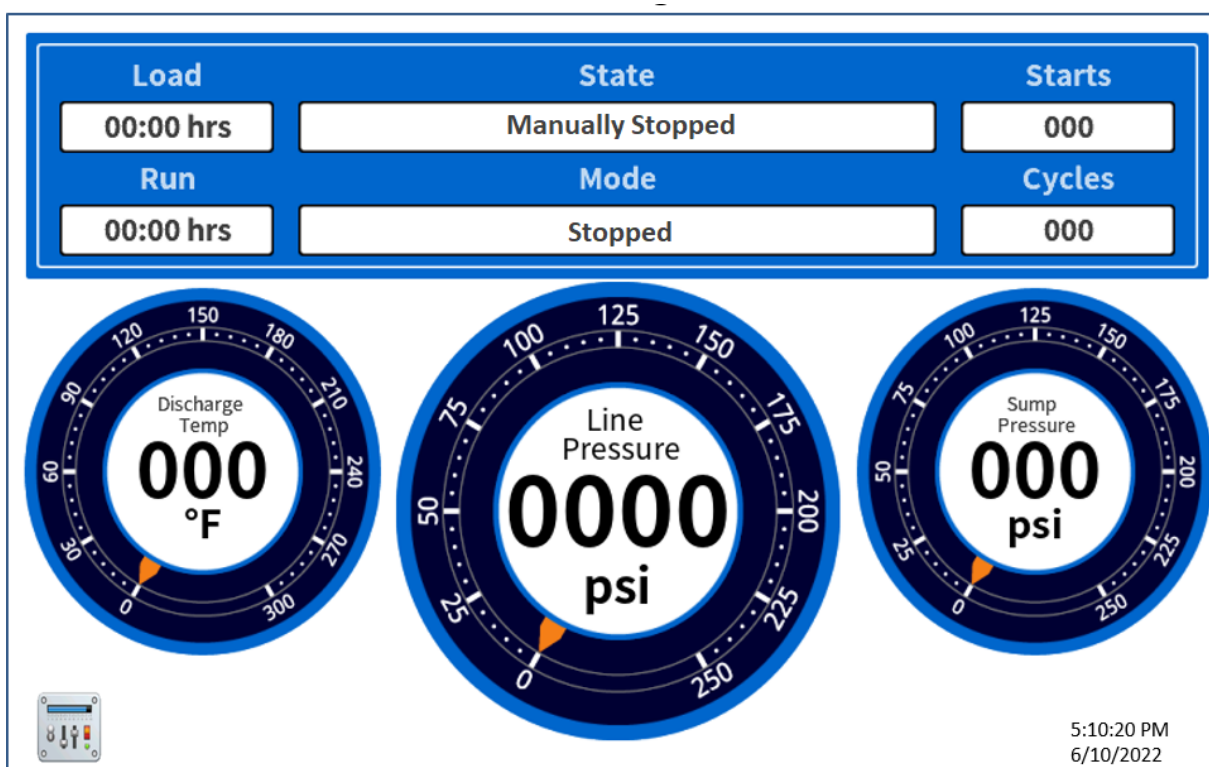




USER MANUAL

Sullair Touch Screen Controller 2.0



SAFETY WARNING

Users are required to read the entire User Manual before handling or using the product. Keep the User Manual in a safe place for future reference.

WARRANTY NOTICE

Failure to follow the instructions and procedures in this manual, or misuse of this equipment, will void its warranty.

PART NUMBER:
1002-6712 R06

The information in this manual is current as of its publication date and applies to all stationary controller models listed on this cover, until the next revision of this manual or release of a replacement manual.

Publication date: 04/17/2026
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Section 1

General Overview

1.1 Introduction

This compressor is equipped with the Sullair Touch Screen (STS) Controller for displaying the compressor system operations, setting the machine parameters and performing maintenance operations. The STS Controller is designed for the safe operation and protection of the compressor system. When fault conditions occur, the controller automatically shuts down the machine before the conditions can cause damage to the equipment. The

STS Controller also contains features that enable sequencing operation with other machines.

1.2 STS Controller panel layout

The STS Controller panel provides the necessary controls for daily operation of the air compressor package. The controller is shown in *Figure 1-1*.

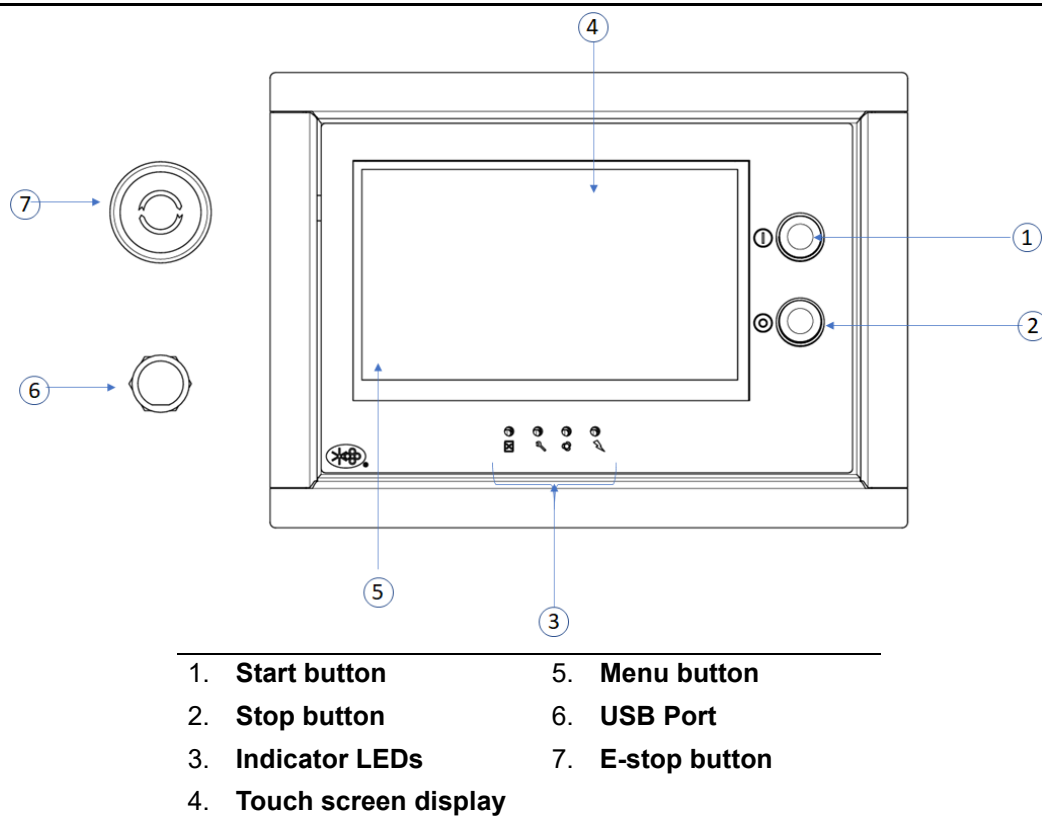


Figure 1-1: STS Controller

Key	Description	Function
1	Start button	Push to start the compressor. Can also be used to reset maintenance and warning messages while the compressor is running.
2	Stop button	Push to stop the compressor. Can also be used to clear fault messages when the compressor is stopped. Oil free compressors will enter an Unload Stop state upon the first press of the Stop Button. The machine will run unloaded for 5 minutes to clear the compressor of condensate. This timer should be allowed to expire but if it is required to stop the machine prior to completion of the unload stop time, press the Stop button a second time.
3	Indicator LEDs	There are four status indicators that identify the current operational status of the machine: • Power-On Indicator (Blue) – Lights when power is applied to the controller. It will blink slowly to indicate that Automatic Restart After Power Failure is enabled. • Automatic or Manual Run Mode Indicator (Green) – Lights whenever the compressor is set to start and run automatically. The light is constant whenever the motor is running. The light will blink slowly if the compressor motor is stopped while in Automatic Mode as a warning that the machine may restart at any time. The light may blink rapidly if a machine start is imminent. • Maintenance or Warning Indicator (Amber) - Lights when recommended maintenance or service warning is issued. In most cases, the machine will continue to operate normally. • Fault Indicator (Red) - Lights when a compressor fault has occurred. The light remains steady and the compressor remains inoperative until the fault condition is corrected.
4	Touch screen display	Displays operating parameters and compressor information. Provides interface between the user and the compressor controller.
5	Menu button 	Returns to the main menu screen.
6	USB Port	Use this port to upload information to the STS controller using a flash drive.
7	Emergency Stop (E-stop) button	Used to stop the compressor immediately. The E-stop button is logged as a fault and should only be used when essential.

Section 2

Home Screen

2.1 Home Screen Introduction

This section describes the data displayed on the three STS Controller home screens for viewing air compressor information.

NOTE

The control parameters described in this manual are those which can be adjusted via the STS controller's menus. Additional parameters that control the operation of the compressor and sequencing of multiple machines can be viewed and edited using the Sequencing & Protocol Manual.

NOTE

Consult your local Sullair service representative for installation guidance.

NOTE

Do not use tools or any other instrument to operate touch screen. Use only finger or stylus to operate display while only using moderate force.

The STS Controller home screens will display the line pressure and current operating mode. The home screen displays various current machine statistics appearing under the heading Status. These values are read-only and cannot be changed.

There are three different schemes for the home screen as seen in figures 1, 2, and 3.

All three screens will show a combination of the following parameters. Which parameter information is displayed depends on the type of machine configured i.e. single stage flooded, two stage flooded, or oil free.

State - The state of the compressor operation in response to the current mode and current conditions. There are 27 states: INITIALIZING, STOPPING, MANUALLY STOPPED, REMOTE STOPPING, REMOTE STOPPED, STANDING BY, FAULTING, FAULTED, WAITING FOR BLOWDOWN, STARTING 1, STARTING 2, STARTING 3, PRECOOLING THE DRYER, LOADING, LOADED & MODULATING, FULLY LOADED, UNLOADING, REMOTE UNLOADING, RUNNING UNLOADED, REMOTE UNLOADED, RESTARTING, POST MIV, UNLOAD STOP, RESTART MODE, ECO MODE, IPC, and PQ WIDE.

Mode - Shows the way the machine operation is being controlled. There are five Operating Modes: AUTOMATIC, MANUAL, OFF, FAULT, and UI COMM.

Starts - Total number of times the compressor has been started automatically or manually.

Cycles - Total number of load cycles the compressor has completed.

Run - Total number of hours the compressor motor has been running.

Load - Total number of hours the compressor has run loaded.

Discharge Temperature - The internal temperature of the compressor.

Sump Pressure - The compressor sump pressure.

Line Pressure - The discharge pressure of the compressor.

Line Temperature (Two stage oil free screen) - Temperature of compressed air exiting compressor package.

1st Stage Out Temperature (Two stage oil free screen) - Temperature of compressed air exiting the first stage air end.

2nd Stage In Temperature (Two stage oil free screen) - Temperature of compressed air entering the second stage of the air end. This is after the intercooler.

2nd Stage In Pressure (Two stage oil free screen) - Interstage pressure of compressed air.

2nd Stage Out Temperature (Two stage oil free screen) - Temperature of compressed air exiting the second stage of the air end.

Interstage Temperature (Two stage oil flooded screen) - Temperature of interstage air-oil mixture of the air end.

Interstage Pressure (Two stage oil flooded screen) - Pressure of the interstage chamber of the air end.

Injection Temperature (Two stage oil flooded screen) - Temperature of the compressor fluid entering the air end.

Fluid Temperature - Temperature of the lubrication fluid on an oil free compressor.

Fluid Pressure - Pressure of the lubrication fluid on an oil free compressor.

Ambient Temperature - Temperature of the ambient air surrounding the compressor package.

Water Supply Temperature - Temperature of the incoming water on water cooled compressors (if equipped).

Water Out Temperature - Temperature of the outgoing water on water cooled compressors (if equipped).

Motor DE Bearing Temperature - Temperature of the drive side bearing of the drive motor.

Motor NDE Bearing Temperature - Temperature of the non-drive side bearing of the drive motor.

Winding Temperature - Internal winding temperature of the drive motor.

