



**Scroll
Medical Air System**

**Installation
Operation and
Maintenance
Manual
2 - 15 Hp**



Oil-Less Scroll Medical Air System

Model Number:	
Serial Number:	
Date Purchased:	
Purchased from:	

For further technical assistance, service or replacement parts, please contact:

Patton's Medical

3201 South Boulevard
Charlotte, NC 28209

Customer Service: 1-866-960-0087

Phone: 704-529-5442

FAX: 704-525-5148

www.pattonsmmedical.com

Please include the unit serial number located on the control panel with all inquiries.

Patton's Medical reserves the right to make changes and improvements to update products sold previously without notice or obligation.

Issue Date: August 5, 2011



Oil-Less Scroll Medical Air System

Table of Contents

Safety Precautions

1.0 General Information

2.0 Installation

- 2.1 Inspection Upon Receiving
- 2.2 Handling
- 2.3 Location
- 2.4 Space Requirements
- 2.5 Piping
- 2.6 Wiring

3.0 Control Panel

- 3.1 HMI System Controller (Human Machine Interface) Front Panel
- 3.2 HMI Main Display Screen (Multiplex Systems)
- 3.3 Control Buttons
- 3.4 "Troubleshooting" Button
- 3.5 "Trend Dew Point" Button
- 3.6 "Trend System Pressure" Button
- 3.7 "Trend CO" Button
- 3.8 "System Information" Button
- 3.9 HMI Maintenance and Spare Parts
- 3.10 HMI Cleaning Method

4.0 System Operation

- 4.1 Prestart-up
- 4.2 Initial Start-up
- 4.3 Normal Start-up
- 4.4 Normal Operation
- 4.5 Normal Shutdown
- 4.6 Emergency Shutdown/Alarms

5.0 Trouble Shooting

6.0 Maintenance

- 6.1 Maintenance Schedule
- 6.2 Replacement Filter Elements

(Continued next page)



Oil-Less Scroll Medical Air System

Table of Contents

7.0 Inspection/Replacement Procedures

7.1 V-belts

7.2 Air Intake Filter

7.3 Readjustment of Cut-out and Cut-in Pressure

8.0 Replacement Parts

9.0 Warranty

10.0 Maintenance Record



Oil-Less Scroll Medical Air System

Safety Precautions

Pressurized air from the system may cause personnel injury or property damage if the unit is improperly operated or maintained. The operator should have carefully read and become familiar with the contents of this manual before installing, wiring, starting, operating, adjusting and maintaining the system. The operator is expected to use common sense safety precautions, good workmanship practices and follow any related local safety precautions.

In addition:

- **Before starting any installation or maintenance procedures, disconnect all power to the package.**
- All electrical procedures must be in compliance with all national, state and local codes and requirements.
- A certified electrician should connect all wiring.
- Refer to the electrical wiring diagram provided with the unit before starting any installation or maintenance work.
- Release all pressure from the package before removing, loosening, or servicing any covers, guards, fittings, connections, or other devices.
- Notify appropriate hospital personnel if repairs or maintenance will affect available compressed air levels.
- Air inlet must be placed in an area free of toxic or hazardous contaminants. It must be kept away from ETO exhaust vents, vacuum exhaust vents, areas close to automotive exhausts, etc., in accordance with the latest edition of NFPA 99.
- Prior to using the Scroll Medical Air System, the medical facility must have a certifier perform all installation tests as specified in the latest edition of NFPA 99 and is responsible for ensuring that the Medical Air meets the minimum requirements as specified in the latest edition of NFPA 99.
- This is a high speed, rotating piece of machinery. Do not attempt to service any part while machine is in operation.
- Do not operate unit without belt guards, shields or screens in place.
- Make sure that all loose articles, packing material, and tools are clear of the package.
- Check all safety devices periodically for proper operation.
- Never operate a compressor with its isolation (shutoff) valve closed or without its relief valve in place. Damage to the compressor may occur.
- **Do not add lubricating oil of any kind to the compressor.**
- The "Hand" mode of operation should only be used for emergencies such as a PLC malfunction and should not be used for normal operation.
- Electrical service must be the same as specified on the control panel nameplate or damage to the equipment may occur.
- Vibration during shipment can loosen electrical terminals, fuse inserts, and mechanical connections. Tighten as necessary.



Oil-Less Scroll Medical Air System

1.0 General Information

System Configurations

The Scroll Medical Air systems are either base mounted or tank mounted units in configurations of duplex, triplex, quadruplex or other multiplexed configurations. All are compliant to the latest edition of the NFPA 99 code and consist of at least two compressors, two motors, two desiccant dryers with purge control, two pre-filters, two afterfilters and regulators, an integral pre-wired control panel and corrosion resistant air receiver. The systems are constructed as either single point connection (SPC) or modular packages. The complete package is pre-wired, pre-piped, and assembled either on one common base with single point connections for electrical, intake air, discharge air, and condensation drain or as a modular system with connection points for the above.

Compressor Module

The compressor is a continuous duty rated scroll type with sealed bearings. The design is single stage, air-cooled, consisting of one fixed and one orbiting scroll sealed with PTFE tip seals between the scroll halves and rated for 120 psig discharge pressure. The scrolls are protected from dust or contamination with a two part face seal. Orbiting bearings are grease filled and permanently sealed requiring no lubrication at any time. The drive bearing is grease filled and lip sealed with a maintenance interval of not less than 10,000 hours. The scroll case is constructed of die cast aluminum. Maximum heat dissipation is achieved through an integral cooling fan and air ducting.

Compressor Drive and Motor

The compressor is v-belt driven and protected by an OSHA approved totally enclosed belt guard. A slotted mounting base allows full adjustment for belt tensioning. The motor is a NEMA rated, open drip proof, 3600 RPM, with 1.15 service factor suitable for 208 or 230/460V electrical service.

Intake Piping

Each compressor has a piped intake with one "hospital type" inlet air filter and threaded opening for remote intake piping. The inlet filter removes dust from the incoming air through cyclonic action and through an element.

Discharge Piping

Each compressor is equipped with an integral air-cooled aftercooler designed for a maximum approach temperature of 10° F complete with automatic solenoid drain valve. Each compressor is equipped with a wired high discharge air temperature shutdown switch. The compressor discharge line includes a flex connector, safety relief valve, isolation valve and check valve. The discharge piping of each compressor incorporates an integral valve to provide load-less starting and rapid air evacuation between the check valve and scroll discharge at shutdown to produce less than 1/4 revolution of reverse rotation of the scroll. The discharge air piping is made of ASTM B-819 copper tubing, brass, aluminum, and/or stainless steel. The discharge flex connector is braided, 304 stainless steel, brass, or bronze.



Oil-Less Scroll Medical Air System

1.0 General Information (continued)

Isolation System

The compressor and motor are fully isolated from the system base by means of a four-point, heavy duty, isolation system for a minimum of 95% isolation efficiency.

Dryer

Each desiccant dryer is individually sized for peak calculated demand and capable of producing a -40°F (-40°C) pressure dew point. Dryer purge flow is minimized through a demand-based purge saving control system. Isolation valves to permit servicing without shutting down the medical air system along with an air sample port are included.

Control System

The mounted and wired control system is NEMA 12 and U.L. labeled. The control system provides automatic lead/lag sequencing with circuit breaker disconnects for each motor with external operators. The control panel also includes full voltage motor starters with overload protection, redundant 120V control circuit transformers, visual and audible reserve unit alarm with isolated contacts for remote alarm, hand-off-auto selector switches, and runtime hourmeters. Automatic alternation of compressors is based on a first-on/first-off principle with provisions for simultaneous operation if required and automatic activation of the reserve unit if required. Visual and audible alarms indicators for high discharge air temperature shutdown, with isolated contacts for remote alarm, are included.

An HMI (Human Machine Interface) touch screen display is mounted in the control panel door. It includes:

- a pressure display
- a runtime display
- dew point/CO monitoring
- a 4-day dew point trend display
- a 4-day CO trend
- a 4-day pressure trend
- an alarm history display
- a maintenance schedule and history display
- a service indicator
- a replacement parts display
- a battery backup for history display
- a pressure set point adjustment display



Oil-Less Scroll Medical Air System

1.0 General Information (continued)

Final Line Filters and Regulators

The inlet to each dryer includes a mounted high efficiency coalescing pre-filter rated for 0.01 micron mounted on each dryer with automatic solenoid drain and element change indicator. A particulate final line filter rated for 0.01 micron is mounted on each dryer with element change indicator along with a final line regulator and safety relief valve.

Dew Point Sensor/CO Sensor

The factory mounted, piped and wired, dew point sensor/CO sensor include remote alarm contacts. The dew point sensor is a ceramic type with system accuracy of $\pm 2^{\circ}$ F. The CO sensor is a chemical type with system accuracy of ± 2 PPM (at 10 PPM) for carbon monoxide. The dew point alarm is factory set at 36° F (2° C) per NFPA 99, and the CO alarm is factory set at 10 PPM. Both set points are field adjustable. High CO and high dew point conditions are indicated with visual and audible alarms. The alarms are also logged to the "History" screen on the HMI. See Section 3.3.3 for more details.)

Air Receiver

The vertical air receiver is corrosion resistant, ASME Coded, National Board Certified, and rated for a minimum 150 PSIG design pressure. The tank piping includes a liquid level gauge glass, safety relief valve, manual drain valve, and a timed automatic solenoid drain valve.



Oil-Less Scroll Medical Air System

2.0 Installation

2.1 Receiving Inspection

The Scroll Medical Air system should be carefully inspected upon delivery. Any damage by the carrier should be noted on the delivery receipt, especially if the system will not be immediately uncrated and installed. The system may remain in its shipping container(s) until ready for installation. If the system is to be stored prior to installation, it must be protected from the elements to prevent rust and deterioration.

DO NOT REMOVE the protective covers from the inlet and discharge connection ports of the unit until they are ready for connecting to the hospital's pipeline distribution system.

2.2 Handling

!!WARNING!!

USE APPROPRIATE LOAD RATED LIFTING EQUIPMENT AND OBSERVE SAFE LIFTING PROCEDURES DURING ALL MOVES.

The compressor package can be moved with either a forklift or dollies. Be sure that the orange spacers used to prevent the compressor/motor base from unnecessary movement while moving and/or mounting the unit are in place. Keep all packing in place during installation to minimize damage. Examine the route the unit must travel and note dimensions of doorways and low ceilings. The 2-7½ hp systems are designed to go through 36" doorways. The larger systems, 10-15 hp, must be separated to go through 36" doorways. If this is necessary, carefully label all electrical connections that are removed for easier re-assembling at the final destination. Units should be placed to ensure easy access to perform maintenance and high visibility of indicators and gauges.

2.3 Location

The Medical Air system should be installed indoors in a clean, well-ventilated environment. Areas of excessive dust, dirt or other air-borne particulate should be avoided.

Secure the package to a flat, level surface capable of supporting the weight and forces of the unit. Make sure that the main base is not bowed, twisted, or uneven. Because of the internal flexible hose connections and spring isolators, **no special foundation is required**. However, the unit base must be securely bolted using all mounting holes provided in the base. If a raised concrete pad is used, the base must not overhang the concrete pad. A method to drain away moisture is necessary. If a gravity drain is not available, a connection to a drain is necessary. After securing the unit to the floor, remove the orange spacers from under the compressor/motor base.



Oil-Less Scroll Medical Air System

2.0 Installation (continued)

2.3 Location (continued)

The area should have an average ambient temperature of 70°F (21°C) with a minimum ambient temperature of 40°F (4.4°C) and a maximum ambient temperature of 100°F (37.8°C). **(Note: At temperatures below 32°F the bare compressor will not be adversely affected, but freezing of the condensate can occur which could affect operation.)**

Sound levels of 65 to 80 dbA are to be anticipated depending on the size of the package (duplex, triplex, quad). Though the sound levels are not excessive, they should be considered when locating the system.

