GARDNER DENVER®

13-19-600
Version: 00
August 14, 2006

AUTO SENTRY®
E-SMART
CONTROLLER

GARDNER DENVER

MAINTAIN COMPRESSOR RELIABILITY AND PERFORMANCE WITH GENUINE GARDNER DENVER® COMPRESSOR PARTS AND SUPPORT SERVICES

Gardner Denver® Compressor genuine parts, manufactured to design tolerances, are developed for optimum dependability – specifically for Gardner Denver compressor systems. Design and material innovations are the result of years of experience with hundreds of different compressor applications. Reliability in materials and quality assurance is incorporated in our genuine replacement parts.

Your authorized Gardner Denver Compressor distributor offers all the backup you'll need. A worldwide network of authorized distributors provides the finest product support in the air compressor industry.

Your authorized distributor can support your Gardner Denver air compressor with these services:

1. Trained parts specialists to assist you in selecting the correct replacement parts.
2. Factory warranted new and remanufactured rotary screw airends. Most popular model remanufactured airends are maintained in stock at the Remanufacturing Center in Indianapolis, IN., for purchase on an exchange basis with liberal core credit available for the replacement unit.
3. A full line of factory tested AEON™ compressor lubricants specifically formulated for use in Gardner Denver compressors.
4. Repair and maintenance kits designed with the necessary parts to simplify servicing your compressor.

Authorized distributor service technicians are factory trained and skilled in compressor maintenance and repair. They are ready to respond and assist you by providing fast, expert maintenance and repair services.

For the location of your local authorized Gardner Denver Air Compressor distributor, refer to the yellow pages of your phone directory, check the Gardner Denver Web Site at www.gardnerdenver.com or contact:

Factory:
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1800 Gardner Expressway
Quincy, IL 62301
Phone: (217) 222-5400
Fax: (217) 224-7814

HP	Parts List	Service Manual
5, 7.5 & 10 HP	13-19-500	13-19-602
15 HP	13-19-502	13-19-604
20 HP	13-19-504	13-19-606

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GENERAL INFORMATION

GENERAL DESCRIPTION

The rotary screw compressor is prewired with all controls, motor, starter for the voltage and horsepower at the time of ordering. It is necessary only to connect the compressor unit to the correct power supply and to the shop air line. A standard compressor unit consists of the compressor, oil reservoir, oil cooling system and filter, motor, IP54 starter/control box and control components as described in the package service manual.

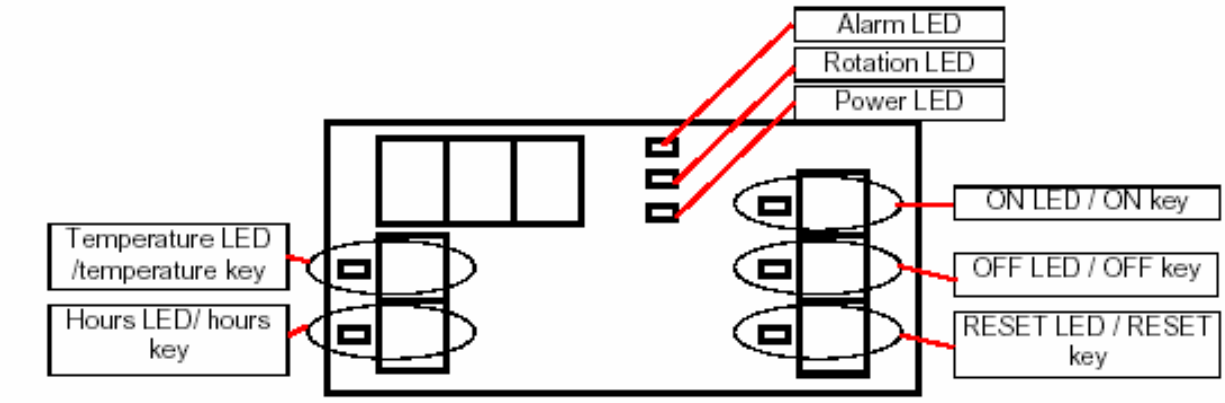

Figure 1-1 - KEYPAD

The compressor controller is used for regulating the compressor and for adjustments. The compressor controller has an alpha-numeric display which advises discharge temperature, maintenance hours, alarms and shutdowns. The controller functions include automatic starting and stopping the compressor, controller and tripping the alarms (through LEDs and codes shown on the display), display and control of the oil temperature, run hours, load hours and maintenance hours.