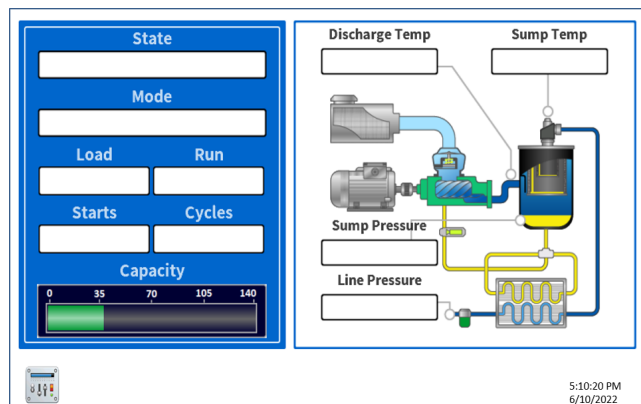


Figure 2-1: Mimic screen single stage

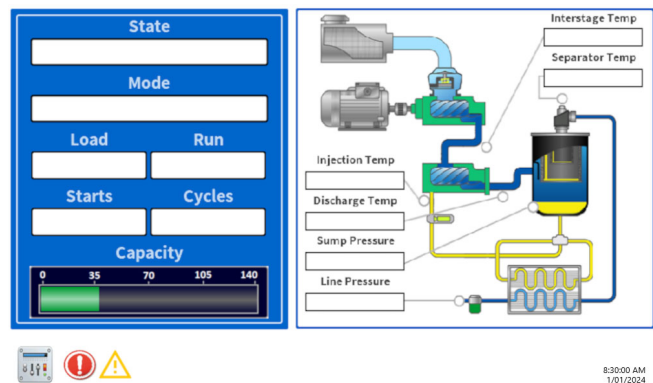


Figure 2-2: Mimic screen two stage oil flooded

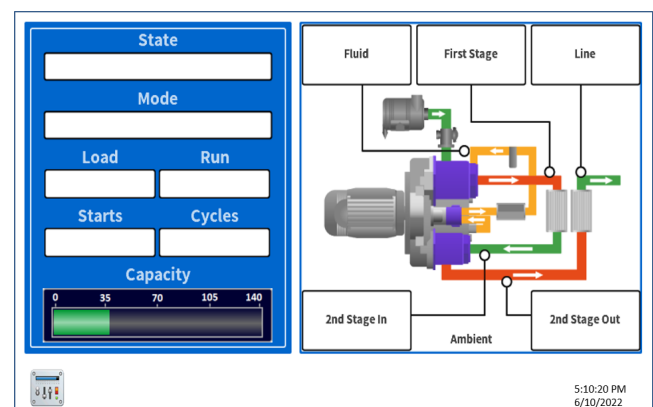


Figure 2-3: Mimic screen two stage oil free

Only for the DS280-450 machine:

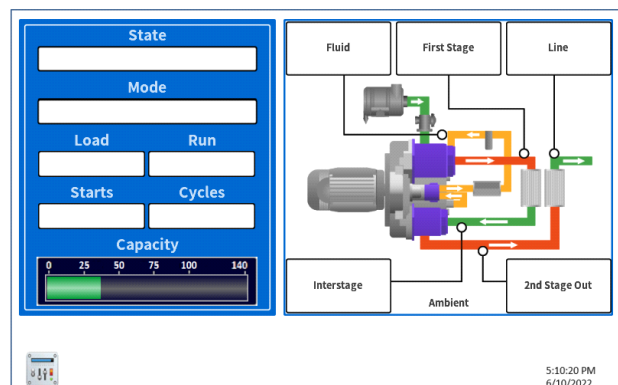


Figure 2-4: Mimic screen two stage - DS280-450

Both the Mimic and Multigauge screens (Figure 2-1 through Figure 2-4) have a **Capacity** bar.

The **Capacity** indicates how much air is being delivered by the compressor package as a percent of the compressor's full capacity. The data is updated frequently and shows only the instantaneous delivery rates as compared to the position of the spiral valve or the percentage of maximum frequency of the VFD.

The E-Mode icon is displayed on the home screen to indicate status and mode of operation. A green E-mode icon indicates E-Mode is active while red indicates it is inactive. Additionally, an icon will accompany the E-mode icon indicating which type of control is active. See *Section : Once all selections are made, press the write button to save settings. Scheduling is now active.* on page 18

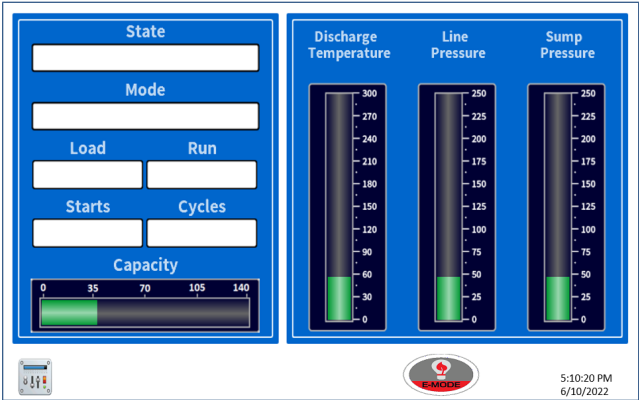


Figure 2-5: Multigauge screen

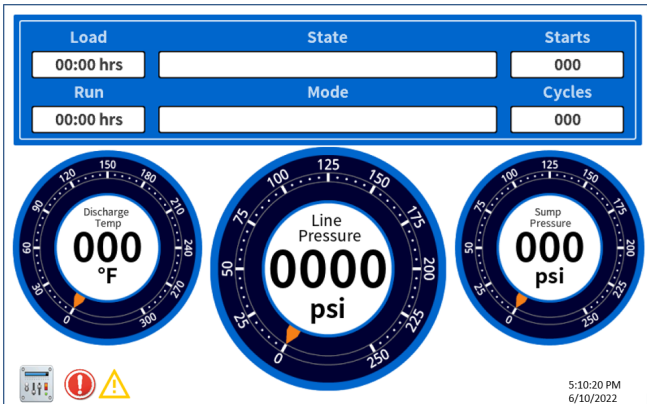


Figure 2-6: Analog/Digital - Fault & Warning Icon Button

2.1.1 Recommended Service & Warnings

NOTE

- Do not expose machine to temperatures outside of design specifications.
- Do not expose machine or control panel to direct, uninterrupted UV/sunlight.
- Do not install machine in areas with high continuous moisture content.

The Fault or Warning icon button will appear any time one of those situations occurs. The icon will show the

seriousness of the situation (Fault or Warning). The Mode field will tell you the reason.

	Fault – takes you to the Event History screen. See Section 3.4.3 on page 26
	Warning – for the list of warnings see Section 3.4.1 on page 24

There are two situations that cause the Warning icon to appear:

Recommended Service – press the Warning icon to be directed to the Recommended Service screen (see [Section 3.4.2.1](#) on page 26)

Machine warning – press the Warning icon to be directed to the Warnings screen (see [Section 3.4.1](#) on page 24)

For more information like the time of the fault, the user can push the icon button to be directed to the event history. On the Event History screen, an icon appears next to each event as shown in [Figure 2-7](#).



Figure 2-7: Event History Screen

2.1.2 Remote/Automatic Operation

Some functions can be enabled which will allow the compressor to start/stop and operate remotely or without

local user input. In this case, a notification is provided on the Home screen via display of the auto-restart icon.

	When this icon is pressed, a screen will be displayed indicating which functions are enabled.
---	---

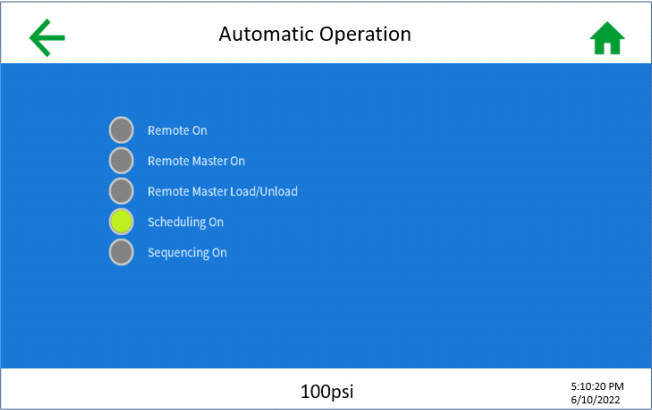


Figure 2-8: Automatic Operation

Section 3

Controller Functions

3.1 Main Menu



When the Menu button on the home screen is selected, the Main Menu screen with the System Infor-

mation, System Configuration, Maintenance, and Log In buttons will appear. Each menu button is described below.

3.1.1 Menu Hierarchy

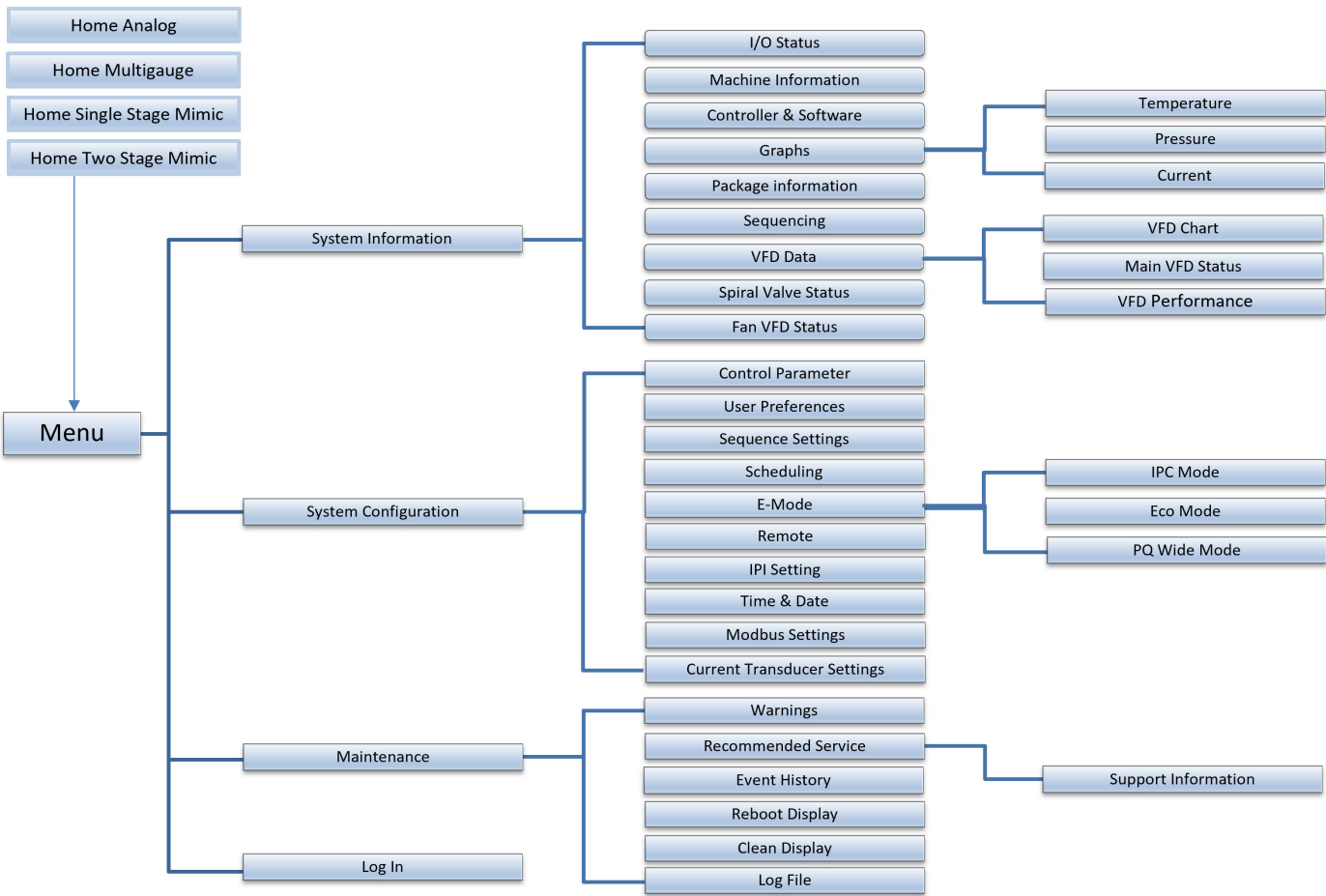


Figure 3-1: Menu Hierarchy

3.2 System Information

All system information for the machine can be found in this menu group. These menus are read only.

3.2.1 I/O Status: Input & Relay Status

Follow these steps to access the Input & Output Status screen:



1. Press the Menu icon from the home screen of the STS Controller. The Main Menu appears.
2. Press the System Information button.
3. Press the I/O Status button.

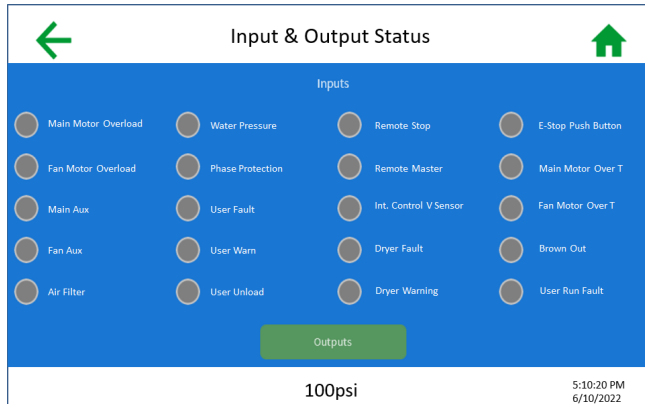


Figure 3-2: Input & Output Status

The digital Inputs and relay Outputs indicate that a signal from an input device has been received or a digital output is activated. Input status is shown as default. To see output status, press the Outputs button. Not all Inputs and Outputs are used on all models.

Digital Inputs - Each green light indicates that the input has been activated.

E-Stop Push Button - The E-stop input indicator will appear red when the E-stop is pressed.

Relay Outputs - Each green button indicates that the output relay has been activated by the controller.

3.2.2 Machine Information

Follow these steps to access the Machine Information screen:



1. Press the Menu icon from the home screen of the STS Controller. The Main Menu appears.
2. Press the System Information button.
3. Press the Machine Information button.

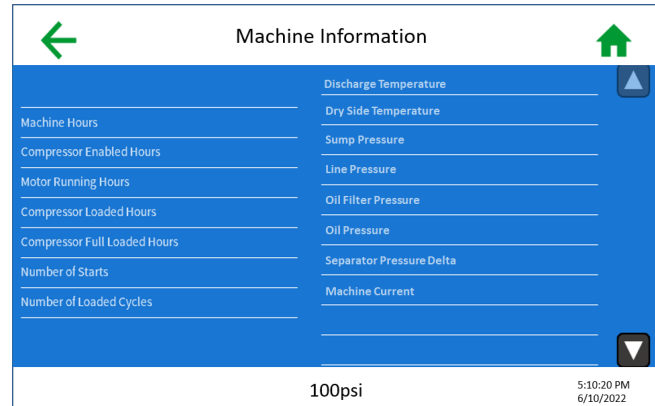


Figure 3-3: Machine Information

The Machine Information menu presents data for the titles listed on the controller screen. Data presented depends on the model compressor. Not all models will have all of the data presented below.

