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Contact-Cooled Rotary Screw Air Compressor

UP5S 11, UP5S 15, UP5S 18, UP5S 22

UP6S 15, UP6S 20, UP6S 25, UP6S 30

Installation, Operation and Maintenance

EN Installation, Operation and Maintenance



Save These Instructions



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FOREWORD

The contents of this manual are considered to be proprietary and confidential to **Ingersoll Rand** and should not be reproduced without the prior written permission of **Ingersoll Rand**.

Nothing contained in this document is intended to extend any promise, warranty or representation, expressed or implied, regarding the **Ingersoll Rand** products described herein. Any such warranties or other terms and conditions of sale of products shall be in accordance with the standard terms and conditions of sale for such products, which are available upon request.

This manual contains instructions and technical data to cover routine operation and scheduled maintenance tasks by operation and maintenance staff. Major overhauls are outside the scope of this manual and should be referred to an authorized **Ingersoll Rand** service department.

All components, accessories, pipes and connectors added to the compressed air system should be:

- of good quality, procured from reputable manufacturer and, wherever possible, be of a type approved by **Ingersoll Rand**.
- clearly rated for a pressure at least equal to the machine maximum allowable working pressure.
- compatible with the compressor lubricant/coolant.
- accompanied with instructions for safe installation, operation and maintenance.

Details of approved equipment are available from **Ingersoll Rand** Service departments.

The use of non-genuine spare repair parts other than those included within the **Ingersoll Rand** approved partslist may create hazardous conditions over which **Ingersoll Rand** has no control. Therefore **Ingersoll Rand** does not accept any liability for losses caused by equipment in which non-approved repair parts are installed. Standard warranty conditions may be affected.

Ingersoll Rand reserves the right to make changes and improvements to products without notice and without incurring any obligation to make such changes or add such improvements to products sold previously.

The intended uses of this machine are outlined below and examples of unapproved usage are also given, however **Ingersoll Rand** cannot anticipate every application or work situation that may arise.

IF IN DOUBT CONSULT SUPERVISION.

This machine has been designed and supplied for use only in the following specified conditions and applications:

- Compression of normal ambient air containing no known or detectable additional gases, vapors or particles.
- Operation within the ambient temperature range specified in the Product specification sheet.

The use of the machine in any of the situation types listed in Table 1:

- Is not approved by Ingersoll Rand,**
- May impair the safety of users and other persons, and**
- May prejudice any claims made against Ingersoll Rand.**

TABLE 1

Use of the machine to produce compressed air for:

- direct human consumption
- indirect human consumption, without suitable filtration and purity checks.

Use of the machine outside the ambient temperature range specified in the Product specification sheet.

Use of the machine where there is any actual or foreseeable risk of hazardous levels of flammable gases or vapors.

THIS MACHINE IS NOT INTENDED AND MUST NOT BE USED IN POTENTIALLY EXPLOSIVE ATMOSPHERES, INCLUDING SITUATIONS WHERE FLAMMABLE GASES OR VAPORS MAY BE PRESENT.

Use of the machine fitted with non **Ingersoll Rand** approved components.

Use of the machine with safety or control components missing or disabled.

The company accepts no responsibility for errors in translation of this manual from the original English version.

SAFETY

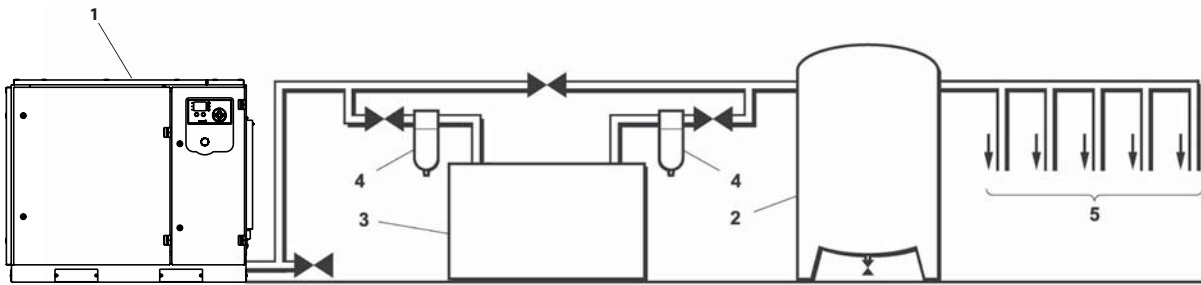
Locate, read, understand and follow all Danger, Warning, Caution, and Operating Instructions on the product and in all Manuals. Failure to comply with safety precautions described in the manuals supplied with the product, this manual or any of the labels and tags attached to the product may result in death, serious injury or property damage.

Check that all labels, tags and data (name) plates are in place and legible.

It is your responsibility to make this information available to others.

If you have any questions about safety or procedures not included in this manual, ask your supervisor or contact any **Ingersoll Rand** office or qualified **Ingersoll Rand** distributor.

INSTALLATION / HANDLING



T5750
Revision 02
07/04

KEY

- 1 Compressor
- 2 Air Receiver
- 3 Air Dryer
- 4 Compressed air filters
- 5 System demand points

NOTICE

Items [2] to [5] are optional or may be existing items of plant. Refer to your Ingersoll Rand distributor / representative for specific recommendations.

■ LOCATION IN THE PLANT

The compressor can be installed on any level floor capable of supporting it. A dry, well ventilated area where the atmosphere is clean is recommended. A minimum of 150 mm (6 inches) should be left at the rear and 1 m (3 ft) at the sides of the machine for adequate service access and ventilation.

Adequate clearance needs to be allowed around and above the machine to permit safe access for specified maintenance tasks.

Ensure that the machine is positioned securely and on a stable foundation. Any risk of movement should be removed by suitable means, especially to avoid strain on any rigid discharge piping.

NOTICE

The Main Motor Overload Current set point is preset into the compressor controller program before leaving the factory and is not user adjustable. If this is required to be changed, due to an input voltage conversion, contact your local Ingersoll Rand service provider.

⚠ CAUTION

Screw type compressors [1] should not be installed in air systems with reciprocating compressors without means of isolation such as a common receiver tank. It is recommended that both types of compressor be piped to a common receiver using individual air lines.

⚠ CAUTION

The use of plastic bowls on line filters and other plastic air line components can be hazardous. Their safety can be affected by either synthetic coolants or the additives used in mineral oils. Ingersoll Rand recommends that only filters with metal bowls should be used on any pressurised system.

⚠ CAUTION

Before starting machine remove shipping bolt and discard.

⚠ CAUTION

The standard compressor unit is not suitable for operation in temperatures liable to cause freezing as condensate water is liable to be produced in the after cooler and receiver where fitted.

Refer to your Ingersoll Rand distributor for further information.

■ DISCHARGE PIPING

Discharge piping should be at least as large as the discharge connection of the compressor. All piping and fittings should be suitably rated for the discharge pressure.

INSTALLATION / HANDLING

It is essential when installing a new compressor [1], to review the total air system. This is to ensure a safe and effective total system. One item which should be considered is liquid carryover. Installation of air dryers [3] is always good practice since properly selected and installed they can reduce any liquid carry over to zero.

It is good practice to locate an isolation valve close to the compressor and to install line filters [4].

OPERATING INSTRUCTIONS

■ GENERAL OPERATION

The compressor is an electric motor driven, single stage screw compressor, complete with accessories piped, wired and baseplate mounted. It is a totally self contained air compressor package.

The standard compressor is designed to operate in an ambient range of 35.6 °F – 104 °F (2 °C to 40 °C) with a special option package available to operate in ambient temperatures ranges from 35.6 °F up to 124 °F (2 °C up to 50 °C). The maximum temperature is applicable to either version up to a maximum elevation of 3280 ft (1000 m) above sea level. Above this altitude significant reduction in maximum allowable ambient temperature is required.

Compression in the screw type air compressor is created by the meshing of two (male & female) helical rotors.

The air/coolant mixture discharges from the compressor into the separation system. This system removes all but a few PPM of the coolant from the discharge air. The coolant is returned to the cooling system and the air passes through the aftercooler and out of the compressor.

Cooling air is moved through the coolers by the cooling fan and discharged from the machine.

CAUTION

Cooling air is drawn in at the end of the machine package passing through the filter and cooler before being discharged from the top of the machine. Care should be taken to avoid blocking the airflow, or causing any restriction in excess of the maximum backpressure allowed for ducting. Do not direct the airflow at face or eyes.

The power transmission from the drive motor to the airend male rotor is by pulley and belts. The constant auto tensioning system, using airend mass torque and gas arm, ensures that the belts are always under the correct tension, eliminating the need for adjustment and maximizing the life of the belts.

By cooling the discharge air, much of the water vapor naturally contained in the air is condensed and may be drained from the downstream piping and equipment.

The coolant system consists of a sump, cooler, thermostatic valve and a filter. When the unit is operating, the coolant is pressurized and forced to the compressor bearings. The compressor load control system is automatic on-off line.

The compressor will operate to maintain a set discharge line pressure and is provided with an auto restart system for use in plants where the air demand varies sufficiently to allow a compressor to shut down and save power. Significant system volume will assist this and is recommended.

NOTICE

Not all Xe-70 Controller options available on this compressor model (UP Series).

WARNING

When the unit stops running as the result of low air demand, normally indicated by auto restart light, it may restart and return to load at any time.

Safety of operation is provided as the compressor will shut down if excessive temperatures or electrical overload conditions should occur.

CAUTION

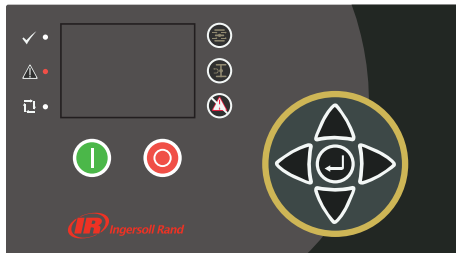
This unit is not designed or intended to operate when contaminated with silicone. Lubricants, greases or other items containing silicone should not be used on this unit.

OPERATING INSTRUCTIONS (XE-70M CONTROLLER)

■ USER INTERFACE

The standard user interface configuration of the controller consists of the membrane and the LCD display. The membrane consists of five command keys (Start, Stop, Load, Unload, and Reset), four navigation keys (Up, Right, Left and Down), and an Edit mode selection key (Enter). These keys, in conjunction with the graphics display and the LED icons, make up the user interface to the compressor.

Figure 1: Xe-70M



■ LED STATUS ICONS

Three LED icons are used to indicate the current status of the control system from a distance and are located on the upper left side of the user interface.

Table 1: Xe-70M LED Status Icons

Icon	Name	Function
	OK	Illuminates when no Warnings or Trips are sensed. Can be in a Ready or Not Ready state. This icon will flash when the machine is Running Unloaded.
	Alert	Illuminates when a Warning (flashes) or Trip (constant ON) is sensed. Can be in a Ready (Warning) or Tripped state.
	Auto	Illuminates when the compressor stops in auto restart.

■ COMMAND KEYS

These keys command the controller to perform actions as specified in the following table. When any of these keys are pressed the action below will be initiated and logged in the event log.

Table 2: Xe-70M Command Keys

Icon	Name	Function
	Load	Puts the compressor into the selected mode of operation. Unit will load if the pressure conditions are right.
	Unload	Puts the compressor into an unloaded state. Unit will run unloaded indefinitely.

