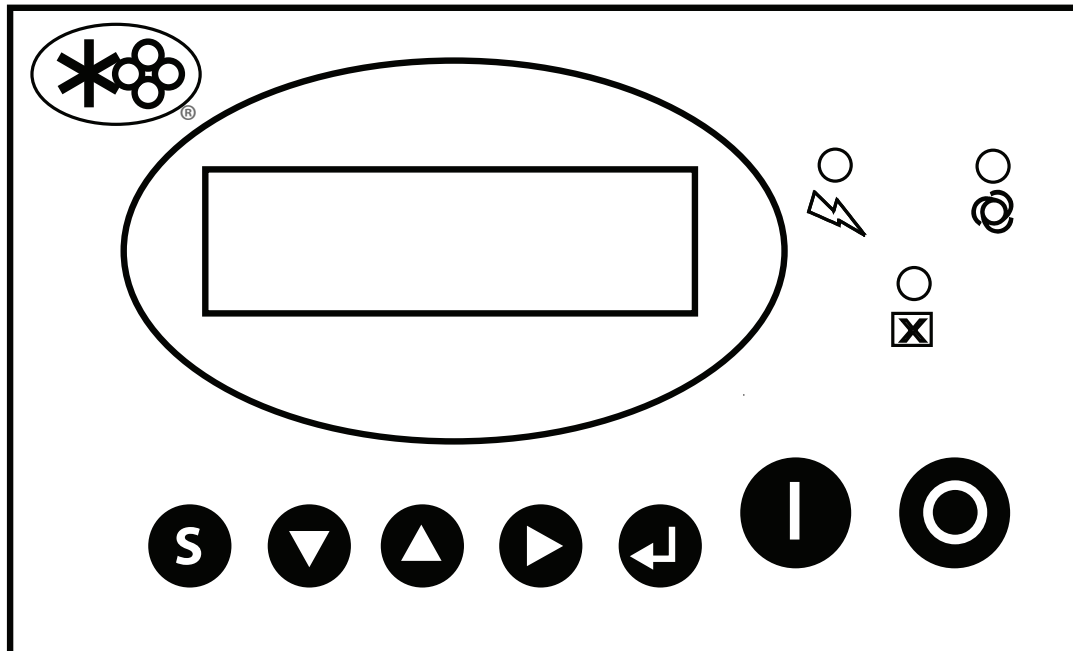




USER MANUAL

ShopTek™ CONTROLLER USER INTERFACE MANUAL



WARRANTY NOTICE

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

PART NUMBER:
02250180-094 R00

KEEP FOR
FUTURE
REFERENCE

©SULLAIR CORPORATION

The information in this manual is current
as of its publication date and applies to
controller part number :

88290018-640 R03

and all subsequent serial numbers.



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Sullair Air Care Seminars are courses that provide hands-on instruction for the proper operation, maintenance, and servicing of Sullair products. Individual seminars on Industrial compressors and compressor electrical systems are offered at regular intervals throughout the year at Sullair's corporate headquarters training facility located at Michigan City, Indiana.

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Section 1

SAFETY

NOTE



**OPERATOR IS REQUIRED TO READ
ENTIRE INSTRUCTION MANUAL.**

1.1 GENERAL

Sullair Corporation and its subsidiaries design and manufacture all of their products so they can be operated safely. However, the responsibility for safe operation rests with those who use and maintain these products. The following safety precautions are offered as a guide which, if conscientiously followed, will minimize the possibility of accidents throughout the useful life of this equipment.

The compressor should be operated only by those who have been trained and delegated to do so, and who have read and understood this Operator's Manual. Failure to follow the instructions, procedures and safety precautions in this manual may result in accidents and injuries. **NEVER** start the compressor unless it is safe to do so. **DO NOT** attempt to operate the compressor with a known unsafe condition. Tag the compressor and render it inoperative by disconnecting and locking out all power at source or otherwise disabling its prime mover so others who may not know of the unsafe condition cannot attempt to operate it until the condition is corrected.

Install, use and operate the compressor only in full compliance with all pertinent OSHA regulations and/or any applicable Federal, State, and Local codes, standards and regulations. **DO NOT** modify the compressor and/or controls in any way except with written factory approval.

While not specifically applicable to all types of compressors with all types of prime movers, most of

the precautionary statements contained herein are applicable to most compressors and the concepts behind these statements are generally applicable to all compressors.

1.2 PERSONAL PROTECTIVE EQUIPMENT

- A. Prior to installing or operating the compressor, owners, employers and users should become familiar with, and comply with, all applicable OSHA regulations and/or any applicable Federal, State and Local codes, standards, and regulations relative to personal protective equipment, such as eye and face protective equipment, respiratory protective equipment, equipment intended to protect the extremities, protective clothing, protective shields and barriers and electrical protective equipment, as well as noise exposure administrative and/or engineering controls and/or personal hearing protective equipment.

1.3 PRESSURE RELEASE

- A. Install an appropriate flow-limiting valve between the service air outlet and the shut-off (throttle) valve, either at the compressor or at any other point along the air line, when an air hose exceeding 1/2" (13mm) inside diameter is to be connected to the shut-off (throttle) valve, to reduce pressure in case of hose failure, per OSHA Standard 29 CFR 1926.302(b)(7) and/or any applicable Federal, State and Local codes, standards and regulations.
- B. When the hose is to be used to supply a manifold, install an additional appropriate flow-limiting valve between the manifold and each air hose exceeding 1/2" (13mm) inside diameter that is to be connected to the manifold to reduce pressure in case of hose failure.
- C. Provide an appropriate flow-limiting valve at the beginning of each additional 75 feet (23m) of hose in runs of air hose exceeding 1/2" (13mm)

inside diameter to reduce pressure in case of hose failure.