Machine Hours - Total number of hours the controller has been monitoring compressor operation.

Compressor Enabled Hours - Total number of hours the compressor has been enabled to run.

Motor Running Hours - Total number of hours the compressor motor has been running.

Compressor Loaded Hours - Total number of hours the compressor has run loaded.

Compressor Full Load Hours - Total number of hours the compressor has run at full load.

Number of Starts - Total number of times the compressor has been started automatically or manually.

Number of Load Cycles - Total number of load cycles the compressor has completed.

Discharge Temperature - Air end discharge air/oil temperature or air temperature for oil free compressors.

Dry Side Temperature - Package outlet temperature (if available).

Sump Pressure - Compressor discharge pressure.

Line Pressure - Package outlet pressure.

Oil Filter Pressure - Oil pressure at the inlet of the oil filter.

Oil Pressure - Injection oil pressure.

Separator Pressure Data - This is the result of pressure P1 (Sump) minus pressure P2 (Line).

Machine Current - Displays the value of Current Transducer (AI6), if installed.

Line Temperature (Two stage oil free screen) - Temperature of compressed air exiting compressor package.

1st Stage Out Temperature (Two stage oil free screen) - Temperature of compressed air exiting the first stage air end.

2nd Stage In Temperature (Two stage oil free screen) - Temperature of compressed air entering the second stage of the air end. This is after the intercooler.

2nd Stage In Pressure (Two stage oil free screen) - Interstage pressure of compressed air.

2nd Stage Out Temperature (Two stage oil free screen) - Temperature of compressed air exiting the second stage of the air end.

Interstage Temperature (Two stage oil flooded screen) - Temperature of interstage air-oil mixture of the air end.

Interstage Pressure (Two stage oil flooded screen) - Pressure of the interstage chamber of the air end.

Injection Temperature (Two stage oil flooded screen) - Temperature of the compressor fluid entering the air end.

Fluid Temperature - Temperature of the lubrication fluid on an oil free compressor.

Fluid Pressure - Pressure of the lubrication fluid on an oil free compressor.

Ambient Temperature - Temperature of the ambient air surrounding the compressor package.

3.2.3 Controller & Software Information

Follow these steps to access the Controller & Software Information screen:



1. Press the Menu icon from the home screen of the STS Controller. The Main Menu appears.
2. Press the System Information button.
3. Press the Controller & Software button.

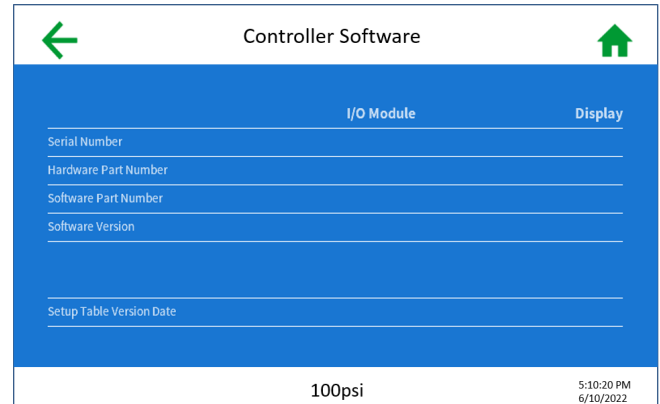


Figure 3-4: Controller & Software Information

The Controller & Software Information display presents part number and date information for the compressor controller. This information is read-only and is displayed in 3 different columns: I/O Module, BUI Module and Display. The categories are described below.

Serial Number - Displays the serial number of the corresponding module.

Hardware Part Number - Displays the corresponding hardware module's part number.

Software Part Number - Displays the version part number of the corresponding module software.

Software Version - Displays the version of the corresponding module software.

Setup Table Version Date - Displays the date of the parameter table which was used for initializing the machine.

3.2.4 Graphs

This menu contains buttons for displaying time-based graphs of Temperature and Pressure for both machines, plus Current for non-VFD machines and Power for VFD machines.

Follow these steps to access the Graphs screen:



1. Press the Menu icon from the home screen of the STS Controller. The Main Menu appears.
2. Press the System Information button.
3. Press the Graphs button.
4. Press the Temperature, Pressure, or Current button to access the corresponding graph.

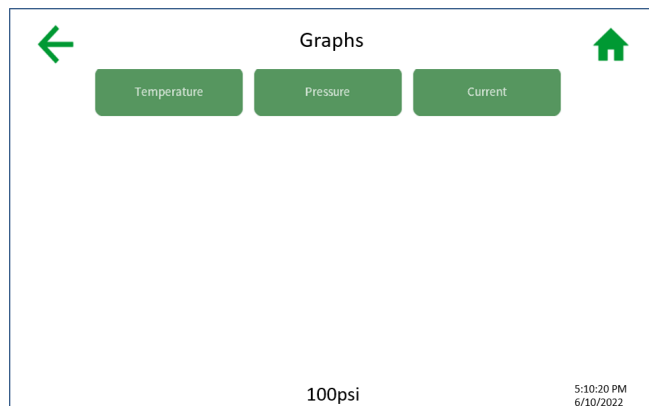


Figure 3-5: Graphs

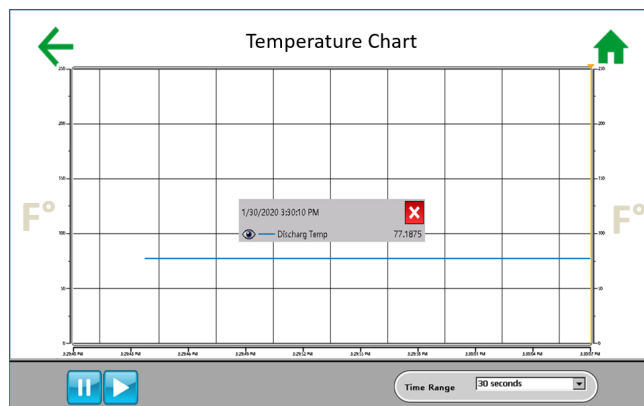


Figure 3-8: Temperature

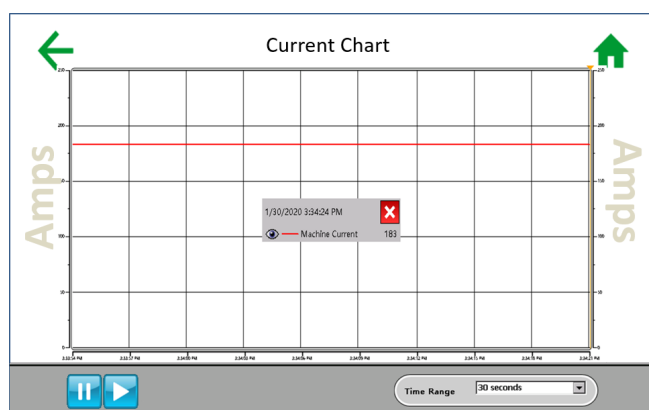


Figure 3-6: Current

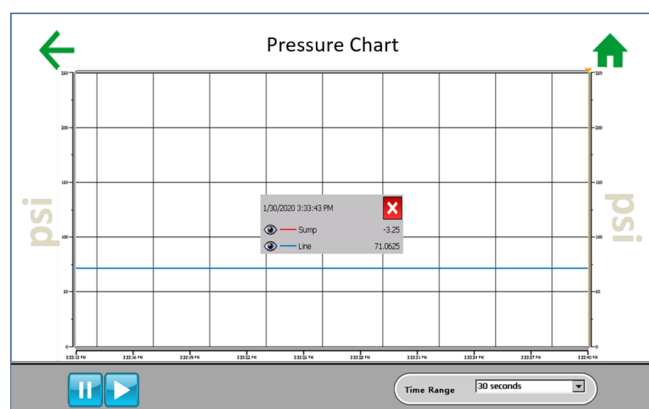


Figure 3-7: Pressure

Press screen to bring up values at a location on the graph. Graphing can be paused and restarted using the provided buttons.

The time stamp may vary with 30 seconds, or 1, 5, 10 and 30 minutes.

3.2.5 Package Information

The information about the compressor package is recorded during the Controller's initialization.

Follow these steps to access the Package Information screen:

1. Press the Menu  icon from the home screen of the STS Controller. The Main Menu appears.
2. Press the System Information button.
3. Press the Package Information button.

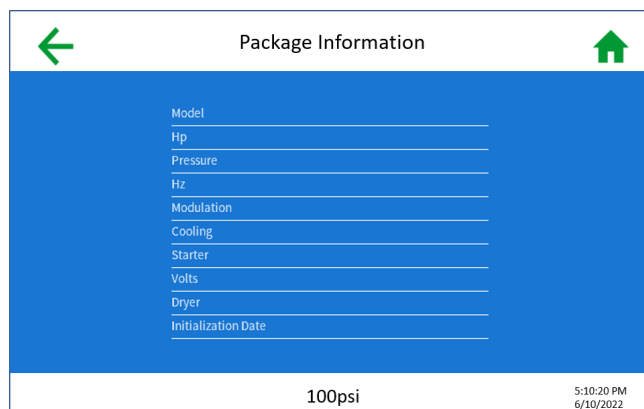


Figure 3-9: Package Information

Model - The model number

HP - Motor Horsepower

Pressure - Nominal pressure rating

Hz - Line frequency

Modulation - The style of controller capacity modulation.

- CONV: Conventional with Load/Unload & VFD
- SPRL: Air End with an electronic spiral valve

Cooling - Method of cooling

- AC: Air-cooled
- WC: Water-cooled

Starter - The motor control

- FV/YD: Wye-delta
- VFD: Variable Frequency Drive

Volts - Nominal Starter line voltage

Dryer - Dryer type

Initialization Date - Date the controller was initialized.

3.2.6 Sequencing

Please refer to the Sequencing & Protocol Manual for more information on this area of the STS Controller screen.

3.2.7 VFD Data

The VFD Information menu screen is used to select the VFD Chart, Main Motor Status, and VFD Performance information screens.

Follow these steps to access the VFD Information screen:



1. Press the Menu icon from the home screen of the STS Controller. The Main Menu appears.
2. Press the System Information button.
3. Press the VFD Information button.
4. Press the VFD Chart, Main Motor VFD Status, VFD Performance, or Fan VFD Status (if equipped) button to obtain the corresponding technical information.

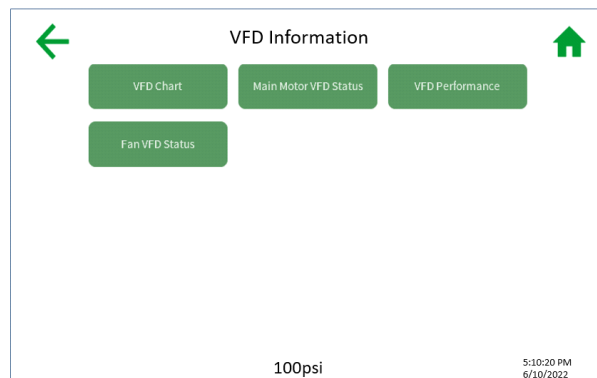


Figure 3-10: VFD Information

3.2.8 Spiral Valve Status

The Spiral Valve Status screen displays a selection of the spiral valve operational data.

Follow these steps to access the Spiral Valve Status screen:



1. Press the Menu icon from the home screen of the STS Controller. The Main Menu appears.
2. Press the System Information button.
3. Press the Spiral Valve Status button.

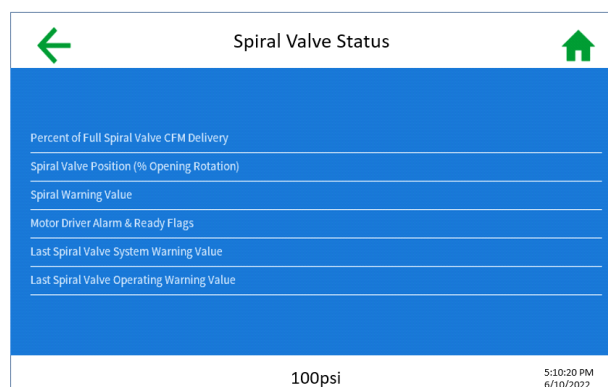


Figure 3-11: Spiral Valve Status

Percent of Full Spiral Valve CFM Delivery - This number represents the position of the spiral valve in terms of a percent of its turn down range.

Spiral Valve Position - This number represents the position of the spiral valve in terms of a percent of its available travel range.

Spiral Warning Value - This is the value of the last spiral motor driver alarm that disabled valve movement. The value *h* refers to hexadecimal.

Motor Driver Alarm & Ready Flags - This will report selected internal flags. The value *h* refers to hexadecimal.

Last Spiral Valve System Warning Value - This will report the numeric value of the any current System warnings. These warnings indicate system issues that do not allow the valve to operate and require a physical repair after power is removed. The value *h* refers to hexadecimal.

Last Spiral Valve Operation Warning Value - This reports the numeric value of any warnings that may be associated with issues that have blocked valve operation, and may require changing certain operating conditions before they will reset. Examples could be start-ups at low ambient air temperatures, or a malfunctioning compressor cooling system. The value *h* refers to hexadecimal.

3.2.9 Fan VFD Status

The Fan VFD Status screen displays operational parameters of fan VFD if so equipped.

Follow these steps to access the Fan VFD Status screen:



1. Press the Menu icon from the home screen of the STS Controller. The Main Menu appears.
2. Press the System Information button.
3. Press the Fan VFD Status button.