Icon	Name	Function
	Reset	Clears Warnings and Trips once the fault condition is corrected.
	Start	Starts the compressor.
	Stop	Stops the compressor. This button should be pressed instead of the Emergency Stop for normal stopping operation.
	Enter	Toggles the display between the Navigation mode and the Edit mode.

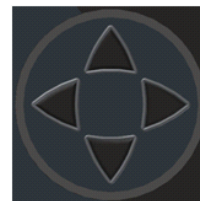
NOTICE

The Load and Unload keys are not used on the variable speed compressors.

■ NAVIGATION KEYS

There are four navigation keys (UP, RIGHT, DOWN and LEFT). While the ENTER key is not considered a navigation key, it is used in conjunction with the navigation keys to make or confirm a selection.

Figure 2 : Navigation Keys



The navigation keys roll over. Pressing one of the navigation keys will lead the user down a navigation path. Each time the key is pressed, another step in the path is taken. Once the end of a navigation path is reached, pressing the key one more time will bring the user back to the beginning of the path. Pressing the opposite key will move the user through the navigation path in the opposite direction. Once the beginning is reached, pressing the opposite key will take the user to the end of the path.

■ DISPLAY LAYOUT

Figure 3 : Display Layout

	A
	B
	C
	D

OPERATING INSTRUCTIONS (XE-70M CONTROLLER)










Table 3 : Display Layout

Key	Name	Description
A	Folder Bar	Uses tabs to graphically identify each folder.
B	Title Bar	Identifies current folder and page (underlined).
C	Page Content	Content of the current page.
D	Dashboard	Displays system status.

■ FOLDER NAVIGATION AND ICONS

To move among the tabbed folders shown on the LCD display, press the RIGHT and LEFT keys. The navigation rolls over from the last to the first folder and vice-versa.




Table 4 : Folder Bar Icons

Folder Name	Icon	Description
Home		System performance and status main information. The first page of this folder is the default page when the controller first powers up.
Operator Settings		System options and configuration settings.
Events		System events log.
Trip History		Details on the most recent trips.
Maintenance		Status and notification setup for compressor maintenance items.
General Settings		General settings such as Language, Time, and Units of Measure.
Integral Sequencing		Integral Sequencing communication status and configuration.
Status		Measurements or status from/of all analog and digital I/O.
Factory Settings		Compressor tuning parameters. Also displays hardware and software versions.

■ PAGE NAVIGATION

Once the desired folder is selected, press the DOWN key to move to the page selection area and then use the RIGHT and LEFT keys to select the desired page. Use the UP key to get back to the folder tabs.

Table 5 : Title Bar Page Icons

Icon	Description
	Start of the page selection area.
	Indicates that there are more pages available by navigating right.
	Indicates that there are more pages available by navigating left.

■ ACCESSING PARAMETERS

After the desired page is selected, the page's parameters can be selected by using the DOWN key. The cursor will move to the next parameter each time the DOWN key is pressed. Use the UP key to go back to the previous one.

The cursor rolls over, so once the last parameter is selected, pressing the DOWN key will navigate the cursor to the Folder Bar. If the first parameter is selected, pressing the UP key will move the cursor to the page selection area.

Once selected, access parameters by pressing the ENTER key. Make changes using the NAVIGATION keys and then enter the setting by pressing the ENTER key again. After a parameter is accessed, pressing the ENTER key will enter the current setting into the control program and navigate the cursor back to the selected parameter on the page.

When the cursor is on a parameter that has an enabled/disabled box, pressing the ENTER key will cause the setting to toggle.


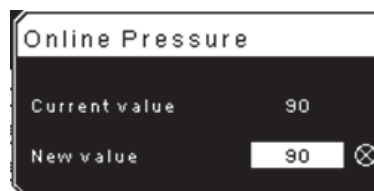
This icon  appears on numeric entry windows (see Figure 69). Placing the cursor on it and then pressing the ENTER key will cancel the entry and any changes that were made.

Figure 4 : Numeric Entry Window



NOTICE





Not all pages have adjustable parameters. Some just have read-only information.

■ DASHBOARD ICONS

The dashboard is intended to be a quick at-a-glance view of system status. The following table lists standard dashboard icons and their definition. Note that the color of these icons changes based on the state set by the application while running.

OPERATING INSTRUCTIONS (XE-70M CONTROLLER)

Table 6 : Dashboard Icons

Name	Icon	Description
Remote Control		Remote control is enabled. This can be Remote Start/Stop, COM Control, Integral Sequencing or Web Control.
Service Required		A service reminder is nearing or has expired (i.e.: an air or oil filter needs to be changed).
Unloaded or Loaded		Compressor is in the unloaded state.
		Compressor is in the loaded state.

■ DASHBOARD STATUS MESSAGES

The dashboard also displays the current operating state of the compressor. The following states can be encountered during machine operation:

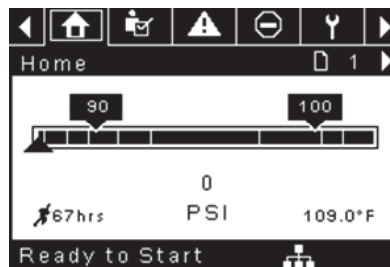
- **Ready to Start** – The compressor currently has no trip or start inhibit conditions present. The machine can be started by pressing the start button at any time.
- **Starting** – A start command has been given to the compressor and the start sequence is being performed. The time period for this state can vary depending on the starter type of the machine.
- **Load Delay** – The compressor is waiting for a small period of time after starting before allowing the machine to load. This ensures the machine is at operating conditions before loading.
- **Running Loaded** – The compressor is operating and producing air. The inlet valve is open and the blow-off valve is closed.
- **Running Unloaded** – The compressor is operating, but not producing air. The inlet valve is closed and the blow-off valve is open.
- **Reload Delay** – This is a brief period of time after the compressor has unloaded before it is allowed to load again. This gives the inlet and bypass valves time to reach their proper positions.
- **Auto-Restart** – The compressor has stopped due to pressure rising above the offline or auto-stop setpoints and auto-restart being enabled. The compressor will automatically restart when pressure falls to the online or target pressure setpoint.
- **Stopping** – The compressor has received a stop command and the stop sequence is being performed.
- **Blowdown** – The compressor must wait for a brief period of time after stopping its motor before it is allowed to start again. The compressor will restart at the end of the blowdown period if a start command is received during blowdown.
- **Not Ready** – The compressor has detected a condition that will not allow the compressor to start. The condition must be cleared before a start is allowed, but does not need to be acknowledged.
- **Tripped** – The compressor has detected an abnormal operational condition that has stopped the machine. A trip must be acknowledged by hitting the reset button before the compressor can start.
- **Processor Init** – The controller is being initialized.

■ FIXED SPEED COMPRESSOR

■ HOME FOLDER

Page 1: System Overview

Figure 5 : Home Folder



This is the factory default display after powering up the system.

- **Online Pressure Setpoint** - indicated in the black box and arrow, which is always left of center on the gauge. The compressor will load when package discharge pressure falls below this value.
- **Offline Pressure Setpoint** - indicated in the black box and arrow, which is always right of center on the gauge. The compressor will unload when package discharge pressure rises above this value.
- **Package Discharge Pressure** - indicated by the large numbers centered below the gauge and by the black arrow below the gauge. This is the air pressure that the compressor is supplying to the plant.
- **Pressure Unit of Measure** - indicated below the Package Discharge Pressure. This is selectable from the GENERAL SETTINGS folder.
- **Airend Discharge Temperature** - indicated by the numbers in the lower right of the display. This is the temperature of the air/oil mixture at the discharge of the compression module.
- **Temperature Unit of Measure** - indicated to the right of the Airend Discharge Temperature. This is selectable from the GENERAL SETTINGS folder.
- **Run Hours** – indicated by the numbers in the lower left of the display. The number of hours the compressor motor has been running.

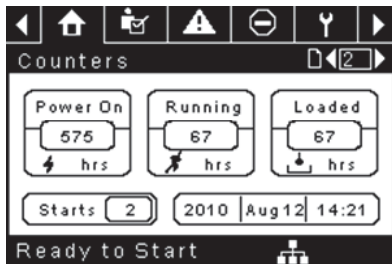
NOTICE

The online and offline set points can be selected and modified on this page. All other information on this page is read only.

OPERATING INSTRUCTIONS (XE-70M CONTROLLER)

Page 2 : Counters

Figure 6 : Counters



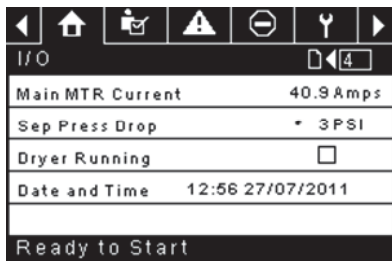
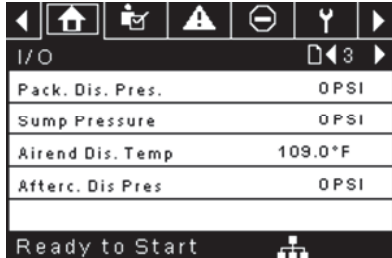
- **Hour Meters** - Indicates the hours that: the controller has been powered up, the compressor motor has been running, and the compressor has running loaded.
- **Starts** - Indicates the number of times a start is attempted on the compressor.
- **Date & Time** - Indicates the current date and time. This is adjustable and configurable in the GENERAL SETTINGS folder.

NOTICE

All information on this page is read only.

Pages 3 & 4 – Analog Inputs and Compressor Information

Figure 7 : Analog Inputs and Compressor Information



Any sensor that is not installed or is reporting a failure will show a [-] symbol.

NOTICE

All information on this page is read only.

The following analog inputs are displayed in this section.

- **Package Discharge Pressure** – The pressure the compressor is delivering to the plant.
- **Sump Pressure** – The compressor's internal pressure at

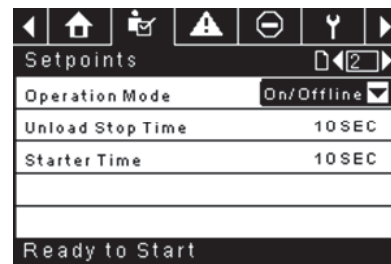
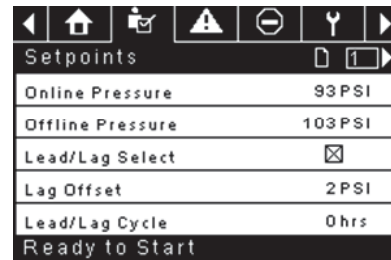
the sump tank.

- **Airend Discharge Temperature** – The temperature of the air/oil mixture at the discharge of the compression module.
- **After-cooler Discharge Temperature (Not available on this compressor model)** – The temperature of the air after passing through the after-cooler. Note – Only shown when the Low Ambient option is purchased and installed.
- **After-cooler Discharge Pressure (Not available on this compressor model)** – Pressure the compressor is delivering before the dryer. Note – Only shown when the TAS option is purchased and installed.
- **Separator Pressure Drop** – The pressure drop across the separator element.
- **Dryer Run Status (Integrated dryer units only) (Not available on this compressor model)** – Checkbox that shows whether the dryer is currently running (checked) or not (blank).
- **Time and Date**
- **Main Motor Current** – Current flowing through the main motor as measured by the installed current transducers.