- D. Flow-limiting valves are listed by pipe size and flow-rated. Select appropriate valves accordingly, in accordance with their manufacturer's recommendations.
- E. **DO NOT** use air tools that are rated below the maximum rating of the compressor. Select air tools, air hoses, pipes, valves, filters and other fittings accordingly. **DO NOT** exceed manufacturer's rated safe operating pressures for these items.
- F. Secure all hose connections by wire, chain or other suitable retaining device to prevent tools or hose ends from being accidentally disconnected and expelled.
- G. Open fluid filler cap only when compressor is not running and is not pressurized. Shut down the compressor and bleed the receiver tank to zero internal pressure before removing the cap.
- H. Vent all internal pressure prior to opening any line, fitting, hose, valve, drain plug, connection or other component, such as filters and line oilers, and before attempting to refill optional air line anti-icer systems with antifreeze compound.
- I. Keep personnel out of line with and away from the discharge opening of hoses or tools or other points of compressed air discharge.
- J. **DO NOT** use air at pressures higher than 2.1 bar for cleaning purposes, and then only with effective chip guarding and personal protective equipment per OSHA Standard 29 CFR 1910.242 (b) and/or any applicable Federal, State, and Local codes, standards and regulations.
- K. **DO NOT** engage in horseplay with air hoses as death or serious injury may result.

1.4 FIRE AND EXPLOSION

- A. Clean up spills of lubricant or other combustible substances immediately, if such spills occur.
- B. Shut off the compressor and allow it to cool. Then keep sparks, flames and other sources of ignition away and **DO NOT** permit smoking in the vicinity when checking or adding lubricant or when refilling air line anti-icer systems with anti-freeze compound.
- C. **DO NOT** permit fluids, including air line anti-icer system antifreeze compound or fluid film, to

accumulate on, under or around acoustical material, or on any external surfaces of the air compressor. Wipe down using an aqueous industrial cleaner or steam clean as required. If necessary, remove acoustical material, clean all surfaces and then replace acoustical material. Any acoustical material with a protective covering that has been torn or punctured should be replaced immediately to prevent accumulation of liquids or fluid film within the material. **DO NOT** use flammable solvents for cleaning purposes.

- D. Disconnect and lock out all power at source prior to attempting any repairs or cleaning of the compressor or of the inside of the enclosure, if any.
- E. Keep electrical wiring, including all terminals and pressure connectors in good condition. Replace any wiring that has cracked, cut, abraded or otherwise degraded insulation, or terminals that are worn, discolored or corroded. Keep all terminals and pressure connectors clean and tight.
- F. Keep grounded and/or conductive objects such as tools away from exposed live electrical parts such as terminals to avoid arcing which might serve as a source of ignition.
- G. Remove any acoustical material or other material that may be damaged by heat or that may support combustion and is in close proximity, prior to attempting weld repairs.
- H. Keep suitable fully charged Class BC or ABC fire extinguisher or extinguishers nearby when servicing and operating the compressor.
- I. Keep oily rags, trash, leaves, litter or other combustibles out of and away from the compressor.
- J. **DO NOT** operate the compressor without proper flow of cooling air or water or with inadequate flow of lubricant or with degraded lubricant.
- K. **DO NOT** attempt to operate the compressor in any classification of hazardous environment unless the compressor has been specially designed and manufactured for that duty.

1.5 MOVING PARTS

- A. Keep hands, arms and other parts of the body and clothing away from couplings, belts, pulleys, fans and other moving parts.
- B. **DO NOT** attempt to operate the compressor with the fan, coupling or other guards removed.

SECTION 1

- C. Wear snug-fitting clothing and confine long hair when working around this compressor, especially when exposed to hot or moving parts.
- D. Keep access doors, if any, closed except when making repairs or adjustments.
- E. Make sure all personnel are out of and/or clear of the compressor prior to attempting to start or operate it.
- F. Disconnect and lock out all power at source and verify at the compressor that all circuits are de-energized to minimize the possibility of accidental start-up, or operation, prior to attempting repairs or adjustments. This is especially important when compressors are remotely controlled.
- G. Keep hands, feet, floors, controls and walking surfaces clean and free of fluid, water or other liquids to minimize the possibility of slips and falls.

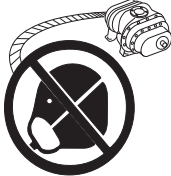
1.6 HOT SURFACES, SHARP EDGES AND SHARP CORNERS

- A. Avoid bodily contact with hot fluid, hot coolant, hot surfaces and sharp edges and corners.
- B. Keep all parts of the body away from all points of air discharge.
- C. Wear personal protective equipment including gloves and head covering when working in, on or around the compressor.
- D. Keep a first aid kit handy. Seek medical assistance promptly in case of injury. **DO NOT** ignore small cuts and burns as they may lead to infection

1.7 TOXIC AND IRRITATING SUBSTANCES

- A. **DO NOT** use air from this compressor for respiration (breathing) except in full compliance with OSHA Standards 29 CFR 1910 and/or any applicable Federal, State or Local codes or regulations.

 **DANGER**



Death or serious injury can result from inhaling compressed air without using proper safety equipment. See OSHA standards and/or any applicable Federal, State, and Local codes, standards and regulations on safety equipment.

- B. **DO NOT** use air line anti-icer systems in air lines supplying respirators or other breathing air utilization equipment and **DO NOT** discharge air from these systems into unventilated or other confined areas.
- C. Operate the compressor only in open or adequately ventilated areas.
- D. Locate the compressor or provide a remote inlet so that it is not likely to ingest exhaust fumes or other toxic, noxious or corrosive fumes or substances.
- E. Coolants and lubricants used in this compressor are typical of the industry. Care should be taken to avoid accidental ingestion and/or skin contact. In the event of ingestion, seek medical treatment promptly. Wash with soap and water in the event of skin contact. Consult Material Safety Data Sheet for information pertaining to fluid of fill.
- F. Wear goggles or a full face shield when adding antifreeze compound to air line anti-icer systems.
- G. If air line anti-icer system antifreeze compound enters the eyes or if fumes irritate the eyes, they should be washed with large quantities of clean water for fifteen minutes. A physician, preferably an eye specialist, should be contacted immediately.
- H. **DO NOT** store air line anti-icer system antifreeze compound in confined areas.
- I. The antifreeze compound used in air line anti-freeze systems contains methanol and is toxic, harmful or fatal if swallowed. Avoid contact with the skin or eyes and avoid breathing the fumes. If

swallowed, induce vomiting by administering a tablespoon of salt, in each glass of clean, warm water until vomit is clear, then administer two teaspoons of baking soda in a glass of clean water. Have patient lay down and cover eyes to exclude light. Call a physician immediately.