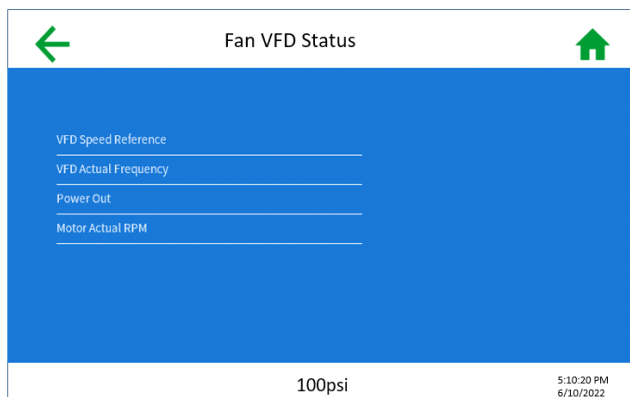


Figure 3-12: Fan VFD Status

VFD Speed Reference - This is the frequency being commanded to the drive from the controller.

VFD Actual Frequency - Actual operating frequency reported by the VFD.

Power Out - Approximate power of fan reported by VFD.

Motor Actual RPM - Calculated value of motor RPM based on operating frequency and motor rated RPM.

3.3 System Configuration

All system configuration data for the machine can be found in this menu group.

3.3.1 Control Parameters

Follow these steps to access the Control Parameters screen:



1. Press the Menu icon from the home screen of the STS Controller. The Main Menu appears.
2. Press the System Configuration button.
3. Press the Control Parameters button.

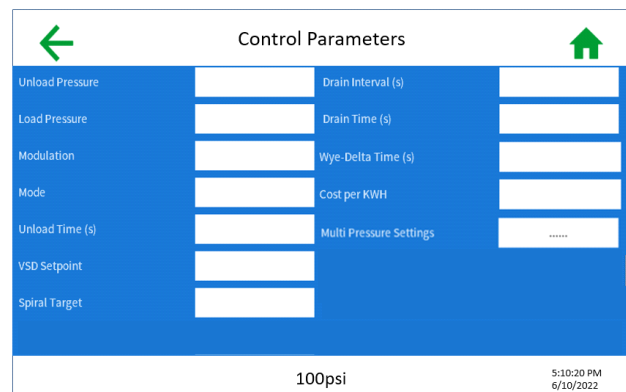


Figure 3-13: Control Parameters

The following three settings affect the compressor's response to line pressure. The compressor starts to deliver air to the system whenever pressure falls below the Load pressure and stops delivering air whenever pressure rises above the Unload pressure.

Unload Pressure - Line pressure setpoint (psi, bar, or kpa) at which the compressor will unload and stop delivering air.

Load Pressure - Pressure (psi, bar, or kpa) at which the compressor motor will start, and the compressor will begin to deliver air.

Modulation - Assigns the way the machine will be delivering air (Load/Unload or Modulate).

Mode - Allows selection of Automatic or Manual mode. In Automatic mode, the compressor will shut off after running unloaded for the Unload Time. The machine will restart once Load or Restart Pressure (depending on model) is reached. In Manual mode, the machine will run unloaded until it is manually stopped or Load Pressure is reached and machine is loaded.

VFD Setpoint Pressure - Available only with VFD equipped machines. It is the targeted pressure for the variable speed controls. The speed will be adjusted to maintain this pressure. Most packages will allow adjustment of this over a wide range to allow tailoring of the pressure to the needs of the application.

Spiral Target Pressure - Available only with electronic spiral valve equipped machines. The target pressure is set the same as described for the VFD Setpoint Pressure.

Unload Time (seconds) - Set this to the time that the machine is to run unloaded in Automatic mode before shutting off.

Drain Interval (seconds) - Set this time as the desired interval between activation of the drain cycle for machines equipped with an electric solenoid drain.

Drain Time (seconds) - Set this time as the number of seconds that the drain is to remain energized.

Wye-Delta Time (seconds) - Set this as the time for the wye to delta starter transition.

Cost per KWH - Available only with VFD equipped machines. Sets the KWH cost value used in operating cost calculations. Enter value divided by 1000. For example, the default is 70, which is \$0.070/KWH.

Multi-Pressure Setting - This setting allows users to establish multiple operation points that can be used in other functions such as Scheduling. Parameters available to be set are as follows:

- Unload Pressure - as previously described.
- Load Pressure - as previously described.
- Restart Pressure - pressure at which machine will restart when loaded and in Automatic mode.
- Control Pressure - equivalent to VFD Setpoint Pressure and Spiral Target Pressure.

Figure 3-14: Multi Pressure Setting

3.3.2 User Preferences / Changing Controller Units and Language Preferences

You may change the display preferences of the STS Controller. The units of measure for pressure and temperature, and language preferences can be changed at the User Preference screen. These changes are then reflected in the STS Controller display.

Follow these steps to access the User Preferences screen:



1. Press the Menu icon from the home screen of the STS Controller. The Main Menu appears.
2. Press the System Configuration button.
3. Press the User Preferences button.

Figure 3-15: Preference

Follow these steps to change the STS display user preferences:

1. Press the **Pressure Units** field and press the correct unit – psi, bar, and kPa.
2. Press the **Temperature Units** field and press either F (Fahrenheit) or C (Celsius).
3. Press the **Language** field and press the desired language: English, Chinese, French, German, Japanese, Portuguese, Russian, Spanish, Italian, Dutch, Polish, Czech, Thai, or Vietnamese.
4. Press the **Home Screen** field and press the correct home screen style: Mimic, Multigauge, and Analog/Digital Panel. Please see *Section 2.1* on page 7 for a fuller explanation of these three home screens.
5. Press the back arrow to return to the previous window. The new User Preferences are saved.

3.3.3 Scheduling

The Scheduling screen is designed to show when the machine will be running certain actions at scheduled times during the week. The user can schedule the machine to run a 24/7 schedule.

Follow these steps to access the Scheduling screen:



1. Press the Menu icon from the home screen of the STS Controller. The Main Menu appears.
2. Press the System Configuration button.
3. Press the Scheduling button.
4. Press Enable button to activate scheduling function.

In *Figure 3-16*, the first column indicates the time set for the specific action. The time can be set from 00:00 to 23:59.

Follow these steps to add a time:

1. Touch the box where the time is to be entered. A keypad appears.
2. Enter the time without a colon. For example, 1245 should be entered instead of 12:45.

The second to eighth columns indicate the day that action happens. In *Figure 3-16*, the first event is set to happen Tuesday through Friday.

The next to last column is the action that takes place during the scheduled date and time. The action can be any of the following:

- **Unload** - Compressor is put in the Unloaded state. In Automatic mode, the compressor will stop after the unload time setting has been reached. This is recommended over Halt to allow cool down.
- **Halt** - This action halts the compressor. Note that on oil free compressors, this action will induce a unload stop. Reference Section 1 for more detail.
- **Normal** - This action returns the compressor to normal operations.
- **Pressure** - Select from P1, P2, P3 that were established in Multi-Pressure setting in Control Parameters.

Once all selections are made, press the write button to save settings. Scheduling is now active.

Figure 3-16: Schedule

3.3.4 E-MODE Operation

Certain models of compressors equipped with Sullair STS controllers contain various modes of operation designed to optimize operation and save energy. A description of each E-Mode is provided below. Note that each E-Mode can only be operated independently. Multiple E-modes cannot be enabled together.

E-Mode operation is enabled by pressing the E-Mode button on the home screen. Green indicates E-mode is active while red indicates it is inactive. Additionally, an icon will be displayed next to the E-Mode icon indicating which mode has been enabled (IPC, PQ, ECO).

IPC (Intelligent Pressure Control) mode - This control mode takes advantage of the fact that plant side pressure drop reduces in times of low demand. The controller automatically compensates for this by reducing the delivered pressure of the machine to match the required pressure at the compressed air point of use. This operation is detailed in the graphs shown below. This mode of operation is available for both fixed speed and VFD machines. IPC mode is effective for single compressor installations. For installations with multiple compres-

sors, IPC mode can result in lower than desired operation pressure and should be avoided.

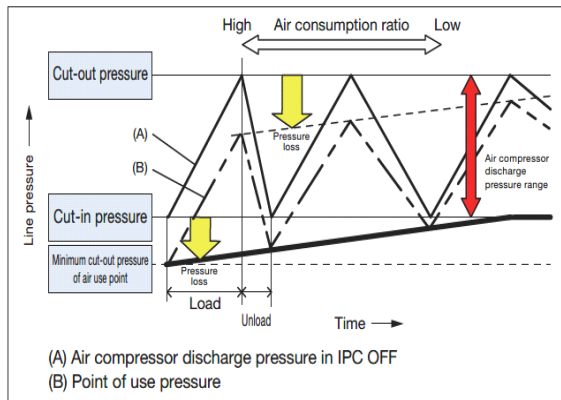


Figure 3-17: IPC Mode Off

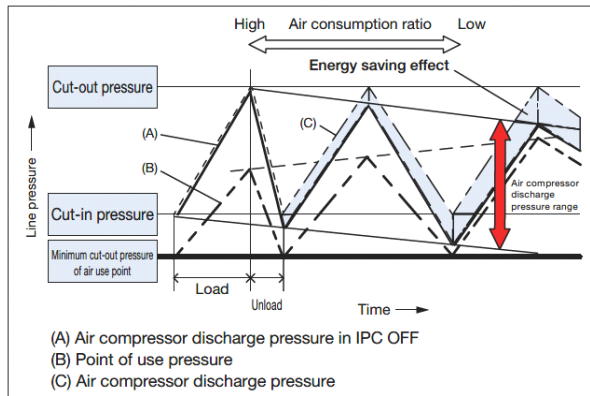


Figure 3-18: IPC Mode On

Follow these steps to enable and access IPC Settings:

1. Press the Menu icon from the home screen of the STS Controller. The Main Menu appears.
2. Press the System Configuration button.
3. Press the E-MODE button
4. Enable IPC operation by selecting button.
5. Press the IPC button to enter settings menu.

The following dialog box will pop-up.

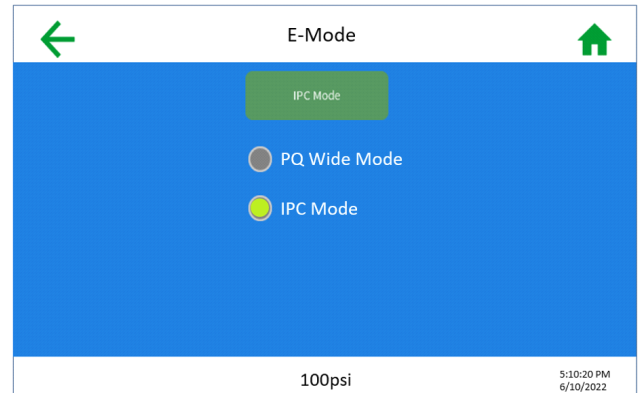


Figure 3-19: E-Mode

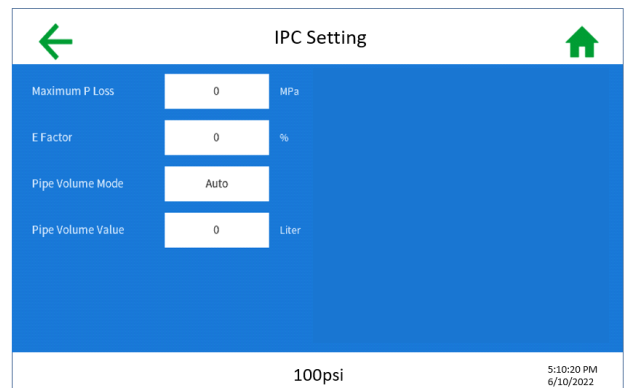


Figure 3-20: IPC Setting

IPC settings should be programmed as follows:

Maximum P Loss - Value of pressure drop from compressor package exit to point of use.

Pipe Volume Mode - Select Auto or Manual. Applicable for fixed speed machines only.

For Auto function, the system volume is automatically calculated based on the first load/unload cycle after power on. This calculation is only effective if the load ratio is higher than 50%.

For Manual function, the system volume is to be entered manually.

E-Factor - Enter value for how much of the P Loss value entered previously is effective. 100% would indicate that all the P Loss value should be used in the calculation. If the pressure at point of use drops too much, this value should be decreased.

3.3.5 PQ Wide Mode

This function provides increased flow and power capability for VFD equipped machines. If the line pressure is lower than the setpoint pressure, the controller automatically increases operating speed of the compressor to increase delivered air capacity. This operation is detailed in the graph shown below.

When PQ wide mode is active and operating speed of the compressor is increased, the capacity bar on the home screen will indicate greater than 100% capacity.