2.4 Space Requirements

The Medical Air system should be placed to ensure easy access to perform maintenance and high visibility of indicators and gauges. It is recommended that a minimum space of 24" be allowed on all sides of the compressor system for ventilation and maintenance. A minimum space of 36" in front of the control panel is required by NEC code. A vertical distance of 36" is required above the unit for ventilation and maintenance.

2.5 Piping

2.5.1 Intake Piping

WARNING:

The air intake must be placed in an area free of toxic or hazardous contaminants; it must be kept away from ETO gas exhaust vents, vacuum exhaust vents, areas close to automotive exhausts, etc., in accordance with NFPA 99.

The air intake line must be piped to the outside in accordance with NFPA 99. To ensure that airflow restriction will not occur, size the piping according to the following chart. All piping must be pre-cleaned for medical gas in accordance with NFPA 99. The outside pipe must be turned down and screened to prevent contamination. The source of air is typically from outside the building. In hot humid areas, using the building's air-conditioned supply (per NFPA 99) may improve operating conditions of the system.

All of the 10-15 hp Single Point Connection (SPC) systems have the necessary flex connectors for the air intake and discharge factory piped, and no further flex connectors are needed. However, for the 2-7½ hp systems, the customer must install one intake flex connector.



Oil-Less Scroll Medical Air System

2.5 Piping (continued)

2.5.1 Intake Piping (continued)

Medical Air	System Pipe Length (ft) - See Notes											
	25	50	75	100	150	200	250	300	350	400	450	500
Duplex 2 HP	1.25	1.25	1.25	1.25	1.50	1.50	1.50	2.00	2.00	2.00	2.00	2.00
Duplex 3 HP	1.25	1.25	1.50	1.50	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.50
Duplex 5 HP	1.50	2.00	2.00	2.00	2.00	2.50	2.50	2.50	2.50	2.50	2.50	3.00
Duplex 7.5 HP	2.00	2.00	2.00	2.50	2.50	2.50	3.00	3.00	3.00	3.00	3.00	3.00
Duplex 10 HP	2.00	2.50	2.50	2.50	2.50	3.00	3.00	3.00	3.00	3.50	3.50	3.50
Duplex 15 HP	2.50	2.50	2.50	3.00	3.00	3.50	3.50	3.50	3.50	4.00	4.00	4.00
Triplex 10 HP	3.00	3.00	3.00	3.00	3.00	3.00	3.50	3.50	3.50	3.50	4.00	4.00
Triplex 15 HP	3.00	3.00	3.00	3.00	3.50	3.50	4.00	4.00	4.00	4.00	5.00	5.00
Quad 10 HP	3.00	3.00	3.00	3.00	3.50	3.50	3.50	4.00	4.00	4.00	4.00	5.00
Quad 15 HP	3.00	3.00	3.50	3.50	4.00	4.00	5.00	5.00	5.00	5.00	5.00	5.00

- 1) All pipe sizes are based on the following: copper pipe (Type L), 14.7 psia, 70 deg F.
- 2) The minimum pipe size must be maintained for the total length of the inlet pipe. Use next larger size pipe in the event the minimum size is not available.
- 3) When determining the total pipe length, add all the straight lengths of pipe together in addition to the number of elbows times the effective pipe length for that pipe size .

Effective Pipe length for each 90 deg elbow										
Pipe size (in.)	1.25	1.5	2.00	2.5	3	3.5	4	5	6	
Eff. Pipe Length (ft)	3.4	4	4.9	6.4	7.9	9.4	10.0	11.9	13.2	

2.5.2 Discharge Piping

A larger piping size may be required depending on the length of the distribution piping in the facility.

Systems	Pipe Size
Duplex 2 HP	1/2
Duplex 3 HP	1/2
Duplex 5 HP	3/4
Duplex 7.5 HP	3/4
Duplex 10 HP	3/4
Duplex 15 HP	1
Triplex 10 HP	1
Triplex 15 HP	1-1/4
Quad 10 HP	1
Quad 15 HP	1-1/4



Oil-Less Scroll Medical Air System

2.0 Installation (continued)

2.6 Wiring

WARNING!

BE SURE TO DISCONNECT ALL ELECTRICAL POWER TO THE COMPRESSOR SYSTEM BEFORE PERFORMING ANY ELECTRICAL PROCEDURES.

Refer to the electrical diagram provided with the unit before starting any installation or maintenance work.

Do not operate compressor on a voltage other than the voltage specified on the compressor nameplate.

All customer wiring should be in compliance with the National Electrical Code and any other applicable state or local codes.

CAUTION: In the Duplex configuration, all voltages will be disconnected from the compressor modules using the circuit breaker. Opening the appropriate fused knife-switch disconnect, disconnects control power. Turning off the appropriate motor circuit breaker disconnects motor power.

Refer to the wiring diagram that came with the compressor system for pertinent wiring connections.

Electrical power for the Medical Air system must be supplied from the emergency life support circuit.

Check the control voltage, phase, and amp ratings before starting the electrical installation, and make sure the voltage supplied by the hospital is the same.

The wire size should be able to handle peak motor amp load of all operating units, refer to the full load and compressor system amperes on the wiring diagram.

Check all electrical connections within the air system that may have loosened during shipment.

Only qualified electricians should make power connections to the control panel and any inter-connecting wiring.

Ensure that the emergency generator system's electrical supply is consistent with the air system's requirements.

Three-phase power supplied from the emergency generator(s) must match that of the normal supply to allow for correct direction of the motor rotation at all times.

3.0 Control Panel



Fig. 3.1 Duplex Control Panel

- 1. Display Screen** – Displays the systems operating screens.
- 2. Touch Key** – For operating the touch switches in the display screen.
- 3. Power LED** – Green: Power is correctly supplied
Orange: Screen Saver
Blinking in orange/green: Blown backlight bulb
Not lighted: Power is not supplied
- 4. USB Interface** – USB Interface for connecting a personal computer.
- 5. USB Environmental protection cover** – Opens/Closes
- 6. HOA selector switch** – Compressor control switch, Hand – Off – Auto.
- 7. Alarm horn** – Sounds when an alarm condition occurs.
- 8. Alarm Reset/Horn Silence** – Pushbutton to silence alarm and reset visual alarm on HMI screen after alarm condition is corrected.
- 9. Dryer Control Selector Switch** – Manual Purge - Off - Demand Purge
- 10. External Operator** – To control circuit breaker disconnect

3.0 Control Panel (continued)

3.1 HMI System controller (Human Machine Interface) Front Panel

The Scroll Medical Air system has an HMI touch screen controller to control and monitor the complete system operation as well as record service and alarm history of the unit and change pressure setting levels.

3.2 HMI Main Display Screen (Multiplex Systems)

The main screen for Multiplex Systems will monitor and display the system's dew point and CO readings, air receiver pressure, individual unit total run hours and run status (HOA switch position). Included on this screen is a service due alarm, transducer fault alarm and lag alarm for the system as well as individual alarms for each compressor unit (motor overload, high discharge air temperature, high inlet vacuum, and failed start alarms). The "MENU" button in the upper right corner will allow the operator to navigate through the screens to view the system alarm history, service schedule and records, dew point, CO and pressure trends, basic troubleshooting, pressure settings, and system general information. When the HMI is powered up the main control window will appear on the display screen (See FIG 3.2.). This touch screen displays the systems current dew point reading, CO, pressure, total hours run for each module, HOA switch setting and status of service schedule and alarm conditions.

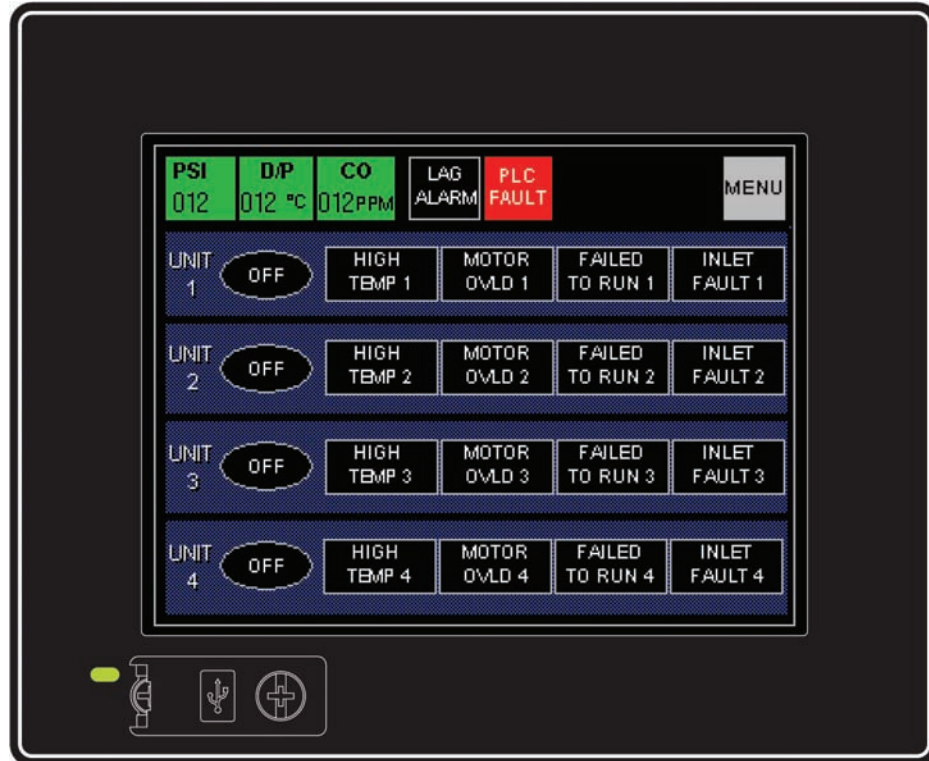


FIG 3.2. Main Panel Screen (Quadruplex System shown)

3.0 Control Panel (continued)

3.2 HMI Main Display Screen (Multiplex Systems) (continued)

1. MENU: Displays menu screen which allows the operator to access the systems operating history, service requirements, dew point, CO, and pressure trends, troubleshooting info and main system info. See 3.3.1 for full description of these functions.
2. DEW POINT (D/P): Display's the current dew point reading at the units discharge point. If the dew point reading is higher than -2°C , a high dew point alarm will occur. The dew point indicator will flash red and the horn will sound. Pressing the reset button on the face of the control panel will silence the alarm. Selecting the indicator when flashing red will open a troubleshooting window. The dew point indicator will continue to flash red until the dew point falls below -2°C . At this point the dew point alarm will reset.
3. CO: Display's the current CO reading at the units discharge point. If the CO reading is higher than 10 ppm, a high CO alarm will occur. The CO indicator will flash red and the horn will sound. Pressing the reset button on the face of the control panel will silence the alarm. Selecting the indicator when flashing red will open a troubleshooting window. The CO indicator will continue to flash red until the CO falls below 10 ppm. At this point the CO alarm will reset.
4. PRESSURE (PSI): Display's the current pressure inside the air receiver.
5. SERVICE DUE: Service intervals and types of service are preprogrammed into the HMI. The button will flash yellow when service is due. Pressing the "service due" button when flashing will display the service schedule screen (FIG 3.3.4.b.).
6. TDC FAULT: Indicator will flash red and horn will sound if the transducer fails. Pressure reading on the display screen will default to "0" psi. Selecting the indicator when flashing red will open a trouble shooting window.
7. LAG ALARM: Indicator will flash red and horn will sound when last available compressor unit comes on. Press the reset button to silence the alarm. If the condition is corrected both the alarm and indicator will turn off. If a lag condition remains the indicating light on the HMI will remain on. Selecting the indicator when flashing red will open a trouble shooting window. Once the lag condition is corrected, press the reset button again to turn off alarm light.
8. UNIT RUN HOURS: Displays total run hours for each compressor module. Press the run status light to display the run hours screen.
9. HAND-OFF-AUTO: Displays status of each compressor module. The green "HAND" displays when the compressor is running and the HOA selector switch is in the HAND setting. The green "AUTO" displays when the compressor is not running and the HOA selector switch is in the AUTO position. The "OFF" indicator is displayed when the HOA selector switch is in the "OFF" position.
10. MOTOR OVLD: Display will flash red and sound an alarm when overload switch is tripped in the control panel. The compressor in question will not re-start until the reset button on the starter inside the main control cabinet is reset (See "Motor overheating" in the Troubleshooting Section 5.0). Press the reset button on front panel to silence the alarm. Selecting the indicator when flashing red will open a trouble shooting window. The indicator on the

HMI will remain on until motor starter is reset.