1.8 ELECTRICAL SHOCK

- A. This compressor should be installed and maintained in full compliance with all applicable Federal, State and Local codes, standards and regulations, including those of the National Electrical Code, and also including those relative to equipment grounding conductors, and only by personnel that are trained, qualified and delegated to do so.
- B. Keep all parts of the body and any hand-held tools or other conductive objects away from exposed live parts of electrical system. Maintain dry footing, stand on insulating surfaces and **DO NOT** contact any other portion of the compressor when making adjustments or repairs to exposed live parts of the electrical system. Make all such adjustments or repairs with one hand only, so as to minimize the possibility of creating a current path through the heart.
- C. Attempt repairs in clean, dry and well lighted and ventilated areas only.
- D. **DO NOT** leave the compressor unattended with open electrical enclosures. If necessary to do so, then disconnect, lock out and tag all power at source so others will not inadvertently restore power.
- E. Disconnect, lock out, and tag all power at source prior to attempting repairs or adjustments to rotating machinery and prior to handling any ungrounded conductors.



DANGER

All field equipment must be tested for electrostatic fields prior to servicing or making contact with the machine using the following or equivalent test equipment:

- **90-600 VAC: Volt detector such as Fluke Model 1AC-A**
- **600-7000 VAC: Voltage detector such as Fluke Networks Model C9970**

It is the responsibility of each organization to provide/arrange training for all their associates expected to test for electrostatic fields.

1.9 LIFTING

- A. If the compressor is provided with a lifting bail, then lift by the bail provided. If no bail is provided, then lift by sling. Compressors to be air-lifted by helicopter must not be supported by the lifting bail but by slings instead. In any event, lift and/or handle only in full compliance with OSHA standards 29 CFR 1910 subpart N and/or any applicable Federal, State, and Local codes, standards and regulations.
- B. Inspect points of attachment for cracked welds and for cracked, bent, corroded or otherwise degraded members and for loose bolts or nuts prior to lifting.
- C. Make sure entire lifting, rigging and supporting structure has been inspected, is in good condition and has a rated capacity of at least the weight of the compressor. If you are unsure of the weight, then weigh compressor before lifting.
- D. Make sure lifting hook has a functional safety latch or equivalent, and is fully engaged and latched on the bail or slings.
- E. Use guide ropes or equivalent to prevent twisting or swinging of the compressor once it has been lifted clear of the ground.
- F. **DO NOT** attempt to lift in high winds.
- G. Keep all personnel out from under and away from the compressor whenever it is suspended.
- H. Lift compressor no higher than necessary.

SECTION 1

- I. Keep lift operator in constant attendance whenever compressor is suspended.
- J. Set compressor down only on a level surface capable of safely supporting at least its weight and its loading unit.
- K. When moving the compressor by forklift truck, utilize fork pockets if provided. Otherwise, utilize pallet if provided. If neither fork pockets or pallet are provided, then make sure compressor is secure and well balanced on forks before attempting to raise or transport it any significant distance.
- L. Make sure forklift truck forks are fully engaged and tipped back prior to lifting or transporting the compressor.
- M. Forklift no higher than necessary to clear obstacles at floor level and transport and corner at minimum practical speeds.
- N. Make sure pallet-mounted compressors are firmly bolted or otherwise secured to the pallet prior to attempting to forklift or transport them. **NEVER** attempt to forklift a compressor that is not secured to its pallet, as uneven floors or sudden stops may cause the compressor to tumble off, possibly causing serious injury or property damage in the process.

1.10 ENTRAPMENT

- A. If the compressor enclosure, if any, is large enough to hold a man and if it is necessary to enter it to perform service adjustments, inform other personnel before doing so, or else secure and tag the access door in the open position to avoid the possibility of others closing and possibly latching the door with personnel inside.
- B. Make sure all personnel are out of compressor before closing and latching enclosure doors.

NOTES

Section 2

STARTUP PROCEDURES

2.1 INTRODUCTION

This compressor is equipped with a Controller for controlling the compressor system operation, setting the machine parameters and performing maintenance operations. The 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 Controller also contains features that enable sequential interface with other machines.

2.2 CONTROLLER PANEL LAYOUT

The Controller panel is shown in *Figure 2-1*. The controller panel consists of :

Display Screen for displaying machine status.

Start Pad ① —Large green pad button used to start the compressor operation.

Stop Pad ② —Large red key pad used to stop

the compressor operation.

Up Arrow Pad ▲ —Used to navigate “up” the list of display messages and to increase or change parameter values for adjustments.

Down Arrow Pad ▼ —Used to navigate “down” the list of display messages and to decrease or change parameter values for adjustments.

Return/Reset Pad ↩ —Angled arrow key pad used to return to upper menu when changing parameters. A long hold is used to clear fault messages.

Right Arrow Pad ► —Used to make selection in menu screen and to change digits when making changes to parameters.

Set Pad ③ —Used to save changes to parameters. The set pad is also used to manually load or unload the compressor during operation.

Each of the controller components and functions is described in detail in *Section 4*.

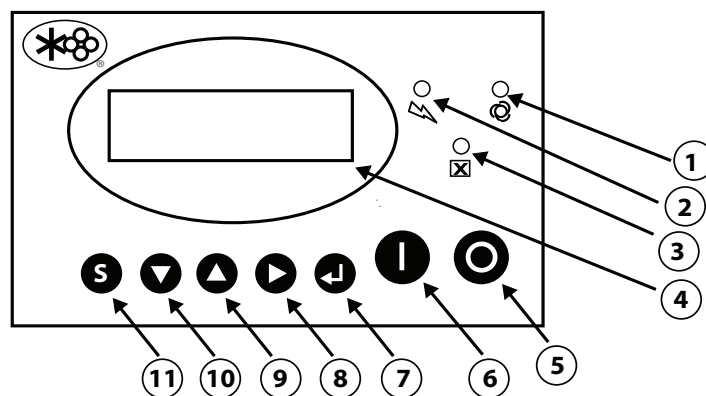


Figure 2-1: Controller Panel

- | | |
|--|----------------------------|
| 1. Run Mode Indicator Light (Green) | 7. Return/Reset Button |
| 2. Power On Indicator Light (Red) | 8. Cursor/Confirm Button |
| 3. Fault Warning Indicator Light (Red) | 9. Up Button |
| 4. Display Panel | 10. Down Button |
| 5. Stop Button | 11. Set/Load/Unload Button |
| 6. Start Button | |

2.3 START UP PROCEDURES

COMPRESSOR MOTOR ROTATION DIRECTION CHECK (AT INSTALLATION)

After the compressor has been installed and the electrical wiring is completed, perform following steps to verify the direction of the compressor motor rotation.