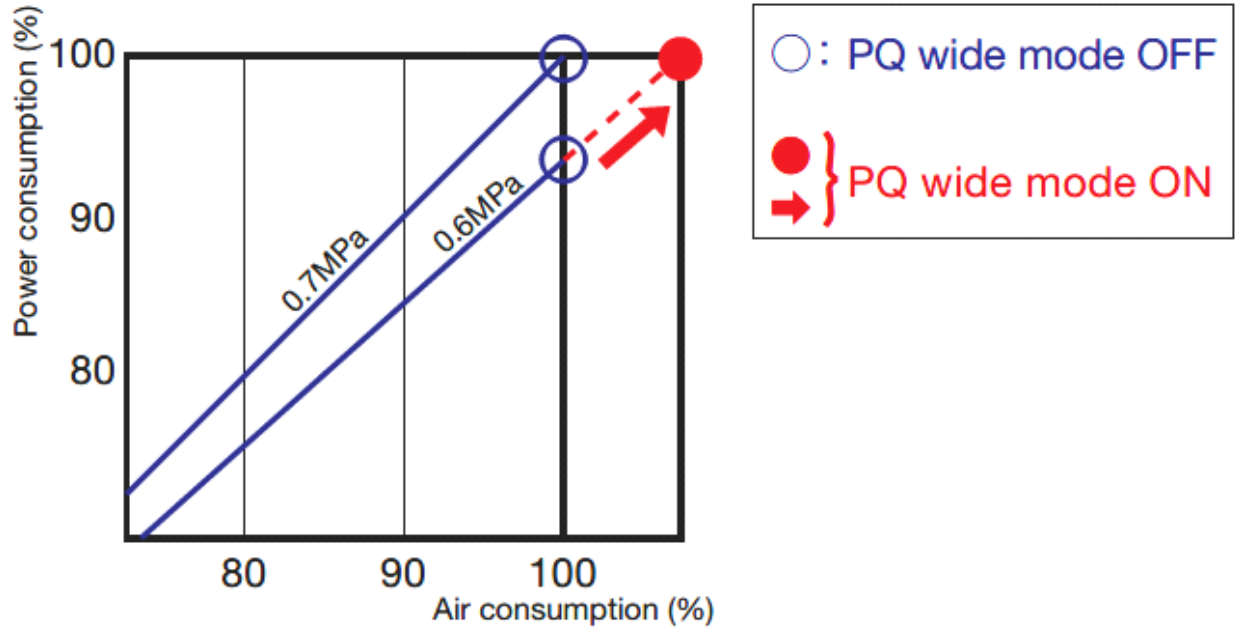


Figure 3-21: PQ Wide Mode Operation

Follow these steps to enable and access PQ Wide Mode Settings:

1. Press the Menu icon from the home screen of the STS Controller. The Main Menu appears.
2. Press the System Configuration button.
3. Press the E-Mode button.
4. Enable PQ Wide Mode operation by selecting button.
5. Press PQ Wide Mode button to select desired PQ Mode, A or B. Mode B functions as described above. Mode A disables the above functionality and sets maximum operation frequency based on the control setpoint.

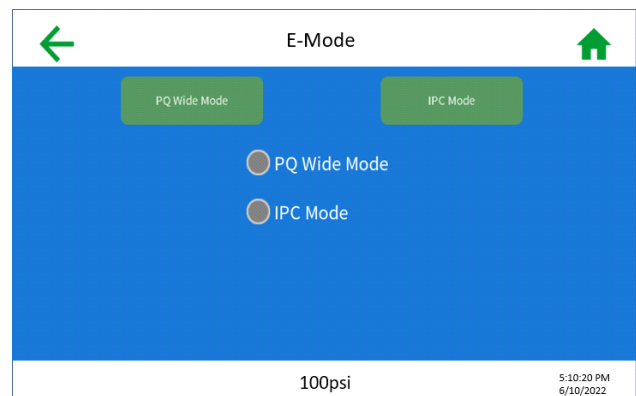


Figure 3-22: E-Mode

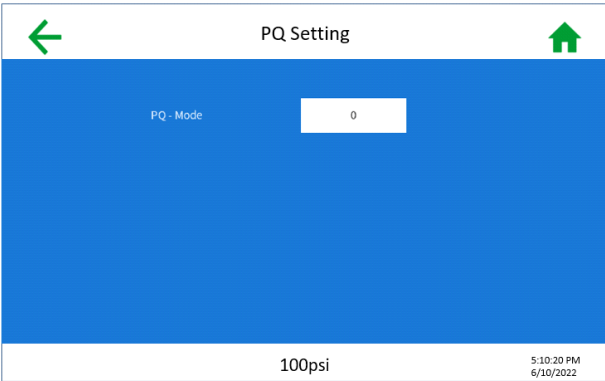


Figure 3-23: PQ Setting

3.3.6 ECO Mode

This mode of operation is available only on fixed speed models. Energy savings are realized in ECO Mode by reducing the unload pressure of the compressor. A cycling interval set point is established. If the actual system cycling interval is longer than the set interval, the controller will automatically reduce the unload pressure to bring the actual cycling interval closer to the set point. This will result in less time spent operating at higher pressures and energy being saved. There is a pressure differential setting available which defines the allowable offset from the compressors programmed unload pressure. Refer to the graph below for operation of ECO Mode. Note that effective ECO Mode operation requires a sufficient volume of air storage.

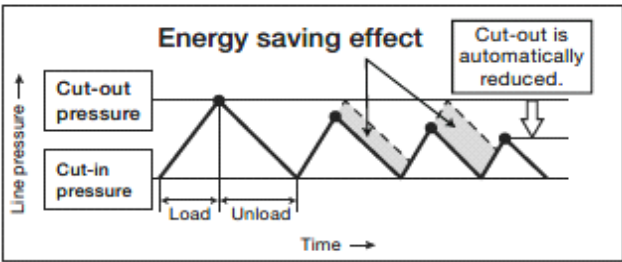


Figure 3-24: Eco Mode Operation

Follow these steps to enable and access ECO Mode Settings:

- 1. Press the Menu icon from the home screen of the STS Controller. The Main Menu appears.

- 2. Press the System Configuration button.
- 3. Press the E-Mode button.
- 4. Enable ECO Mode operation by selecting button.
- 5. Press the ECO Mode button to enter settings menu.

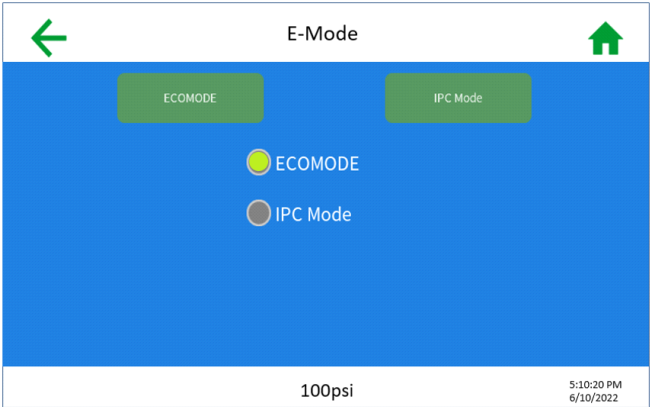


Figure 3-25: E-Mode

ECO Mode settings should be programmed as follows:

Interval - This is the target cycling interval time in seconds. It is recommended to leave this at the 30 second factory default. Contact Sullair Service if ECO Mode operation is not as expected.

P DIF 1, P DIF 2, P DIF 3 - This setting defines the maximum allowable pressure offset from the value set in Control Parameters. These differential settings correspond to P1, P2, and P3 multi-pressure settings.

3.3.7 Remote Operation and Settings

The controller allows remote operation as described below. Remote operation can be via digital inputs or modbus control. The table below defines the inputs used for remote operation.

Table 3-1: Remote Settings

Operation	Input
Remote Start	Input DIN15 (J22)
Remote Stop	Input DIN11
Remote Unload	Input DIN10
Remote Master	Input DIN12
Remote Master for Load/Unload	Input DIN16(J22)

Follow these steps to access the remote settings menu.

- 1. Press the Menu icon from the home screen of the controller. The Main Menu appears.
- 2. Press the System Configuration button.

3. Press the Remote button.

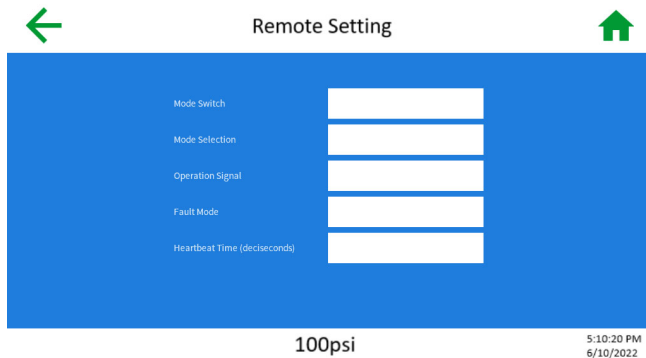


Figure 3-26: Remote Setting

Select operation settings as follows:

Mode Switch - Select between the following:

- **Panel** - When this is selected, local or remote operation is selected at the controller screen by Mode Selection.
- **External** - When this is selected, local or remote operation is determined by the remote master input. Activating the remote master input enables remote mode. De-activating the remote master input returns the operating mode to local.

Mode Selection - Select between the following:

- **Local Mode** - This is the default setting and restricts operation of the machine to the controller panel. In this mode, the machine start and stop buttons are enabled and the remote inputs and modbus registers are disabled.
- **Remote Mode** - This setting enables remote operation of the machine. The local start button is disabled but the stop button remains enabled. The remote inputs and modbus registers are enabled.

Operational Signal - Select between the following:

- **Pulse signal** - This selection enables both the remote start and remote stop inputs. The remote start signal is an active high pulse, meaning the compressor will start at the presence of a pulse signal on the assigned input. The stop signal is low active, meaning the compressor will stop when there is no pulse signal on the assigned input. The control pulses must be longer than 500 ms.
- **Level signal** - When this is selected, the remote start input is enabled and remote stop is disabled. Activating the start input will start the machine. De-

activating the start input will stop the machine. Note that for oil free machines, this will be an unload stop. Refer to Section 1 for more detail on unload stop.

Fault Mode - Select between the following:

- **Local Mode** - Selecting this setting will temporarily override the remote mode in the event of a fault. This is to allow local control to aid in troubleshooting and resolving the fault. This temporary override is active until either power is cycled or the fault mode is toggled to remote and back to local.
- **Remote Mode** - Selecting this setting will keep the machine in remote mode in the event of a fault. Upon clearing the fault, normal remote operation will resume.

Heartbeat Time (deciseconds) - Time interval in which a heartbeat message should be received before Remote Master expires

Remote Heartbeat - Remote Master is enabled if the user sends 1 to the Remote Heartbeat register (52696) continuously at the interval (Heartbeat Time) set by the user. The system will revert to local mode if a value of 1 is no longer received by the Remote Heartbeat register before the duration expires. The Remote Master physical switch (DIN12) OR the Remote Heartbeat Register can keep Remote Master active, and both need to be off to return to local settings.

Remote Unload - While in remote mode, if the remote input is activated the compressor will unload. If the controller is in Automatic mode, the compressor will stop after the unload timer expires.

Remote Master - The remote master input overrides the local controller. This input is active when the mode switch is set to External as well as when the mode selection is set to remote mode. In this mode, the remote controller is responsible for starting, stopping, and unloading the machine. If the machine pressure reaches the active maximum user unload limit, the local controller will unload. When the pressure drops sufficiently below the user unload limit, the local controller will return unload control to the remote master. The remote master should be set to unload below the maximum user unload limit for optimal operation.

Remote Modbus - Three modbus registers are provided for remote operation: start/stop and load/unload. This capability is available when Remote mode has been selected. Additionally, a jumper wire is required between DIN11 and +24V supply on the controller. Additionally,

the Operation Signal needs to be set to Pulse. Registers and usage is detailed in the table below:

Table 3-2: Remote Modbus Settings

Operation	Modbus Register	Set Value
Remote Start	52686	0 - release remote control 1 - start machine 2- stop machine
Remote Unload	52687	2 - unload machine 1 - stop unload request
Remote Heartbeat	52696	1- modbus remote master active

3.3.8 Instantaneous Power Interruption (IPI)

The STS controller is capable of restarting the machine in the event of a power interruption. This control can be accessed as follows.

1. Press the Menu icon from the home screen of the STS Controller. The Main Menu appears.
2. Press the System Information button.
3. Press the IPI button.

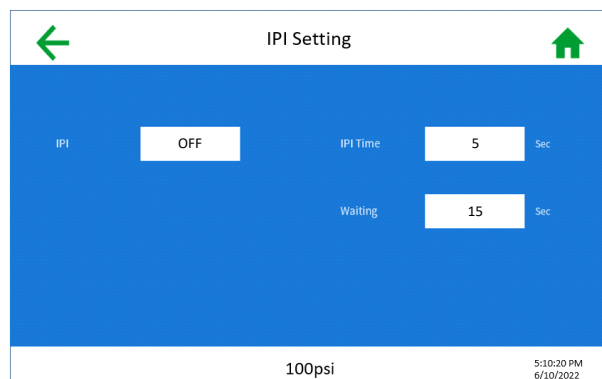


Figure 3-27: IPI Setting

Refer to Figure 3-27; parameters may be adjusted as follows:

IPI - Set to ON to enable restart function or OFF to disable.

IPI Time - If the power interruption is longer than this parameter, the machine will automatically stop and remain off when power is restored.

Waiting - This value defines the time delay for a restart after power is restored.

Example Operation:

If power is restored within the IPI time, the green indicator light will flash indicating a machine start is imminent. A timer will start and once the waiting time has expired, the machine will restart and resume mode of operation prior to power interruption.

3.3.9 Set Date & Time

Follow these steps to access the remote settings menu:

1. Press the Menu icon from the home screen of the controller. The Main Menu appears
2. Press the System Configuration button.
3. Press the Set Date & Time button.

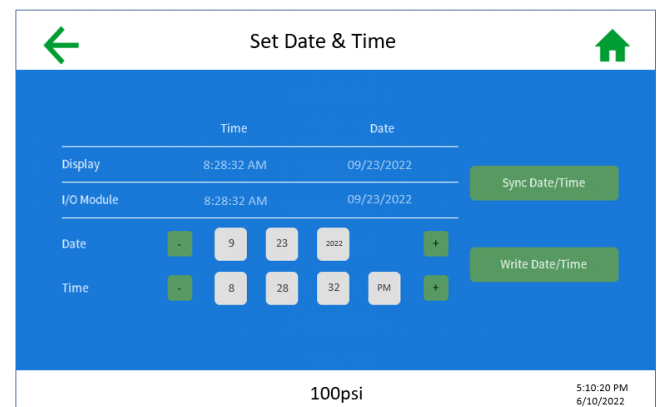


Figure 3-28: Set Date & Time

To set the dates and time, select the appropriate box and use the + and – buttons to adjust the value. Once set to desired values, press Write Date/Time button. This will write values to the I/O. Then press the Sync Date/Time button to synchronize time and date between the I/O module and display.