OPERATOR SETTINGS FOLDER

Pages 1-2: Operator Settings

Figure 8 : Operator Settings



The below values are all setpoints

Online Pressure – The compressor will load when the package discharge pressure falls below this value.
Range (in PSI): 65 to Offline Pressure - 10

Offline Pressure – The compressor will unload when package discharge pressure rises above this value.
Range (in PSI): 75 to Rated Pressure + 10. Please note that the range will be reduced by 7 psi when operating a TAS

OPERATING INSTRUCTIONS (XE-70M CONTROLLER)

machine.

Lead/Lag – When this box is checked the compressor is operating as a lead machine. Unchecking the box causes the machine to run as a lag machine.

Lag Offset – If the machine is running as a lag compressor, the lag offset will be subtracted from the online and offline setpoints.

Range (in PSI): 0 – 45, depending on the online and offline setpoints. The Lag Offset will never allow you to exceed the minimum or maximum values of the online and offline setpoints.

Mode of Operation – Selections are Online/Offline, Modulation/ACS, and Modulation only – determines how the compressor will try to maintain a specific pressure.

- **Online/Offline** – The compressor will load the machine by energizing a solenoid that opens the inlet valve and closes the blowdown valve when package discharge pressure falls below the online pressure setpoint. The compressor will unload the machine by de-energizing the solenoid when pressure rises above the offline pressure setpoint.
- **Modulation** – The compressor will still load and unload as in online/offline, but will energize a different solenoid valve for modulation. When the package discharge pressure is between the online and offline setpoints the compressor will adjust the inlet valve in order to achieve a stable output pressure. The output pressure target needs to be set by a technician at the inlet valve in order to provide effective modulation control. Modulation can only work when the package discharge pressure is above 60 psi. Modulation is an option and must be enabled in the factory settings tab.
- **Mod/ACS** – The compressor will initially start out in online offline mode. If the compressor goes through 3 load/unload cycles within 3 minutes, it will switch over into Modulation mode. It will remain in modulation until the stop button is pressed or 3 minutes pass between an unload and load command. Mod/ACS is an option and must be enabled in the factory settings tab.

Unloaded Stop Time – Time period that the machine must run unloaded before the motor is allowed to stop after a stop command is received.

Range (in seconds): 10 - 30

Starter Time – Time period that the compressor needs in order to come up to operating speed after a start command before being able to produce air. Range (in seconds): 5 - 30

The parameters on these pages are adjustable any time.

*Note that Mode of Operation can only be adjusted if the modulation option has been purchased for the compressor and the Enable Modulation factory setpoint has been turned ON.

Pages 3-6: Operator Options

Figure 9 : Operator Options

Options	
En Auto-Restart	<input type="checkbox"/>
AutoRestart Time	120 SEC
AutoRestart Dly	0 SEC
COM Control	<input type="checkbox"/>
Ready to Start	

Options	
Rem Start/Stop	<input type="checkbox"/>
Enable PORO	<input type="checkbox"/>
PORO Time	10 SEC
Low Ambient Temp	35°F
Ready to Start	

Options	
Sched Start Day	Sunday
Sched Start Hour	0
Sched Start Min	0
Ready to Start	

Options	
Sched Stop Day	Sunday
Sched Stop Hour	0
Sched Stop Min	0
Ready to Start	

The below values are all setpoints

Enable Auto-Restart – Enabling this will allow the compressor to stop if it has been running unloaded for a period of time, and the motor has exceeded its minimum running time (10 minute in most cases).

Auto-Restart Time – The time period the compressor must run unloaded before stopping in auto-restart. This time period begins the moment that package discharge pressure rises above the offline setpoint. Both this time period and the minimum motor run timer (10 minutes) must be satisfied before the compressor will stop in auto restart.

Range (in seconds) 2 - 60

OPERATING INSTRUCTIONS (XE-70M CONTROLLER)

Auto-Restart Delay – The time period after the package discharge pressure has fallen below the online setpoint before the compressor can automatically restart.
Range (in seconds): 0 - 60

COM Control – Enabling this setpoint allows the compressor to be controlled by a serial or Ethernet device, such as an X8I. This is equivalent to the “Sequencer” option on older Intellisys controllers.

Remote Start/Stop – Enabling this setpoint allows the compressor to be started and stopped using the digital inputs on the controller.

Enable PORO – Enabling this setpoint will allow the compressor to automatically restart after a power outage has been restored if the compressor was running loaded at the time of the outage. PORO is an option which must be purchased and installed before this feature can be turned ON.

PORO Time – Time after the controller power has been restored and controller has finished booting before the compressor will perform a PORO start. During this time the PORO Horn will sound.
Range (in seconds): 10 - 600

Low Ambient Temp – Temperature below which the low ambient option will come into effect.
Range (in deg F): 30 - 60

Scheduled Start Day – Day (or days) of the week for which a scheduled start will be performed. The compressor will start when its onboard clock matches the day, hour, and minute of the scheduled start setpoints. Scheduled Start/Stop is an option which must be purchased and installed before this feature can be turned ON.

Scheduled Start Hour – Hour of the day for which a scheduled start will be performed. Scheduled Start/Stop is an option which must be purchased and installed before this feature can be turned ON.

Scheduled Start Minute – Minute of the hour for which a scheduled start will be performed. Scheduled Start/Stop is an option which must be purchased and installed before this feature can be turned ON.

Scheduled Stop Day – Day (or days) of the week for which a scheduled stop will be performed. The compressor will stop when its onboard clock matches the day, hour, and minute of the scheduled stop setpoints. Scheduled Start/Stop is an option which must be purchased and installed before this feature can be turned ON.

Scheduled Stop Hour – Hour of the day for which a scheduled stop will be performed. Scheduled Start/Stop is an option which must be purchased and installed before this feature can be turned ON.

Scheduled Stop Minute – Minute of the hour for which a scheduled stop will be performed. Scheduled Start/Stop is an option which must be purchased and installed

before this feature can be turned ON.

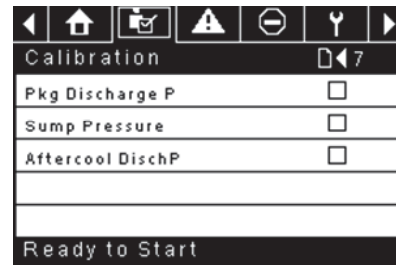
Note that in order to disable Scheduled Start/Stop, the Scheduled Start and Stop days, hours, and minutes must match exactly.

* The low ambient temperature is only adjustable if the low ambient factory set point is ON.

** A value of 0 will disable the lead/lag cycle time feature.

Page 7 Calibrate Sensors

Figure 10 : Calibrate Sensors



Sensor calibration can only take place when the machine is stopped and there is no pressure on the sensor. Calibration only needs to take place after a sensor is replaced, the controller is replaced, the controller software is upgraded, or the operator suspects the sensor reading is in error. Calibrate a sensor by selecting the checkbox beside the sensor name. Note that the checkbox may appear too quickly to be visible. Calibration can be confirmed by verifying that the sensor value now reads zero.

Each of the sensors listed below can be calibrated.

- Sump Pressure (3APT) – Only on units with the Enable 3APT factory setpoint ON.
- Package Discharge Pressure (4APT)
- After-cooler Discharge Pressure (7APT) – Only on units with integrated dryer. **Note : Not available on this compressor model.**

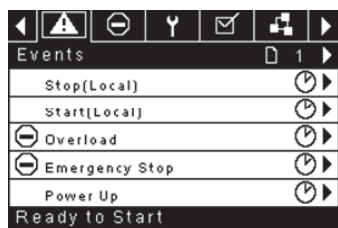
Note that if a sensor is currently reading a value that is +/- 10% of its range from zero, the sensor will not be able to be calibrated and an warning will be logged in the event log. Make sure the sensor is being exposed to atmosphere before attempting calibration.

OPERATING INSTRUCTIONS (XE-70M CONTROLLER)

EVENTS FOLDER

Pages 1 to a Max of 50

Figure 11: Events folder

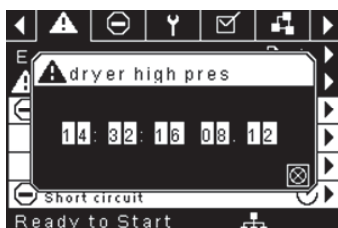


The pages in the Events folder document up to the last 250 events that the controller has experienced, with the time and date of the occurrence. The events are recorded in sequence, with number one being the newest and 250 being the oldest. When a new event occurs, it becomes number one and all others are shifted up in number.

The page numbers in the Title Bar are used to scroll through the events, with each page displaying up to five. Page one displays events one through five, page two displays six through ten, and so on.


The time and date of the event can be viewed by navigating to an event and pressing the right arrow navigation key. The time and date window can then be exited by pressing the enter key.


Figure 12 : Events folder



The following items will generate an event.

- Power ON
- Power OFF
- Press the Start Key
- Press the Stop Key
- Press the Load Key
- Press the Unload Key
- Starting the compressor remotely
- Stopping the compressor remotely
- Loading the compressor remotely
- Unloading the compressor remotely
- Warning
- Trip
- Start Inhibit

Active Warnings will show a flashing caution icon  while acknowledged Warnings will have a solid icon.

Active Trips will show a flashing trip icon  while acknowledged Trips will have a solid icon.

Active Start Inhibits will be listed in the Event log, but not have an icon present. The display will indicate the compressor is not ready to start if a start inhibit is active.

Warning Events List

Sensor Failure (Not available on this compressor model)

Xe-70M On-Screen Text: 7ATT Failure

This will occur whenever sensor 7ATT is recognized as missing or broken. The sensor failure message shall follow the following format: 7ATT FAILURE. The 7ATT sensor failure will be shown only when the integrated dryer is installed (accessed in the factory settings menu). This condition must exist for 3 seconds before the warning is issued.

Change Separator Element

Xe-70M On-Screen Text: Chg Sep Elem

Will occur if the unit is loaded, the package discharge pressure (4APT) is at least 90 psi and the separator pressure drop is greater than 12 psi. This condition must exist for 3 seconds before the warning is issued.

Note that the Enable 3APT setpoint must be turned ON for this warning to occur

High Airend Discharge Temperature

Xe-70M On-Screen Text: High A/E Disch T

Will occur if the unit is running and 2ATT is greater than 221 deg F (97% of 228) and the unit is running. This condition must exist for 3 seconds before the warning is issued.

High Sump Pressure

Xe-70M On-Screen Text: High Sump Pres

If the unit is running loaded, has been loaded for at least 8 seconds and the sump pressure is more than 25 psi above the rated pressure for the compressor. If this warning occurs, the online and offline pressures will be reduced. For example, a rated pressure of 100 psi would have a maximum offline pressure of 110 psi. This warning would occur if the sump pressure goes above 125 psi in this example. This condition must exist for 3 seconds before the warning is issued.

Note that the Enable 3APT setpoint must be turned ON for this warning to occur.

OPERATING INSTRUCTIONS (XE-70M CONTROLLER)

Service

Service warnings occur when the unit has operated a certain number of hours, based on the total hours. Service warnings can have multiple levels, depending on the service level selection. A service level selection of 0 disables service warnings.

Service Level 1

Xe-70M On-Screen Text: SVC Required

If service level 1 has been selected for the unit, a "SERVICE REQUIRED" warning will be issued on hour intervals equal to the service time period set point. This warning can be reset the same as any other warning.

Service Level 2

Xe-70M On-Screen Text: 100 hours to SVC, SVC Required, Service Alarm

If service level 2 has been selected for the unit, the service complete factory set point will be used to clear a level 2 service warning and reset the service time or date. The service complete can be reset before a service warning occurs.

