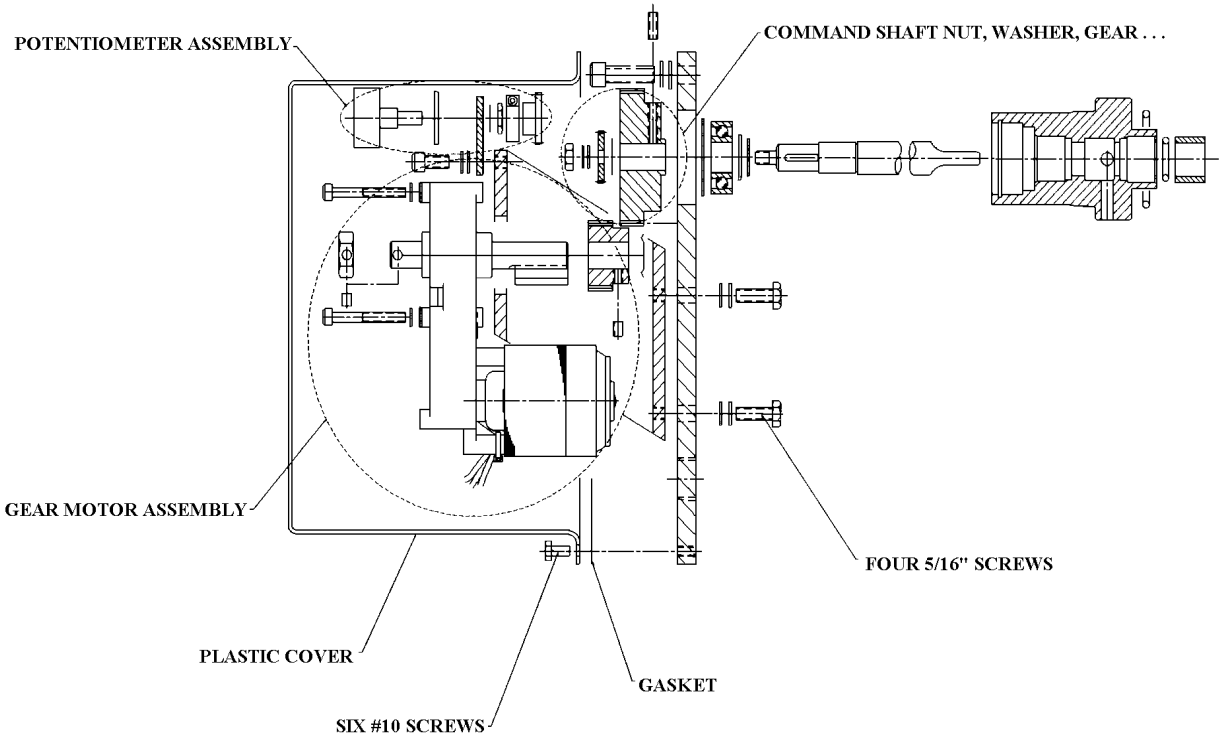
Now the compressor is ready to receive the new actuators.

1. Remove the two safety side covers from the bottom bracket to have access to the actuator shaft (four hex washer head tapping screws).
2. On certain units with economizer, the actuator bottom bracket may have to be turned 180° from its original position with the motor, by removing the four hex screws between the bracket and motor. This will give enough clearance between the motor and economizer line.
3. Before installing the motor, make certain the four #10 tap holes used to secure the motor bracket on the mounting plate are in good condition. If not, you will need to run a tap to make sure the threads are clean.
4. Install the key in the command haft keyway location.
5. Insert the actuator motor assembly into the shaft, making sure the shaft collar is still on the actuator shaft. There are two locations for the key in the actuator shaft. To align the bracket holes with the mounting plate threaded holes, you may have to use the other location depending on where the slide is positioned in the compressor.
6. Tighten the four #10 head cap screws to 66 in/lbs. Use blue Loctite #242 on the screws.

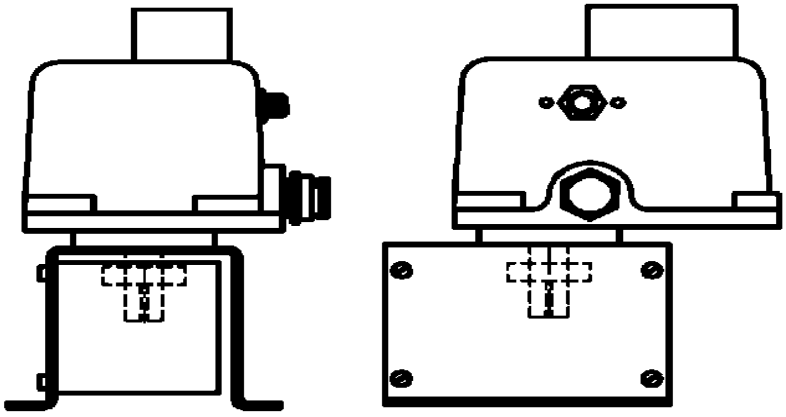
7. Slide the shaft collar until it is flush with the actuator shaft end. Check to make the key is inserted in the actuator shaft correcting, being flush with the end of the actuator shaft.
8. Tighten the shaft collar ¼" head cap screw to 16 ft/lb (192 in/lbs). Make sure the ¼" head cap screw is tightened to the correct torque. Failure to do so might break the actuator shaft under heavy load.
9. Install the two safety side covers to the bracket (four hex washer head tapping screws).
10. Repeat the same procedure for the other motor.

See 'Vilter Slide Valve Actuator Procedure' to continue the set up.

EXISTING SLIDE ACTUATOR CONTROL ASSEMBLY



SLIDE VALVE ACTUATOR



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