1. Pull out the EMERGENCY STOP button.
2. Press the START  pad and EMERGENCY STOP button in succession to “bump start” the compressor.
3. Observe the direction of rotation of the compressor motor shaft. Verify with Operators Manual for correct rotation.
4. Disconnect and lockout power according to lockout/tagout procedure.
5. If the motor shaft is not turning in the proper direction, disconnect the power to the starter and exchange any two of the three power input leads. Refer to the Compressor User’s Manual.
6. Perform above steps 1 - 3 again to confirm proper motor/compressor rotation

FAN MOTOR ROTATION CHECK (AT INSTALLATION)

Verify the correct fan rotation using the following steps:

1. With the compressor running, visually check that the fan rotation is correct.
2. If it is incorrect, change the direction of the fan motor by disconnecting power from the compressor.
3. Disconnect and lockout power according to lockout/tagout procedure.

4. Exchange any two of the three fan motor leads at the fan motor starter. Refer to the compressor User’s Manual.
5. Recheck the direction of the fan motor.

INITIAL START-UP AFTER INSTALLATION

Perform the following procedure at the initial start-up of the compressor following installation.

1. Verify that all preparations and checks necessary for proper installation have been made. Refer to the compressor User’s Manual.
2. Read the preceding pages of this manual thoroughly.
3. Slowly open the shut-off valve to the service line.
4. Press the START  pad to start the compressor. Compressor will begin operating in the default mode (Automatic) set at the factory.
5. Check for possible leaks in piping.
6. Slowly close the service line shut-off valve to verify nameplate pressure unload setting is correct. The compressor should unload when nameplate pressure is achieved. If adjustments are necessary, see *Compressor Adjustment Procedures* on page 17.
7. Observe the operating temperature. Refer to compressor Operator’s Manual for acceptable operating range. If temperature exceeds this range, check the cooling system and installation environment.
8. Open the shut-off valve to the service line.
9. After operating the machine for 24 hours, inspect the compressor for fluid leaks and proper operating temperature.

SUBSEQUENT START-UP PROCEDURE

1. On subsequent start-ups, check the fluid sight glass for proper fluid level. Service if necessary. See compressor User's Manual.
2. Press the START  pad on the display screen. The machine will prepare to start up in the last operating mode existing at shut-down. The current Machine mode will appear on the display screen.
3. If a different operating mode is desired, use the arrow pads to navigate to the Load Mode parameter. Press the  pad to change the mode. Navigate to the desired mode (Automatic or Manual). Press the  pad to accept and save the mode setting.
4. When the compressor is running, observe the display panel and maintenance indicators to ensure the values displayed are within the proper ranges.

2.4 SHUTDOWN PROCEDURE

Shut down the compressor by pressing the STOP

 pad on the Controller panel.

NOTE

The system may require a set amount of time to pass prior to restarting.

**WARNING**

The compressor may restart automatically after a power failure or after the E-Stop button has been reset.

NOTES

Section 3

ADJUSTMENTS

3.1 INTRODUCTION

This section describes steps for using the Controller to modify specific parameters that control the machine operation

Typically, the top line of the Controller Display Screen will display the operating mode; the bottom line will display the line pressure and compressor temperature. As the user presses the down navigation arrow, the screen will display various machine statistics. These values are not adjustable at the Controller. Navigating past the status screens, the screen will display "CUSTOMER SET" and "FACTORY SET". The "CUSTOMER SET" menu allows adjustment of control parameters. The "FACTORY SET" menu is set at the factory and not adjustable without the factory password.

Section 3.2 provides general steps to modifying the compressor control parameters. A description of each user modifiable parameter is provided in Section 3.3.

3.2 COMPRESSOR ADJUSTMENT PROCEDURES

The following steps are to be used to modify a control parameter:

1. Use UP ▲ arrow and DOWN ▼ arrow pad on the controller to navigate to select "CUSTOMER SET". This will be indicated by the text "CUSTOMER SET" appearing in **reverse** (negative) characters on the top line of the display. Press the RIGHT ► arrow pad to enter the menu.

2. Use the UP ▲ arrow or DOWN ▼ arrow pad to navigate to the parameter to be changed. Press the RIGHT ► arrow pad to select the parameter.
3. At this point, the controller will prompt for a password. This is the customer password and this can be changed within the "CUSTOMER SET" menu.

NOTE

Default customer password is 0607.

4. To enter the password use the UP ▲ arrow and DOWN ▼ arrow to change the digit value. Use the RIGHT ► arrow to move to the next digit.
5. After entering the final digit and pressing the  pad, the selected parameter will display. To change the parameter value, use the UP ▲ arrow and DOWN ▼ arrow to change the digit value. Use the RIGHT ► arrow to move to the next digit.
6. After all desired parameter changes have been made, press  pad to save changes.

7. Press ENTER  pad to return to the normal view.

NOTE

If during the adjustment process, the **START** , **STOP** , or **ENTER**  pad is pressed prior to pressing the  pad, the display will return to the **NORMAL** view and the parameter value will not be changed.

3.3 USER ADJUSTABLE CONTROL PARAMETERS

Listed below are descriptions of the parameter that can be adjusted at the Controller:

LOAD PRESS – Loading set point (psi, bar). When line pressure falls below this value, the machine will load. For example, if the load pressure is set to 125 psi, the machine will load when the line pressure goes below 125 psi. Refer to *Table 3-1:Default Pressure Settings*.

UNLOAD PRESS – Set point (psi, bar) at which the system pressure will begin unloading. For example if this parameter is set to 135 psi the machine will unload when the line pressure exceeds 135 psi. Refer to *Table 3-1:Default Pressure Settings*.

MTR START TIME – Determines length of time (sec) before start of main compressor motor. Must be longer than the STAR-DELTA (wye-delta) TIME plus LOAD DELAY TIME.

DRAIN/REMOTE – Used to select between drain control or to allow remote operation. When set as DRAIN, terminal no. 18 is the connector for drain control. When set as REMOTE and ON/OFF MODE is set as REMOTE, terminal no. 18 is for remote control indication.