11. **HIGH TEMP:** Display will flash red and sound an alarm when the compressor unit is shut down due to high discharge air temperatures. Press the reset button on the front panel to clear the alarm. If the indicator light stays “ON”, the high temp condition still exists. Selecting the indicator when flashing red will open a trouble shooting window. The unit may not restart after pressing the reset button, depending on the system sequencing and system pressure.
12. **FAILED START:** Display will flash red if the compressor module failed to start/run when signaled to start. This alarm will also activate when a Motor Overload Shutdown occurs. Press the reset button on the front panel to silence the alarm (see “Failure to start” in the Troubleshooting Section 5.0). Selecting the indicator when flashing red will open a trouble shooting window. The indicator light on the HMI will remain on until the problem has been resolved and the reset button pushed again.
13. **INLET FAULT:** Display will flash red if the compressor inlet is restricted. Inlet fault will also cause a failed start alarm. The indicator will remain on until the problem is solved and the reset button is pushed.

3.0 Control Panel (continued)

3.3 Control Buttons

3.3.1 MENU

The MENU button in the upper right corner (FIG 3.2.) on the main screen when selected will display the “MENU SCREEN” window that will allow the operator to access information about the units’ history, service requirements, dew point, CO and pressure trends, troubleshooting help and system information (See FIG 3.3.1.) Each button will be explained in detail in this section.

3.3.2 – “MAIN” Button

The main button can be found on many of the screens within the HMI Controller. At any time when the “MAIN” button is selected, the HMI display will return to the Main Display Screen (FIG 3.2.)

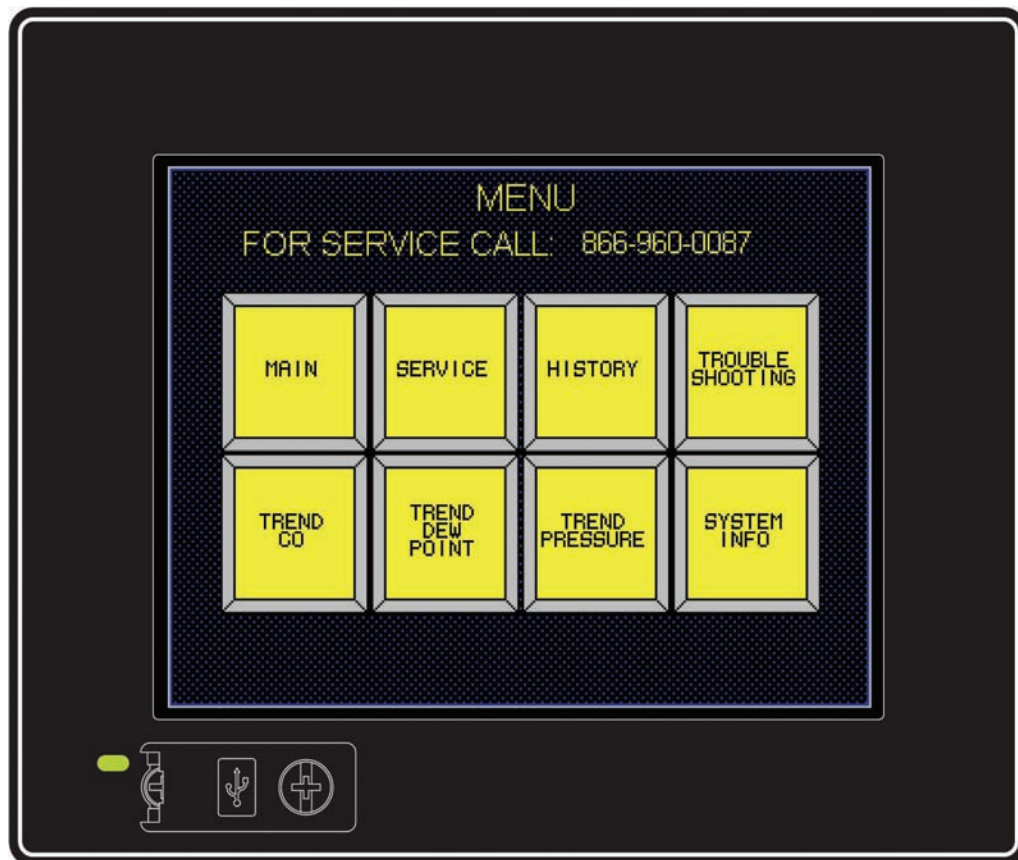


FIG 3.3.1. Menu Screen

3.0 Control Panel (continued)

3.3 Control Buttons (continued)

3.3.3 – “HISTORY” Button

The “HISTORY” button (see FIG 3.3.1.) will open a new window listing all the alarm conditions that have occurred as well as routine maintenance alerts (FIG 3.3.3.). The list will show the date and time of the incident, type of incident and when the condition was cleared/corrected. This creates a permanent record of the history of the unit and cannot be reset.

1. “MAIN” button will return you to the main screen.
2. “MENU” button will return you to the Menu Screen
3. “SHOW CURSOR” and “HIDE CURSOR” buttons will turn on and off the highlight feature used to select specific line items on the history screen
4. The Up and Down arrows allows you to scroll through the history list.
5. “DETAILS” button will open another window which will give the operator more info about a specific occurrence. Highlight specific line to view details then press “Details” button. Service messages will display what actions need to be taken to service the unit. Alarm messages will list troubleshooting info to help resolve the alarm condition.
6. “SAVE” button will open a new window called Program/Data Control. From this screen you can save the Alarm History to a CF (Memory) Card.

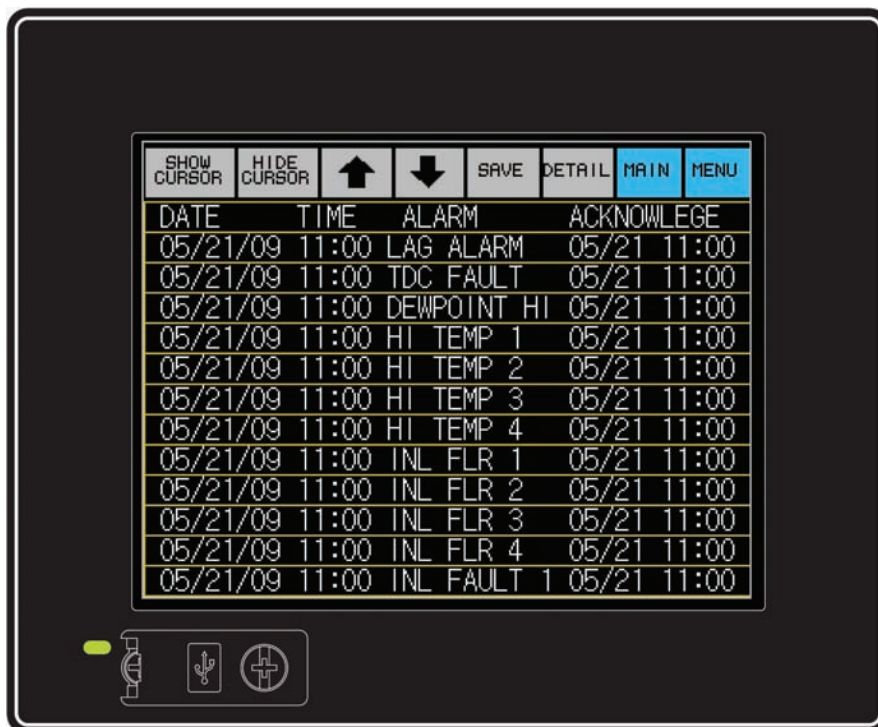


FIG 3.3.3. History screen

3.0 Control Panel (continued)

3.3 Control Buttons (continued)

3.3.4 – “SERVICE” Button

The “SERVICE” button (see FIG 3.3.1.) will open a new screen that allows the operator to view the service schedule for the unit, get a list of standard service parts and view the service intervals for the unit (FIG 3.3.4.a.)

1. “MAIN” button will return you to the main screen.
2. “MENU” button will return you to the Menu Screen.
3. “SYSTEM SERVICE SCHEDULE” button will display a new window listing the service items, when they are due to be serviced and the last time service was performed on that item (See FIG 3.3.4.b). The buttons shown at the bottom of the screen allows the operator to navigate between the individual compressor units (unit #1, unit #2) and the overall system service screen. The Log-in button is used to enter a password for access to the reset buttons.
4. Resetting “SYSTEM SERVICE SCHEDULE”: (Note: before resetting service schedule, perform all the required service and maintenance as indicated by the “Service due” alarm.
5. The “SYSTEM SERVICE SCHEDULE” (FIG 3.3.4.b.) screen can be accessed from the main service menu screen or from the service due button on the main screen (if that button is flashing yellow).

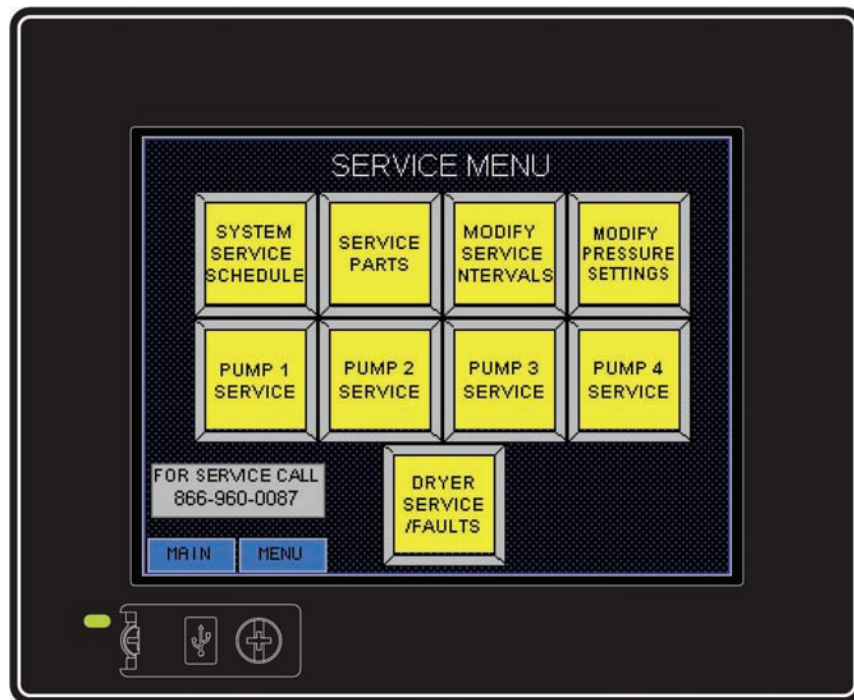


FIG 3.3.4.a. Service Screen

3.0 Control Panel (continued)

3.3 Control Buttons (continued)

3.3.4 – “SERVICE” Button (continued)

6. Select “Log-in” button. Enter password “092955” and select “enter”.
7. Select “OK” in next screen. Display will default back to password screen, select “X” in upper right corner to close screen. Display will then default back to “Service Schedule” screen.
8. Select flashing yellow button to reset service item. A warning window will display asking if you’re sure you want to reset the service schedule. Select “yes” and the service schedule for that item will be updated.
9. Repeat this process for all remaining service due conditions.
10. To return to the “Service Menu Screen” (FIG 3.3.4.a.) touch the “Service Menu” button in the lower left corner.