The software version is displayed when the controller is powered up. The display will read Pxx, when the main switch is turned on. Please quote the software version in case of failure.

SECTION 2
CONTROLLER OPERATION

OPERATING THE COMPRESSOR

With the machine switched off, turn the disconnect switch on and the panel will power up. Both the display and the 8 LEDs on the panel will briefly light up. Afterwards the display will show the Pxx value to advise the software version loaded into the controller. Next the oil temperature in Fahrenheit will display with the Temperature, OFF and Power LEDs on. The Temperature and OFF LEDs are red, the Power LED is yellow. The compressor is now in the start or compressor status display mode, which is a display only mode. If the Hour key is pressed, the 'rUn ' number of hours will be displayed, which is the total number of hours of compressor operation. If the Hour key is pressed again, the 'Ld' number of hours will be displayed, which is the total number of hours of loaded compressor operation. If the Hours key is pressed again, you will see the maintenance hours displayed in the following sequence:

'S.01' number of hours
'S.02' number of hours
'S.03' number of hours
'S.04' number of hours
'S.06' number of hours

If the hours button is not pressed for one minute, the discharge temperature will reapprear on the display.

The compressor will not start if the system pressure is above the reset pressure or if the unit has not blown down. When the compressor is running the 3 LEDs will display the discharge temperature in Fahrenheit, the temperature LED, the power LED and the ON LED will be lit.

Automatic restarting or electrical shock can cause injury or death. Open main disconnect switch, lockout and tagout before servicing the unit.

NOTICE

There are only 3 alpha-numeric letters that can be displayed. The hours are read by watching the display scroll. First note the S.0x number to know which hours are being displayed, then the hours, which if they are more than 999, will be a number, a decimal point and three more numbers. The hours when more than 999 will scroll, then the designation (S.0x) then the number of hours again…. For example, on the next oil change, you will see S.01, then 3.998, then S.01, then 3.998. This is 3,998 hours until the next oil change. Depressing the OFF key will take you to the hours until the next air filter change, etc.

KEYPAD

The majority of the keys on the controller perform different functions, depending on whether the controller is in display or program mode, see Figure 1-1, page 4.

CONTROL MODES

Continuous – the compressor will run in continuous mode. Motor will not shut down. Compressor will run in load/unload mode, controlled by the pressure switch.

Automatic – the compressor will load/unload, same as Continuous run mode. When the compressor has run unloaded for a specified time (Figure 3-1, page 13, Menu 1, Setting 4), the main motor will stop. The compressor will re-start when the discharge pressure reaches the load setting on the pressure switch..

