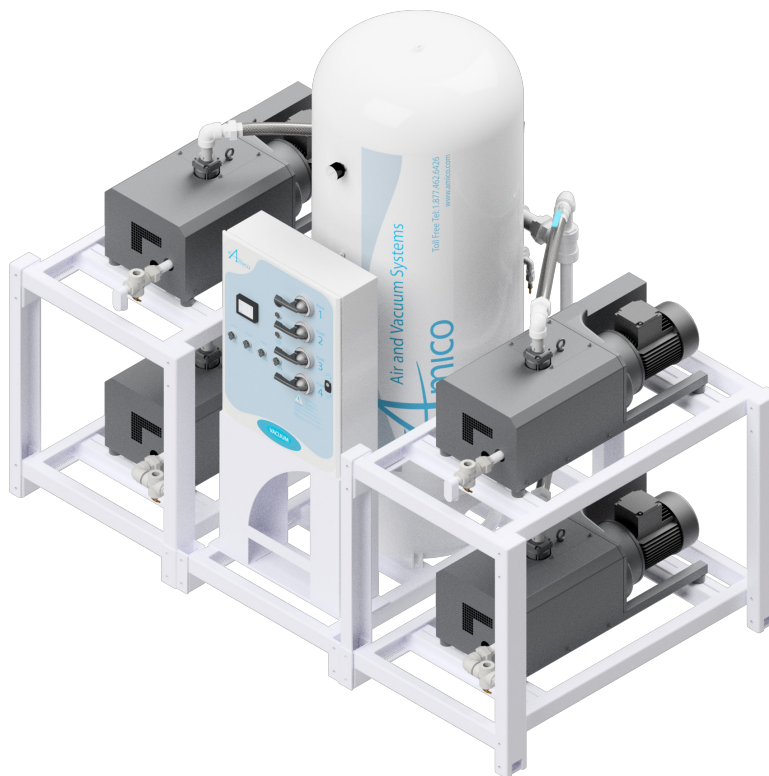


Operation and Maintenance Manual

Contact-Less Claw Vacuum Systems



Model Number: _____

Job Number: _____

Date Shipped: _____

Date Started Up: _____

Introduction

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

Amico Source Corporation

85 Fulton Way
Richmond Hill, ON
L4B 2N4 Canada

Toll Free Tel: 1 877 462 6426

Toll Free Fax: 1 866 440 4986

Tel: 905 764 0800

Fax: 905 764 0862

For Technical Support: as-techsupport@amico.com

For Parts: as-parts@amico.com

Please include the system's job number located on the control panel with all inquiries.

Amico Source Corporation reserves the right to make changes and improvements to update products without notice or obligation.

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Safety Precautions

The high vacuum levels produced from the system may cause personnel injury or property damage if the unit is improperly operated or maintained.

Operator should have carefully read and become familiar with the contents of this manual before installing, wiring, starting, operating, adjusting and maintaining the system.

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 vacuum 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 vacuum levels.
- Vacuum discharge must be placed away from any intake to the facility in accordance with NFPA 99.
- Prior to using the Amico Medical Vacuum System, 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 vacuum meets the minimum requirements as specified in NFPA 99.
- This is a high speed, rotating piece of machinery. Do not attempt to service any part while the machine is in operation.
- To prevent automatic starting, disconnect all electrical power before performing any maintenance.
- 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 discharge pipe blocked. Damage to the pump may occur.
- 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.

General Information

Product Description

The vacuum system is intended for either:

- Medical use for patients
- Waste anesthetic gas disposal (WAGD)*
- Labs

*For WAGD operation, Amico Source Corporation suggests an oxygen assured pump. Please contact Amico Source Corporation for more information.

The Amico Medical Vacuum System is designed according to the specifications agreed upon during the design phase. Changing the intended use is permissible only after prior consultation with Amico Source Corporation.

Suggested operating temperature: 78°F (26°C).

The vacuum system is intended for use indoors unless otherwise specified.

The vacuum system is designed according to local regulations.

Principles of Operation

The vacuum system takes air from the inlet. The air is passed through an inlet filter (optional) to prevent solid matter from entering the vacuum system. The vacuum pump draws air from the system and from the receiver tank. This allows the system to produce a more stable vacuum level and prevents multiple starting and stopping of the pump(s).

All parts of the system are designed to be isolated including the pump(s) and tank(s). This ensures the continuity of medical vacuum for the patients connected to the system.

Transport

The system is split and crated according to specifications. Amico will make every attempt to split the system into as few pieces as possible to consolidate shipping.

Installation and Commissioning

Inspection Upon Receipt

The condition of the Amico Medical Vacuum System should be carefully inspected upon delivery. Any indication of damage by the carrier should be noted on the delivery receipt, especially if the system will not be immediately uncrated and installed.

Amico Source Corporation modules may remain in their shipping containers until ready to be installed. If any of the modules are to be stored prior to installation, they 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 modules until they are ready for connecting to the facility's pipeline distribution system.

Handling



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

The vacuum system can be moved with either a forklift or a standard pallet jack (for modular systems).

Walk along the route the unit must travel and note dimensions of doorways and low ceilings. Units should be placed to ensure easy access to perform maintenance and high visibility of indicators and gauges. When installing a modular system, there is no preferred arrangement of modules. The modular design of the components allows for the system to be custom fit to the facility to optimize accessibility and operation.

Installation Prerequisites



WARNING: All vacuum systems should be commissioned by an authorized Amico representative. Failure to do so will void all warranties on the system.

Ensure that the site where the system will be installed has a source of electrical power and that power is of the correct electrical specification as per the design of the system.