STAR-DELTA TIME – Set time (sec) for star (wye) to delta starter transition. Disable by setting to zero (0), standard for full voltage start. Requires approximately 4-6 seconds for wye-delta starting.

LOAD DELAY TIME – Load delay time (sec) after wye delta transition or completed motor start.

UNLOAD RUN TIME – Set time (sec) that machine

will run unloaded in AUTO mode before shutting off.

STOP DELAY TIME – Set time (sec) that machine will continue to run after pressing the stop  button.

RESTART TIME – Set time (sec) that must pass after the machine is stopped before it can be restarted.

ON/OFF MODE – Used to specify LOCAL or REMOTE starting. When REMOTE mode is set, user must press local  button first before the remote control can start or stop the machine. If the machine is stopped by the local  button, the remote control will not be able to start the machine.

CLEAR OIL FILT – Reset time for oil filter maintenance. Set to “0000H” to reset.

CLEAR A-O SEP – Reset time for separator element maintenance. Set to “0000H” to reset.

CLEAR AIR FILT – Reset time for air filter maintenance. Set to “0000H” to reset.

CLEAR FLUID ALM – Reset time for fluid maintenance. Set to “0000H” to reset.

CLEAR GREASE AL – Reset time for grease maintenance. Set to “0000H” to reset.

OIL FILT CHANGE – Set value (hrs) to trigger alarm for oil filter maintenance. Set value to “0000” to disable the alarm.

A-O SEP CHANGE – Set value (hrs) to trigger alarm for separator element maintenance. Set value to “0000” to disable the alarm.

AIR FILT CHANGE – Set value (hrs) to trigger alarm for air filter maintenance. Set value to “0000” to disable the alarm.

FLUID CHANGE – Set value (hrs) to trigger alarm for fluid maintenance. Set value to “0000” to disable the alarm.

GREASE REQ – Set value (hrs) to trigger alarm for grease maintenance. Set value to “0000” to disable the alarm.

USER PASSWORD – Customer password setting.

COM MODE - Determines communication protocol. Set to DISABLE for no functionality. Set to SEQ for multiple machine sequencing. Set to PC to communicate with MODBUS protocol.

SEQUENCE STATE - Set to SLAVE or MASTER when operating in sequence mode with other

machines.

COM ADDRESS – Communication address.

SEQUENCE NO. – Number of compressors in sequencing network.

SEQ LOAD PRESS - Master machine load pressure set point (psi, bar) at which slave compressor is started. For example if set at 125 psi, when master machine pressure is less than 125 psi and SEQ DELAY time has passed, the master compressor will command a slave machine to start and load.

SEQ UNLOAD PRESS - Master machine unload pressure set point (psi, bar) at which slave compressor is commanded to unload or stop. For example, if set at 135 psi, when master machine pressure is greater than 135 psi and SEQ DELAY time has passed, the master compressor will command a slave machine to unload or stop.

SEQ DELAY - Set time (sec) that master machine allows to pass before sending a command to a slave machine to load or unload.

LANGUAGE SEL – Select ENGLISH, FRENCH, SPANISH or PORTUGUESE as controller display language.

POWER FREQ – Select incoming power frequency.

PHASE PROT – Select incoming power phase protection to be INACTIVE.

DRAIN OPEN – Set time (sec) for drain to remain energized. Machines are not shipped from the factory with solenoid drains. DRAIN must be selected from DRAIN/REMOTE parameter setting.

DRAIN CLOSE – Set interval (min) between activation of the drain cycle. Machines are not shipped from the factory with solenoid drains. DRAIN must be selected from DRAIN/REMOTE parameter setting.

TEMP UNITS – Displayed temperature units (°C/°F).

PRESSURE UNITS – Displayed pressure units (psi/bar).

Table 3-1: Default Pressure Settings

Factory Setting	Hz	Pressure Designation		Customer Set Values				Factory Set Values			
Pressure Selection				Load Press		Unload Press		Max. Unload		Shutdown Press	
		psig	bar	psig	bar	psig	bar	psig	bar	psig	bar
0.8 MPa	50	116	8.0	103	7.1	118	8.1	121	8.3	126	8.7
0.86 MPa	60	125	8.6	112	7.7	127	8.8	130	9.0	135	9.3
1.0 MPa	50	145	10.0	132	9.1	147	10.1	150	10.3	155	10.7
1.03 MPa	60	150	10.3	137	9.4	152	10.5	155	10.7	160	11.0
1.2 MPa	60	175	12.0	161	11.1	176	12.1	179	12.3	184	12.7
1.3 MPa	50	188	13.0	176	12.1	191	13.2	195	13.4	199	13.7