3.3.10 Modbus Settings

The STS controller provides for modbus communication to external devices. Settings can be changed depending on the desired configuration.

These settings can be accessed as follows:

1. Press the Menu icon from the home screen of the controller. The Main Menu appears.
2. Press the System Configuration button.
3. Press the Modbus Settings button.

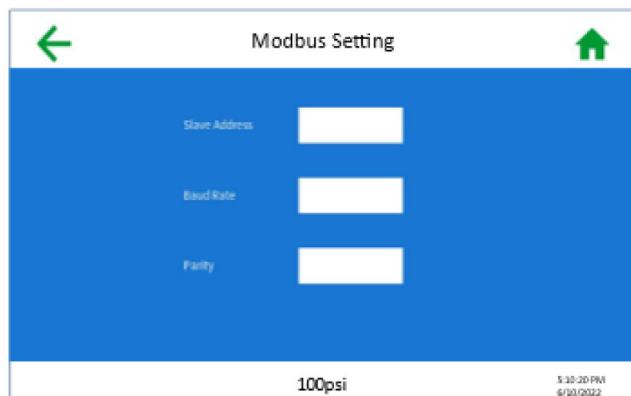


Figure 3-29: Modbus Setting

Refer to Figure 3-29; parameters may be adjusted as follows:

Slave Address - Can be set to any integer value from 1 to 247.

Baud Rate - Upon pressing this field, a separate window will open with available baud rate selections ranging from 1200 to 921600. Refer to figure 3.30 for available selections.

Parity - May be set to None, Even or Odd.

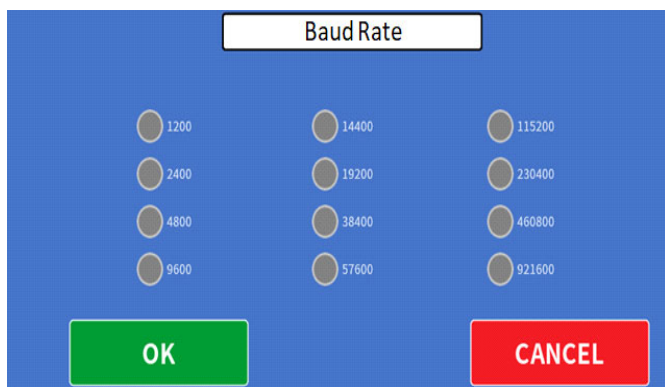


Figure 3-30: Baud Rate

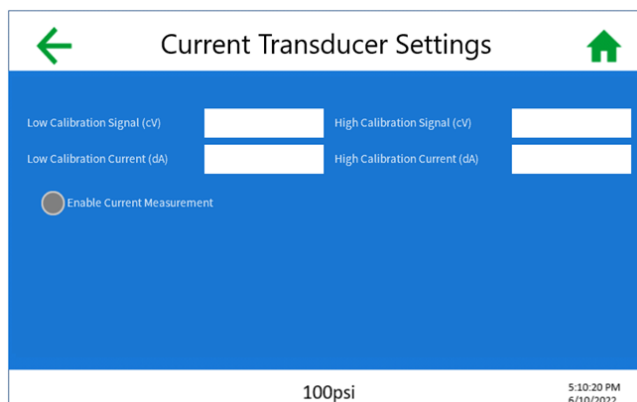


Figure 3-31: Current Transducer Settings

3.4 Maintenance

The Maintenance menu contains recent Warnings, Recommended Service, Event History, Reboot Display, Clean Display and Log File buttons.

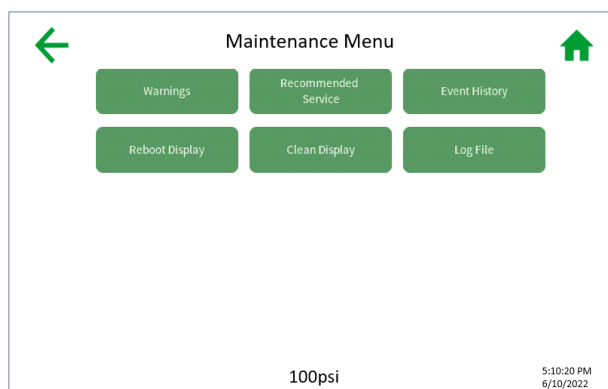


Figure 3-32: Maintenance Menu

3.3.11 Current Transducer Settings

This screen displays the settings for using an optional Current Transformer/Transducer (CT) kit. The upper and lower bounds of the current settings are displayed and automatically set up for the machine and its compatible kit. By default, the "Enable Current Measurement" button is disabled. Once the CT kit is installed, tap the button and it will turn green to show that current measuring is

3.4.1 Warnings

When a warning message is displayed, the compressor will still operate. However, the condition which caused the warning must be resolved within a short period of time to prevent a fault condition or damage to the machine. Refer to the Troubleshooting section of this manual.

Follow these steps to access the Warnings screen:



1. Press the Menu icon from the home screen of the STS Controller. The Main Menu appears.
2. Press the Maintenance button.
3. Press the Warnings button.

For actions to be taken when a Warning condition occurs, see the figure below.

Warning messages that may appear on the Maintenance Display are listed below.

High Oil (Fluid) Filter dP - Indicates the fluid filter pressure differential is high. The fluid filter needs to be checked or changed.

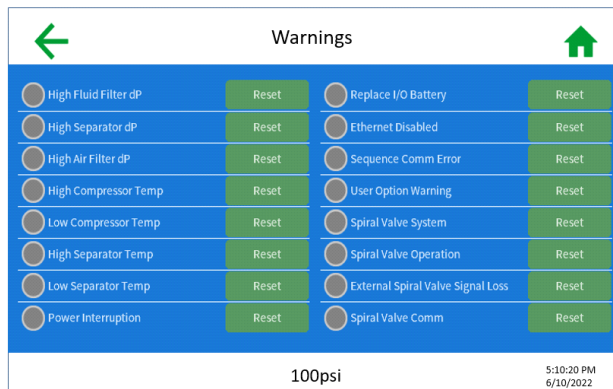


Figure 3-33: Warnings

High Separator dP - Indicates the fluid separator pressure differential is high. The separator unit needs to be checked or changed.

High Air Filter dP - Air filter pressure differential is high indicating that the air filter element needs to be checked or changed.

High Temperature Warnings - Temperature at the indicated probe location is approaching the set high limit.

Low Temperature Warnings - Temperature at the indicated probe location is approaching the set low limit.

Power Interruption - An interruption in power to the compressor has occurred.

Replace I/O Battery - Indicates that the controller internal battery is low and needs to be replaced.

Ethernet Disabled - Indicates that a problem has occurred with the Ethernet connection.

Sequence Comm Error - Communication problem exists between the compressor controllers set up for sequential operation.

User Option Warning - A user furnished switch has been activated.

VFD Overtemp - Indicates that the variable frequency drive is operating near its designed temperature limit.

Spiral Valve System - Electronic Spiral Valve Operation has been blocked by a system set-up issue. Check the cable connection between the spiral motor driver and the motor.

Spiral Valve Operation - Electronic Spiral Valve Operation has been blocked by an abnormal operational issue such as component temperatures. These will tend to clear themselves as compressor operating conditions normalize. Check for high ambient conditions and low temperature start-up.

Spiral Valve Comm - Electronic Spiral Valve Operation has been blocked by a loss of communication between the STS Controller and the Spiral motor driver module. Check the connection between the power cable and the driver module. Check the communication cable between the STS I/O module and the spiral motor driver. If this is a replacement driver module double check that the driver switches are set as directed.

3.4.2 Recommended Service

Follow these steps to access the Recommended Service screen:



1. Press the Menu icon from the home screen of the STS Controller. The Main Menu appears.
2. Press the Maintenance button.
3. Press the Recommended Service button.

The Recommended Service menu shows the hours remaining to the next recommended service activity.

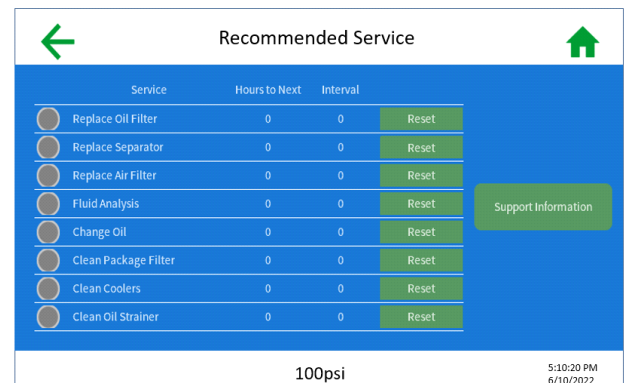


Figure 3-34: Recommended Service

3.4.2.1 Service Reminders

Service Reminders may inform the user that a component of the compressor is recommended for service. Resetting service intervals is available to the user after maintenance is completed. Note that the Reset button must be pressed upon reprogramming, re-initialization of a machine to begin timer. Filters and fluids should be changed as directed by the specific model's Operator's manual. The compressor location and environment may dictate more frequent changes.

The following service reminders can appear under the Recommended Service menu.

Replace Oil Filter - The compressor fluid filter life interval has expired. Change the fluid filter within the time frame noted in the machine operation specifications.

Replace Separator - The compressor fluid separator life interval has expired. Change the separator within the time frame noted in the machine operation specifications.

Replace Air Filter - The compressor air filter life interval has expired. Change the air filter within the time frame noted in the machine operation specifications.

Fluid Analysis - Fluid analysis interval has expired. Schedule the compressor fluid analysis per machine operation specifications.

Change Oil - The compressor fluid life interval has expired. Change the compressor fluid within the time frame noted in the machine operation specifications.

Clean Package Filter (If equipped) - Filters on incoming package air is due for cleaning.

Clean Coolers - Coolers should be cleaned to maintain effective cooling performance.

Clean Oil Strainer - Strainer on oil lubrication system for oil free compressors should be cleaned.

Inlet Valve Maintenance - Perform required maintenance on inlet valve.

Grease Motors - Grease motors as indicated by nameplate and manufacturer.

3.4.3 Event History

Follow these steps to access the Event History screen



1. Press the Menu icon from the home screen of the STS Controller. The Main Menu appears.
2. Press the Maintenance button.
3. Press the Event History button.

A history of the 16 most recent Warning, Fault and alarm messages may be viewed in the Event History window.

No.	Event	Date	Time	Hours
1				
2				
3				
4				
5				
6				
7				
8				

100psi 5:10:20 PM 6/10/2022

Figure 3-35: Event History

1. Select the Event History button on the Maintenance menu.
2. The Event History window will appear displaying the following elements:
 - 2.1. First column shows the number of the event.
 - 2.2. Second column shows the corresponding icon - the red circle means fault and the yellow triangle means warning. See *Section 2.1.1* on page 9.
 - 2.3. Third column shows abbreviated headings corresponding to the event.

There are column headings for the machine: Date, Time, and Hours.

Note: Use the up and down buttons on the top and the bottom of the scroll bar to view more than ten events.

Warning history is also included in the comprehensive text report. See *Section 3.2.8* on page 15.

3.4.4 Reboot Display

Follow these steps to access the Reboot Display screen:



1. Press the Menu icon from the home screen of the STS Controller. The Main Menu appears.
2. Press the Maintenance button.
3. Press the Reboot Display button.
4. The display will immediately reboot without a confirmation screen and return to the home screen.

3.4.5 Clean Display

Only use a soft cloth and mild detergent to clean the display. Use of other materials may void the warranty. Follow these steps to access the Clean Display screen:



1. Press the Menu icon from the home screen of the STS Controller. The Main Menu appears.
2. Press the Maintenance button.
3. Press the Clean Display button.

The Clean Display disables the touch screen and gives the user 10 seconds for cleaning. Repeat steps 1-3 if more cleaning time is needed.

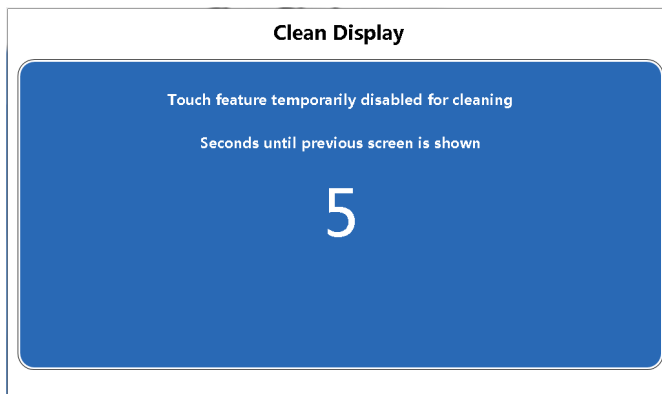


Figure 3-36: Clean Display

3.4.6 Machine Reports via Log File

The Sullair Touch Screen may be used to generate comprehensive reports of the controller's setup and machine history. These reports are small files that may be filed for future reference, e-mailed, or pasted into other documents. They may also be viewed using Microsoft Excel.

Follow these steps to access the reports:

1. Plug in USB drive to port on front of machine.
2. Press the Menu icon from the home screen of the STS Controller. The Main Menu appears.
3. Press the Maintenance button.