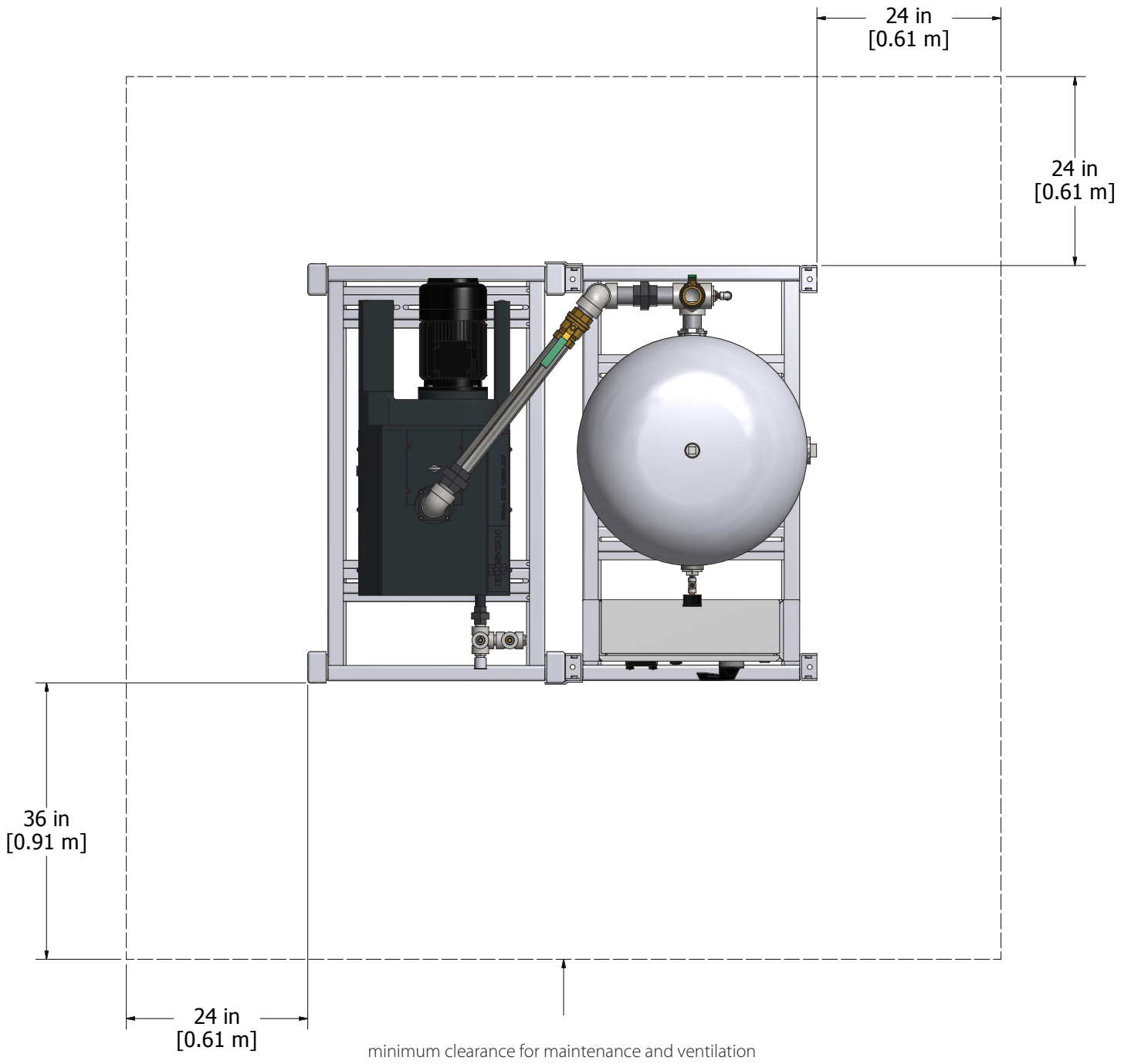
Mounting Position and Space

For maintenance and ventilation of the system, it is recommended that there is 2' (60.96 cm) of clearance around the system and 3' (91.44 cm) of clearance in front of the control panel. Vibration pads are provided for the system to reduce noise caused by the vibration of the system. The system should be leveled and placed on a concrete pad that is suitable to sustain the weight of the system.

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).

Sound levels of 76 to 85 dbA are to be anticipated. Though the sound levels are not excessive, they should be considered when choosing the installation location for the system.

Installation and Commissioning



Piping

Below is a summary of the requirements for the medical vacuum system exhaust locations.

1. Locate the medical vacuum exhaust outdoors in a manner that will minimize the hazards of noise and contamination to the hospital and its environment. The exhaust shall be located remote from any door, window, air intake or other openings in buildings with particular attention given to separate levels of intake and discharge. Care shall also be exercised to avoid discharge locations contraindicated by prevailing winds, adjacent buildings, topography and other influences. Outdoor exhausts shall be protected against entry of insects, vermin, debris or precipitation. Exhaust lines shall be sized to minimize back pressure. Discharge piping shall be free of dips or loops that might trap condensate or oil. If such discharge piping is unavoidable, a trapping drip leg shall be installed to keep the piping free of fluid buildup. The exhaust shall be located at least 30 ft (10 m) from any door or operable window, 50 ft (15 m) from any mechanical air intake and a minimum of 10 ft (3 m) above grade.
2. Medical vacuum exhausts for separate pumps shall be permitted to be joined together to one common exhaust, provided such intake is appropriately sized.
3. Discharge of pumps utilizing a common exhaust pipe shall be fitted with a check valve or a manual valve (locked open) or arranged to permit capping of the active pipe when removing or servicing the pump.
4. Install a drip leg at the base of each pump exhaust line riser.
5. Minimum exhaust pipe sizing required based on the medical vacuum system horsepower, configuration and the total pipe length (including elbows and tees) in the medical vacuum exhaust line.
 - a. The medical vacuum exhausts are joined together to one common exhaust.
 - b. Minimum pipe size must be maintained for the total length of exhaust pipe.
 - c. Use the next larger size pipe in the event the minimum size is not available.

To ensure that no restriction of airflow (and thus back pressure) occurs in the exhaust line, size the piping according to the table on the next page.

Piping

Exhaust Pipe Sizing

Unit	Flow Basis SCFM@19" hg	Allowable Equivalent Run (Feet)							
		1.5"	2.0"	2.5"	3.0"	4.0"	5.0"	6.0"	8.0"
<i>Minimum Nominal Pipe Size:</i>		1.5"	2.0"	2.5"	3.0"	4.0"	5.0"	6.0"	8.0"
Duplex 1.5 Hp	12	450							
Duplex 2 Hp	20	170	700						
Duplex 3 Hp	36	65	250	800					
Duplex 5 Hp	74	16	65	200	475				
Duplex 7.5 Hp	138			60	150	600	1,900		
Duplex 10 Hp	178			45	100	425	1,200		
Duplex 15 Hp	240				55	225	675	1,600	
Duplex 20 Hp	272				45	180	525	1,300	
Duplex 25 Hp	336				25	110	325	800	
Triplex 5 Hp	113		30	50	225	900			
Triplex 7.5 Hp	207				75	300	900		
Triplex 10 Hp	267				45	180	550	1,400	
Triplex 15 Hp	375					100	300	700	
Triplex 20 Hp	409					80	250	600	
Triplex 25 Hp	504					60	175	425	
Quad 7.5 Hp	275				45	190	550	1,400	
Quad 10 Hp	355					110	325	800	
Quad 15 Hp	478					65	190	450	
Quad 20 Hp	542						50	150	350
Quad 25 Hp	670						35	170	425

Fittings Equivalent Lengths								
<i>Minimum Nominal Pipe Size</i>	1.00"	1.25"	1.50"	2.00"	2.50"	4.00"	5.00"	6.00"
Elbows	2.5'	3.0'	4.0'	5.5'	7.0'	12.5'	16.0'	19.0'
Tee (Branch/Run)	4.5'	5.5'/.5'	7'/.5'	9'/.5'	12/.5'	21'/1'	27'/1.5'	34'/2'

Wiring



WARNING: BE SURE TO DISCONNECT ALL ELECTRICAL POWER FROM THE 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 system on a voltage other than the voltage specified on the system panel.