The initial "SERVICE REQUIRED" warning will occur at total hour intervals equal to the service time period set point. However, 100 hours before this a "100 HOURS TO SERVICE" warning will occur. This warning can be reset the same as any other warning. One hundred hours later the "SERVICE REQUIRED" warning will occur. This warning can be reset the same as any other warning, however this warning will return in 24 hours if the service complete factory set point has not been set. If the service complete has not been set, 100 hours later, the "ALARM – SERVICE REQUIRED" warning will be issued. This warning can only be cleared by the service complete factory set point. Once the service complete factory set point is set, indicating the service is completed, the time for the next "SERVICE REQUIRED" warning will be calculated by adding the service time period to the total hours value, with the "100 HOURS TO SERVICE" warning occurring 100 hours before and the "ALARM – SERVICE REQUIRED" warning occurring 100 hours after that time.

High Discharge Pressure

Xe-70M On-Screen Text: High Disch Pres

Will occur if the unit is using a remote sensor or is under the control of an external device, such as an X8I, is loaded, and the discharge pressure (4APT) is greater than the maximum offline pressure. This condition must exist for 3 seconds before the warning is issued. If this condition occurs, the compressor will automatically unload. The unit will be available to reload once the discharge pressure falls to the rated pressure value.

Dryer Temp Warning (Not available on this compressor model)

Xe-70M On-Screen Text: Dryer Temp

Dryer High Pressure (Not available on this compressor model)

Xe-70M On-Screen Text: Dryer High Pres

Xe-70 Dryer Controls are not linked to UP Series 15-30HP/11-22kW dryers.

Change HE Filter (Not available on this compressor model)

Xe-70M On-Screen Text: Change HE Filt

Note that the Enable 7APT setpoint must be turned ON for this warning to occur.

Invalid Calibration

Xe-70M On-Screen Text: Invalid Cal

Will occur if the sensor zero value is $\pm 10\%$ of its scale. See Sensor Calibration.

Trip Events List

Low Sump Pressure

Xe-70M On-Screen Text: Low Sump Press

Will occur if the unit is running unloaded or loaded and 3APT is less than 13 psi for 15 seconds.

Note that the Enable 3APT setpoint must be turned ON for this warning to occur

High Airend Discharge Temperature

Xe-70M On-Screen Text: High A/E Disch T

This will occur if 2ATT is greater than 228 deg F and the unit is running.

Check Motor Rotation

Xe-70M On-Screen Text: Ck Motor Rot

This will occur if 3APT is less than 1 psi on a unit, 3 seconds after starting (6 seconds if the unit is equipped with a soft starter or airend discharge temperature is less than 50 deg F). This condition can be caused by the motor running in reverse. Once correct motor rotation is established, this trip will not be checked again unless power is removed from the controller. However, if correct motor rotation is not established, this fault will be checked after each start until correct motor rotation is established. Correct motor rotation is established when the controller reads a sump pressure of 1 psi or more within 3 seconds of starting.

Note that the Enable 3APT setpoint must be turned ON for this warning to occur.

Overload

Xe-70M On-Screen Text: Overload

This will occur if the fan or motor overload relays opens.

OPERATING INSTRUCTIONS (XE-70M CONTROLLER)

The contact must be open for at least 3 seconds before the trip will occur.

Xe-70M On-Screen Text: Main Motor OL

This will occur if the current transducers indicate that the motor amp draw is excessive. This overload is the equivalent of a class 10A trip level.

Remote Stop Failure

Xe-70M On-Screen Text: Rem Stop Fail

Will occur if the remote start/stop option is enabled, the remote stop button remains open and either start button is pressed.

Remote Start Failure

Xe-70M On-Screen Text: Rem Start Fail

Will occur if the remote start/stop option is enabled, the unit is started by the remote start button, and the button stays closed for 7 seconds after the unit starts.

Sensor Failure (Not available on this compressor model)

Xe-70M On-Screen Text:
3APT Failure, 4APT Failure, 7APT Failure, 2ATT Failure,
Main Motor CT Failure.

This will occur when a sensor is recognized as missing or broken. The sensors affected by this trip are CT1, CT2, CT3, 3APT, 4APT, 7APT, and 2ATT. The sensor should be displayed along with the sensor failure message. The sensor failure message shall follow the following format: 3APT Failure.

Emergency Stop

Xe-70M On-Screen Text: Emergency Stop

This will occur when the EMERGENCY STOP button is engaged.

High Sump Pressure

Xe-70M On-Screen Text: High Sump Pres

This will occur if the compressor is running loaded for at least 8 seconds, and any one of the 3 following conditions exist. (1) The sump pressure is above the rated pressure by 35 psi. (2) The separator pressure drop is measured to be more than 25 psi and the package discharge pressure at least equal to the minimum online set point value. (3) The sump pressure is above 165 psi if the rated pressure is less than 190 psi or the sump pressure is above 220 if the rated pressure is 190 psi.

Note that the Enable 3APT setpoint must be turned ON for this warning to occur.

Unit Too Cold To Start

Xe-70M On-Screen Text: Unit Too Cold

This will occur if the unit does not have the low ambient

option, the airend discharge temperature (2ATT) is less than 35 deg F, and the operator attempts to start the compressor. This fault can only occur once a day. Once this fault occurs, the operator can reset it and start the compressor. This fault will be logged in the trip history to indicate that the unit is being started in low ambient conditions.

Start Inhibit List

High Airend Discharge Temperature

Xe-70M On-Screen Text: High A/E Disch T

This will occur if 2ATT is greater than 95% of 228 deg F.

High Sump Pressure

Xe-70M On-Screen Text: High Sump Pres

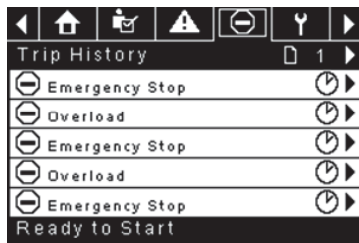
This will occur if the sump pressure (3APT) is 25 psi or higher than the rated pressure of the compressor.

OPERATING INSTRUCTIONS (XE-70M CONTROLLER)

■ TRIP HISTORY

Pages 1 to a Max of 3

Figure 13 : Trip History




The pages in the Trips History folder document up to the last 15 trips that the controller has experienced, and time stamps each. The trips are recorded in sequence, with number one being the newest and 15 being the oldest. When a new trip occurs, it becomes number one and all others are shifted up in number.

The page numbers in the Title Bar are used to scroll through the events, with each page displaying up to seven. Page one displays events one through five, page two displays six through ten, and so on.

The following items will generate an entry in the trip history.

- Trips

Active Trips will show a flashing trip icon  while acknowledged Trips will have a solid icon.

The trip history also records compressor data at the time of the trip to assist in diagnostics and troubleshooting. Navigating to the trip entry and hitting the right navigation button will bring up the trip history dialog box.

Figure 14 : Trip History

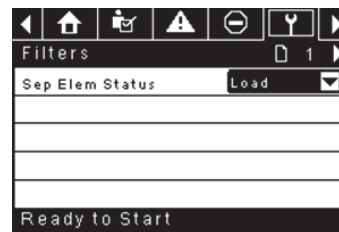


While the dialog box is active, press the left and right keys in order to scroll through the displayed data. The name of the trip will always be shown in the title bar of the dialog box. Press enter when finished viewing the data to return to the trip history screen.

■ MAINTENANCE FOLDER

Page 1 – Filter Status

Figure 15 : Filter Status



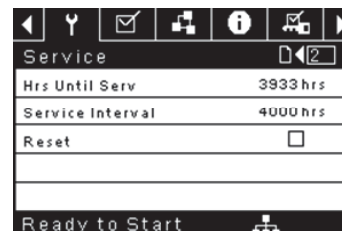
This page displays the status of the filters. The filter status will either be "OK" or "Change" depending on the compressor's diagnostic readings. If a filter reaches the "change" status, a warning will be issued and the service indicator will light up to notify the user. Please note that the compressor must be in a "Running Loaded" state to check these maintenance items. If the compressor is not in a running state – the status will display "Load," unless a maintenance indicator has been issued when the machine was running and has not yet been reset.

The following filters are displayed:

- Separator Element

Page 2 - Maintenance Configuration

Figure 16 : Maintenance Configuration



This page allows the user to set the service interval and to reset the counter after the service has been performed. The service interval may be set to any value between 1000 and 8000 hours, but must be set in accordance with the factory maintenance schedule. After maintenance has been performed, the user can reset the counter by navigating to the Reset button and pressing the enter key. Note that after changing the Service Interval a Reset must be performed to set the Hours Until Service to the proper value.

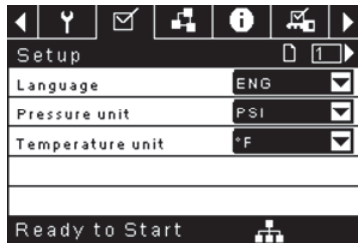
■ GENERAL SETTINGS FOLDER

All parameters in the general settings folder are adjustable.

OPERATING INSTRUCTIONS (XE-70M CONTROLLER)

Page 1 – Language and Units Selection

Figure 17 : Language and Units Selection



Language is selectable from the following 30 choices:

- English (default)
- Bulgarian
- Chinese, simplified
- Croatian
- Czech
- Danish
- Dutch
- Estonian
- Finish
- French
- German
- Greek
- Hungarian
- Italian
- Indonesian
- Korean
- Latvian
- Lithuanian
- Maltese
- Norwegian
- Polish
- Portuguese
- Romanian
- Russian
- Slovak
- Slovenian
- Spanish
- Swedish
- Thai
- Turkish

The controller will display all screens in the selected language and only one language can be selected at a time.

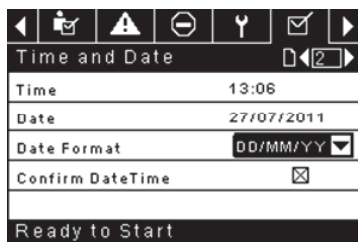
Each language appears in its native translation.

Temperature is selectable between °F and °C.

Pressure is selectable between psi, kpa, bar, kg/cm².

Page 2 – Time & Date Settings

Figure 18 : Time & Date Settings



All items are adjustable.

Time allows the current time to be set in a 24 hour format

Date allows the current month, day, and year to be set

Date Format is selectable between dd/mm/yyyy (default), mm/dd/yyyy, and YYYY/MM/DD

Confirm New Time and Date is used to verify that changes to selections are desired. An “x” must appear in the checkbox before any changes will take affect.

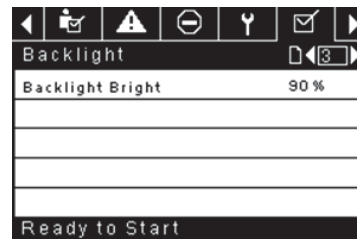
The controller will continue to display any changes, even when the selections have not been confirmed and the user exits the page, then returns. Cycling of the power returns all selections to their current settings.

NOTICE

The controller does not support Daylight Savings Time.

Page 3 – Backlight Settings

Figure 19 : Backlight Settings



Backlight Brightness adjusts the brightness of the display.

NOTICE

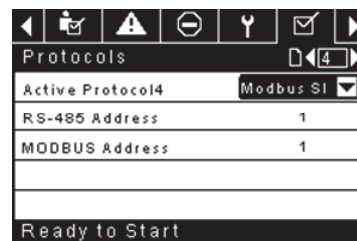
The backlight will be switched ON whenever any of the controller's keys are pressed.