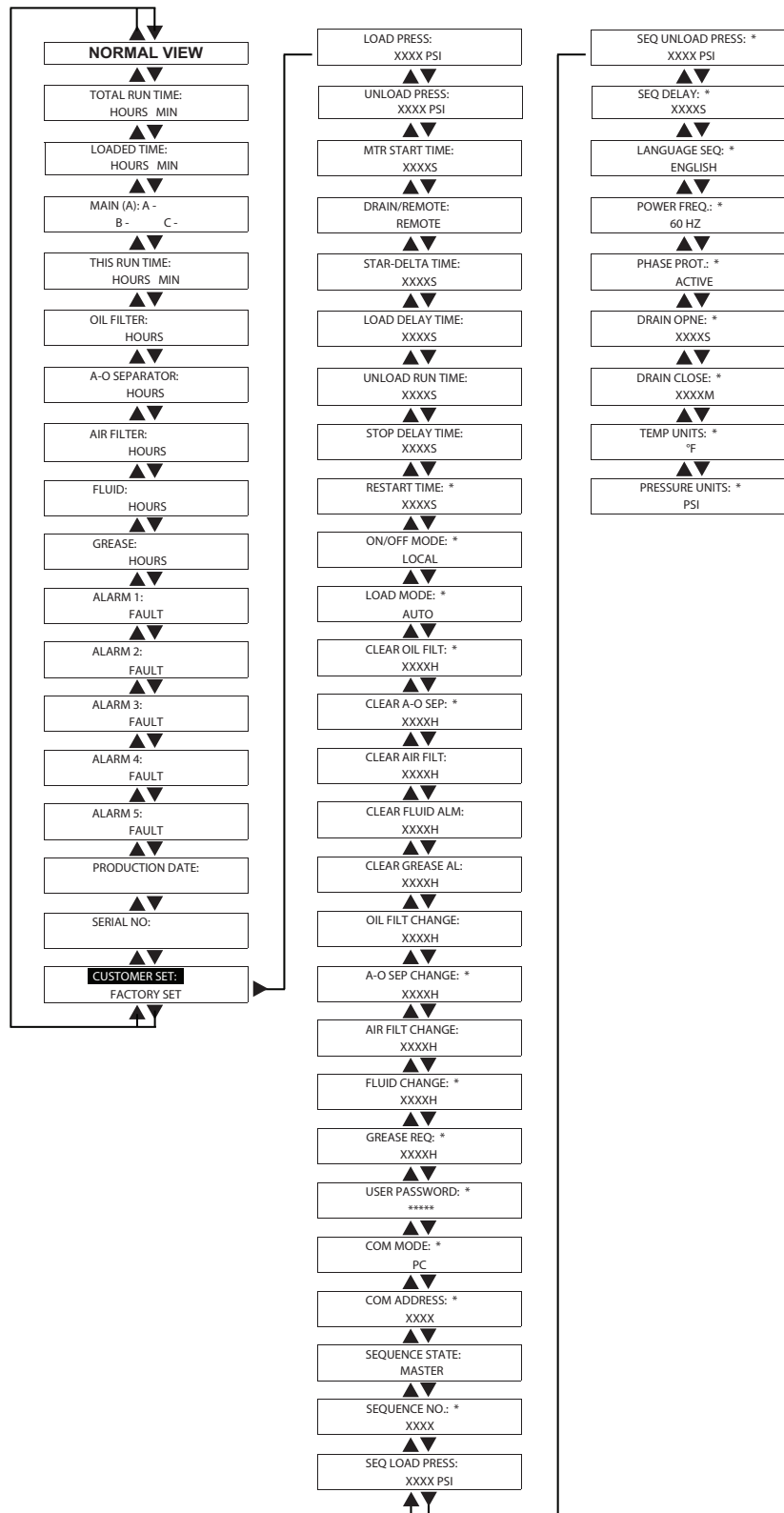


Figure 3-1: Controller Display Flow Diagram

3.4 REMOTE UNLOAD

The machine may be configured to allow user-furnished external remote control. This may be wired to a remote switch, timer, or other controls to halt operation of the compressor as desired. To enable remote control of the compressor:

1. Wire the remote contact to terminal 6 and terminal 10.
2. Change ON/OFF Mode to REMOTE. The local  button must be pressed to enable remote control.
3. Once enabled, the controller will respond to the wired input.
 - If the contact is open, the compressor unloads and stops delivering air to the system. If the operating mode is AUTOMATIC, the compressor will stop after running unloaded for the period set in the UNLOAD RUN TIME setting. When operating in a group of sequenced compressors, this removes only this compressor for service.
 - If the contact is closed, the compressor operates normally.

3.5 DRAIN CONTROL

Shoptek compressors are not equipped with condensate drain valves however the Controller does have capability to control a solenoid type drain valve.

To enable drain control:

1. Access "CUSTOMER SET" menu and select the DRAIN/REMOTE parameter. Change parameter to DRAIN.
2. Set the amount of time to energize the drain solenoid. This is accomplished by the DRAIN OPEN parameter in the "CUSTOMER SET" menu.
3. Set the interval between activation of the drain cycle. This is accomplished by the DRAIN CLOSE parameter in the "CUSTOMER SET" menu.
4. Connect drain solenoid valve to terminals 18 and 10.

NOTES

Section 4

DESCRIPTION

4.1 INTRODUCTION

This section describes the components of the Controller, the function of each component, and the various types of displays that may appear on the display screen. Descriptive lists of all messages appearing in the display are also provided.

4.2 TOUCH PAD BUTTON DESCRIPTION

The controller panel has seven touch pads that allow the operator control of the compressor and enable adjustment of the machine operating parameters. Each touch pad and its functions are described below:

Start Pad  —Large green pad button used to start the compressor operation.

Stop Pad  —Large red key pad used to stop the compressor operation.

Up Arrow Pad  —Used to navigate “up” the list of display messages and to increase or change parameter values for adjustments.

Down Arrow Pad  —Used to navigate “down” the list of display messages and to decrease or change parameter values for adjustments.

Return/Reset Pad  —Angled arrow key pad used to return to upper menu when changing parameters. A long hold is used to clear fault messages.

Right Arrow Pad  —Used to make selection in menu screen and to change digits when making changes to parameters.

Set Pad  —Used to save changes to parameters. The set pad is also used to manually load or unload the compressor during operation.

4.3 INDICATOR LED DESCRIPTION

Three LED's on the controller panel provide indication of the general state of the machine.

Power On Indicator  (RED LED)—Lights whenever power is applied to the controller.

Automatic or Manual Run Mode Indicator  (GREEN LED)—Lights when the compressor operation is set to start and run automatically. This LED lights steadily when the motor is running.

Fault Warning Indicator  (RED LED)—Lights when a compressor fault has occurred. The indicator will remain lit and the compressor will remain inoperative until the fault condition is remedied. The controller display screen will indicate STOP and a brief description of the cause of the fault. Refer to *Section 5: Troubleshooting* on page 29 to resolve fault conditions.

4.4 DISPLAY SCREEN

Information relevant to the compressor operation is presented in three views on the controller display screen: Normal View, Main Status Views, Customer Set Views.

In addition to the standard views, two information screens are displayed when power is first supplied to the compressor. Refer to *Figure 4-1*. The first screen shows “SULLAIR” along with the serial number of the compressor. Refer to *Figure 4-2*. The second screen shows the total operation time of the compressor along with the controller software revision level and date of manufacture. Each of these screens will display for 3 seconds before the Normal View is displayed.

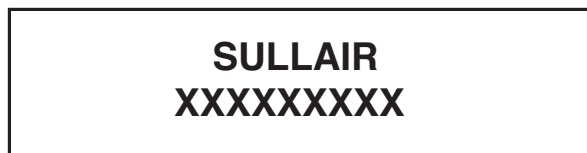


Figure 4-1: Information Screen 1

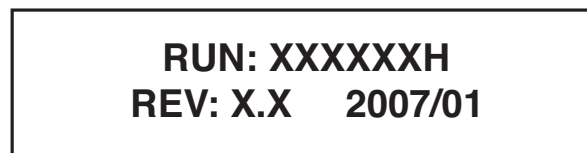


Figure 4-2: Information Screen 2

NORMAL VIEW

The Normal View is the default view for the display screen. When in Normal View, information regarding the compressor current operating conditions appears on the display screen. See *Figure 4-3*.