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



CAUTION: All voltages will be disconnected from the pump modules using the circuit breaker. Opening the appropriate fused knife-switch disconnects control power. Turning off the appropriate motor circuit breaker disconnects motor power.

Refer to the wiring diagram(s) that came with the pumps for pertinent wiring connections.

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 specifications for full load and compressor system amperes on the wiring diagram.

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

Only qualified electricians should make power connections to the control panel and any interconnecting wiring.

Ensure that the electrical supply for the emergency generation system is consistent with the vacuum system's requirements.

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

Control Panel

System Overview

The Premium series controllers are based on vacuum transducers. Every controller will have a color touch screen (HMI) that will allow for process variables adjustment; alarm set points adjustment; visual indication of system faults; current vacuum level as well as each pump status including pump faults, pump duty in sequence and elapsed run time. All pumps will have a circuit breaker through the door disconnect and illuminated H-O-A switches.

Control Panel

Controllers are factory wired for a single power source and a power distribution block is provided for power connection. The system will accept separate power feeds for each pump in case the power distribution block is removed for redundancy purposes. A minimum of two control transformers will be provided. In case the primary transformer fails, a secondary transformer automatically provides control power. Power switching relay(s) are provided to switch primary transformer windings to any available power source if separate power feeds are used.

Sequence of Operation

Operation of the controller is based on "ON" and "OFF" setpoints. (See "Setpoints Adjustment" for instructions on how to adjust setpoints).

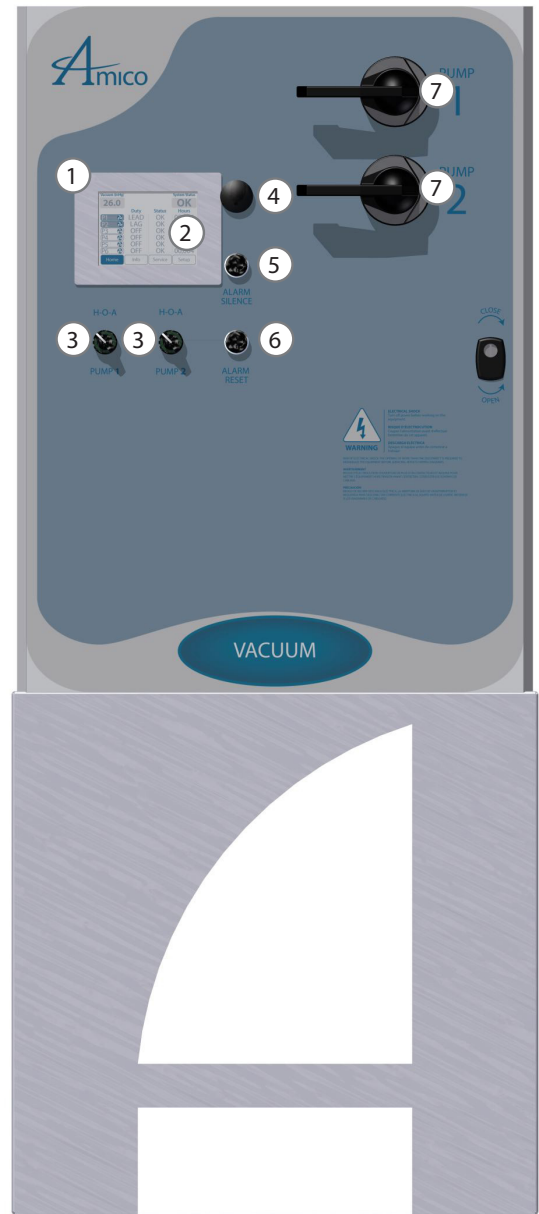
The lead pump will switch on when vacuum level drops below the "ON" setpoint and shuts off when vacuum level reaches the "OFF" setpoint. Every time the lead setpoint is satisfied, the next available pump will become the lead pump.

Lag and all reserve pumps (if applicable) will switch on when the vacuum level drops below the respective "ON" setpoints and will switch off when respective "OFF" setpoints are reached.

Note: See "System timers" for additional information on pump sequencing).

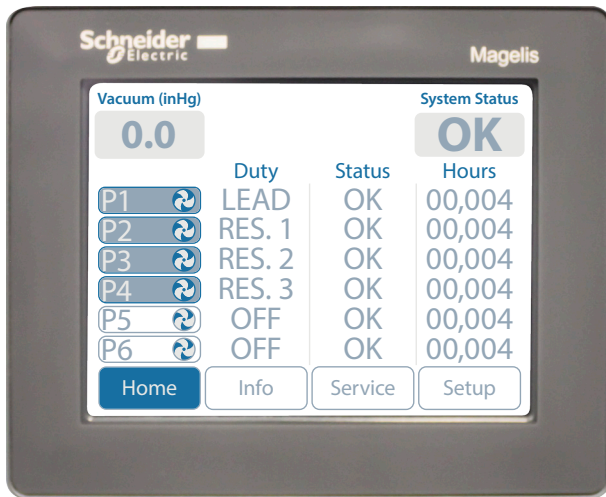
If a pump is switched off by an H-O-A switch or a pump fault is detected, it will be automatically taken out of the sequence and its duty transferred to the next available pump. Once the fault is cleared (See "Troubleshooting" for additional information) and the H-O-A switch is in the "A" position, the pump will be automatically included into the sequence.