WARNING

The start, stop, load, unload, reset, and acknowledge keys on the controller remain functional while the backlight is switched OFF. It is recommended to press the enter key or one of the navigation keys in order to switch the backlight ON.

Page 4 - Serial Port Address Settings

Figure 20 : Serial Port Address Settings



This page allows the user to set up the network addresses for the RS-485 networks the controller is capable of communicating with.

OPERATING INSTRUCTIONS (XE-70M CONTROLLER)

Active Protocol – Allows the serial port to be configured to Airbus (used for X-Series system controllers and integral sequencing) or Modbus protocols.

MODBUS Address – Sets the modbus node ID for the controller to communicate with a Modbus capable device, this can be any value between 1 and 254.

RS-485 Address – Sets the airbus address that allows the controller to communicate over Integral Sequencing or an X-Series system controller network.

Pages 5 & 6 – Ethernet Settings (ECO Module Only)

Please note that these pages will have no effect unless the ECO module option has been purchased.

Figure 21 : Ethernet Settings (ECO Module Only)

Ethernet	
IP	192.168.002.220
Gateway	192.168.002.001
Subnet Mask	255.255.255.000
MAC Address	00:00:00:00:00:00
Ready to Start	

IP Address Setting – When DHCP is not enabled, this setpoint sets the IP address of the controller.

IP Address Actual – This will match the IP address setting when DHCP is not enabled. If DHCP is enabled this will display the address assigned to the controller by the DHCP server.

Default Gateway Setting – Setpoint for the default gateway.

Default Gateway Actual – Current reading/setting for the default gateway.

Subnet Mask Setting – Setpoint for the subnet mask

Subnet Mask Actual – Current reading/setting for the subnet mask

MAC Address – This is the unique hardware MAC address for the controller. This can not be changed.

Enable DHCP – Allow the controller to automatically receive an IP address from the Local Area Network (LAN)

Apply– After editing the desired setpoint navigate to the accept setting and press enter in order for the values in the setting variables to be confirmed by the controller.

Cancel – Discard any changes made to the Ethernet settings.

■ INTEGRAL SEQUENCING FOLDER

Figure 22 : Integral Sequencing folder

Setup	
Enable ISC	<input type="checkbox"/>
Unload pressure	106 PSI
Load pressure	94 PSI
Ready to Start	

Tuning	
Start Delay Int	3 SEC
Damping	1.0
Tolerance	3 PSI
# Compressors	4
Ready to Start	

Priority	
C01 Priority	1
C02 Priority	1
C03 Priority	1
C04 Priority	1
Ready to Start	

Rotation	
Sequence	----
Rotate Now	<input type="checkbox"/>
Rotate Interval	24 hrs
Time Left	0 hrs
System Pressure	100 PSI
Ready to Start	

Integral Sequencing allows the compressor to be networked with up to three other compressors (fixed or variable speed) to maintain a stable system pressure by loading and unloading compressors as needed. Integral sequencing requires no additional hardware other than a serial two wire connection daisy chained between all compressors in the system, connected to port X04 on the controller.

For a compressor to be a member of the integral sequencing system, the COM control setpoint in the operator settings tab must be enabled and the compressor must be started via the local start button. Additionally, it is recommended that the Auto-Restart function be enabled as the integral sequencing system

OPERATING INSTRUCTIONS (XE-70M CONTROLLER)

will never start and stop machines, only load and unload them. Integral sequencing relies on Auto-Restart to turn OFF the compressor motor when not needed.

Please note that the compressor's address in the integral sequencing system is defined by the RS-485 address that is set on the general settings folder. Also note that the pressure signal used to determine when to load or unload another compressor is based on the pressure reading from the compressor assigned as the integral sequencing master. Lastly, note that the Active Protocol on the general settings tab must be set to Airbus485 for integral sequencing to operate properly.

Certain functions may interfere with compressors loading and unloading:

- Verify that the Remote Load Enable switch is in the open position. Having this closed will allow the remote load/unload switch to define the load command.

Start Delay Interval – Determines the amount of time between loading compressors. This prevents all compressors from loading at once. This setpoint should be set to the longest starting time of any compressor in the system. In general, this will be equivalent to the star delta transition time for a fixed speed machine, or ramp time for a VSD machine.

Damping – The pressure control “Damping” setting which is used to tune how quickly the system responds to pressure deviations. The default is 10 and should not normally be changed.

Tolerance - The pressure control “Tolerance” setting, which is used to tell the system how to respond to changes in pressure above and below the load/unload pressures. The default is 3.0 psi and should not normally be changed.

Number of Compressors – Defines how many compressors are in the system. There is a maximum of 4.

Priority – Each compressor can be assigned a priority level. Setting a priority for a compressor affects how the rotation will occur. Compressors with priority 1 will always be in the lead position(s), followed by priority 2 compressors, and so on. Compressors will only rotate positions with other compressors of the same priority level.

Sequence – Displays the current load/unload order of the system. Each compressor in the system is assigned a letter. The letter indicates whether the machine with the assigned Airbus address is a lead machine (loads first, unloads last) or one of the trim machines. Letter A is assigned to the lead machine, B to the next machine to load, C to the third machine to load, and D to the final machine to load. Machines will unload in the reverse order, such that A will be the last machine running.

The first position in the - - - sequence on Integral Sequencing tab, page 3 always refers to the compressor that is assigned Airbus Address 1. The second position to Airbus Address 2, and so on. Note that the letter sequence may change due to rotation.

Note that the sequence will only be displayed on the master controller.

Rotate Now – Selecting this setpoint will cause the sequence to shift according to the priorities, regardless of the rotation interval setpoint.

Rotation Interval – Determines the time period between automatic sequence rotations.

Time Left – Counts down the time until the sequence rotation will occur.

System Pressure – Shows the current pressure reading that the system is using for control. This will only be shown on the sequence Master controller.



STATUS FOLDER

NOTICE

All information on these pages is read only.

NOTICE

Some values may only be visible when the factory settings password is entered.

Page 1 – Analog Inputs

Figure 23 : Analog Inputs

Analog Inputs	
Pkg Discharge P	100 PSI
Sump Press	7 PSI
Airend Disch T	184 °F
Aftercool DischP	36 PSI
Ready to Start	

Analog Inputs:

The following analog inputs are displayed in this section.

- **Package Discharge Pressure** – The pressure the compressor is delivering to the plant
- **Sump Pressure** – The compressor's internal pressure at the sump tank.

OPERATING INSTRUCTIONS (XE-70M CONTROLLER)

- **Airend Discharge Temperature** – The temperature of the air/oil mixture at the discharge of the compression module.
- **After-cooler Discharge Temperature (Not available on this compressor model)** – The temperature of the air after passing through the After-cooler. Note that this will only be shown if the Low Ambient option has been purchased and installed.
- **After-cooler Discharge Pressure (integrated dryer units only) (Not available on this compressor model)** – Pressure the compressor is delivering before the dryer.

Page 2 – Compressor Data

Figure 24 : Compressor data

Timers	
Running	67 hrs
Loaded	67 hrs
Power On	575 hrs
Time	14:40
Ready to Start	

Compressor Data:

- **Power ON Hours** – The number of hours the controller has been powered up
- **Running Hours** – The number of hours the compressor's motor has been running
- **Loaded Hours** – The number of hours the compressor has been producing air
- **Real Time Clock** - Current time of day

Pages 3 and 4 – Digital Inputs

Figure 25 : Digital inputs

Digital Inputs	
Emergency Stop	Closed
Overload	Closed
Rem Load Enable	Open
Rem Load/Unload	Open
Ready to Start	

Digital Inputs	
Remote Start	Open
Remote Stop	Closed
Dryer Temp	Open
Dryer High Press	Closed
Ready to Start	

Digital Inputs:

Each digital input will have an indication showing whether the input is in an "OPEN" or "CLOSED" state. This is the physical state of the input and may not necessarily line up with the logical condition. The normal state is shown below.

- **Emergency Stop** – Normally Closed
- **Main/Fan Motor Overload** – Normally Closed
- **Remote Load Enable** – Normally Open
- **Remote Load/Unload** – Normally Open
- **Remote Start** - Normally Open
- **Remote Stop** – Normally Closed
- **Dryer Temperature Fault** – Normally Open
- **Dryer High Pressure** – Normally Closed

Pages 5 and 6 – Digital Inputs

Figure 26 : Digital inputs

Digital Outputs	
Contact KM1, KM2	Open
Contact KM3	Open
Fan Contact KM4	Open
L/Unload & Blowd	Open
Ready to Start	

Digital Outputs	
Modulation 5V	Open
Dryer/Blower Run	Open
PORO Horn	Open
Trip Indication	Open
Ready to Start	

Digital Outputs:

Each digital output will have an indication showing whether the output is in an "OPEN" or "CLOSED" state. This is the physical state of the input and may not necessarily line up with the logical condition. The normal state is shown below.

- **Starter Contact KM1, KM2** – Normally Open
- **Starter Contact KM3** – Normally Open
- **Fan Starter Contact KM4** – Normally Open
- **Load Solenoid 15V** – Normally Open
- **Modulation Solenoid 35V** – Normally Open
- **Dryer Run / Fan Run** – Normally Open
- **PORO Horn** – Normally Open
- **Trip Indication** – Normally Open

OPERATING INSTRUCTIONS (XE-70M CONTROLLER)

Page 7 – Analog Outputs

Figure 27 : Analog inputs

Analog Outputs	
VSD Blower	4.000 mA
Ready to Start	

Analog Outputs (Not available on this compressor model) :

The value for the analog outputs will be in mA.

- **VSD Blower Output** – Current speed of the VSD blower (if installed).

Page 8 – CT Inputs

Figure 28 : CT Inputs

CT inputs	
CT1 A	100.930 mA
CT1 B	103.070 mA
CT1 C	103.171 mA
Ready to Start	

CT Inputs

Displays the mA value of the current transformers installed on each leg of the motor incoming power

- CT1
- CT2
- CT3

FACTORY SETTINGS FOLDER

This folder is for **Ingersoll Rand** factory and service personnel. A password must be entered on page one in order to adjust values in this folder. This folder is used for setting parameters that are specific to that compressor and displaying software information for the controller.

Page 1 – Password

Figure 29 : Password

Password	
Password	****
Password entered	<input checked="" type="checkbox"/>
Password Timeout	<input type="checkbox"/>
Pas. Timeout Del	10 SEC
Ready to Start	

Password:

Provides access to enter a valid password to gain access to password protected parameters. The password is entered by scrolling down to the password value and pressing the return key.

Password entered:

This checkbox will indicate a valid password has been entered. If this checkbox is blank, a valid password has not been entered or it has timed out. This is read only.

Password timeout enable:

Checking this box will enable the password time feature.

Password timeout:

This timeout along with the password timeout enable allows the user to set an adjustable amount of time to require a valid password to be re-entered. Once this timeout is reached re-entry of a valid password is required. The timeout counter is reset after any button press.