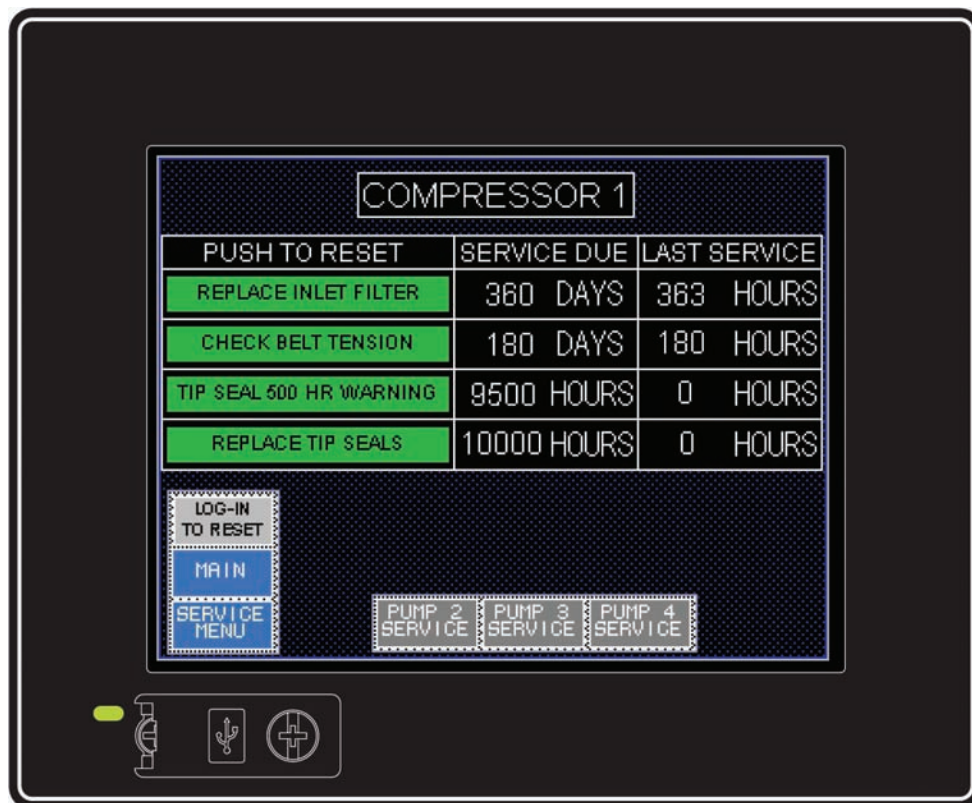


FIG 3.3.4.b. Service Schedule Screen

3.0 Control Panel (continued)

3.3 Control Buttons (continued)

3.3.4.1 – “SERVICE PARTS” Button

The “Service Parts” button will display a screen listing all the service parts for a given HP that are part of the routine maintenance schedule. The screen lists the part description, quantity per module and part numbers for ALL systems (FIG 3.3.4.c.). To return to the “Service Menu Screen” touch the “MENU” button in the lower left corner.

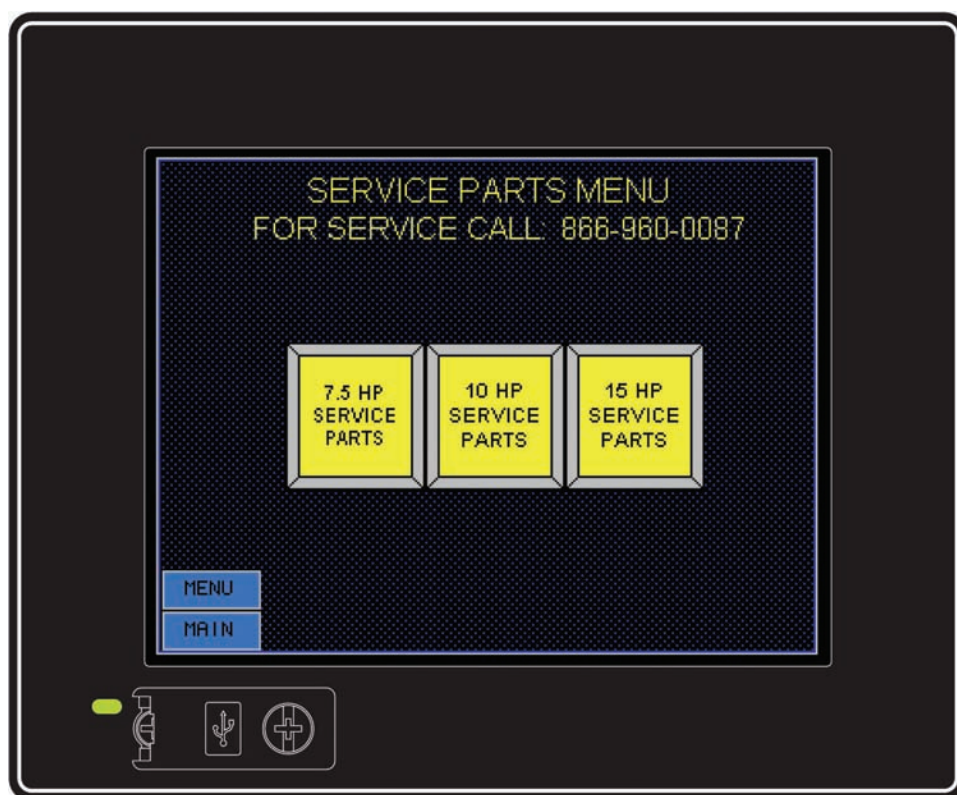


FIG 3.3.4.c. Service Parts Screen

3.0 Control Panel (continued)

3.3 Control Buttons (continued)

3.3.4.2 – “Modify Service Intervals” Button

The “Service Interval” screen (FIG. 3.3.4.d) lists the time interval for routine maintenance for each system. From the “Service Menu” screen, press the “Modify Service Intervals” button. The time intervals are pre-programmed into the HMI at the factory and are used to trigger the “Service Due” indicator on the main control screen (FIG 3.2 or 3.2.a). To return to the “Service Menu” Screen (FIG 3.3.4.a.) touch the “Service Menu” button in the lower left corner.



FIG. 3.3.4.d Service Interval Screen

3.0 Control Panel (continued)

3.4 “Trouble Shooting” Button

The “Trouble Shooting” screen (See Fig 3.4.a) is designed to help the operator diagnose problems with the system. From the Main screen, press “Menu”, then press the “Troubleshooting” button. Each button on this screen corresponds to an alarm button on the main panel. By touching one of the buttons the operator can view a trouble shooting list for the listed alarm conditions (FIG 3.4.b)

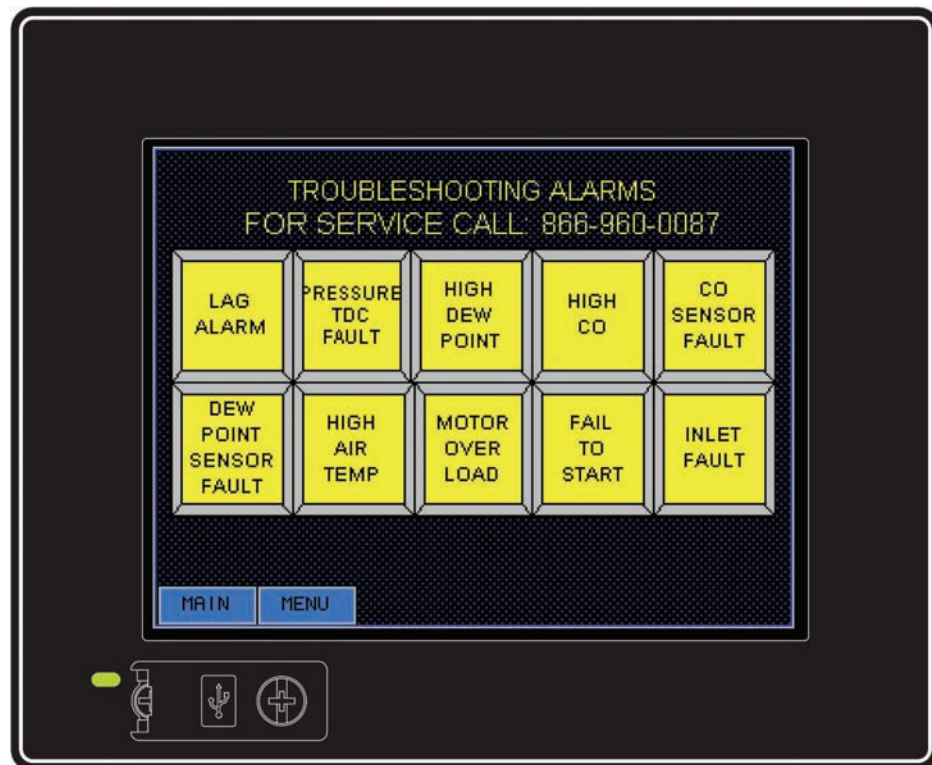
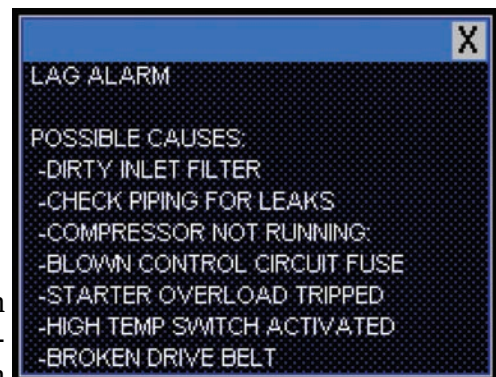


FIG 3.4.a. Troubleshooting Alarms Screen

FIG 3.4.b Lag Alarm Troubleshooting Screen
(Example)



To close the Trouble Shooting Screen touch the “X” in the upper right corner of the screen, the display will default back to the “Troubleshooting Alarms” screen. Touch the “Main” button to return to the Main Screen (FIG 3.3.1.).

3.0 Control Panel (continued)

3.5 “Trend Dew Point” Button

The “Trend Dew Point” screen allows the operator to view graphically the dew point levels over 4 different time spans.

To return to the “Trend Dew Point” screen touch the arrow in the lower left corner.



FIG 3.5.a. Dew Trend Point Menu Screen

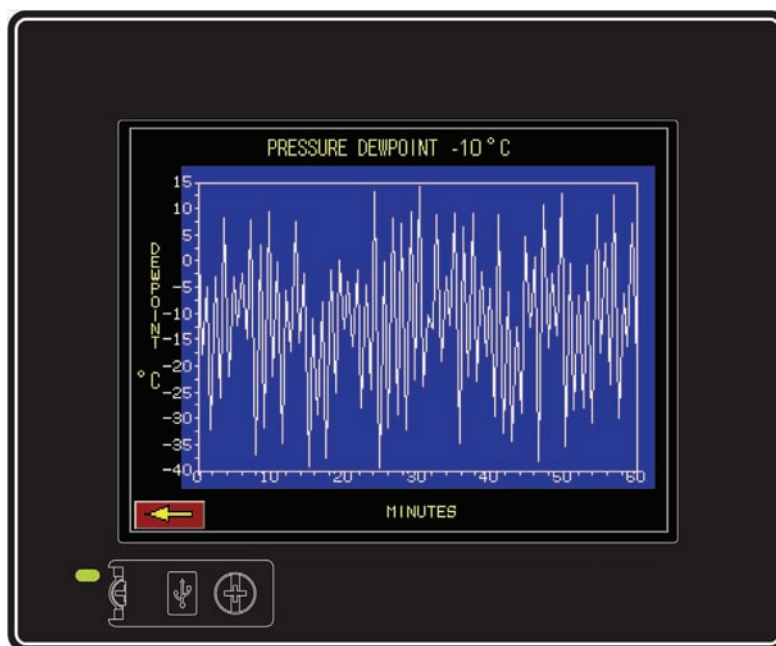


FIG 3.5.b. 60 Minute Dew Point Trend Screen

3.0 Control Panel (continued)

3.6 “Trend System Pressure” Button

The “Trend System Pressure” screen allows the operator to view graphically the system pressure levels in the air receiver over 5 different time spans.