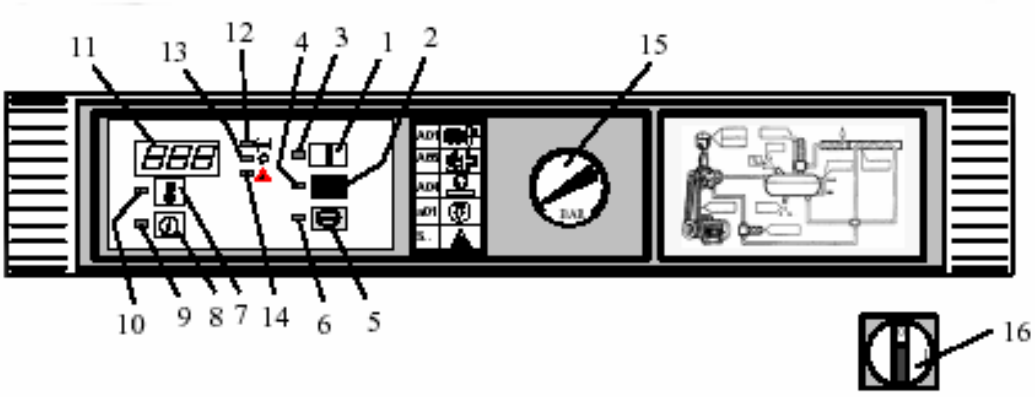

Figure 2-1 – CONTROL PANEL

1	ON BUTTON	9	HOURS LED
2	OFF BUTTON	10	TEMPERATURE LED
3	ON LED	11	DISPLAY (3 DIGIT)
4	OFF LED	12	ALARMS LED
5	ALARM BUTTON	13	ROTATION LED
6	RESET LED	14	POWER LED
7	TEMPERATURE OIL BUTTON	15	NETWORK PRESSURE MANOMETER
8	HOURS BUTTON	16	MAIN SWITCH/EMERGENCY STOP

Function of the keys in display mode:

Key	Function
Temperature	Display of discharge temperature
Hours	Display number of operating hours
	Total hours (rUn)
	Loaded hours (Ld)
	Number of hours until next service (maintenance hours):
	S.01 hours until oil change
	S.02 hours until air filter change
	S.03 hours until oil filter change
	S.04 hours until air/oil separator change
	S.06 hours until general maintenance
ON	Run
OFF	Stop
Reset	Clear shutdowns and alarms messages on the display
	Exit programming and menus

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NOTICE

There are only 3 alpha-numeric letters that can be displayed. The hours are read by watching the display scroll. First note the S.0x number to know which hours are being displayed, then the hours, which if they are more than 999, will be a number, a decimal point and three more numbers. The hours when more than 999 will scroll, then the designation (S.0x) then the number of hours again…. For example on the next oil change, you will see S.01, then 3.998, then S.01, then 3.998. This is 3,998 hours until the next oil change. Depressing the OFF key will take you to the hours until the next air filter change, etc.

Function of the keys in program mode:

Key	Function
Temperature	Up arrow key (increases the time, temperature, etc or selects new value on display)
Hours	Down arrow key (decreases the time, temperature, etc or selects new value on display)
ON	Run - **DO NOT DEPRESS WHILE IN PROGRAMMING MODE;** this starts the unit
OFF	Scrolls down to the different parameters within the menu selected
Reset	Exit programming and menus

Automatic restarting or electrical shock can cause injury or death. Open main disconnect switch, lockout and tagout before servicing the unit.

LED's

The condition the machine is in is indicated by the status of the 8 LEDs on the control panel. The following table details the machine status as indicated by the LEDs:

LED	STATUS	DESCRIPTION
Temperature LED	On	Display reads discharge temperature
	Blinking slow	Warning: Temperature has reached discharge setting of 220° F
	Blinking fast	Shutdown: Temperature has reached high discharge temperature setting of 225° F
Hours LED	On	Display reads hours of operation and hours before maintenance is required
	Blinking slow	Warning: Maintenance is required. Note: The display will alternately display the discharge temperature and maintenance hours.
Alarm LED	Blinking slow	Warning
	Blinking fast	Shutdown
Rotation LED	Blinking fast	Will not start, incorrect direction of motor rotation, invert two of the incoming power lines. Phase loss. Voltage drop of more than 20%.
Power up LED	On	The controller has power to it.
ON LED	On	Unit is in run condition
	Blinking slow	Unit is in unloaded run condition
	Blinking fast	Unit can re-start after blow down is complete. (The ON key has been pressed soon after the OFF key was pressed or the unit is in Automatic mode after power interruption).
OFF LED	On	Unit is stopped
	Blinking slow	Unit is blowing down
	Blinking fast	Unit will stop after unload has timed out.
RESET LED	On	Controller is in program mode (or has been pressed during normal operation).