Pages 2 Thru 6 – Factory Settings

Figure 30 : Factory settings

Factory Setpoint	
Rated Pressure	100 PSI
Starter Type	Star-Delta
Service Level	1
Ready to Start	

Factory Setpoint	
Main MTR Protect	ON
Nominal Current	80.0 Amps
Main MTR CT RNG	40.0 Amps
CT Windings	1
Ready to Start	

Enable Modulate	
Enable Modulate	<input type="checkbox"/>
Enable PAC	<input checked="" type="checkbox"/>
Enable Dryer	<input checked="" type="checkbox"/>
Const Run Dryer	<input checked="" type="checkbox"/>
Ready to Start	

Factory Options	
En VSD Blower	<input type="checkbox"/>
Limit VSD Blower	<input checked="" type="checkbox"/>
Blower Override	101 %
Enable Low Amb	<input type="checkbox"/>
Ready to Start	

OPERATING INSTRUCTIONS (XE-70M CONTROLLER)

Hours Adjustment	
Running	0 hrs
Loaded	0 hrs
Power On	1 hrs
Ready to Start	

These pages are used for setting parameters that are specific to the compressor. All of the factory settings that are adjustable are listed below. All settings on these pages are password protected.

Rated Pressure (psi – 100, 115, 135, 190) – This is the nominal pressure that the compressor can provide.

Starter Type (Star-delta, Remote Starter, Soft Starter) – Choose the starter type installed in the compressor. If this is not set correctly, the compressor may not start.

Service Level (0, 1, or 2) – Set the service level reminders for the compressor.

- **Service Level 0** – Disables all service reminders
- **Service Level 1** – A service warning will be issued when the service time period has been expired. This warning can be reset by any user.
- **Service Level 2** – A service warning will be issued 100 hours prior to the service time period expiring. This 100 hour warning can be reset by any user. At the expiration of the service time interval the service warning will again occur. This warning can be reset by any user but will recur every 24 hours until the service complete factory setpoint has been set (Password Required).

Motor Protection – Used to enable current transformer based overload and locked rotor protection. This must be set to ON unless a thermal overload is installed in the compressor starter panel.

Nominal Current – Used to set up the motor overload protection. This value is set at the factory and must not be changed.

Main Motor CT Range - Must match the range of the installed current transformers. All current transformers must have the same range.

CT Windings – Must match the number of windings of the installed current transformers. All current transformers must have the same winding number

Enable Modulation (ON/OFF) – This enables the modulation option in the controller, allowing Modulation or Mod/ACS modes of operations to be chosen from the operator settings. The modulation option must be installed on the compressor for this to work.

Enable PAC (ON/OFF) – Enables Progressive Adaptive Control – this will reduce operating pressure in the case of a Change HE Filter warning or High Sump Pressure warning in order to protect the compressor.

Enable Dryer (ON/OFF) (Option not applicable for UP Series. Set to defaults) – Enables dryer control from the controller. The dryer option must be installed in the compressor for this to work properly.

Constant Run Dryer (ON/OFF) (Option not applicable for UP Series. Set to defaults) – Enabling this function causes the dryer to run whenever the compressor is in a running state, including auto-restart. Disabling this will allow the dryer to stop if certain conditions are met, such as satisfying a minimum run timer. Certain dryer warnings will stop the dryer regardless of this setpoint. If the dryer stops for any reason it will not be allowed to restart for 90 seconds. When the compressor is being controlled by an external source, constant run dryer will be enabled regardless of this setpoint's state.

Enable VSD Blower (ON/OFF) (Option not applicable for UP Series. Set to defaults) – Enable this function if there is a VSD blower option installed in the compressor.

Limit Blower VSD (ON/OFF) (Option not applicable for UP Series. Set to defaults) – Enable this setpoint to limit the maximum speed of the blower to 39 Hz.

Blower Override (Option not applicable for UP Series. Set to defaults) – Sets the blower on VSD blower equipped units to run at a set percentage of full speed. Setting this to 101% enables automatic control

Enable Low Ambient (ON/OFF) (Option not applicable for UP Series. Set to defaults) – Enable this setpoint to activate low ambient control. Low ambient control uses temperature readings to determine the speed of the blower to allow the compressor to reach an optimal operating temperature. When low ambient is enabled, the compressor will always start, but will run unloaded until the aircend discharge temperature reaches the low ambient temperature set point.

Running Hours (adjustable) – Used to adjust the running hours counter on the compressor

Loaded Hours (adjustable) – Used to adjust the loaded hours on the compressor

Power ON Hours (Read Only)

Pages 7 & 8 – Factory Settings

Figure 31 : Factory Settings

Software Version	
Software CCH	24236028
Software Version	E19
QL Software Name	QLCMCWA1
QL Software Ver	E01
Ready to Start	

These pages are used for displaying software information for the controller. All items are read only.

MAINTENANCE

UP SERIES MAINTENANCE SCHEDULE

PERIOD	MAINTENANCE
Each 24 hours operation.	Check the coolant level and replenish if necessary.
Visual check of machine for any leaks, dust build up or unusual noise or vibration.	Report immediately, contact Ingersoll Rand authorized distributor for assistance if in doubt.
When compressor is receiver mounted.	Drain air receiver of condensate, or check that automatic drain is operating.
Visual check condition of package pre-filter.	Blow clean if needed.
If the air filter indicator locks into the red position before the 2000 hour/ 1 year change out period.	Check the condition of filter. Change the air filter if needed. Dusty environments require more frequent replacement or, optional high dust filter. (The indicator should be checked with the unit stopped.)
First 150 hours.	Change the coolant filter.
Each month or 100 hours.	Remove and clean package pre-filter, replace if needed. Check the cooler(s) for build up of foreign matter. Clean if necessary by blowing out with air or by pressure washing.
1000 hours:	Analyze food grade lubricant (Ultra FG)
Each year or 2000 hours.	Change the coolant filter.
	Check motors with grease fittings and grease bearings per motor data tag.
	Check scavenge screen for blockage, clean if required.
	Change the separator cartridge.
	Change the air filter element.
	Take coolant sample for fluid analysis (Ultra\Ultra EL).
	Change the package pre-filter.
	Check the inlet valve flapper, recondition as necessary.
Visual check of drive belts and tensioning gas spring.	

PERIOD	MAINTENANCE
Pressure vessel inspection frequency may be otherwise defined by local or national legislation.	Separator vessel and air receiver when fitted. Fully inspect all external surfaces, and fittings. Report any excessive corrosion, mechanical or impact damage, leakage or other deterioration.
Every 6000 hours	Replace food grade lubricant (Ultra FG).
	Check and replace all items included within 2000 hour service.
Every two years or 8000 hours.	Change drive belt and gas spring. Check and replace all items included within 2000 hour service. Fit the following reconditioning parts as appropriate: Solenoid valves, Inlet valve kit, Minimum Pressure valve kit, Thermostatic Valve Kit.
	Replace Premium Coolant (Ultra) at which ever interval occur first
	16000 hours or every 3 years
Every 4 years or 16000 hours.	Replace all hoses.
	Strip, clean and re-grease motor bearings on motors with grease fittings.
	Replace sealed bearing on motors without grease fittings.
6 years/16000 hours or as defined by local or national legislation.	Fit replacement electrical contactor tips.
	Separator tank.
	Remove the cover plate and any necessary fittings. Clean the interior thoroughly and inspect all internal surfaces.

ROUTINE MAINTENANCE

This section refers to the various components which require periodic maintenance and replacement.

It should be noted that the intervals between service requirements may be significantly reduced as a consequence of poor operating environment. This would include effects of atmospheric contamination and extremes of temperature.

The SERVICE/MAINTENANCE CHART indicates the various components' descriptions and the intervals when maintenance has to take place. Oil capacities, etc., can be found in the Product specification sheet.

MAINTENANCE

Compressed air can be dangerous if incorrectly handled. Before doing any work on the unit, ensure that all pressure is vented from the system and that the machine cannot be started accidentally.

CAUTION

Before beginning any work on the compressor, open, lock and tag the main electrical disconnect and close the isolation valve on the compressor discharge. Vent pressure from the unit by slowly unscrewing the coolant fill cap one turn. Unscrewing the fill cap opens a vent hole, drilled in the cap, allowing pressure to release to atmosphere. Do not remove the fill cap until all pressure has vented from the unit. Also vent piping by slightly opening the drain valve. When opening the drain valve or the coolant fill cap, stand clear of the valve discharge and wear appropriate eye protection.

Ensure that maintenance personnel are properly trained, competent and have read the Maintenance Manuals.

Prior to attempting any maintenance work, ensure that:-

- all air pressure is fully discharged and isolated from the system. If the automatic blowdown valve is used for this purpose, then allow enough time for it to complete the operation.
- the machine cannot be started accidentally or otherwise.
- all residual electrical power sources (mains and battery) are isolated.

Prior to opening or removing panels or covers to work inside a machine, ensure that:-

- anyone entering the machine is aware of the reduced level of protection and the additional hazards, including hot surfaces and intermittently moving parts.
- the machine cannot be started accidentally or otherwise.

Prior to attempting any maintenance work on a running machine, ensure that:-

DANGER

Only properly trained and competent persons should undertake any maintenance tasks with the compressor running or with electrical power connected.

- the work carried out is limited to only those tasks which require the machine to run.
- the work carried out with safety protection devices disabled or removed is limited to only those tasks which require the machine to be running with safety protection devices disabled or removed.

- all hazards present are known (e.g. pressurised components, electrically live components, removed panels, covers and guards, extreme temperatures, inflow and outflow of air, intermittently moving parts, safety valve discharge etc.).
- appropriate personal protective equipment is worn.
- loose clothing, jewelry, long hair etc. is made safe.
- warning signs indicating that Maintenance Work is in Progress are posted in a position that can be clearly seen.

Upon completion of maintenance tasks and prior to returning the machine into service, ensure that:-

- the machine is suitably tested.
- all guards and safety protection devices are refitted and correctly working.
- all panels are replaced, canopy and doors closed.
- hazardous materials are effectively contained and disposed of in a manner compliant with local or National environmental protection code

WARNING

Do not under any circumstances open any drain valve or remove components from the compressor without first ensuring that the compressor is FULLY SHUT- DOWN, power isolated and all air pressure relieved from the system.

■ TOP UP COOLANT PROCEDURE

The reservoir is designed to prevent overflow. With warm unit stopped in the normal way, the sight tube level should be within 15 mm (0.6 in) of the top of the green strip. The level should not drop beyond the bottom of the sight tube when running with a steady load.

CAUTION

Ensure that Ingersoll Rand premium coolant is used. Failure to do so will void manufacturers warranty.

■ COOLANT CHANGE PROCEDURE

It is better to drain the coolant immediately after the compressor has been operating as the liquid will drain more easily and any contaminant will still be in suspension.

1. Stop the machine, electrically isolate and vent all trapped pressure.
2. Place a suitable container close to the drain valve.
3. Slowly remove fill/vent cap.
4. Remove plug from drain valve.
5. Open the drain valve and drain coolant into container.
6. Close the drain valve.

MAINTENANCE

7. Replace plug in drain valve.
8. Refill the machine following the "top up coolant" procedure above. After initial fill, to purge any airlocks, the machine should be run for a few minutes cycling between load and no load, before checking that the level is correct.
9. Replace and tighten coolant fill cap.

■ COOLANT FILTER CHANGE PROCEDURE

1. Stop the machine, electrically isolate and vent all trapped pressure.
2. Loosen filter with the correct tool.
3. Remove the filter from the housing.
4. Place the old filter in a sealed bag and dispose of in a safe way.
5. Clean the mating face of the housing taking care to avoid any particles entering the machine.
6. Remove the new **Ingersoll Rand** replacement filter from its protective package.
7. Apply a small amount of lubricant to the filter seal.
8. Screw the new filter down until the seal makes contact with the housing, then hand tighten a further half turn.
9. Start the compressor and check for leaks.