To return to the “Trend System Pressure” screen touch the arrow in the lower left corner.

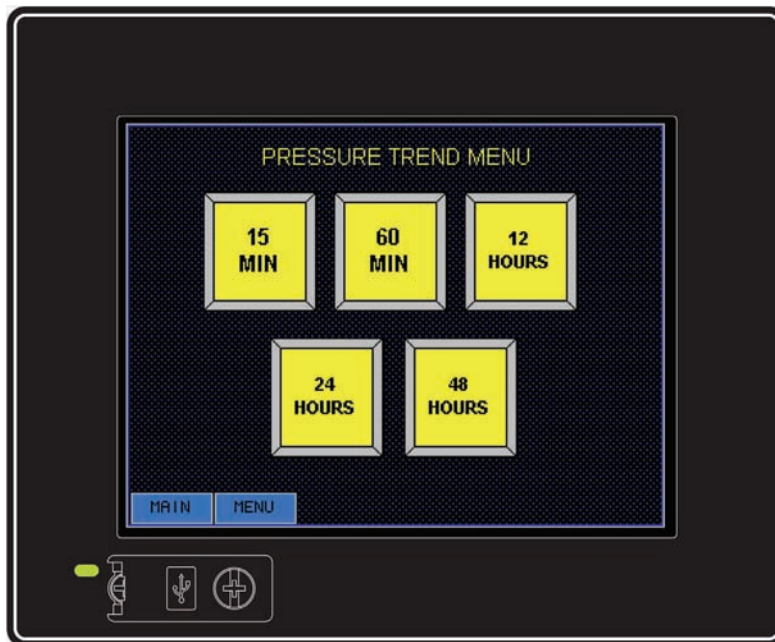


FIG 3.6.a. System Pressure Trend Menu Screen

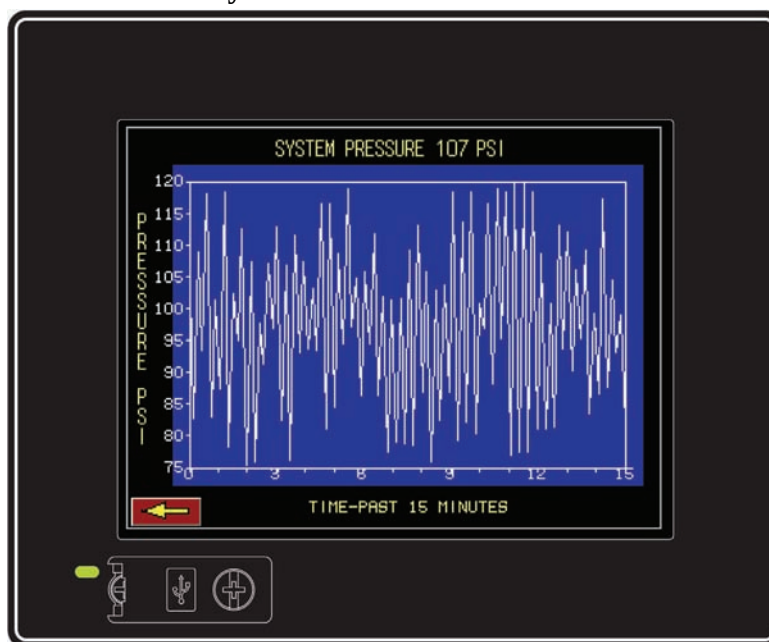


FIG 3.6.b. System Pressure Trend Screen

3.0 Control Panel (continued)

3.7 “Trend CO” Button

The “Trend CO” screen allows the operator to view graphically the CO levels over 5 different time spans.

To return to the “Trend CO” screen touch the arrow in the lower left corner.

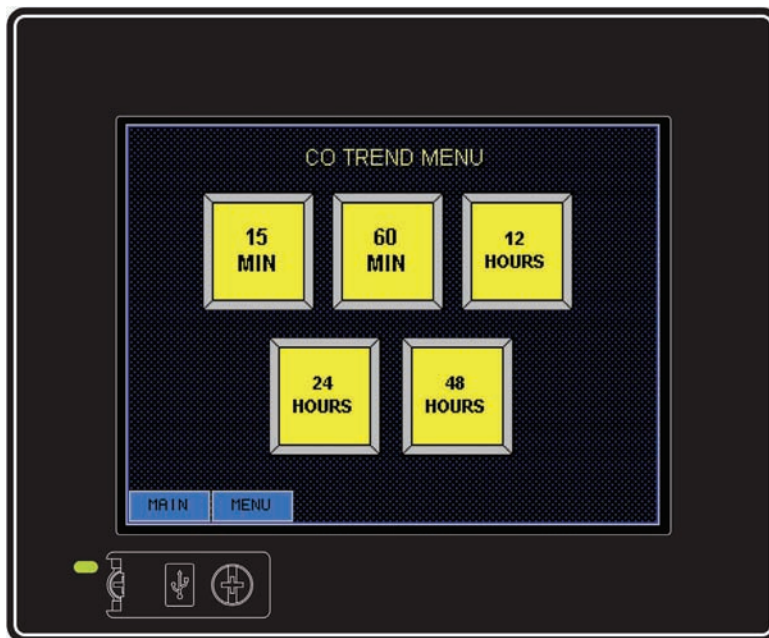


FIG 3.7.a. Trend CO Menu Screen

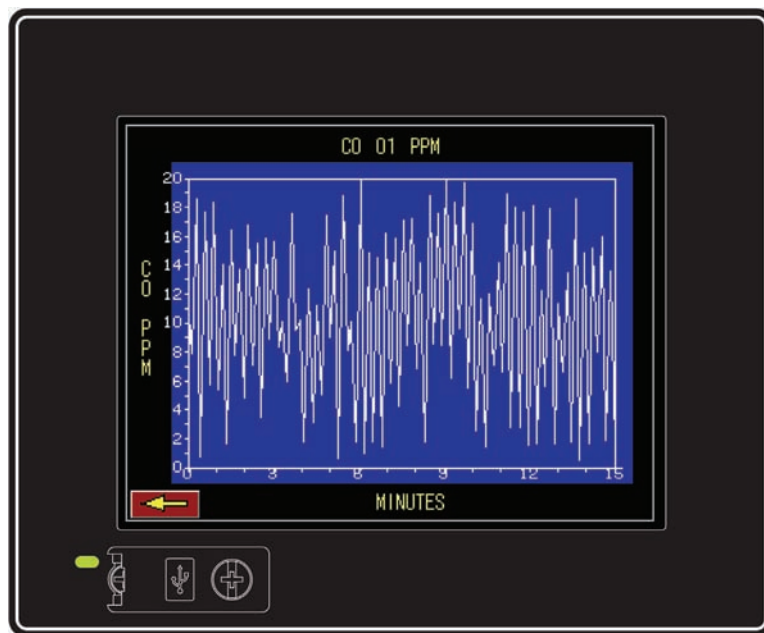


FIG 3.7.b. Trend 15 Minute CO Screen

3.0 Control Panel (continued)

3.8 “System Info” Button

The “System Info” button displays all the system information required when scheduling maintenance or purchasing spare parts from Patton’s Medical. The information includes model number, serial number, horsepower, system voltage and unit start up date (See FIG 3.7.). This information will be programmed into the HMI at startup by a Patton’s Medical authorized technician. To return to the “Menu Screen” touch the arrow in the upper left corner.

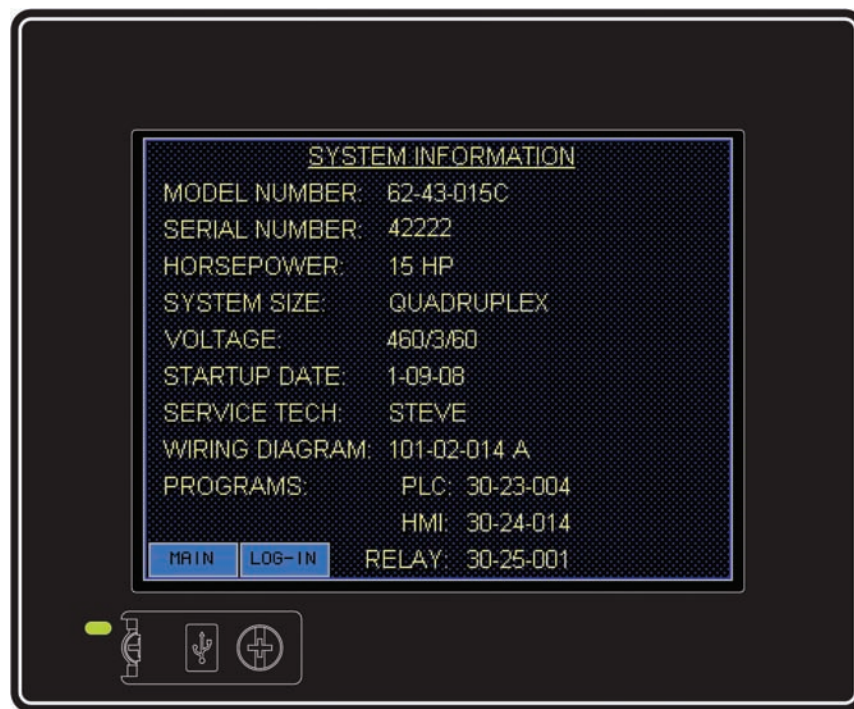


FIG 3.7. System Information Screen

3.0 Control Panel (continued)

3.9 HMI Maintenance and Spare Parts

The HMI battery should be replaced every 4 years. The battery backs up clock data, alarm history and recipe data. The battery is pre-installed at the factory prior to shipping to the customer.

3.9.1 Battery

Part No.: 30-35-001 Back up battery

3.9.2 Battery Specifications

Item Specifications

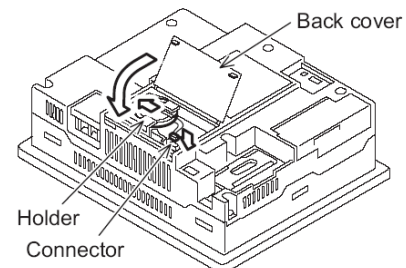
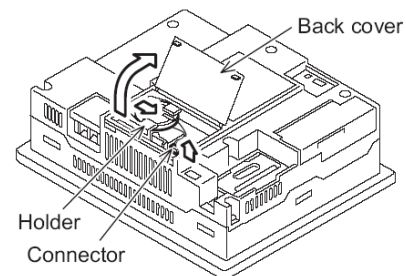
Type: Magnesium manganese dioxide lithium primary battery
Voltage: 3.0V
Life: Approx. 5 years (Operating ambient temperature of 25°C)
Application: For backup of clock data, and alarm history

3.9.3 Battery Replacement Procedure

1. Turn off power to HMI.
2. Open the back cover of the HMI.
3. Remove the old battery from the holder.
4. Disconnect the old battery connector and insert the new battery connector within 30 seconds.
Failure to replace in time allotted will cause clock to reset.
Contact **Patton's Medical** for assistance 1-866-960-0087.
5. Insert the new battery into the holder and close the back cover.
6. Turn the HMI power on.

3.10 HMI Cleaning Method

To clean the HMI, wipe the surface of the screen with a soft cloth using neutral detergents. **Do Not** use chemicals such as thinner, organic solvents and strong acids, since they may cause the protective sheet to be deformed or the dissolvable paint on the surface to peel off. In addition, do not use spray solvents since they may cause the electrical failure of the HMI and peripheral devices.