Automatic restarting or electrical shock can cause injury or death. Open main disconnect switch, lockout and tagout before servicing the unit.

DISPLAY MESSAGES

The Auto Sentry E-Smart Controller has 6 digital inputs. They signal shutdowns, the following information is for identifying and fixing the faults.

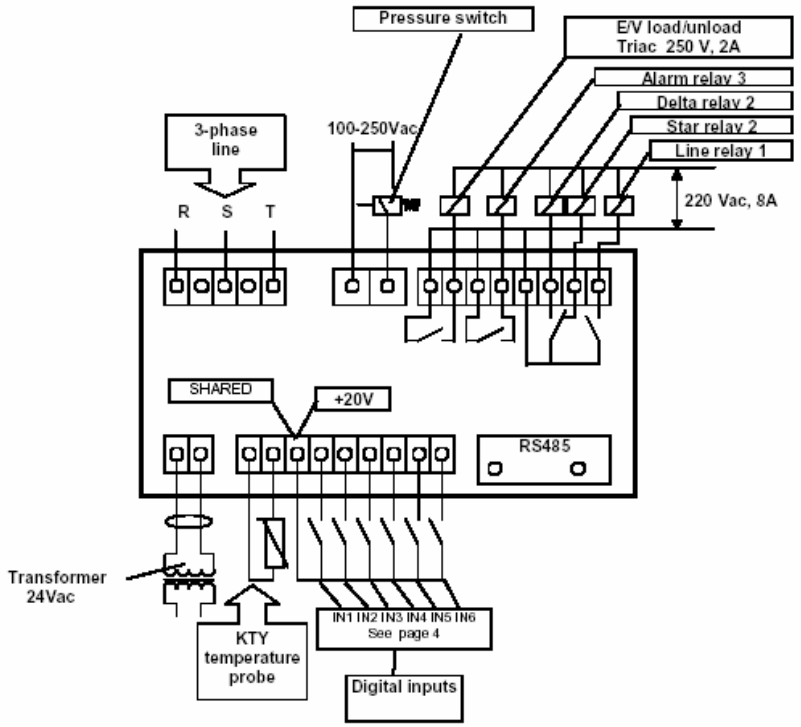
Display Message	Description
rUn	Total hours on the unit
Ld	Total loaded hours on unit
S.01	Hours until next oil change
S.02	Hours until next air filter change
S.03	Hours until next oil filter change
S.04	Hours until next air/oil separator change
S.06	Hours until general maintenance
A01	High discharge temperature shutdown (225° F).
A03	Motor overload shutdown
A04	Incorrect direction of rotation, phase loss or voltage drop (< 20%) shutdown
A07	Thermistor failure
A14	24 vac micro power break shutdown *
A20	Optional pressure switch shutdown
A25	Optional high temperature shutdown
a01	Air filter change warning
a02	Warning: Compressor is waiting to re-start after a shut down; delay in compressor re-start due to blow down timer not timed out
a03	High discharge temperature warning (220° F)

* - The controller is equipped with a micro power-break detection system. Every time a power drop is detected at 24 vac, the unit will record the event. If two consecutive breaks (one second) are detected, the controller will automatically shutdown the unit. All the LEDs will blink on at the same time, and A14 shutdown will appear. When the 'A' (in A14) appears on the display, all the relays will be released. The compressor can only be restarted by manually pressing the 'RESET' key, then the 'ON' key on the controller.