The top line of the display screen in Normal View shows the current compressor operating mode and state. The lower line of the Display Screen displays the discharge pressure and the internal temperature of the compressor package.



Figure 4-3: Display Screen Normal View Example

The Display Screen will also display fault conditions when they occur.

MAIN STATUS VIEW

The Main Status View shows real-time machine measurement information.

This information is quickly accessed using the Down navigational arrow. The top line of the display screen will indicate the measurement. See *Figure 4-4*. The second line will show the current value of the measurement being viewed.

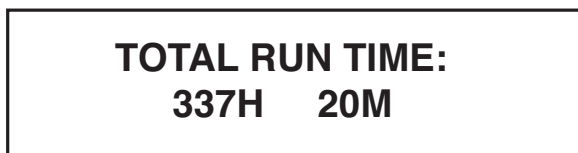


Figure 4-4: Display Screen Main Status View Example

Listed below are compressor attributes that may be viewed in the Main Status View.

TOTAL RUN TIME – Displays the total time the compressor has been running loaded or unloaded.

LOADED TIME – Displays the total time the compressor has been running loaded.

MAIN (A) - Feature not available.

THIS RUN TIME – Displays the total time the compressor has been running loaded or unloaded since the most recent startup.

THIS LOADING – Displays the total time the compressor has been running loaded since the most recent startup.

OIL FILTER – Displays the total time on the oil filter since the last service.

A-O SEPARATOR - Displays the total time on the separator element since the last service.

AIR FILTER – Displays the total time on the air filter

since the last service.

FLUID – Displays the total time on the fluid since the last service.

GREASE – Displays the total time on the grease since the last service.

ALARM1, ALARM2, ALARM3, ALARM4, ALARM5 – Displays past alarms or faults. Displays the description along with the number of hours on machine when the alarm or fault occurred.

PRODUCTION DATE – Displays production date of compressor.

SERIAL NO. – Displays serial number of machine.

CUSTOMER SET VIEW – CONTROL PARAMETERS

The Customer Set View shows current machine parameters which are conditions and limits that can be modified by the operator. This view is accessed using the navigational arrows and is indicated by the text “CUSTOMER SET” appearing on the first line of the display screen. The second line of the display screen indicates “FACTORY SET”. These are factory settings which cannot be changed by the end user without the factory password. Press the Right

▶ arrow pad when “CUSTOMER SET” appears as reverse characters on the display screen. From here, the parameters are displayed and can be changed. Refer to *Section 3: Adjustments* for instructions on changing the compressor control parameters and a list of the control parameters that can be modified by the user.



Figure 4-5: Accessing Customer Set View

4.5 OPERATING MODES

The Operating Mode is the manner in which the machine operation is being controlled.

There are four Operating Modes: AUTOMATIC, MANUAL, STOP, and FAULT. The active operating mode of the compressor appears on the upper line of the display screen's Normal View. See *Figure 4-6*.



Figure 4-6: Compressor Operating Mode Display

The compressor operating modes are described below:

Automatic mode - Indicated by the word AUTO appearing in the upper line of the display window. This is a user selected mode that sets the compressor motor to automatically start when conditions necessitate and stop when motor operation not required.

Manual Mode - Indicated by the word MANUAL appearing in the upper line of the display window. This is a user selected mode that allows the operator to manually control the compressor motor operation.

When the START ① pad is pressed while in Manual Mode the compressor motor will run continuously until the STOP ② pad is pressed. The compressor and all other machine parameters function the same in both Manual and Automatic modes.

Stop mode - Indicated by the word STOP ③ appearing in the upper line of the display window. This mode indicates that the compressor and motor have been turned off under normal conditions. When in this mode the machine will not operate until the START pad is pressed. If the machine is stopped due to the E-Stop button being pressed, this is indicated by the word E-STOP appearing in the upper line of the display window.

Fault mode - Indicated by the word STOP appearing in the upper line of the display window along with a fault code on the lower line. This mode indicates that a machine problem has occurred causing the controller to shut down the machine until the condition is cleared. After a fault condition has been resolved, the fault indication can be cleared from the controller by pressing and holding the Return/Reset

⏮ pad. Refer to *Section 5: Troubleshooting*, for information on resolving fault conditions.

4.6 OPERATING STATES

Operating States describe the state of the compressor operation in response to the current mode and current conditions. Essentially, the operating state is what the machine is doing at a particular moment. Most operating states occur automatically as normal functions of the compressor and require no direct action from the operator. Text descriptions of operating states appear on the upper line of the display screen while in Normal View. See *Figure 4-7*.

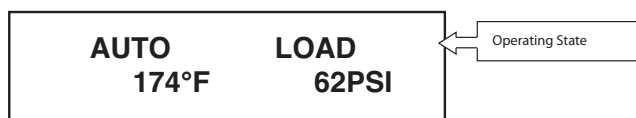


Figure 4-7: Controller Display Normal View: Operating State

The list below provides an explanation of each Operating State message that may appear in the Normal View display. Some operating states occur instantaneously and may not be seen by the operator. Additionally, upon startup the controller serial number, revision level, and production date are quickly displayed.

STOPPING - Displayed as the compressor is being stopped. A timer is also displayed which counts down the delay from when the (O) button is pressed and the compressor stops. This delay is set with 'STOP DELAY TIME' in the "CUSTOMER SET" menu.

STOP – Displayed after the compressor is stopped. A timer is also displayed which counts down the time until the motor can be restarted. This time is set with "RESTART TIME" in the "CUSTOMER SET" menu.

REMOTE STOP - Displayed when the compressor operation is stopped but is armed to restart. The machine will start when the remote start contact is close.

STANDBY - Displayed when the compressor is stopped and waiting for proper conditions before restarting.

STOP: (FAULT) - Displayed as a fault condition is occurring.

Y START - Displayed as compressor initiates startup processes. A timer is also displayed which counts down the start time. This time is set with "STAR-DELTA TIME" in the "CUSTOMER SET" menu.