Oil-Less Scroll Medical Air System

4.0 System Operation

4.1 Prestart-up

The contractor should notify **Patton's Medical** two weeks prior to start-up date to schedule an appointment for an authorized technician to review the installation prior to start-up.

WARNING:

Prior to putting the Medical Air system into use, the medical facility must have a Certifier perform all installation tests as specified in NFPA 99. The medical facility is also responsible for ensuring that the Medical Air meets the minimum requirements for Medical Air as specified in NFPA 99.

CAUTION: Failure to install the unit properly and have an authorized technician from **Patton's Medical** start-up the system can void the manufacturer's warranties.

WARNING:

Have more than one person on hand during prestart-up and start-up procedures to ensure safety and to facilitate certain checks.

Prestart-up and start-up procedures should be performed for a new installation or when major maintenance has been performed.

The main power source to the control panel should be OFF for the duration of the visual inspection.

Ensure that the equipment is installed on a solid level surface. Walk around the system to ensure that there is enough clearance on all sides to perform operational checks/actions and maintenance. The temperature of the area containing the modules should be approximately 70°F (21.1°C) with a minimum ambient temperature of 40°F (4.4°C) and a maximum ambient temperature of 100°F (37.7°C).

Check the inlet piping for proper size and connection to the compressor modules. Refer to section 2.5 in this manual.

Check all piping system joints that might have come loose during shipment and installation to ensure they are tight.

Check the air receiver, dryers, controls, and compressors for damage.

Check the drain valves on the air receiver and compressor modules.



Oil-Less Scroll Medical Air System

4.0 System Operation (continued)

4.2 Initial Start-up

CAUTION: Complete the prestart-up procedure before continuing with the initial start-up procedure

WARNING:

To prevent electrical shock, ensure that ALL electrical power to the system is OFF, including the disconnect switches and H-O-A switches on the control panel. The facility's supply circuit breaker should also be locked out.

NOTE: DO NOT ADD OIL TO THE COMPRESSOR. The design of the Scroll compressor is totally **oil-less**. It is not necessary to fill the crankcases with oil.

WARNING:

Ensure that all loose articles, packing material, and tools are clear of the system.

Set the H-O-A switches are to "O" (OFF).

Check all voltages supplied to the system to ensure they are the required value and phases needed by the control panel.

Open the inlet isolation valve on each compressor.

Open the outlet isolation valve on each compressor.

Open the receiver isolation valves.

Close the receiver bypass valve.

Close the dew point sensor isolation valve.

Close the inlet and outlet valves on **both** dryer/filter/regulator assemblies.

Close the outlet isolation valve.

Apply power to the system and turn the disconnect switches to "On".



Oil-Less Scroll Medical Air System

4.0 System Operation (continued)

4.2 Initial Start-up (continued)

Check for correct direction of rotation of each compressor by momentarily turning the H-O-A switch to the “Hand” position and observing rotation.

WARNING:

DO NOT RUN THE COMPRESSOR BACKWARDS!

Rotation direction arrows are located on the belt guard (rotation is counter clockwise, facing the compressor pulley). Correct the rotation, if required, by switching the motor leads at the starter.

WARNING:

REMOVE POWER BEFORE WORKING ON ANY ELECTRICAL CONNECTIONS.

Start each compressor by turning the H-O-A switch to the “Auto” position. Allow each compressor module to operate for a short time (15 to 30 seconds) and check for any unusual noises or vibrations.

If everything appears normal, allow each compressor to run in the “Auto” mode until pressure builds in the air receiver. The lag compressor should stop when the pressure reading reaches 105 psig. Pushing the reset button on the control panel can now silence the lag alarm. The lead compressor should stop when the panel gauge pressure reaches 110 psig. Check for any leaks in the piping up to the inlet isolation valves of the dryers. Repair leaks, if needed.

Open the inlet isolation valve on one of the dryers. One of the dryer towers should be online at line pressure. The other dryer tower will be at 0 psig and airflow will be coming from the dryer purge exhaust muffler. It is possible that the outlet dew point may be low enough to activate the purge saving feature at start-up because of preliminary testing of the dryer at the factory. If the “Demand Purge” feature is activated, then both dryer towers will be at the same pressure as the control panel gauge and there will be no flow from the dryer purge exhaust muffler. Check for air leaks.

Adjust the pressure regulator to the desired pressure setting.

Open the outlet isolation valve of the dryer/filter/regulator group. Check for air leaks.

Open the dew point sensor isolation valve.



Oil-Less Scroll Medical Air System

4.0 System Operation (continued)

4.2 Initial Start-up (continued)

Slowly open the outlet isolation valve to allow air to flow out to the hospital.

Adjust the pressure regulator setting if necessary.

If everything appears normal, open the inlet isolation valve of the other dryer/filter/regulator assembly. If the dryer pressures appear as expected, open the dryer/filter/regulator outlet isolation valve. Close the other dryer/filter/regulator inlet and outlet isolation valves.

CAUTION: Only one dryer/filter/regulator group should be on line at a time.

Adjust the pressure regulator to the desired pressure.

Adjust the pressure regulator setting, if necessary.

The dryer should purge until the dew point monitor reading is below minus 10°C. If dew point is below minus 10°C; both towers of the on-line dryer will be at the same pressure as the control panel pressure gauge.

Observe the system for normal operation.

4.3 Normal Start-up

Hospital shutoff valve - CLOSED.

Isolation (shutoff) valves - OPEN.

Receiver bypass valve - CLOSED.

One air dryer off line with valves CLOSED; the other air dryer on-line with the valves OPEN.

Main electrical power - ON.

Disconnect switches - ON.

H-O-A switches - AUTO (starting all compressor units).

Pressure gauge increasing to 110 psi.



Oil-Less Scroll Medical Air System

4.0 System Operation (continued)

4.3 Normal Start-up (continued)

Check that each compressor shuts down as it reaches its off-limit pressure.

Check that the mainline regulator is set for the desired output pressure and adjust if necessary.

Slowly OPEN the hospital shutoff valve.

Note: Opening the hospital valve may cause a pressure demand that brings the lag compressors back on-line. This is a normal sequence.

Note: The Medical Air system is now on-line and in the Normal Operating Mode (lead/lag operation).

To verify dryer operation, refer to Appendix A for desiccant dryers.

4.4 Normal Operation

3.4.1 Controls

During normal operation, all H-O-A switches should be turned to the “Auto” position so that the PLC can effectively control the system. The PLC monitors the system pressure transducer, starts and stops the compressors depending on the pressure transducer’s changing conditions and automatically alternates the lead position between compressor units.

In a typical **duplex** system, one compressor will be able to handle the system load. The PLC will signal the lead compressor to start when the lead pressure setting closes at 100 psig with falling system pressure. If one compressor can carry the load, then the system pressure will rise to 110 psig and turn off. When the system pressure drops again, the PLC will automatically sequence the lead role to the other compressor and will start it. If the lead compressor runs continuously in lead for more than 15 minutes, the PLC will automatically sequence the compressor attempting to evenly distribute the run time among all available compressors. If during operation, the second compressor is required to come on in addition to the lead compressor, the PLC will turn on the “Lag Alarm”.

4.0 System Operation (continued)

4.4 Normal Operation (continued)

4.4.1 Controls (continued)

In a **triplex** or **quadruplex** system, the operation is very similar to the duplex operation described above with the following differences. For each additional compressor, there is an additional pressure setting (see Table 3-1 below). With a triplex or a quadruplex system, the lag unit running alarm may not necessarily correspond to the third or fourth compressor coming on. To determine when the PLC turns on the lag alarm, it counts the number of units in the “Auto” position and makes a decision based on the pressure switch conditions. For example, in a quadruplex system with only 2 H-O-A switches in the “Auto” position, the lag alarm will turn on when the second unit is turned on.

Note: For a compressor to be considered available to the system (through the PLC), its H-O-A switch must be in the “Auto” position.

Table 3-1 System Pressure Settings.

System Pressure Setting	Start (Close)	Stop (Open)
Lead	100 psig	110 psig
Lag 1	95 psig	105 psig
Lag 2 - Tpx and Qpx Only	90 psig	100 psig
Lag 3 - Qpx Only	85 psig	95 psig

For maintenance, or other reasons, the compressors can operate in the “Hand” position. In this condition, the compressor in the “Hand” position will start and stop depending on the back up pressure switch settings.

Note: Any compressor in the “Hand” position will start and stop when the back-up switch closes or opens.

4.4.2 Dryers

This fully automatic, heat-less type dryer alternately cycles the compressed air flow through two desiccant charged vessels where the gas’ vaporous moisture content is adsorbed. One desiccant vessel is always on-line in a **drying cycle** throughout normal dryer operation. The opposite, off-line vessel is in a **regeneration cycle** for removal of the previously adsorbed moisture content, or in a purge saving cycle at line pressure.

4.0 System Operation (continued)

4.4 Normal Operation (continued)

4.4.2 Dryers (continued)

When the dryer selector switch is in the **“Manual Purge”** position, the dryer will shift towers every 120 seconds. At normal operating conditions, one tower is approximately 110 psig and the other tower is at 0 psig. Any condition other than this is not normal and will cause a high dew point condition. During tower changeover, the online chamber will exhaust, and the chamber that is regenerating (purging) will come to line pressure. There is a 50 second repressurization cycle. If the selector switch is on the manual purge cycle, the dryer will use 15% of the system capacity to purge the dryer.

When the dryer selector switch is in the **“Demand Purge”** position, the dryer purge is controlled by the dew point monitor and purging depends on the dew point condition. When the dew point reading is above the set point of -10°C , the dryer will function normally (one tower at 110 psig, one tower at 0 psig). When the dew point is below the set point of -10°C on the dew point monitor, closing the exhaust valve turns off purge. In this condition, both towers will be approximately 110 psig and the dryer will continue to shift towers. However, the off line chamber will remain at 110 psig until the dew point is above -10°C .

4.5 Normal Shutdown

H-O-A switches-OFF

Disconnect switches-OFF

Main power source-OFF

Hospital shutoff valve-CLOSED

Air receiver manual tank drain-OPEN

Pressure gauge decreasing to 0 psi (0 kPa)

Close air receiver manual tank drain when pressure decreases to 0 psi (0 kPa)

4.0 System Operation (continued)

4.6 Emergency Shutdown / Alarms

The following conditions may arise during operation.

High Air Temperature Shutdown - This will shut down the compressor in question and will not re-start until the alarm reset button is pressed on the main control panel. Before allowing the unit to re-start, the condition should be checked (see “Compressor runs hot” in the Troubleshooting Section 5.0). Even after pushing the button, the unit may not re-start, depending on system sequencing and system pressure.

Motor Overload Shutdown - This will shut down the compressor in question and will not re-start until the reset button on the starter inside the main control cabinet is reset. See “Motor overheating” in the Troubleshooting Section 5.0.

Lag Unit Running Alarm - This alarm will activate if the last available compressor unit comes on. In the case of a duplex system, it will activate when the second compressor turns on or the lag pressure setting is reached. To silence the alarm, press the alarm reset button. In the event the lag alarm is persistent, check to see if any leaks or valves are open downstream or reduce the system load.