■ AIR FILTER ELEMENT CHANGE PROCEDURE

1. Stop the machine, electrically isolate and vent all trapped pressure.
2. Unscrew the retaining cap and withdraw the old element.
3. Fit the new element.
4. Replace the retaining cap.

■ SEPARATOR CARTRIDGE CHANGE PROCEDURE

1. Stop the machine, electrically isolate and vent all trapped pressure.
2. Loosen separator cartridge with the correct tool.
3. Remove the cartridge from the housing; place it in a sealed bag and dispose of it safely.
4. Clean the mating face of the housing.
5. Remove the new **Ingersoll Rand** replacement cartridge from its protective package.
6. Apply a small amount of lubricant to the cartridge seal.
7. Screw the new cartridge down until the seal makes contact with the housing, then hand tighten a further half turn.
8. Start the compressor and check for leaks.



CAUTION

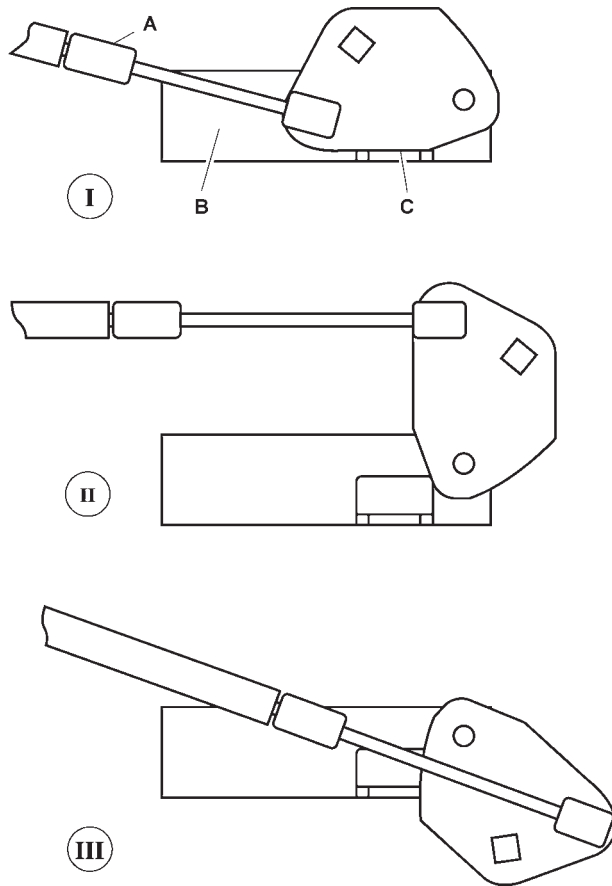
This unit is not designed or intended to operate when contaminated with silicone. Lubricants, greases or other items containing silicone should not be used on this unit.

■ COOLER CLEANING PROCEDURE

1. Stop the machine, electrically isolate and vent all trapped pressure.
2. Remove the top cover to obtain access to the cooler.
3. Clean the cooler.
4. Rebuild in reverse order.

MAINTENANCE

■ BELT CHANGE / GAS STRUT CHANGE PROCEDURE



A. Gas strut.

B. Support bracket (part of pivoted assembly).

C. Tension cam.

Figure 1

1. Stop the machine, electrically isolate and vent all trapped pressure.
2. Remove the side cover from the machine.
3. Fit a 1/2" square drive wrench in the tension cam located above the airend (access from front door). Turn clockwise 1/4 turn to Position II to release gas strut tension on the belts.
4. Using a small screwdriver under the spring clip, ease the ball ends off the spherical studs at the ends of the gas strut.
5. Replace the gas strut and the studs at the same time by removing and replacing the studs then pushing the new gas strut firmly onto the studs until it clicks into place.
6. Turn the tension cam clockwise 1/4 turn to Position III to raise and support the airend. Place a block of wood or similar under the separator tank for support.
7. Replace the belts from the left side of the machine.
8. Turn the tension cam counter-clockwise 1/2 turn to Position I to tension the gas strut.
9. Spin the drive to check alignment of the belt ribs on the pulleys (sheaves).

ELECTRIC DRAIN VALVE - OPERATION AND MAINTENANCE

■ PRODUCT DESCRIPTION

The Electric Drain Valve removes condensed water and oil from the air receiver tank. Additional drains may be installed throughout your compressed air system, including aftercoolers, filters, drip legs and dryers.

The Electric Drain Valve operates on a timer which can be set to automatically drain the air receiver tank at operator determined intervals.

Key features include:

- 100% continuous duty
- NEMA 4 enclosure
- Adjustable time on (0.5 – 10 seconds)
- Adjustable time off (0.5 – 45 minutes)
- Stainless steel operator
- LED to indicate electrical power is on
- LED to indicate valve is open
- Manual override

■ OPERATION

1. Open the strainer ball valve.

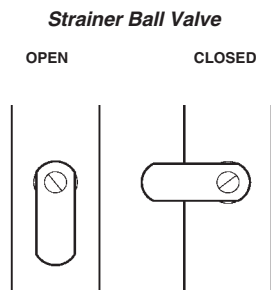


Figure 2

2. Set the "time off" and "time on" knobs. See **TIMER SETTINGS** (below) for an explanation of the settings.
3. During compressor operation, check for air leaks.

■ TIMER SETTINGS

The "time off" setting determines the interval between cycles from 30 seconds to 45 minutes. The "time on" setting determines the actual time the compressor drains condensate.

The timer's cycle rate and drain opening time should be adjusted to open just long enough to discharge the condensate. The timer is properly set when it opens and discharges condensate and then vents air for approximately one second before closing. Adjustments may be made depending on many factors, including humidity and duty cycle.

■ TROUBLESHOOTING

TROUBLE	CAUSE	ACTION
Valve will not close.	Debris in solenoid valve prevents diaphragm from seating.	Remove solenoid valve, disassemble, clean and reassemble.
	Short in electrical component.	Check and replace power cord or timer as needed.
Timer will not activate.	No electrical supply.	Apply power.
	Timer malfunction.	Replace timer.
	Clogged port.	Clean valve.
	Solenoid valve malfunction.	Replace solenoid valve.
	Clogged strainer.	Clean strainer.

■ MAINTENANCE

Periodically clean the screen inside the valve to keep the drain functioning at maximum capacity. To do this, perform the following steps:

1. Close the strainer ball valve completely to isolate it from the air receiver tank.
2. Press the TEST button on the timer to vent the pressure remaining in the valve. Repeat until all pressure is removed.



CAUTION

High pressure air can cause injury from flying debris. Ensure the strainer ball valve is completely closed and pressure is released from the valve prior to cleaning.

1. Remove the plug from the strainer with a suitable wrench. If you hear air escaping from the cleaning port, STOP IMMEDIATELY and repeat steps 1 and 2.
2. Remove the stainless steel filter screen and clean it. Remove any debris that may be in the strainer body before replacing the filter screen.
3. Replace plug and tighten with wrench.
4. When putting the Electric Drain Valve back into service, press the TEST button to confirm proper function.

DRYER OPTION - OPERATION AND MAINTENANCE

The UP series integrated dryer is not for use with the low ambient or outdoor module options.

■ INSTALLATION

- Do not obstruct the dryer air grilles.
- Allow sufficient gap around the unit to facilitate maintenance and ensure unimpeded air discharge from the condenser.
- Avoid recirculation of hot condenser air back into the condenser air inlet.
- Do not connect condensate drains common to other pressurized drain lines in a closed circuit. Make sure the outflow from the condensate drains is unimpeded. Connect the condensate piping in such a way to ensure that sound levels are kept to a minimum during drainage. Ensure that all condensate is disposed of in a responsible manner, in accordance with local norms concerning environmental protection.
- The ambient air around the dryer and compressor must not contain solid or gaseous contaminants. All compressed and condensed gases can generate acids or chemical products which may damage the compressor or components inside the dryer. Take particular care with sulphur, ammonia, chlorine and installations in marine environments. For further advice or assistance consult your local **Ingersoll Rand** representative.

■ ELECTRICAL CONNECTION

The dryer is powered from single-phase that must be supplied separately from the compressor three-phase supply. The dryer should be connected to a single phase supply in accordance with local requirements and codes.

■ CONDENSATE DRAINS

The dryer package is equipped with three automatic condensate float drains in the moisture separator, the dryer's compressor, and the post-filter. Each float drain has a drainage port near the compressed air outlet on the package.

THESE LINES MUST BE KEPT SEPARATE. Joining them will cause improper operation.

■ START-UP AND OPERATION

Preliminary checks

Before starting the compressor, make sure that: The power supply is correct for the dryer voltage.

Starting the dryer

- Use the green switch to start the dryer (Figure 4b).
- To protect dryer equipment, always start up the dryer before activating the air compressor.

- Wait about 5 minutes until the dryer is running at the correct operating temperatures and pressures before starting the compressor.
- Always leave the dryer running while the air compressor is operating, irrespective of load condition.

After stopping the dryer, wait at least 3 minutes before starting it again.

■ STOPPING THE DRYER

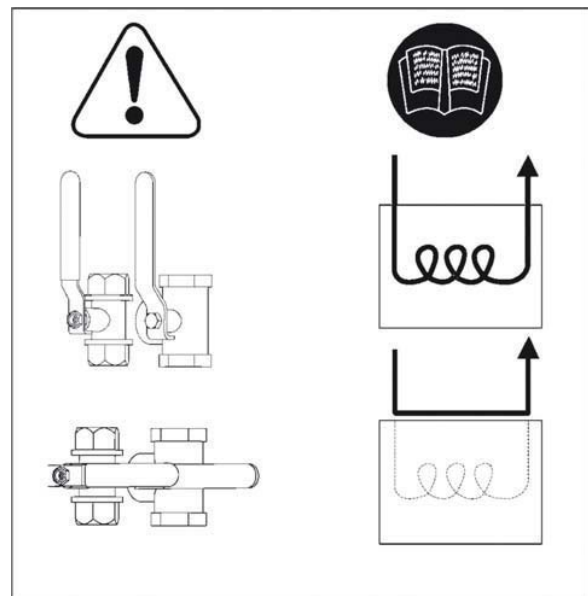
- Use the switch to stop the dryer (Figure 4b).
- Stop the dryer at least 2 minutes after shutting down the air compressor or interrupting the air flow to the dryer.

Compressed air must never enter the dryer when the dryer is switched off or when it is in an alarm situation which stops the refrigeration compressor. The dryer can be bypassed in these conditions.

■ OPERATION

- The dryer operates automatically. It is factory set for a dew point of 7° C (46° F) ISO8573-1 and therefore requires no further calibration
- For maximum performance from your dryer, follow the maintenance schedule.
- The dewpoint thermometer gives an indication of performance of the dryer. When the dryer is switched off at ambient conditions, it displays red. In normal conditions it should be operating in the green region. If the unit continues to operate in the red region, contact your local **Ingersoll Rand** representative.

Figure 3 shows the dryer's refrigeration and air circuits.



DRYER OPTION - OPERATION AND MAINTENANCE

In order to bypass the dryer, stop the UP compressor and lock and tag it out. Turn BOTH valves to a horizontal position, as shown. The compressor can be run and the dryer can be removed from the system for repair in bypass mode.

Do not operate with valves in positions other than those shown here. This may pressurize dryer with no air flow.

■ MAINTENANCE

Before accessing live electrical parts, disconnect the power supply to the dryer using disconnect switch or disconnect the cable connections.

Preventive maintenance

For optimum performance from your dryer, follow the periodic maintenanceschedule described below.