1. Display Screen – Displays the systems operating screens, available in Pro IEC or ECO+ displays
2. Touch Monitor – For changing different settings on the display screen
3. H-O-A Selector Switch – Pump control switch: Hand/Off/Auto
4. Alarm Horn – Sounds when an alarm condition occurs
5. Alarm Silence – Silences alarm to allow work to be performed without the annoyance of the alarm
6. Alarm Reset – Resets all alarm states after the condition that set off the alarm is corrected; do not reset the alarm until the type of alarm has been recorded and the alarm cause identified and corrected to the best of your ability
7. Power Breaker – Controls the power to each pump and the control panel

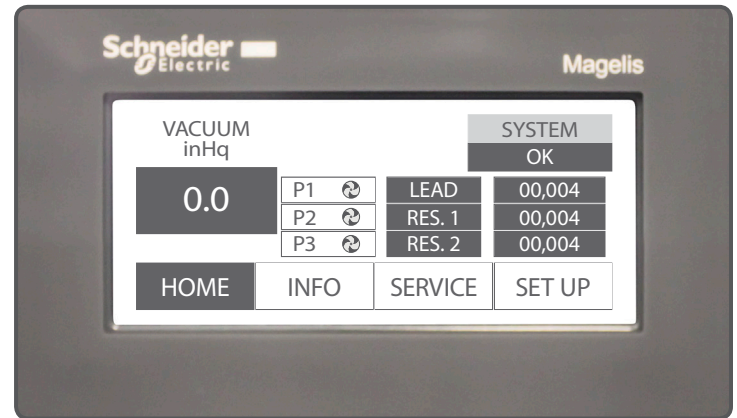


Control Panel

Main Screen



Pro IEC Display Screen



ECO+ Display Screen

Pump Duty

Displays the following:

- If H-O-A switch is in the "O" (OFF) position, it will read "OFF"
- If pump is running, it will read "RUN" regardless of the H-O-A position
- If pump is off and the H-O-A switch is in "A" (AUTO) position, it will read the duty of the pump: LEAD, LAG, RES1 (RESERVE 1), RES2 (RESERVE 2) as applicable
- If a pump is in critical fault, it will read "OUT OF SERVICE"

Pump Status

Displays the following:

- If a pump is in critical fault and the H-O-A switch is in "A" (AUTO) position, it will read "FAULT"
Note: even if the reason for the fault is cleared (e.g. an "OVERTEMP" alarm is cleared and reset), the status of the pump will remain in "FAULT." To reset pump status, the respective H-O-A switch must be turned to "O" (OFF) position. (See "Troubleshooting" for additional information)
- If a pump is in non-critical fault (e.g. maintenance is suggested), it will read "ATTENTION REQUIRED!"
- If a pump is in normal operating condition, it will read "OK"

Run Time Display

- Run time for each pump is displayed in Hours

Vacuum Display

- Current vacuum is displayed in inHg
- In case the pressure transducer fails, all pumps will shut off and "SENSOR FAILED" will be displayed instead of the pressure readout. After the sensor is repaired, push the reset button to reset sensor fault. (See "Troubleshooting" for additional information)

Control Panel

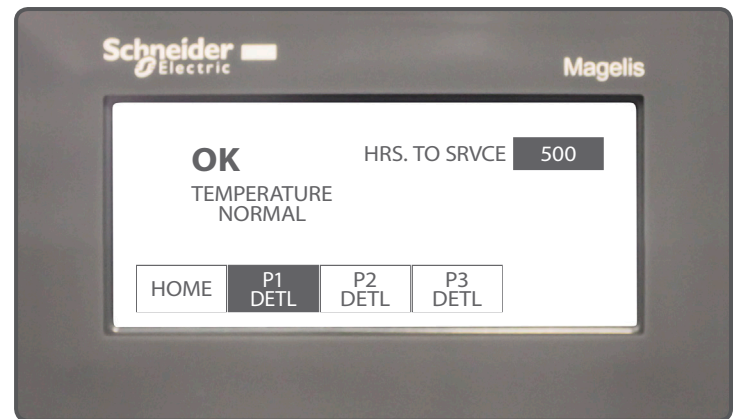
System Status Display

- If no system faults are present, it will read “OK.” If any unit alarms are present, it will read “FAULT! CLICK HERE.” By clicking on the message, a unit alarms screen will be displayed where specific alarms can be viewed. (See “Troubleshooting” for additional information)

Pump Detail Screen



Pro IEC Display Screen



ECO+ Display Screen

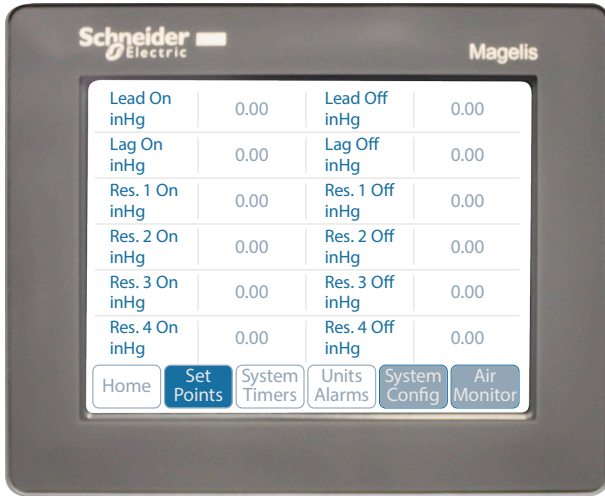
The Pump Detail screen can be accessed from the main screen by pressing the respective “P #” button. It will display the current pump status, hours left until service is required, the temperature readout for each head if RTD sensors are used, pump faults and alarms (See “Troubleshooting” for additional information).

Returning to the Home Screen

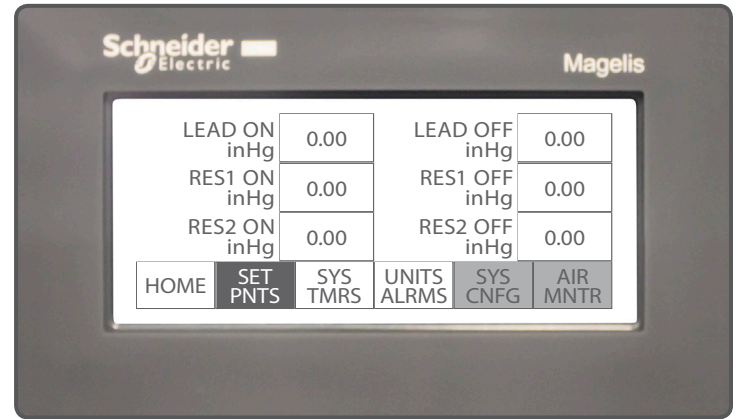
From any subscreen, you can press the “Home” button or “Exit” to return to the Home screen.

Control Panel

Setpoints Screen



Pro IEC Display Screen



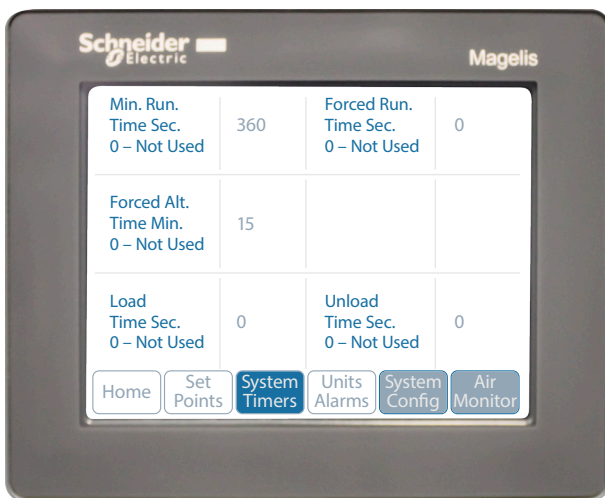
ECO+ Display Screen

The vacuum level setpoints screen can be accessed from the main screen by pressing the “SET UP” button. “ON” and “OFF” setpoints can be adjusted by pressing the respective values. A numeric keypad will appear, allowing direct value entry.