Dryer Switching Fault Alarm (Optional) - See chart in dryer section

5.0 Troubleshooting

Problem	Possible Causes	Solution
Failure to start	Main power disconnected	Turn on main power
	Power failure	Restore power
	Main fuse blown	Replace fuse
	Fuse blown in control circuit	Replace fuse
	Overload tripped on starter	Reset & check for system overload
	High temperature switch activated	Allow unit to cool; reset switch & check for over temperature condition
Power failure	Main fuse blown	Replace fuse
	Fuse blown in control circuit	Replace fuse
Compressor shuts off unexpectedly	Overload tripped on starter	Reset & check for system overload
	Pressure setting out of adjustment	Check transducer
	High inlet vacuum switch activated	Check for dirty/clogged inlet filter or inlet piping restriction
	High temperature switch activated	Allow unit to cool; reset switch & check for over temperature condition
High temperature alarm	High temperature switch activated	Allow unit to cool; reset switch & check for over temperature condition
Motor overload	Low voltage	Check for proper supply voltage
	Defective motor	Contact Patton's Medical



Oil-Less Scroll Medical Air System

5.0 Troubleshooting (continued)

5.0 Troubleshooting (continued)

Note: For air dryer troubleshooting, see Appendix A

Problem	Possible Causes	Solution
Compressor runs hot	Incorrect pressure setting	Adjust pressure setting
	Faulty check valve	Contact Patton's Medical
	Check if valve or line to receiver is leaking or plugged	Replace if necessary
	Intake filter clogged	Clean or replace
Low discharge pressure	System piping leaks	Repair leaks
	Solenoid stuck open	Check electrical connections
	Belts slipping	Adjust tension
	Intake filter clogged	Clean or replace
Compressor cycles too often	System undersized	Contact Patton's Medical
	Incorrect pressure setting	Adjust pressure setting
	Faulty pressure transducer	Replace transducer
	System piping leaks	Repair leaks
	Check valve or line to receiver is leaking or plugged	Replace if necessary
	Both dryers on line	Valve off one dryer
	Water in air receiver	Drain air receiver
Compressor won't shut off	Pressure setting out of adjustment	Adjust

For any operational problems not listed here, please contact your local **Patton's Medical Service** representative.
1-866-960-0087

Problem	Possible Causes	Solution
Excessive belt wear	Belt tension	Adjust tension
	Belt alignment	Realign compressor & motor sheaves
Abnormal noise	Mounting bolts loose	Tighten bolts
	Belt tension	Adjust tension



Oil-Less Scroll Medical Air System

6.0 Maintenance

6.1 Maintenance Schedule

WARNING:
**BEFORE STARTING ANY MAINTENANCE PROCEDURES,
DISCONNECT ALL POWER TO THE PACKAGE.**

Release all pressure from the package before removing, loosening, or servicing any covers, guards, fittings, connections, or other devices.

Never perform any maintenance functions while the unit is in operation.

Item	Frequency	Action
Check condensate in tank	Daily	Open manual drain valve: check auto drain
Check operation of safety valve	Weekly	Manually release pressure
Check inlet air filter(s)	Weekly	Inspect and clean or replace
Check nuts, bolts, fittings, etc.	Monthly	Inspect and tighten
Check belt tension	Monthly	Inspect and tighten or replace
Check flow through orifice of dew point sensor	Every 6 months	Check for flow blockage
Check dew point sensor accuracy	Every 24 months	Verify dew point sensor accuracy (contact Patton's Medical)
Calibrate CO monitor	Every 12 months	
Replace pre-filters & afterfilters	Yearly	Replace filter elements
Replace Dryer Desiccant	6 Years	See Appendix A
Replace Compressor Tip Seals *	10,000 Hours	Contact Patton's Medical Customer Service Department



Oil-Less Scroll Medical Air System

Maintenance Schedule

6.0 Maintenance (continued)

***An authorized Patton's Medical Service Technician must perform compressor tip seals replacement. Please contact Patton's Medical Customer Service department at 1-866-960-0087 prior to 10,000 operating hours to schedule this maintenance. Please have the serial number of your compressor system available.**

6.2 Replacement Filter Elements (Individual)

Duplex

HP	Inlet	Qty.	Pre-filter	Qty.	Afterfilter	Qty.
2-7.5	09-11-001	2	09-12-100	2	09-13-100	2
10-15	09-11-002	2	09-12-100	2	09-13-100	2

Triplex

HP	Inlet	Qty.	Pre-filter	Qty.	Afterfilter	Qty.
10	09-11-002	3	09-12-100	2	09-13-100	2
15	09-11-002	3	09-12-101	2	09-13-101	2

Quad

HP	Inlet	Qty.	Pre-filter	Qty.	Afterfilter	Qty.
10	09-11-002	4	09-12-101	2	09-13-101	2
15	09-11-002	4	09-12-102	2	09-13-102	2

7.0 Inspection/Replacement Procedures

7.1 V-Belts

Narrow type V-belts are used for this unit. Refer to Table 7-1 for the correct size.

7.1.1 Tension Check

Table 7-1 Belt size and Tension (for new belts)

Motor		Tensioning		No. of Belts	Replacement Belt Part Number
Hp	Sheave Diameter	Defl. (in.)	Force (lbs.)		
2	3.15	0.25	5	1	11-01-020
3	4.50	0.25	6	1	11-01-020
5	3.65	0.25	5	2	11-01-020
7 ½	5.00	0.25	6	2	11-01-102
10	3.65	0.25	5	4	11-01-013
15	5.00	0.25	6	4	11-01-014

WARNING:

**BEFORE STARTING ANY MAINTENANCE PROCEDURES,
DISCONNECT ALL POWER TO THE PACKAGE.**

Release all pressure from the package before removing, loosening, or servicing any covers, guards, fittings, connections, or other devices.

Never perform any maintenance functions while the unit is in operation.

Check the belt tension monthly. Disconnect the main power and remove the belt guard. Deflect each V-belt at the center of the drive span with a spring balance or tension meter at the tension force of Table 7-1. Then check that the average deflections at the proper tension force are approximately the same values as shown in Table 7-1.

7.1.2 V-Belt Tension Adjustment

If necessary, adjust the V-belts until the average deflections are within the values shown in Table 7-1.

To tighten the V-belts on the 2-7.5 unit:

1. Remove the belt guard.
2. Loosen the four bolts securing the motor
3. Slide the motor away from the pump until the proper tension and alignment is obtained. To check for correct alignment, place a straight edge on the faces of the two sheaves. Proper alignment is obtained when all the gaps between the straight edge and the sheaves are minimized and less than 1/16".

7.0 Inspection/Replacement Procedures

7.1 V-Belts (continued)

7.1.2 V-Belt Tension Adjustment (continued)

4. Check the belt tension again and make sure the tension is similar to the values listed in Table 7-1.
5. Tighten all four bolts on the motor
6. Replace the belt guard **before** operating the machine.

To tighten the V-belts on the 10-15 unit:

1. Remove the belt guard.
2. Loosen the four bolts securing the pump(s)
3. Turn the belt tensioning adjustment rod on the compressor/motor base until the proper tension and alignment is obtained. To check for correct alignment, place a straight edge on the faces of the two sheaves. Proper alignment is obtained when all the gaps between the straight edge and the sheaves are minimized and less than 1/16".
4. Check the belt tension again and make sure the tension is similar to the values listed in Table 7-1.
5. Tighten all four bolts on the pump(s)
6. Replace the belt guard **before** operating the machine.

CAUTION: IF THE COMPRESSOR IS OPERATED WITH LOOSE V-BELTS OR IMPROPER SHEAVE ALIGNMENT, THE LIFE OF THE V-BELTS IS SHORTENED. EXCESSIVE TENSION CAN BREAK THE SHAFT OR REDUCE BEARING LIFE. BE SURE TO MAINTAIN PROPER V-BELT TENSION AND ALIGNMENT.

7.1.3 Changing the V-Belts

V-belts should be changed every 8,000 hours under normal operating conditions. If any damage is found, they should be replaced at once. To change the v-belts call the nearest **Patton's Medical** distributor or follow the procedures described below:

To remove the belts on the 2-7.5 unit:

1. Remove the belt guard.
2. Loosen the locking bolts securing the motor.
3. Slide the motor toward the pump to relieve the tension on the belts.
4. Remove the old belt(s)

Check and clean:

1. Check and clean all of the grooves of both the motor and compressor sheaves.
2. Check the tightness of bolts on the sheave bushings.

7.0 Inspection/Replacement Procedures (continued)

7.1.3 Changing the V-Belts (continued)

Installation of new belts:

1. Confirm the belt type and length.
2. Place the belt(s) into the grooves of both sheaves.
3. Slide the motor away from the pump until the proper tension and alignment is obtained. To check for correct alignment, place a straight edge on the faces of the two sheaves. Proper alignment is obtained when all the gaps between the straight edge and the sheaves are minimized and less than 1/16".
4. Check the belt tension again and make sure the tension is similar to the values listed in Table 7-1.
5. Tighten all four bolts on the motor
6. Replace the belt guard **before** operating the machine.

To change the belts on the 10-15 unit:

Remove the old belts:

1. Remove the belt guard.
2. Loosen the locking bolts securing the pump(s).
3. Turn the belt tensioning adjustment rod on the compressor/motor base to loosen the tension on the belts.
4. Remove the old belt(s)

Check and clean:

1. Check and clean all of the grooves of both the motor and compressor sheaves.
2. Check the tightness of bolts on the sheave bushings.

Installation of new belts:

1. Confirm the belt type and length.
2. Place the belt(s) into the grooves of both sheaves.
3. Turn the belt tensioning adjustment rod on the compressor/motor base until the proper tension and alignment is obtained. To check for correct alignment, place a straight edge on the faces of the two sheaves. Proper alignment is obtained when all the gaps between the straight edge and the sheaves are minimized and less than 1/16".
4. Check the belt tension again and make sure the tension is similar to the values listed in Table 7-1.
5. Tighten all four bolts on the pump(s)
6. Replace the belt guard **before** operating the machine.

7.0 Inspection/Replacement Procedures (continued)

7.2 Air Intake Filter

WARNING:
BEFORE STARTING ANY MAINTENANCE PROCEDURES,
DISCONNECT ALL POWER TO THE PACKAGE.

Release all pressure from the package before removing, loosening, or servicing any covers, guards, fittings, connections, or other devices.

Never perform any maintenance functions while the unit is in operation.

The air intake filter element should be changed every 1 year of operation under normal operating conditions. To change the filter:

1. Turn off the compressor being serviced and lock open the appropriate disconnect switches.
2. Close intake isolation valve
3. Remove the protective cover by loosening the wing nut (if applicable) and latches.
4. Remove the element.
5. Clean inside of housing.
6. Insert a new element (note orientation of the element).
7. Replace protective cover and tighten wing nut (if applicable) and latches.
8. Open intake isolation valve
9. Turn on the compressor

7.0 Inspection/Replacement Procedures

7.3 Readjustment of Cut-Out and Cut-In Pressure

The cut-out pressure refers to the discharge air pressure at which the unit will stop and is indicated by the pressure readout on the HMI display.

!!WARNING!!

IT IS STRICTLY PROHIBITED TO READJUST DISCHARGE AIR PRESSURE TO MORE THAN THE SPECIFIED MAXIMUM PRESURE (120 PSIG); NEGLECTING IT MAY CAUSE HIGH DISCHARGE TEMPERATURE SHUTDOWN, MAIN MOTOR OVERLOAD SHUTDOWN, OR SERIOUS COMPRESSOR BREAKDOWN.

The cut-in pressure refers to the discharge air pressure at which the compressor will start. The standard factory pressure cut out is 110 psig and 100 psig for cut-in pressure.

CAUTION

Generally, a narrower differential requires a larger volume of receiver, and vice versa. The recommended receiver volume in the instruction manual is based on the standard factory setting of 10 psig differential. If a narrower differential is desired, install a larger volume receiver; otherwise the cycle of start/stop may be shorter which could generate an undesirable effect on the unit.

To adjust pressure settings, press “Menu” in the upper right corner on the Main screen. In the “Menu” screen, press “Service”. In the “Service Menu” screen, press “Modify Pressure Settings”. In the “Pressure Setting Adjustment” screen, press login and enter 030179, press “Enter”, then “OK”, press the “X” in the upper right corner of the screen.

7.0 Inspection/Replacement Procedures (continued)

7.3 Readjustment of Cut-Out and Cut-In Pressure (continued)

After the login is complete, change the Cut-In or the Cut-Out pressure by touching the pressure setting value.