WEEKLY	CONDENSATE DRAINS verify that the condensate drains are operating correctly.
MONTHLY	COMPRESSOR Make sure the refrigerant compressor temperature is below 140° F (60° C) when running.
EVERY 4 MONTHS	CONDENSER Remove any dust from the condenser fins.
	COMPRESSOR Make sure compressor power consumption complies with data plate specifications.
YEARLY	CONDENSATE DRAINS Completely disassemble the drains and clean all their components. AIR FILTER Replace air filter element.

■ MOISTURE SEPARATOR MAINTENANCE

The moisture separator will operate indefinitely under normal working conditions, however at some time it may be necessary to replace the seals should the housing leak.

1. Isolate the housing from the air supply.
2. Fully depressurize in drain bowl as appropriate.
3. Unscrew bowl and remove. If pressure has not been completely released from the housing, air will escape from the warning hole giving an audible alarm. Screw back bowl and repeat instruction 2 before attempting again. Should resistance to unscrewing be experienced, provision is made for a 'C' spanner to fit onto the ribs of the bowl.
4. Check condition of bowl seal and replace if necessary. Clean screw threads.
5. The autodrain assembly is not serviceable and must be replaced if faulty.

6. Refit bowl with 'O' ring seal.
7. Repressurize and check for leaks. If leaks occur they will most probably be from the bowl 'O' ring. Depressurize housing and remove 'O' ring as stated above and inspect and clean. Ensure that mating surfaces are clean and then refit 'O' ring and repressurize.

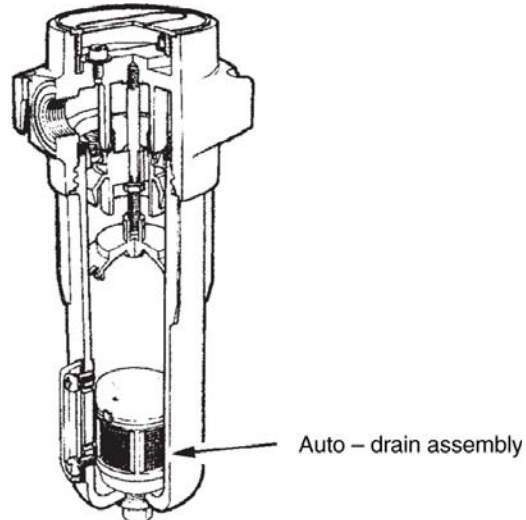


Figure 4a

■ AIR FILTER MAINTENANCE

In order to ensure optimum compressed air quality the filter element should be replaced as follows. (Used filter elements must be disposed of in accordance with local regulations.)

Use only genuine **Ingersoll Rand** replacement elements.

DRYER OPTION - OPERATION AND MAINTENANCE

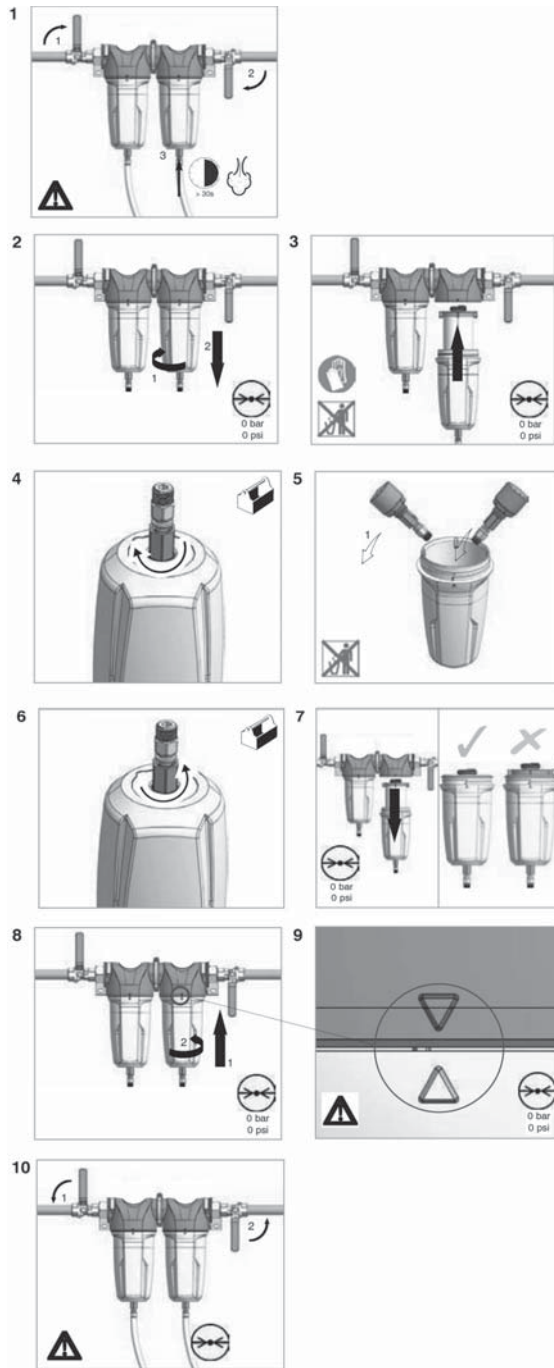


Figure 4b

■ DISASSEMBLING THE UNIT

The unit has been designed and constructed to guarantee continuous operation.

The long service life of some components such as the fan and compressor depends on good maintenance.

The unit must only be disassembled by a refrigerant specialist.

Refrigerant liquid and lubricating oil inside the refrigeration circuit must be recovered in compliance with current norms in the country where the machine is installed.

RECYCLING DISASSEMBLY

Frame and panels	Steel / epoxy resin polyester
Heat exchanger (cooler)	Copper
Pipes	Copper
Drainage system	Polyamide
Heat exchanger insulation	EPS (polystyrene sintered)
Pipe insulation	Gum synthetic
Compressor	Steel / copper / aluminium / oil
Condenser	Steel / copper / aluminium
Refrigerant	R134a
Valve	Brass
Electrical cable	Copper / PVC

■ REFRIGERANT LEAKS IN THE REFRIGERATION CIRCUIT

The unit is dispatched in perfect working order, already charged.

Refrigerant leaks may be identified by tripping of the compressor overload protector (SK).

IF A LEAK IS DETECTED IN THE REFRIGERANT CIRCUIT, SEEK TECHNICAL ASSISTANCE.

■ REFRIGERANT CHARGING

THIS OPERATION MUST ONLY BE PERFORMED BY A REFRIGERANT SPECIALIST.

WHEN REPAIRING THE REFRIGERANT CIRCUIT, COLLECT ALL THE REFRIGERANT IN A CONTAINER AND DISPOSE OF IT IN THE APPROPRIATE MANNER

■ CHARACTERISTICS OF REFRIGERANT R134A

In normal temperature and pressure conditions the above refrigerant is a colorless, class A1/A1 gas with TVL value of 1000ppm (ASHRAE classification).

If a refrigerant leak occurs, thoroughly air the room before commencing work.

TROUBLE SHOOTING

PROBLEM	CAUSE	REMEDY
Compressor fails to start.	Mains power or Control voltage not available.	§ Check incoming power supply. § Check the control circuit fuse. § Check the transformer secondary windings for the control voltage.
	Defective Star / Delta timer.	§ Change Star / Delta timer.
Machine shuts down periodically.	High airend temperature.	Top up coolant.
	Motor overload.	§ For relay, set overload to correct value. For current transducers, ensure set point is correct in controller.
	Belt stretch protection (when fitted).	Change belt.
	Line voltage variation.	§ Ensure voltage does not drop below 10% on start up and 6% running.
High current draw.	Compressor operating above rated pressure.	Set pressure to correct rating for machine.
	Separator cartridge contaminated.	Change air filter, and separator cartridge.
	Low voltage.	§ Ensure voltage does not drop below 10% on start up and 6% running.
	Unbalanced voltage.	Correct incoming supply voltage.
	Damaged airend.	† Change Airend.
Low current draw.	Air filter contaminated.	Change air filter.
	Compressor operating unloaded.	Set pressure to correct rating for machine.
	High voltage.	Reduce site voltage to correct operating voltage.
	Defective inlet valve.	† Fit inlet valve service kit.
High discharge pressure.	Pressure transducer faulty, incorrectly calibrated or EMF interference.	Recalibrate or replace.
	Load solenoid valve defective.	† Fit load solenoid service kit.
	Blowdown valve defective.	† Fit blowdown solenoid service kit.
	Inlet valve malfunction.	† Fit inlet valve service kit.
Low system air pressure.	Separator cartridge contaminated.	Fit new separator cartridge.
	Pressure transducer faulty, incorrectly calibrated or EMF interference.	Recalibrate or replace.
	Minimum pressure valve malfunction.	† Fit Minimum pressure valve service kit.
	Load solenoid valve defective.	† Fit load solenoid service kit.
	Blowdown valve defective.	† Fit blowdown solenoid service kit.
	Drive belt slipping.	Fit new belt and tensioner.
	Air system leaks.	† Fix leaks.
	Inlet valve malfunction.	† Fit inlet valve service kit.
System demand exceeds compressor delivery.	Reduce demand or install additional compressor.	

NOTES:

§ Must be carried out by a competent electrician.

† This work is recommended to be carried out only by an **Ingersoll Rand** authorized service technician.

TROUBLE SHOOTING

PROBLEM	CAUSE	REMEDY
Compressor trips due to over temperature.	Compressor operating above rated pressure.	Set pressure to correct rating for machine.
	Package pre-filter blocked.	Clean / replace package pre-filter.
	Cooler blocked.	Clean cooler.
	Missing or incorrectly fitted enclosure panels.	Ensure that all enclosure panels are correctly fitted.
	Low coolant level.	Top up coolant and check for leaks.
	High ambient temperature.	Re-site compressor.
	Restricted cooling air flow.	Ensure correct air flow to compressor.
Excessive coolant consumption.	Separator cartridge leak.	Fit new separator cartridge.
	Blocked separator cartridge drain.	† Remove fittings and clean.
	Compressor operating below rated pressure.	Set pressure to correct rating for machine.
	Coolant system leak.	† Fix leaks.
Excessive noise level.	Air system leaks.	† Fix leaks.
	Airend defective.	† Change Airend.
	Belts Slipping.	Replace belt and tensioner.
	Motor defective.	† Replace motor.
	Loose components.	† Retighten loose items.
Shaft seal leaking.	Defective shaft seal.	† Fit Airend shaft seal kit.
Pressure relief valve opens.	Pressure transducer faulty, incorrectly calibrated or EMF interference.	Recalibrate or replace.
	Minimum pressure valve malfunction.	† Fit Minimum pressure valve service kit.
	Load solenoid valve defective.	† Fit load solenoid service kit.
	Blowdown valve defective.	† Fit blowdown solenoid service kit.
	Inlet valve malfunction.	† Fit inlet valve service kit.
Black residue on belt guard/cooler box.	Drive belt slipping.	Replace belt and tensioner.
	Pulleys misaligned.	Re-align pulleys.
	Worn pulleys.	† Replace pulleys and belt.
	Gas strut failed.	Replace belt and tensioner.
Safety valve blows when compressor goes on load.	MPV Stuck closed.	Strip MPV, examine and repair if necessary.
	Safety valve faulty.	Check the setting of the safety valve and the rated pressure.

NOTES:

§ Must be carried out by a competent electrician.

† This work is recommended to be carried out only by an **Ingersoll Rand** authorized service technician.



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