RUN MODE – Displayed after the motor is started and before delivering air. A timer is displayed which counts down the time between starting of the motor and de-energizing of the unload solenoid. This time is set with "LOAD DELAY TIME" in the "CUSTOMER SET" menu.

LOAD - Displayed as the compressor begins delivering air.

U.L. - Displayed as the compressor is being unloaded automatically.

REMOTE U.L. - Displayed as the compressor is being unloaded remotely.

4.7 NORMAL VIEW SERVICE REMINDERS

Service reminders may appear in the Normal View display. See *Figure 4-8*.

When service is due, the display will alternate between the operating state display shown in *Figure 4-7* and the alarm display shown in *Figure 4-8*. The upper line will indicate the service to be performed and the bottom line will display the time it became due. When a service reminder appears, the machine will continue to operate normally, however, the appropriate service should be scheduled and accomplished within a short period of time.



Figure 4-8: Controller Display Normal View: Service Reminder

The list below provides an explanation of the Service Reminders that may appear in the Normal View display. Refer to *Section 5: Troubleshooting*, for additional instructions on actions to be taken when a service reminder appears.

OIL FILTER ALM - The compressor fluid filter should be changed within the time frame noted in the machine operation specifications.

A-O SEPARATOR - The compressor fluid separator should be changed within the time frame noted in the machine operation specifications.

AIR FILTER ALM - The compressor air filter should be changed within the time frame noted in the

machine operation specifications.

FLUID CHANGE - The compressor fluid should be changed within the time frame noted in the machine operation specifications.

GREASE CHANGE - The grease should be changed within the time frame noted in the machine operation specifications.

4.8 NORMAL VIEW WARNING MESSAGE

A warning message for high discharge temperature may appear in the Normal View display. This warning message is displayed if the compressor discharge temperature exceeds 225°F (107°C). See *Figure 4-9*. When this warning message appears, the display will alternate between the operating state shown in *Figure 4-7* and the warning message shown in *Figure 4-9*. While the compressor can continue to operate at this high temperature, measures should be taken to correct this operating condition. This can be an indication of other issues that could lead to machine shut down due to high operating temperatures. Refer to *Section 5: Troubleshooting* for additional instructions and actions to be taken.



Figure 4-9: Controller Display Normal View: Warning Message

4.9 FAULT MESSAGES

When a Fault condition occurs, the machine will shut down and the display will indicate STOP on the upper line of the display window and a fault code on the lower line of the Normal View display. See *Figure 4-10*.



Figure 4-10: Controller Display Normal View: Fault Message

The list below provides an explanation of the Fault Messages that may appear when problems occur. Refer to *Section 5: Troubleshooting*, for instructions on actions to be taken when a fault condition occurs.

HIGH DISCH TEMP – The compressor discharge temperature has exceeded the set limit.

PR XDCR FAULT – The pressure transducer has failed or a connection has become loose.

RTD FAULT – The temperature sensor has failed or a connection has become loose.

HIGH PRESSURE – The compressor operating pressure has exceeded the set limit. Refer to *Table 3-1: Default Pressure Settings* on page 19 for shutdown pressure values.

MOTOR OVERLOAD – The motor overload relay has been tripped due to a power overload in the motor.

PHASE ERROR – Feature not available.

MTR PHASE LOSS – Feature not available.

MOTOR LOCKED – Feature not available.

MOTOR SHORT – Feature not available.

NOTES

Section 5

TROUBLESHOOTING

5.1 TROUBLESHOOTING INTRODUCTION

This Troubleshooting section is provided as a guide to aid in diagnosing and resolving compressor problems when they occur. The information contained in *Table 5-1: Troubleshooting Guide*, 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. DO NOT assume that these are the only problems that may occur.

This document cannot address every possible adverse condition that may occur 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:

- a. Check for loose wiring.
- b. Check for damaged piping.

- c. 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 Corporation factory Service Department.

NOTE

Section 5.2 and Section 5.3 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's operator's manual.

5.2 TROUBLESHOOTING GUIDE

Table 5.1 contains symptoms and usual 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. DO NOT assume that these are the only troubles that may occur.

Table 5-1: Controller Troubleshooting Guide

MESSAGE	PROBABLE CAUSE	REMEDY
MOTOR OVERLOAD	Motor overload relay tripped.	Reset overload after heater element cools. Verify correct motor amps.
		Check that compressor is properly configured.
		Ensure load pressure is set below limit of compressor.
		Check for loose connections.
		Check motor starter contact for proper operation.
		Check line voltage, if low consult power company.

Table 5-1: Controller Troubleshooting Guide

MESSAGE	PROBABLE CAUSE	REMEDY
OIL FILTER ALM A-O SEPARATOR AIR FILTER ALM FLUID CHANGE GREASE CHANGE	Service interval has expired. Maintenance due.	Perform recommended maintenance and reset the reminder in the controller.
E-STOP	E-Stop button active.	Release button.
	Faulty E-Stop button.	Check wiring.
		Replace button if necessary.
HIGH PRESSURE	Faulty pressure sensor.	Check and replace pressure sensor if defective.
	High pressure.	Check operation of valves and controls.
	Faulty unload solenoid valve.	Check solenoid valve operation and wiring.
HIGH DISCH TEMP	High ambient temperature, above 105°F (40°C).	Improve ventilation.
	Fluid level low.	Replenish fluid to proper level.
	Thermal valve fault.	Check thermal valve operation.
	Cooler fins dirty.	Clean cooler and fan blades.
	Temp sensor failure.	Check sensor and wiring, replace if necessary.
PR XDCR FAULT	Loose connection	Check connections, repair if needed.
	Faulty pressure sensor.	Check and replace if defective.
RTD FAULT	Loose connection	Check connections, repair if needed.
	Faulty temp sensor.	Check and replace if defective.
PHASE ERROR	Phase imbalance of incoming power.	Phase protection feature not available. Set PHASE PROT to INACTIVE. See <i>Section 3: Adjustments</i> .
MTR PHASE LOSS	Loss of one phase to motor.	Phase protection feature not available. Set PHASE PROT to INACTIVE. See <i>Section 3: Adjustments</i> .

5.3 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 ENTER  pad 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.

The controller will not resume normal operation after a power interruption. To resume operation in Automatic or Manual mode, the START  pad must be pressed.



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