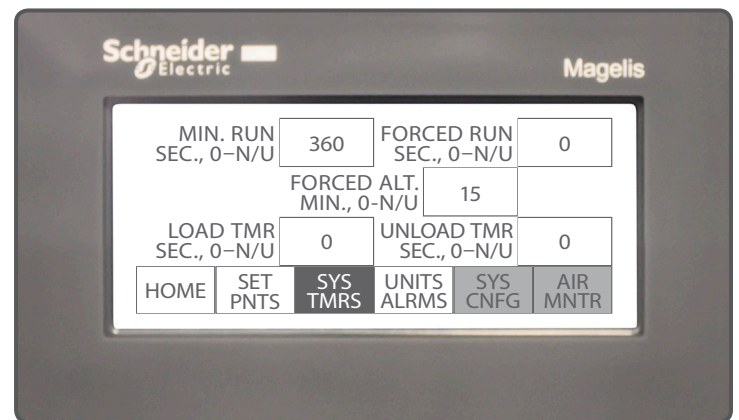
Note: The system has the following restrictions:

- It will not accept “OFF” entry values lower than “ON” values
- Lag and all subsequent Res. (if applicable) “ON” and “OFF” values cannot be higher than previous “ON” and “OFF” values

System Timers Screen



Pro IEC Display Screen



ECO+ Display Screen

The System Timers screen can be accessed from the main screen by pressing the “Set Up” button and then pressing “System Timers.” It will display the minimum run timer, forced run timer, forced alternation timer and load/unload timers.

Control Panel

Minimum Run Timer

The value of this timer is in seconds. This is the time that the pump will run after it has been switched on in automatic mode regardless of vacuum level. For example, if it is set to 600 seconds (10 minutes) and a respective vacuum setpoint is satisfied in 5 minutes, the pump will run for 5 more minutes and then shut down. If a respective vacuum setpoint is satisfied in 13 minutes, the pump will shut down immediately upon switch satisfaction. The value "0" will turn this timer off.



WARNING: ALL VACUUM SYSTEMS SHOULD HAVE THIS SET TO A MINIMUM OF 360 SECONDS. FAILURE TO DO SO WILL VOID THE WARRANTY.

Forced Run Timer

The value of this timer is in minutes. This is the time that will take to switch the next available pump on if the lead setpoint (SP1) is not satisfied within this period. For example, if it is set to 15 minutes and the lead vacuum setpoint is not satisfied within this time with the lead pump running, then the lag pump will be switched on. If the lead setpoint is still not satisfied within the next 15 minutes, the reserve pump (if applicable) will be switched on. All pumps will run until the lead setpoint is satisfied. If a minimum run timer is used (see "Minimum Run Timer" section above), pumps that ran less than the minimum run timer setting will continue to run until their minimum run time elapses. The value "0" will turn this feature off.

Note: If lag and reserve (if applicable) pumps are switched on by their respective vacuum setpoint, they will continue to run until the lead setpoint is satisfied.

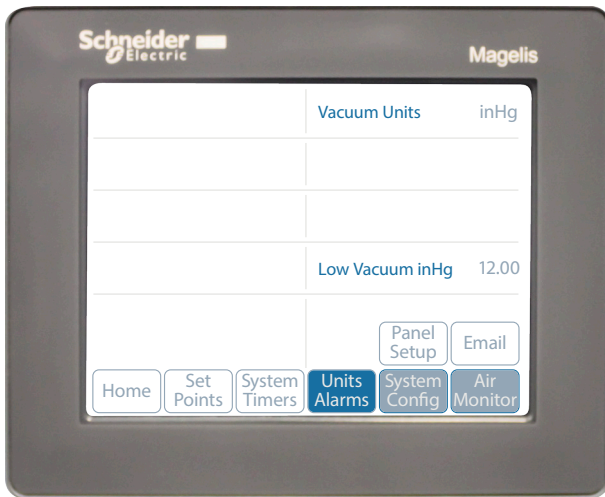
Forced Alternation Timer

The value of this timer is in minutes. This is the time that will take to alternate the pumps in case the lead setpoint was not satisfied within the specified time period. For example, if this timer is set to 480 minutes (8 hours) and the lead setpoint is not satisfied within this period, all pumps will be shut off briefly and the next lead pump will be switched on. The value "0" will turn this feature off.

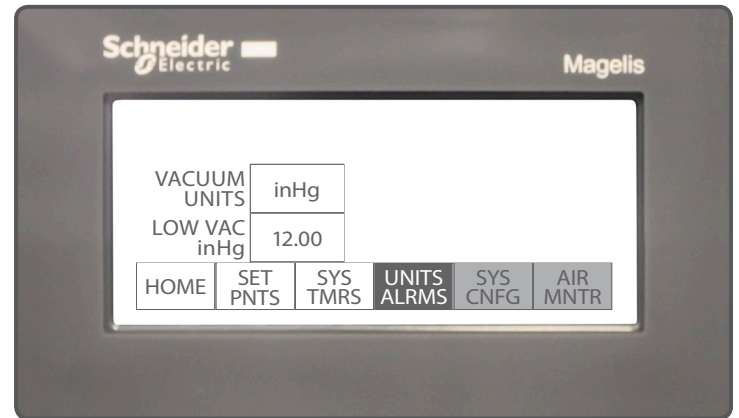
Note: Even with this timer active, normal alternation on each cycle will occur.

Control Panel

Alarms Setpoint Screen



Pro IEC Display Screen



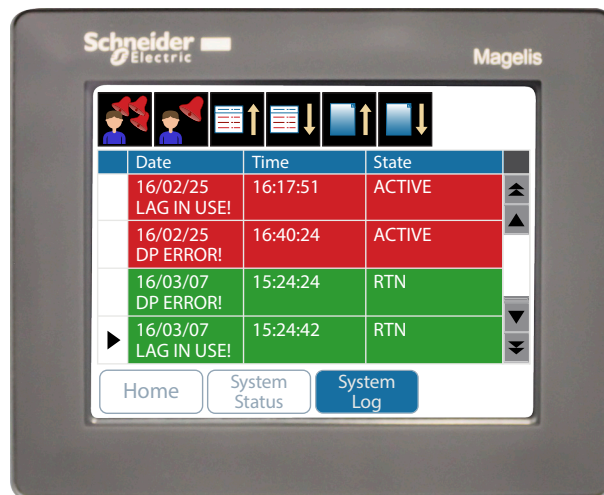
ECO+ Display Screen

This screen can be accessed from the main screen by pressing the "SET UP" button and then pressing "ALARMS." It allows entering settings for the following alarms:

Overtemp Alarm

This alarm setpoint is available if the system is based on RTD temperature sensors to monitor the pump head temperature. If the system uses temperature switches instead, this setpoint is not available. The setpoint is in °F or °C. That can be toggled by pressing the Temperature Units value field. Up/Down arrows will appear and you can use these to switch between units of measure. Press "ENTER" to confirm. Touch the Overtemp Alarm value field so that a numeric keypad appears to allow direct value entry.