4. Press the Log File button.
5. Press the Log File Download button.

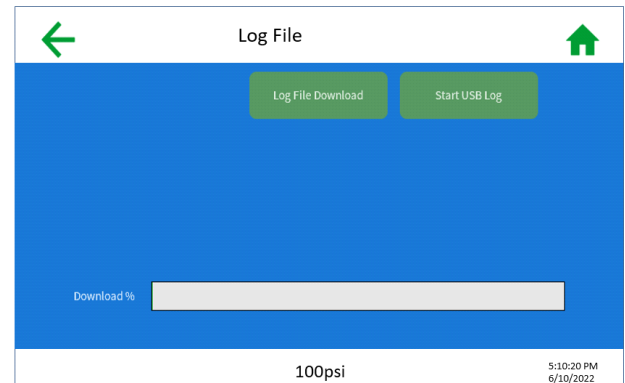


Figure 3-37: Log File

The following files will be downloaded to the connected USB storage device:

Change - This report provides a history of parameter changes made to the machine.

Event - This report provides a history of events accrued in the machine.

Report - This report provides necessary information about the machine such as Package Information, Controller & Software Information, Machine Information, Control Parameters, etc.

Status - This report provides a historical sensor log.

Warning - This report provides controller debug information.

For all reports above, multiple files may be downloaded. The number of files will depend on machine operational history and memory availability. The highest numbered file will be the latest.

Also contained within this menu is the ability to perform a sensor log. With a USB drive connected, press the START USB LOG button. The controller will begin logging sensor values to the USB at a default sample rate of 1 sample per minute.

Notes:

Section 4

Variable Frequency Drive

4.1 Overview

The Sullair VFD drive application is custom designed for operation of air compressors. All necessary control functions are performed through the Sullair Touch Screen Controller and software. The drive functions as a module on the Sullair Touch Screen Controller communications bus. It provides detailed information about relevant drive status data and compressor performance. Drive controls are coordinated with internal compressor controls, and with other Supervisor or controlled compressors in sequenced systems. The Sullair Touch Screen Controller monitors drive performance to provide motor thermal and other protections in an easy-to-use, robust design.

4.1.1 VFD Installation and Operation

Refer to the VFD Installation and Service manual that came with the compressor for installation information.

Generally, the STS functions operate in the same manner for VFD machines as with non-VFD machines. When a VFD compressor is initialized, the program provides additional functionality for monitoring and controlling VFD operations. The VFD Data button appears as in *Figure 4-1* below.

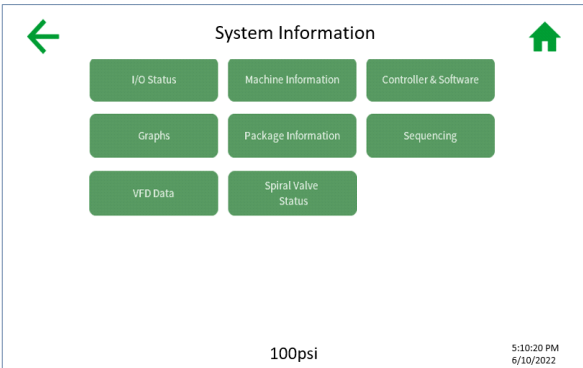


Figure 4-1: System Information

This section defines those additional STS functions that are available for VFD compressors. When the VFD Data button is pressed, four buttons appear on the next screen.

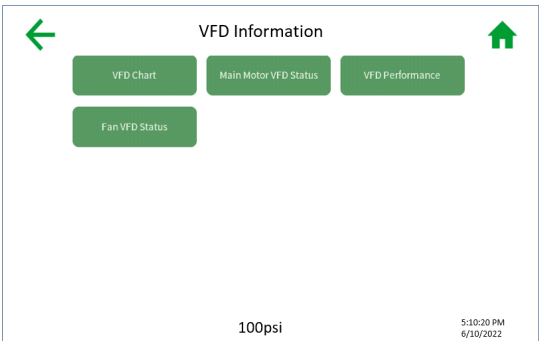


Figure 4-2: VFD Information

4.2 VFD Chart

Select the VFD Chart button to open that screen. This window displays a detailed breakdown of the compressor operation over a Recent period or over the Lifetime of the machine.

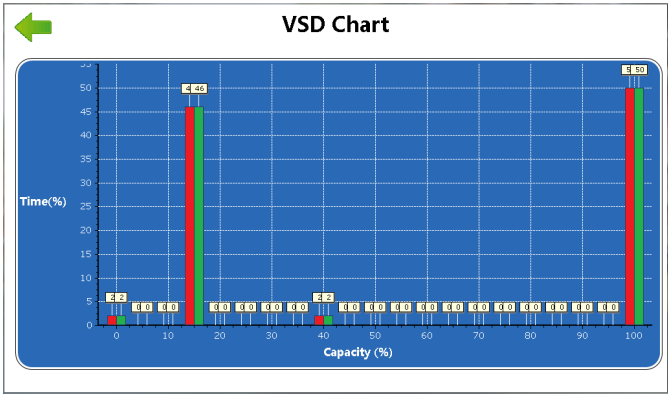


Figure 4-3: Input & Output Status

The VFD Chart shows the percentage of the amount of time the compressor has operated at various rates of delivery. For example, the values shown in the figure correspond to a compressor that has been delivering

approximately 46% of its rated capacity for 24 minutes; it ran 10 minutes at 25% capacity, etc.

Red bars represent the Lifetime delivery and the green bars shows the current one. These values may be used for further estimates of compressor options during plant surveys and evaluations. The Recent values shown in the Delivery Profile window are reset to zero when the Reset button is pressed in the VFD performance screen.

4.3 Main Motor Status

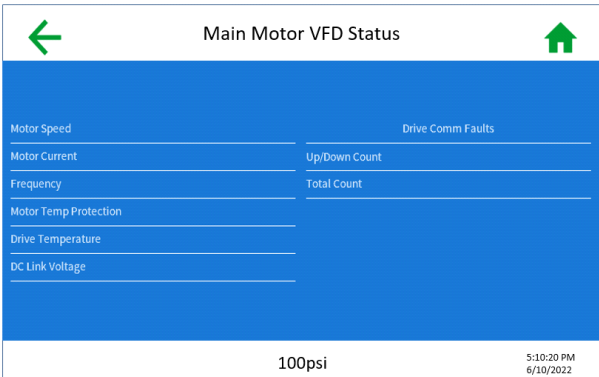


Figure 4-4: Main Motor VFD Status

Service data related to VFD Compressors is displayed in the Main Motor VFD Status window. See Figure 4-4. The Main Menu VFD Status window contains the following information:

Motor speed displays a calculated motor speed based on the programmed motor speed and the VFD’s output frequency.

Motor current displays the motor current measured in Amps.

Frequency displays the frequency command from the controller.

Motor temp protection is calculated using several VFD parameters and output values. No actual motor data is used.

Drive temperature displays the current drive temperature measured in degrees Fahrenheit or Celsius.

DC link voltage displays the drive’s DC link voltage.

Drive Com Faults provides a count of the drive communication faults between the VFD and I/O.

Up/down count is the number of recent faults.

Total count is the total number of drive communication faults that have occurred.

4.4 VFD Performance

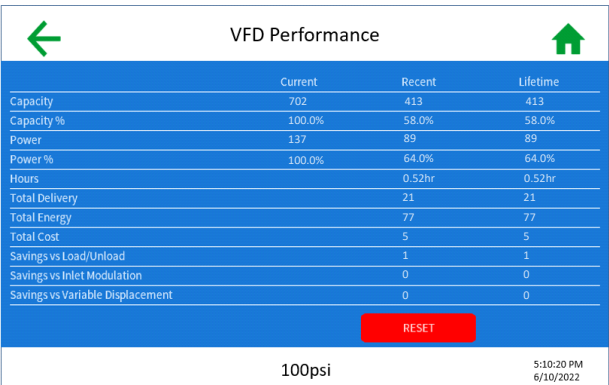


Figure 4-5: VFD Performance

When the STS Controller is initialized as a compressor model with a VFD, additional VFD related parameters will be displayed on the VFD Performance screen. See Figure 4-5. The data shown indicate current, recent and lifetime performance of the VFD compressor package. Lifetime data are averages or totals since the time the compressor was initialized. Recent data are averages and totals since the last reset. Current data show a real time flow rate and power estimates of the compressor package.

Figure 4-5 shows a sample display of VFD performance data for a compressor operating under normal conditions. A description of the VFD data is presented below:

Capacity - approximately how much air is being delivered by the compressor package in CFM. The Current data is updated frequently and shows the real time delivery rates. Recent shows the recent average since the last reset and Lifetime shows the average since the machine was initialized.

Capacity % - approximately how much air is being delivered by the compressor package as a percentage of the VFD’s rated capacity. The Current data is updated frequently and shows the real time delivery rates. Recent shows the recent average, and Lifetime shows the average since initializing.

Power - the amount of power being used to operate the VFD. The power is presented in kilowatts (KW) approximating the compressor’s total power usage. The Current power data is updated frequently and shows the instantaneous power usage rates. Recent shows the recent power usage average, and Lifetime shows the average power usage since the machine was initialized.

Power % - the amount of power being used to operate the VFD expressed as a percentage of the compressor’s estimated usage when operating at full capacity. The Current power data is updated frequently and shows the

real time power usage rates. Recent shows the recent power usage average, and Lifetime shows the average power usage since the machine was initialized.

Hours - the amount of time (in hours and minutes) that the machine has been operated since the Clear Recent Data button was clicked for Recent and since the machine was initialized for Lifetime.

Total Delivery - the estimated total amount of air delivered since the last reset for Recent data and since the machine was initialized for Lifetime data; measured in thousands of cubic feet (KCF).

Total Energy - the estimated total electrical energy consumption since the last reset for Recent data and since the machine was initialized for Lifetime data; measured in Kilowatt-Hours (KWH).

Total Cost - the cost for the electrical energy since the last reset for Recent data and since the machine was initialized for Lifetime data; calculated as dollars (or other units of currency).

Savings vs Load/Unload - the estimated additional cost to deliver the same quantity of air using load/unload compressor control since the last reset for Recent data and since the machine was initialized for Lifetime data; calculated as Dollars. This value is calculated using the Compressed Air Challenge curve for Load/Unload.

Savings vs Inlet Mod. - the estimated additional cost to deliver the same quantity of air using inlet modulation compressor control since the last reset for Recent data and since the machine was initialized for Lifetime data;

calculated as Dollars. This value is calculated using the Compressed Air Challenge curve for Inlet Modulation.

Savings vs Variable Displacement - the estimated additional cost to deliver the same quantity of air using variable displacement compressor control since the last reset for Recent data and since the machine was initialized for Lifetime data; calculated as Dollars. This value is calculated using the Compressed Air Challenge curve for Variable Displacement.

4.4.1 Clear Recent Data

The Recent data column displays average and total values since the date of the last reset. Recent data history may be reset to zero (like a trip odometer in a car) by selecting the Reset button at the bottom of the VFD Performance screen. A few seconds after the button is pressed, all values in the Recent columns of the VFD Performance group and the Delivery History window will be set to zero. New machine statistics will immediately begin to be calculated and the Recent columns will soon be populated with the new Recent data values.

4.4.2 VFD Adjustment

As discussed earlier in this manual in *Section 3.3.1* on page 16, the Control Parameter screen allows the user to modify certain control parameters of the compressor operation. In addition to the general control parameters previously described, two VFD adjustments become available when the STS is initialized to a VFD model. These VFD control parameters are setpoint pressure and cost per kilowatt-hour.

Notes:

Section 5

Remote Monitoring

5.1 Introduction

The STS Controller provides both serial and Ethernet connections to remotely monitor a compressor. Your

local Sullair distributor will be able to assist you with this functionality.

Notes:

Section 6

Troubleshooting

6.1 Introduction

This Troubleshooting section is provided as a guide to aid in diagnosing and resolving certain compressor conditions when they occur. The information contained in *Table 6-1* on page 36 has been compiled from factory experience and contains symptoms and usual causes for the described problems. Each Service Reminder, Warning, or Fault Message is listed with conditions of when the problem may occur, a probable cause, and a suggested solution to the problem.

Note: DO NOT assume that these are the only problems that may occur.

This document cannot address every possible adverse condition that may happen, nor does it provide every solution for the potential troubles listed. All available data concerning the trouble should be systematically analyzed before undertaking any repairs or component replacement procedures.

Always perform a detailed visual inspection when a machine problem occurs prior to attempting any repairs. Doing so may avoid unnecessary repair and/or additional damage to the compressor.

Always remember to:

- Check for loose wiring.
- Check for damaged piping.
- Check for parts damaged by heat or an electrical short circuit, usually apparent by discoloration or a burnt odor.

Should your problem persist after making the recommended check, consult your nearest Sullair Distributor or the Sullair factory Service Department.

NOTE

The Troubleshooting Guide and STS Controller Faults and Warnings portray common systematic problems that can occur during controller operation. For a more thoroughly in-depth coverage of machine operation troubles, consult the Troubleshooting Section in the machine operators manual

6.2 Troubleshooting Guide

The Controller troubleshooting guide contains symptoms and common causes for the problems that may occur throughout the compressor system. Each warning or fault message that may appear is listed along with conditions for the problem, a probable cause, and a suggested solution to the problem.

Note: DO NOT assume that these are the only possible problems that may occur, and each message listed in the guide does not necessarily apply to all compressor units.