DIGITAL INPUTS

The Auto Sentry E-Smart Controller has 6 digital inputs; they signal shutdowns. The following information is for identifying and fixing the faults:

Digital input	Function	Action	Display
Input 1 (IN 1)	Emergency stop		Fast blinking – A05
Input 2 (IN 2) Closed is start Open is stop	Remote start/stop. This function will not be active unless setting 3 in Menu 1 is set to 'Etn'. No reset is possible		
Input 3 (IN 3)	General maintenance, change air filter	Warning	Slow blinking – a01
Input 4 (IN 4)	Motor overload	Shutdown	Fast blinking – A03
Input 5 (IN 5)	Optional high pressure switch	Shutdown	Fast blinking – A20
Input 6 (IN 6)	Optional high temperature switch	Shutdown	Fast blinking – A25



NOTE: DO NOT CONNECT THE SECONDARY OF TRANSFORMER TO EARTH GROUND

Figure 2-2 – WIRING DIAGRAM

SECTION 3
PROGRAMMING

Automatic restarting or electrical shock can cause injury or death. Open main disconnect switch, lockout and tagout before servicing the unit.

To enter the programming mode, you need to press both the Temperature key and the Hours key, simultaneously and hold for 5 seconds. The 'PRO' message will appear on the display and all the LEDs will blink. Three zeroes will blink on the display. The keys are now in program mode.

By pressing the Temperature key, you will increase the number on the display, once the desired number is reached, release the key, pressing the Hours key will decrease the number on the display. When the blinking stops the program selected will be active. If a number selected is not programmed, the controller returns to the display mode. The programmed menus are 1, 2 and 15. To exit the program mode and return to the display mode, press the Reset key.

When you are in program mode, pressing the OFF key will scroll the controller though the program selected. See Figure 3-1, for the table showing the settings in each menu. By pressing the Temperature and Hours keys you change the options within a setting in the menu. The Temperature key also increases values of the setting, the Hours key decreases the values of the setting. The controller will take 3 seconds for the setting to be reset to the new value. If the OFF or RESET key is entered too early the controller will not accept the new value.

Menu	Settings – Display	Default	Min or Option	Max or Option
1	Unit of measure of Temperature CEL/FAH	F	C	F
	Automatic restart - Aut/OFF 15-240 sec/Off	OFF (no auto restart)	OFF	240 seconds
	Remote start/stop - LOC/Etn (1)	LOC	LOC	Etn (remote)
	no-load run time – 3 (1-240 minutes)	3 min	1 min	240 min
	Control mode – Aut/Cnt	Automatic	Continuous	Automatic
2	Service time – S.06	250 hours	0 hours	250 hours
15	Oil life – S.01	4000 hours	0 hours	8000 hours
	Air filter life – S.02	1500 hours	0 hours	2000 hours
	Oil filter life – S.03	1000 hours	0 hours	1000 hours
	Air/oil separator – S.04	3000 hours	0 hours	4000 hours
	ID number of compressor - Add	1	1	32

Note: Remote start-stop is enabled by setting 'Etn' in menu 1. The unit must initially be started by pressing the 'ON' button on the controller.

Figure 3-1 – PROGRAM MENU

Automatic restarting or electrical shock can cause injury or death. Open main disconnect switch, lockout and tagout before servicing the unit.

RESETTING THE SERVICE HOURS

To reset the S.01, S.02, S.03 and S.04 service hours, go into menu 15. By using the OFF key, scroll to the service setting that needs to be changed and press the Temperature key. This will reset the hours in the controller to the default setting.

If the service setting hours set with the 'Temperature' key are more than the default value in figure 3-1, use the 'Hours' key to manually set the service time down to the proper setting. Failure to have the proper service life could cause damage to the compressor.

To complete the reset of the service hours (stop the Hours LED and the Alarm LED from blinking), after the hours have been reset, press the 'RESET' key.

To reset the S.06 service hours, go into menu 2. Press the Temperature key. This will reset the hours in the controller to the default setting of 250 hours. To complete the reset of the service hours (stop the Hours LED and the Alarm LED from blinking), after the hours have been reset, press the 'RESET' key.

Gardner Denver

Specifications subject to change without notice.

 Litho in U.S.A.

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