System Log Screen

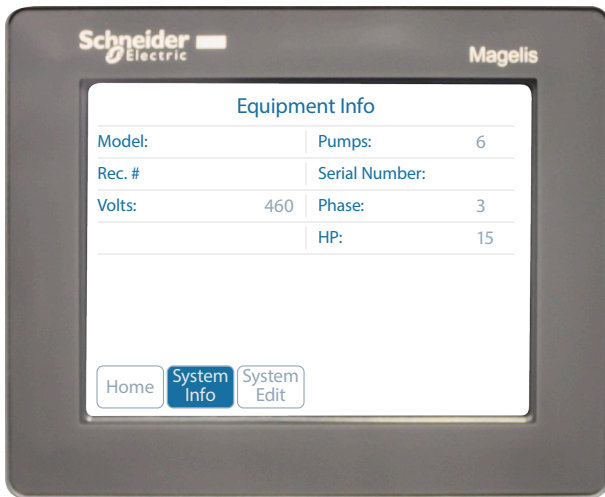


Pro IEC Display Screen

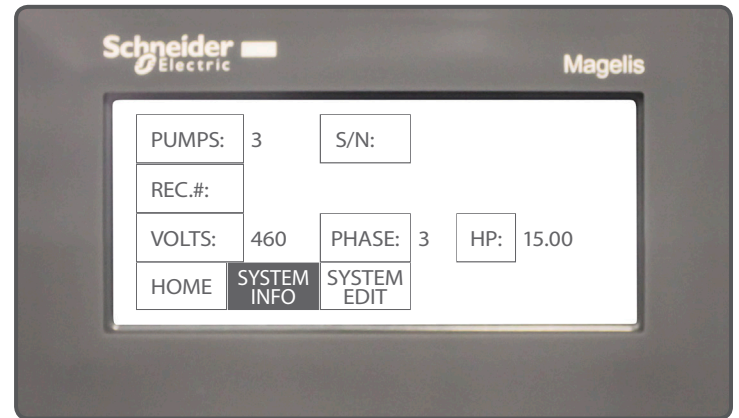
The System Log keeps track of all of the alarms on the system. The information provided in the log can be used for troubleshooting purposes.

Control Panel

System Information Screen



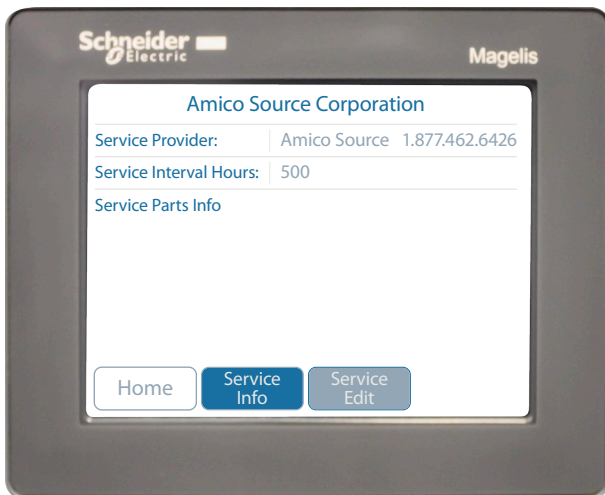
Pro IEC Display Screen



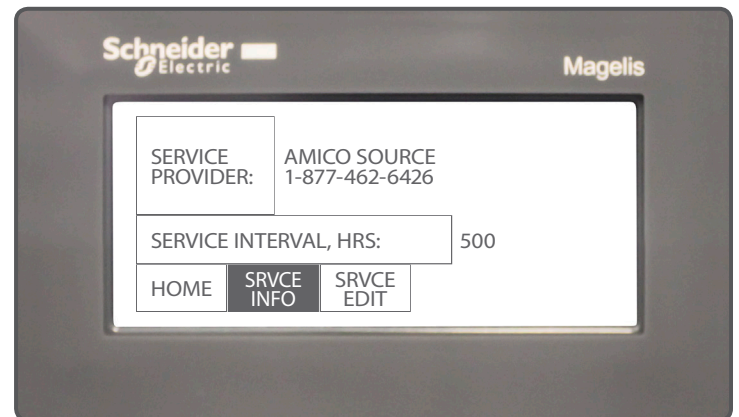
ECO+ Display Screen

This screen can be accessed from the main screen by pressing the "System Info" button. It will display general system information.

Service Information Screen



Pro IEC Display Screen



ECO+ Display Screen

The Service Information screen can be accessed from the main screen by pressing the "System Info" button and then pressing "Service Info" or by pressing on the "Service Needed" message if it has appeared. It will display the service provider's information, maintenance interval and other service information.



Principles of Operation

The contactless claw vacuum pump works on the claw principle.

The components are dimensioned such that on the one hand there is never contact between the two claws or between a claw and the cylinder, on the other hand the gaps are small enough to keep the clearance loss between the chambers low.

In order to avoid the suction of solids, the vacuum pump is equipped with an inlet screen in the suction connection.

In order to avoid reverse rotation after switching off, the vacuum pump is equipped with a non-return valve.

The vacuum pump compresses the inlet gas absolutely oil-free. A lubrication of the pump chamber is neither necessary nor allowed.

Cooling

The vacuum pump is cooled by:

- Radiation of heat from the surface of the vacuum pump
- The air flow from the fan wheel of the drive motor
- The process gas
- The air flow from the fan wheel on the shaft of the vacuum pump

The following are recommendations provided by the vacuum pump manufacturer. For a more detailed manual, please contact Amico Source Corporation for a copy of the pump manual directly from the manufacturer.

Vacuum Level Settings

System Vacuum Factory Settings	Start	Stop
Lead	18 inHg	23 inHg
Res 1	16 inHg	21 inHg
Res 2	14 inHg	19 inHg
Res 3	12 inHg	17 inHg

For maintenance or other reasons, the pumps can operate in the "Hand" position. In this condition, the pump in the "Hand" position will start when the switch remains in hand and will continue to run until the switch is in "Off" or "Auto" position. These vacuum level conditions must be programmed into the control panel. These values of vacuum level must be set to ensure safe operation of the pumps.