Table 6-1: Controller troubleshooting guide

Message	Probable cause	Remedy
Sluggish/ slow/ unresponsive display	Machine may have had long-term UV/sunlight exposure	Remove from UV/sunlight exposure
	Temperature may be outside design specifications	Maintain machine within design specifications
Fluid Analysis	Service interval has expired. Maintenance due.	Collect fluid sample and send in for analysis per sampling program.
Ambient temp high	High temperature surrounding compressor	Improve ventilation.
Aux Motor Overload	Auxiliary Motor Tripped on Cooling Fan, Fluid Pump or Other Motor.	Reset auxiliary overload after element cools. Verify correct motor amps.
		Check for loose connections.
		Check motor starter contact for proper operation.
		Check line voltage, if low consult power company.
CE Voltage too high	Excessive voltage from power supply or transformer.	Check connections and adjustments.
CE Voltage too low	Inadequate voltage from power supply or transformer.	Check connections and adjustments.
	Excessive load or short in 24v control devices.	Check wiring, coils, and solenoid valves.
Change Air Filter	Service interval has expired. Maintenance due.	Perform recommended maintenance and reset the reminder using the Recommended Service screen.
Change Fluid		
Change Fluid Filter		
Change Separator		
Clean Package Filter		
Clean Coolers		
Clean Oil Strainer		
Grease Motor		
Inlet Valve		
Maintenance		
Controller Watchdog	Controller fault.	Contact Sullair Factory Service.
Drain Valve Warning	Failed condensate drain	Service/Replace condensate drain.
Dryer Fault	Indicates a general dryer malfunction has occurred.	Consult the dryer manual and/or Sullair Factory Service.
High Dryer Dew point	The dryer is unable to cool below the high dew point temperature setting.	Consult the dryer manual and/or Sullair Factory Service.
Dryer High DP Fault		

Table 6-1: Controller troubleshooting guide

Message	Probable cause	Remedy
Low Dryer Dew point Dryer Low DP Fault	The dryer is cooling below the low dew point temperature setting.	Consult the dryer manual and/or Sullair Factory Service.
Dryer Overload Dryer Overload Fault	Indicates a dryer overload has occurred.	Consult the dryer manual and/or Sullair Factory Service.
Dryer Relay Fault	Indicates a general dryer malfunction has occurred	Consult the dryer manual and/or Sullair Factory Service.
Dryer Service	Dryer malfunction is imminent.	Consult the dryer manual and/or Sullair Factory Service.
E-Stop Push Button	E-Stop Button Active.	Release button.
	Faulty E-Stop Button.	Check wiring.
Ethernet disabled	Excessive Ethernet traffic	Install a router to reduce the traffic on the compressor's LAN.
Failed to Unload	Compressor failed to unload	Check operation of the inlet valve and controls
High Air Filter dP	Differential Pressure Across Inlet Filter High.	Replace filter.
		Check inlet filter pressure switch.
HIGH AN_ SENSOR	Sensor (Pressure Transducer, Temp Probe, etc.) or Wiring Failure.	Check sensor wiring.
		Check sensor.
High Dryer Dew point	The dryer is unable to cool below the high dew point temperature setting.	Consult the dryer manual and/or Sullair Factory Service.
High Fluid Filter dP	High pressure across fluid filter while running.	Replace fluid filter.
	Fluid filter clogged.	
	Low ambient temperature.	Sump heater may be required in ambients below 40°F (4°C).
	Sensor failure.	Check sensor, wiring and tubing.
High Interstage Pres	Compressor Interstage Blockage or second stage failure	Inspect for: interstage flow restriction, or damaged air end and repair
High Package Press	High pressure.	Check operation of valves and controls.
High Pressure A High Pressure B	Faulty pressure sensor.}	Check and replace pressure sensor if defective.
High Separator dP	High Separator pressure drop	Inspect separator and replace
High Spiral Valve Pr	Mis-adjustment	Check setting of the pressure regulator for the spiral valve actuator.

Table 6-1: Controller troubleshooting guide

Message	Probable cause	Remedy
High Sump Pressure	Sump Pressure High (Poppet, Sullicon, Spiral, Blowdown or Pneumatic Valve Failed)	Check valves. Check Sullicon adjustment (see Control Adjustment section in the compressor operator's manual).
	Faulty solenoid valves.	Check solenoid valve operation and wiring.
	Faulty pressure regulator.	Check pressure regulator adjustment and operation. Check minimum pressure check valve (not applicable to Fluid Free compressors).
High Temperature(s)	High Temp Fault.	Ambient temperature high, improve local ventilation.
	Fluid level low.	Replenish fluid to proper level.
	Thermal valve fault.	Check thermal valve operation.
	Cooler fins dirty.	Clean Cooler fins and fan blades.
	Low water flow.	Check for valve closed, pump off or broken pipe.
	High water temperature.	Increase water flow or lower water temperature.
	High ambient temperature.	Improve ventilation.
	Dirty inlet filter (oil free 1st stage temp).	Replace filter.
	Cooler plugged.	Clean cooler tubes and shell. If plugging persists, use cleaner water.
High Voltage Failed	No power to the high voltage starter	Close the disconnect switch
		Check main motor fuses or circuit breaker
Illegal State	Controller fault.	Contact Sullair Factory Service.
Instantaneous Power Interruption	Power Loss.	N/A. Provided as indication that machine experienced a power loss.
Ethernet Comm Error	Module Network Error; Communication has failed between the Display Module, I/O Module and other modules.	Check wiring.
LOW AN_ SENSOR	Sensor (Pressure Transducer, Temp Probe, etc.) or Wiring Failure.	Check sensor wiring.
		Check sensor.
Low Dryer Dewpoint	The dryer is cooling below the low dewpoint temperature setting.	Consult the dryer manual and/or Sullair Factory Service.

Table 6-1: Controller troubleshooting guide

Message	Probable cause	Remedy
Low Line Pressure	Demand exceeds capacity.	Reduce demands.
	Leaks in supply lines.	Increase capacity.
Low Fluid Pressure or Injection Pressure	Fluid filter clogged.	Check for leaks or open lines in air supply. Repair as necessary.
	Sump fluid level low.	Replace fluid filter.
	Low ambient temperature.	Replenish fluid to proper level.
	Fluid pump failure.	Sump heater may be required in ambient temperatures below 40°F (4°C).
Low Sump Pressure	Bad sensor or connections.	Fluid pump may be required for remote coolers. Consult Sullair Factory Service.
	Machine may have failed to start.	Check pressure sensor, wiring and tubing.
Low Temperature 1	Low ambient air temperature	Check machine operation.
Low Temperature 2		
Low Temperature 3		
Low Water Pressure	Cooling Water Pressure below 10 psi (0.7 bar).	Sump heater may be required in ambients below 40°F (4°C).
	Switch is shorted or open.	Check for closed valves or broken pipes.
Main Motor Overload	Main Motor Overload Relay Tripped.	Replace switch. Check wiring for shorts, arcing or loose connections.
		Reset overload after heater element cools down.
		Check that compressor is properly configured.
		Ensure load pressure is set below limit of compressor.
Memory Error	The controller I/O board has failed.	Check line voltage, if low consult power company.
Not Commissioned	Machine not initialized upon controller replacement.	Board replacement required. Contact Sullair Factory Service.
Option Input	User furnished switch has operated.	Follow commissioning procedures to set up for the specific compressor package.
Option Input Run		Check operation of optional device.
Phase Monitor	Phase protection relay has tripped.	Confirm proper connection of phases and rotation of air end and fan.
Internal Comm Error	Wiring fault between the controller and User Interface panel	Check the cable and connections
Power Interruption	Intermittent Control Power.	Check line voltage and connections.

Table 6-1: Controller troubleshooting guide

Message	Probable cause	Remedy
Pump Motor Overload	Auxiliary Motor Tripped on Fluid Pump Motor	Reset auxiliary overload after element cools. Verify correct motor amps.
		Check for loose connections.
		Check motor starter contact for proper operation.
		Check line voltage, if low consult power company.
Pump Starter Contact	Pump starter failed to operate.	Check starter and control wiring.
	Faulty auxiliary contact.	Check contact and contact wiring.
Replace Battery	Controller I/O backup battery is low.	Replace battery.
RTD Circuit Fault	Damaged wiring.	Replace sensor.
	Failed sensor	
High Motor Temps (Bearing, Winding)	High ambient temperature	Improve ventilation in installed location.
	Dirty cooling fins	Clean motor.
High Separator dP	Pressure Differential Across Separator High.	Replace separator.
	Plugged separator elements.	
	Pressure sensor failure.	Check sensor wiring.
Sequence Comm Error	Cable or connection fault between compressors.	Check wiring.
	Improper sequence adjustments.	Check sequence settings of all compressors in the sequence.
Spiral Valve Comm	Electronic Spiral Valve Operation has been blocked by a loss of communication between the STS Controller and the Spiral motor driver module.	Check the connection between the power cable and the driver module. Check the communication cable between the STS I/O module and the spiral motor driver. If this is a replacement driver module, double check that the driver switches are set as directed.
Spiral Valve Operation	Electronic Spiral Valve Operation has been blocked by an abnormal operational issue such as component temperatures.	These will tend to clear themselves as compressor operating conditions normalize. Check for high ambient conditions and low temperature start-up.
Spiral Valve System	Electronic Spiral Valve Operation has been blocked by a system set-up issue.	Check the cable connection between the spiral motor driver and the motor.
Starter	Main starter failed to operate.	Check starter and control wiring.
	Faulty auxiliary contact.	Check contact and contact wiring.
	Momentary Line Power loss or brownout	Check Line Power quality
UI Voltage too high	Controller fault.	Contact Sullair Factory Service.
UI Voltage too low	Controller fault.	Contact Sullair Factory Service.

Table 6-1: Controller troubleshooting guide

Message	Probable cause	Remedy
User Option Warning	User furnished switch has operated.	Check function of optional device.
HIGH VOLT SENSOR	Controller fault.	Contact Sullair Factory Service.
LOW VOLT SENSOR	Controller fault.	Contact Sullair Factory Service.
VFD1 Comm Fault	Communications lost with the VFD	Check connections to the VFD.
VF Drive Fault		Check VFD control power and check for board faults.
V53 Fieldbus		
VFD Overtemp	Warns that the variable frequency drive is too hot	Ensure adequate ventilation Schedule cleaning before a High Temp fault occurs
VFD1 parameter error	Controller initialized incorrectly.	Initialize the controller per the machine nameplate
VFD1 Response	The VFD drive is not responding to STS control.	Remove power for 1 minute. Restore power for 1 minute. Restart the machine.

6.3 Machine behavior after a power interruption

If the compressor was faulted prior to the power interruption, the controller will resume the Faulted condition and display the reason for the fault. Repair the cause of the fault and press the Stop button to reset the controller.

If the compressor was manually stopped prior to the power interruption, the controller will return to the manually stopped mode. Press the Start button to manually restart operation.

If IPI is enabled and the controller was in Automatic or Manual mode prior to the interruption, the controller will resume that mode after waiting timer expires. No key press is necessary to restart the compressor.

6.4 Internal Battery

The Controller employs an internal battery that maintains the real-time clock and maintains the integrity of the controller memory records when power is disconnected from the controller. For best performance, ensure that the battery is functioning. If the controller is operated with a drained or dead battery, the time-of-day records will not work properly, and loss of recent records could occur. If recent records are lost due to an inoperative battery (or other reason), the controller will revert to the last saved versions of settings and records.

The internal battery is located inside the controller I/O module and will operate for several years without requir-

ing maintenance. When the battery voltage gets low, the controller will issue a Replace Battery warning. Perform the following steps to replace the battery.

1. Press the Stop button to stop the compressor.
2. Disconnect and lockout power according to lock-out/tag out procedure.
3. Open the starter enclosure and locate the I/O Control Module.
4. Remove four screws from the I/O Control Module cover and remove it.

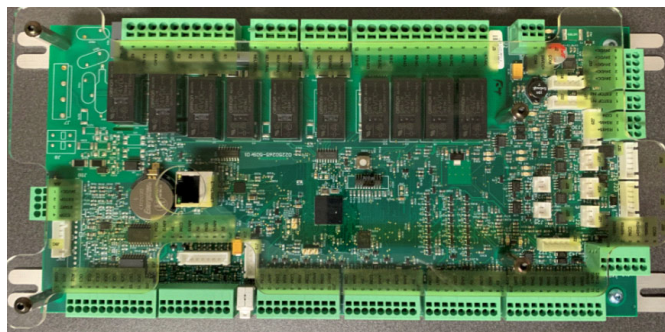


Figure 6-1: I/O With Cover Photo

5. Locate the internal battery. The battery is located near one end of the I/O circuit board (usually oriented towards the top).
6. Remove the battery and replace with a battery type BR2032.

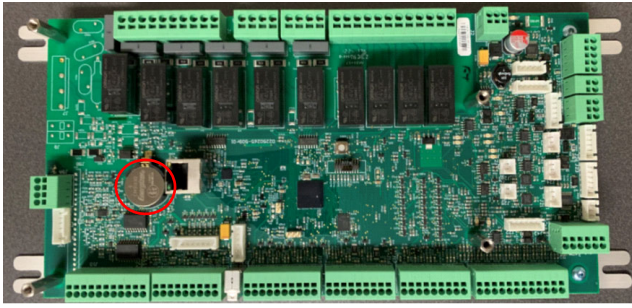


Figure 6-2: I/O Without Cover Photo

7. Replace the I/O cover, close starter door, and follow normal startup procedures.

6.5 Screen calibration

In the event that you are unable to interact with on-screen buttons, attempt to calibrate the touch screen by following the steps below:

1. Enter calibration mode: Immediately after powering on the machine, a SULLAIR splash screen will appear on the touch screen. While this screen is displayed, tap anywhere on the screen three times to initiate the calibration process.
2. Perform calibration: When prompted, touch the center of each bullseye icon as it appears on the screen.
3. Save and exit: After completing the calibration sequence, tap Save, then tap Exit to apply the settings.



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