The screen to the right will appear. Enter the desired setting and press enter. A screen will appear asking you to confirm the change, press OK. The change will be displayed on the screen. The option to change back to the factory default setting is also available by pressing “restore defaults”. When finished, press “Main” to return to the main screen.



FIG. 7.3.1 Pressure Setting Adjustments Screen

Table 7.3 System Pressure Settings

Pressure Settings	Cut-In	Cut-Out
Lead	100 psig	110 psig
Lag 1	95 psig	105 psig
Lag 2 - TPX and QPX Only	90 psig	100 psig
Lag 3 - QPX Only	85 psig	95 psig



Oil-Less Scroll Medical Air System

8.0 Replacement Parts

Any information, service or spare parts requests should include the machine serial number and be directed to:

Patton's Medical

3201 South Boulevard
Charlotte, NC 28209

Telephone: 1-866-960-0087

Fax: (704) 525-5148

Medical.service@pattonsmmedical.com

www.pattonsmmedical.com



Oil-Less Scroll Medical Air System

9.0 Warranty

Patton's Medical warrants the total Medical Air system to be free of defects in material and workmanship under normal use for a period not to exceed twenty-four months from start-up, or thirty months from date of delivery. This warranty covers all necessary parts used in repair as well as all reasonable labor expense. Normal consumable parts required for routine scheduled maintenance (such as filters) are not covered under this warranty.

This warranty does not apply to products that are damaged by external causes, or are improperly warehoused, used, installed, serviced, or maintained by the customer. The sole liability for **Patton's Medical** under this warranty is limited to repairing, replacing, or crediting, at its election, any such products provided that:

- **Patton's Medical** is notified promptly within the warranty period above of any warranty claim.
- The examination of such items by an authorized representative of **Patton's Medical** will disclose to their reasonable satisfaction that claimed products defect has not been caused by misuse, neglect, improper handling, installation, repair, alteration, or accidents.

Product modification performed by the customer without prior written approval by **Patton's Medical** will invalidate the above warranty.

This warranty is given in lieu of all other warranties, expressed or implied, including implied warranties of fitness for a particular purpose and merchantability. In no event shall Patton's Medical be liable for damages in excess of the value of the defective product or part, nor shall Patton's Medical be liable for any indirect, special or consequential damages, loss of profits of any kind, or for loss of use of the products.

Patton's Medical shall not be liable to the customer for any claims, loss of damage of any kind whatsoever arising from the nonperformance of **Patton's Medical** of any part of this agreement occasioned by acts of God, fire, war, labor difficulties, governmental regulations, or action of government. **Patton's Medical** shall not be liable to the customer for any other cause, whether of a similar or dissimilar nature beyond its reasonable control.



Oil-Less Scroll Medical Air System

10.0 Maintenance Record

Model Number _____

Serial Number _____

Installation Date _____

Date of Service					
Hours					
Load					
Ambient Temp.					
Inlet Filter					
Belt Tension					
Misc.					
Serviced By:					

Notes:



Oil-Less Scroll Medical Air System

10.0 Maintenance Record

Model Number _____

Serial Number _____

Installation Date _____

Date of Service					
Hours					
Load					
Ambient Temp.					
Inlet Filter					
Belt Tension					
Misc.					
Serviced By:					

Notes:

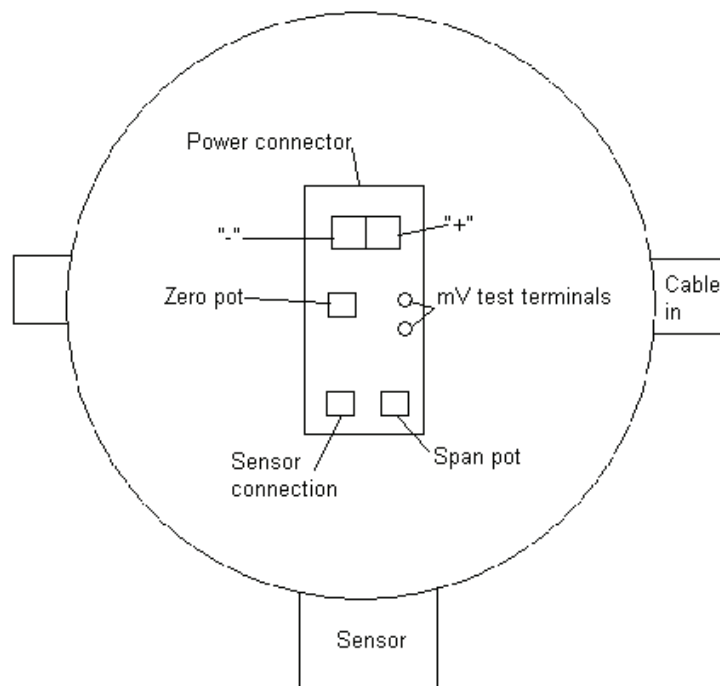
Appendix A—CO Monitor

A.1 Safety Precautions

As with any piece of complex equipment, the Patton's Medical CO transmitter will do the job it is designed to do only if it is used and serviced in accordance with the manufacturer's instructions. Please protect yourself and your employees by following the instructions in this manual. All individuals who have or will have the responsibility for using and servicing this product must carefully read this manual. The warranties made by Patton's Medical with respect to the product are voided if functions or parameters are changed without the permission of Patton's Medical. They are also voided if the product is not used and serviced in accordance with the instructions in this manual. Failures or false alarms caused by interfering gases or electrical signals are not part of the warranty obligation. The above does not alter any statements by Patton's Medical regarding warranties, conditions of sale and/or delivery.

A.2 General Information

The CO transmitter uses an electrochemical sensor to convert a gas concentration into a linear 4–20mA electrical signal, and transmits it over a cable to a controller. It is a simple to connect, loop powered two wire transmitter, where the signal is carried on the “+” wire, along with the supply voltage.



Appendix A—CO Monitor**A.3 Electrical Connections**

The power connector is designed with a “quick disconnect” feature, which simplifies transmitter installation, replacement and service. The connector plug is easily removed from the transmitter by pulling straight up on the top of the power connector. This separates the bottom connection from the wiring connections to the plug. The connector plug is designed to be installed in only one direction (polarized) for safety reasons. Power is connected to the plug (upper portion) of the power connector by securing the stripped ends of the electrical cable using the two screws on the connector plug. Connect the supply wires (10–30 VDC) to the correct terminals on the connector plug (see diagram), and re-attach to the transmitter pc board by pressing back down on the pins from where it was removed.

CAUTION: If the supply wires are reversed on the power connector, the transmitter will produce no current output.

Appendix A—CO Monitor**A.4 Zero Point Adjustment**

The CO transmitter uses a conveniently located set of two test terminals (see diagram on previous page) which provide a mV reading that corresponds to the 4–20 mA output. A reading of 40 mV on the test terminals corresponds to 4 mA, and 200 mV corresponds to 20 mA. This feature offers a quick and easy way to verify zero readings and gas response without having to disconnect wires and place current meters in line with the transmitter.

Using a DC voltmeter set to the mV range, place the voltmeter’s leads in the 40–200 mV test terminals on the transmitter pc board. The reading should be approximately 40 mV. If you are unsure if the supply air is clean, flow impurity free air (zero air) into the sensing inlet using a calibration adapter and a 0.5 l pm fixed flow regulator, and allow the mV reading to stabilize. Please contact your Patton’s Medical sales representative for zero gas ordering information if necessary. If the mV reading is not close to 40 mV, then the zero must be adjusted.

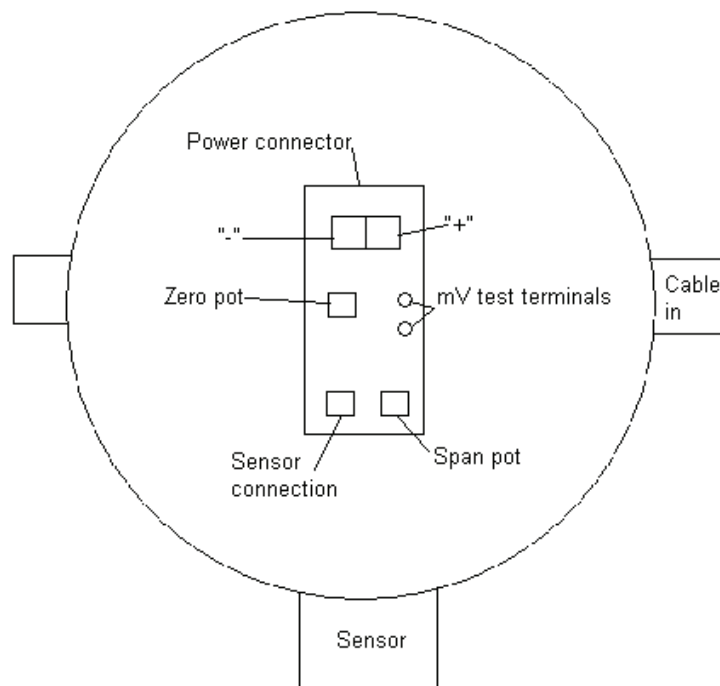
To adjust the **ZERO** to **4mA** (40 mV on the test terminals), slowly adjust the zero potentiometer on the transmitter board (see diagram) until a reading of 40 mV on the test terminals is reached (if the zero potentiometer cannot be adjusted to 40 mV, please contact Patton’s Medical service for detailed instructions). This procedure will set the current output from the transmitter to 4 mA (zero).

Appendix A—CO Monitor

A.5 Sensitivity Check (Calibration)

The transmitter uses a conveniently located set of two test terminals (see diagram) which provide a mV reading that corresponds to the 4-20 mA output. A reading of 40 mV on the test terminals corresponds to 4 mA, and 200 mV corresponds to 20 mA. This feature offers a quick and easy way to verify zero readings and gas response, without having to disconnect wires and place current meters in line with the transmitter.

Using a DC voltmeter set to the mV range, place the voltmeter's leads in the 40–200 mV test terminals on the transmitter pc board. Attach the calibration adapter to the sensing inlet. Flow 20 ppm calibration gas at 0.5 lpm (please contact your Patton's Medical sales representative for calibration gas ordering information if necessary). Allow the gas to flow across the sensor for 2 minutes or until the transmitter signal is stable, then check to see that the mV reading is at 50.6 mV. If the mV reading is not correct, adjust the **Span** potentiometer slowly until a mV reading of 50.6 is obtained (if the span potentiometer cannot be adjusted to the correct mV reading, please contact Patton's Medical service for detailed instructions). After the span adjustment is complete, remove the calibration gas, re-attach the supply air, and allow the transmitter current output to return to 40 mV (zero).





Oil-Less Scroll Medical Air System

Appendix A—CO Monitor

A.6 Technical Data

Patton's Medical reserves the right to change part number, prices & technical information without notification.

Gas & Detection Range:	Carbon Monoxide to 300 ppm
Detection principle:	Electrochemical
Gas supply:	Supplied
Response time T90:	< 30 seconds
Output signal:	4–20mA Linear
Voltage supply:	10–30 VDC
Sensor Cable:	18 AWG 2 conductor shielded
Operating Temperature:	-20 to 50° C (typical)
Relative Humidity:	15–95% rh non-condensing



Oil-Less Scroll Medical Air System

Appendix A—CO Monitor

A.7 Troubleshooting

Symptom	Possible Cause	Solution
No output	Supply wires reversed	Check wiring for proper polarity
No voltage to transmitter	No power	Check for 10-30 VDC at power connector
No response to gas	Sensor has expired Sensor wires disconnected Sensor not plugged in correctly	Replace Sensor Check Sensor Wiring Check sensor connection to transmitter pcb
Sensor will not calibrate	Sensor has expired Incorrect or bad span gas	Replace sensor Use correct concentration of span gas



3201 South Boulevard
Charlotte, NC 28209
1-866-960-0087
www.pattonsmmedical.com