For high altitude installations, pumps may not be able to meet these vacuum levels. If the pump runs and is unable to meet these settings, please contact Amico Source Corporation's Technical Support for assistance.

Maintenance

Vacuum Pump



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

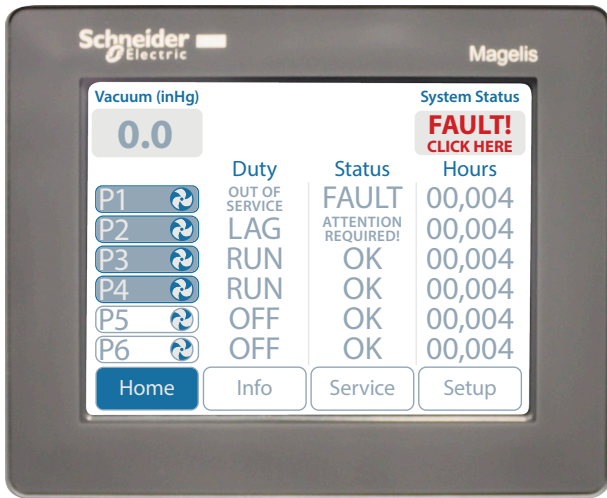
Release all vacuum from the package before removing, loosening, or servicing any covers, guards, fittings, connections, or other devices.

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

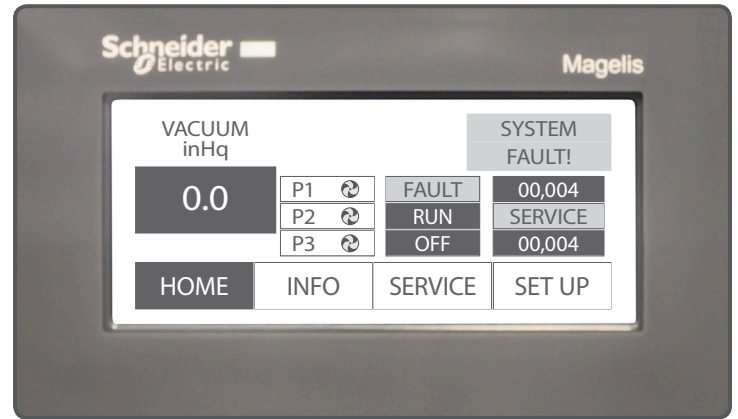
Component	Inspection Instructions	Maintenance and Inspection Time Interval			Remarks
		Every 500 Hours or 1 Month	Every 1,000 Hours or 3 Months	Every 5,000 Hours or 1 Year	
Enclosure of pump	Clear surrounding of dust	Inspect			
Oil level	Check that the level is slightly above the middle of the sight glass and free of contamination.	Inspect		Change	
Fan cowling	Clear of dust		Inspect		
Fan wheel	Clear of dust		Inspect		
Ventilation grilles	Clear of dust		Inspect		
Cooling fan	Clear of dust		Inspect		
Inlet screen	Clear of dust and debris	Inspect			Check regularly and replace if needed

Control Panel Troubleshooting

To Begin troubleshooting the system, press the System Status button which reads "FAULT! CLICK HERE" or "SYSTEM FAULT!".

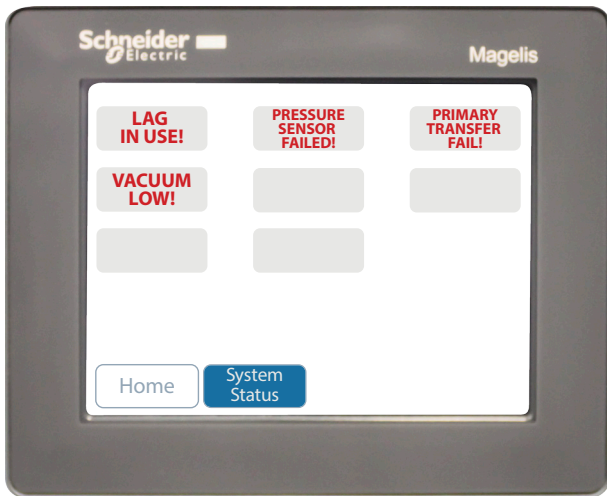


Pro IEC Display Screen

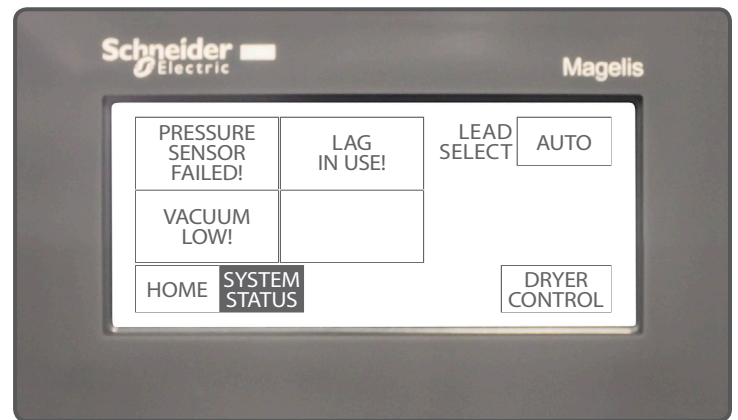


ECO+ Display Screen

You will get a screen like the one shown below:



Pro IEC Display Screen



ECO+ Display Screen

Control Panel Troubleshooting

Problem	Possible Causes	Solution
Pressure sensor failed	<ul style="list-style-type: none"> Loose Wire 	<ul style="list-style-type: none"> Check the wiring between the sensor and terminal in the panel
"ERROR" in place of pressure readout	<ul style="list-style-type: none"> Pressure sensor is faulty 	<ul style="list-style-type: none"> Replace pressure sensor
Lag in use	<ul style="list-style-type: none"> Last available pump is called One of the pumps may be out of service 	<ul style="list-style-type: none"> Confirm all pumps are working on automatic Once at least one of the pumps is turned off automatically in the system, press alarm reset Investigate the demand from the facility
Primary transformer failed	<ul style="list-style-type: none"> Transformer failure Burned out fuse 	<ul style="list-style-type: none"> Contact certified technician
Receiver high water (Québec systems only)	<ul style="list-style-type: none"> CSA vacuum systems in Québec only High water level in receiver tank 	<ul style="list-style-type: none"> Check receiver tank for water Drain tank as necessary Replace sensor as necessary

Pump Troubleshooting

Problem	Possible Causes	Solution
Failure to start	Main power disconnected	Turn on main power
	Phase reversal monitor open	Change power supply phase on incoming power
		Check voltage dial setting on phase reversal switch
	Power failure	Restore power
	Main fuse blown	Replace fuse
	Fuse blown in control circuit	Replace fuse
	Overload tripped on starter	Reset and check for system overload
	High temperature switch activated	Allow unit to cool, reset switch and check for over temperature condition
	Vacuum switch open	Adjust or replace switch
Loose or faulty connection	Check and tighten all wire connections	
Power failure	Main fuse blown	Replace fuse
	Fuse blown in control circuit	Replace fuse
Pump shuts off unexpectedly	Overload tripped on starter	Reset and check for system overload
	Vacuum switch has incorrect adjustment	Adjust or replace
	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 and check for over temperature condition

Pump Troubleshooting

Problem	Possible Causes	Solution
High temperature alarm	High temperature switch activated	Allow unit to cool, reset switch and check for over temperature condition
Low tank vacuum	System piping leaks	Repair leaks
	Defective pressure gauge	Replace gauge
	Pressure switch open	Adjust or replace
	No power to solenoid or solenoid stuck open	Check electrical connections
	Intake filter clogged	Clean or replace
Pump cycles too often	System undersized	Contact Amico Source Corporation
	Incorrect vacuum setting	Adjust vacuum switch
	Faulty vacuum switch	Replace switch
	System piping leaks	Repair leaks
	Check valve or the line to receiver is leaking or plugged	Replace if necessary
	Minimum timer not set	Set minimum timer to 6 minutes
	Water in air receiver	Drain air receiver
Pump won't shut off	Vacuum switch has incorrect adjustment or it is faulty	Adjust or replace
Abnormal noise	Mounting bolts loose	Tighten bolts
Motor overheating	Low voltage	Check for proper supply voltage
	Defective motor	Contact Amico Source Corporation
Pump runs hot	Incorrect vacuum level setting	Adjust pressure switch
	Faulty check valve	Contact Amico Source Corporation
	Check if valve or the line to receiver is leaking or plugged	Replace if necessary
	Intake filter clogged	Clean or replace
Vacuum pump does not reach the usual vacuum level. The drive motor draws a too high current. Evacuation of the system takes too long	The vacuum system or suction line is not leak-tight	Check the hose or pipe connection for possible leak
	The vacuum relief valve is misadjusted or defective	Contact Amico Source Corporation
	The inlet screen in the suction connection is partially clogged	Clean screen If frequent, install an inlet filter
	Partial clogging in the discharge	Remove the clogging
	Incorrect sized discharge piping	Use larger diameter
	Internal parts worn or damage	Contact Amico Source Corporation
The drive motor is running, but the vacuum pump stands still	Coupling between the drive motor and the pump is defective	Inspect and replace the coupling element

Pump Troubleshooting

Problem	Possible Causes	Solution
The vacuum pump starts, but labours or runs noisily or rattles	Loose connection(s) in the drive motor terminal box	Check the proper connection of the wires against the connection diagram. Tighten or replace loose connections
	Not all drive motor coils are properly connected	
	The drive motor operates on two phases only	
	Defective bearings	Contact Amico Source Corporation
	Worn coupling element	Replace the coupling element
Low oil level in the synchronising gear, leaking oil	Contact Amico Source Corporation	

Replacement Parts

Amico Source Corporation

85 Fulton Way

Richmond Hill, Ontario

L4B 2N4

Phone: (877) 462-6426

Fax: (866) 440-4986

For parts: as-parts@amico.com

Warranty Policy - Medical Air and Vacuum Systems

Amico Source Corporation warrants the equipment it manufactures to be free of defects in materials or workmanship when installed and operated in accordance with instructions. The Warranty Periods commence upon shipment or at start up, whichever period terminates earlier.

Standard Warranty Periods

	From Shipment	From Start-up
Medical Air Systems	30 months	24 months
Desiccant Air Dryer Systems	30 months	24 months
Lubricated Vane Vacuum Systems	30 months	24 months
Oil-less Vane Vacuum Systems	30 months	24 months
Liquid Ring Vacuum Systems	30 months	24 months
Claw (Standard and O2 Assured) Vacuum Systems	30 months	24 months

Conditions of Standard Warranty Periods – Complete Systems

30 months from the date of shipment or 24 months from start-up, whichever comes first, on replacement of defective parts. Labor, travel and shipping costs are covered for 18 months from the date of shipment or 12 months from start-up, whichever comes first.

Conditions of Standard Warranty Periods – Parts Orders

12 months from the date of shipment on replacement of defective parts only.

This warranty covers all necessary parts and services as defined in the Conditions of Standard Warranty Periods, required for correction of the defect whether by any or all of repair, replacement, or credit, which election shall be made by Amico Source Corporation at its sole discretion, and which are purchaser's only remedies for breach of warranty.

This warranty requires the owner to ensure that the equipment is:

- Installed in accordance with installation and maintenance manuals provided with the product
- Started up or placed in service by an authorized representative of Amico Source Corporation, which includes the completion and forwarding to Amico Source Corporation of a Start-up and Warranty Registration Form; downloadable from the following location: <http://www.amico.com/warranties>
- Certified in accordance with all applicable local standards, by a properly qualified certification agency
- Maintained in strict accordance with Operation and Maintenance Instructions provided with the product

Warranty Policy - Medical Air and Vacuum Systems

Warranty claims will be honoured only after defective parts are evaluated by Amico Source Corporation and only when the examination discloses to Amico Source Corporation's reasonable satisfaction that the equipment has not been damaged in shipment or improperly installed, operated outside of any published parameters (including but not limited to temperature, pressure, or ventilation), improperly or inadequately maintained, field modified in any way, improperly repaired, or in any other way improperly applied or used.

All claims against this warranty require prompt notification, within the warranty period, of any seeming defect. Failure to promptly notify Amico Source Corporation of the seeming defect will invalidate all warranties.

Amico Source Corporation is not liable for delay, damage or defect caused by shipping, acts of God, fire, war, labor difficulties, action of government, or other cause beyond the reasonable control of Amico Source Corporation. If there is a material delay in delivery for any reason, purchaser's only remedy is to cancel the purchase order.

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 is Amico Source Corporation liable for damages in excess of the value of the defective product, nor is Amico Source Corporation liable for any indirect, special or consequential damages, loss of profit of any kind, or for loss of use of the products, even if Amico Source Corporation is aware or should be aware of the possibility of the same.

Maintenance Record

Model Number: _____

Serial Number: _____

Installation Date: _____

Date of Service								
Hours								
Load								
Ambient Temperature								
Inlet Filter								
Misc.								
Serviced By								
Gear Oil								

Notes:

Notes

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