Industrial Scroll Compressor

Deluxe Controller

USER'S MANUAL

Form No. CQGF3408 Ver. 02 07/24/2019

WARNING – PROHIBITION – MANDATORY LABEL INFORMATION

Gardner Denver Scroll compressors are the result of advanced engineering and skilled manufacturing. To be assured of receiving maximum service from this machine, the owner must exercise care in its operation and maintenance. This book is written to give the operator and maintenance department essential information for day-to-day operation, maintenance and adjustment. Careful adherence to these instructions will result in economical operation and minimum downtime.

Boxed text formats are used, within this manual, to alert users of the following conditions:

Safety Labels are used, within this manual and affixed to the appropriate areas of the compressor package, to alert users of the following conditions:

⚠ DANGER

Indicates a hazard with a high level of risk, which if not avoided, WILL result in death or serious injury.

Equipment Starts Automatically

Health Hazard – Explosive Release of Pressure

Cutting of Finger or Hand Hazard – Rotating Impeller Blade

High Voltage – Hazard of Shock, Burn, or Death Present until Electrical Power is Removed

Cutting of Finger or Hand Hazard – Rotating Fan Blade

Entanglement of Fingers or Hand/Rotating Shaft

⚠ WARNING

Indicates a hazard with a medium level of risk which, if not avoided, <u>COULD</u> result in death or serious injury.

Asphyxiation Hazard – Poisonous Fumes or Toxic Gases in Compressed Air

⚠ CAUTION

Indicates a hazard with a low level of risk which, if not avoided, <u>MAY</u> result in a minor or moderate injury.

Burn Hazard – Hot surface

PROHIBITION/MANDATORY ACTION REQUIREMENTS

Do not Operate Compressor with Guard Removed

Lockout Electrical Equipment in De-Energized State

Do Not Lift Equipment with Hook – No Lift Point

Loud Noise Hazard – Wear Ear Protection

Handle Package at Forklift Points Only

Read the Operator's Manual Before Proceeding with Task

SAFETY PRECAUTIONS

Safety is everybody's business and is based on your use of good common sense. All situations or circumstances cannot always be predicted and covered by established rules. Therefore, use your past experience, watch out for safety hazards and be cautious. Some general safety precautions are given below:

Failure to observe these notices will result in injury to or death of personnel.

- **Keep fingers and clothing away from rotating fan, drive coupling/belting, etc.**
- **Disconnect the compressor unit from its power source, lockout and tagout before working on the unit – this machine is automatically controlled and may start at any time.**
- **Do not loosen or remove the enclosure or belt covers, or break any connections, etc., in the compressor air system until the unit is shut down and the air pressure has been relieved.**
- **Electrical shock can and may be fatal.**
- **Perform all wiring in accordance with the National Electrical Code (NFPA-70) and any applicable local electrical codes. Wiring and electrical service must be performed only by qualified electricians.**
- **Open main disconnect switch, lockout and tagout and check for voltage before working on the control.**

Failure to observe these notices could result in damage to equipment.

- **Stop the unit if any repairs or adjustments on or around the compressor are required.**
- **Do not use the air discharge from this unit for breathing – not suitable for human consumption.**
- **An Excess Flow Valve should be on all compressed air supply hoses exceeding 1/2 inch inside diameter (OSHA Regulation, Section 1926.302).**
- **Do not exceed the rated maximum pressure values shown on the nameplate.**
- **Do not operate unit if safety devices are not operating properly. Check periodically. Never bypass safety devices.**

TABLE OF CONTENTS

SECTION 1
REVISION HISTORY AND SOFTWARE COMPATIBILITY

Version	Date	Notes	Current Controller Firmware Version
00	February 26, 2016	First release	3.5.7
01	April 1, 2017		3.5.7
02	July 24, 2019		3.5.7

SECTION 2
GENERAL INFORMATION

The Deluxe controller's application software was written specifically for use on Gardner Denver Industrial Scroll air compressors and is capable of controlling multiplex systems containing up to four scroll pumps. The compressor systems utilize traditional DOL motor starters as standard which are controlled via an intelligent flat cable In-Panel wiring system called SmartWire-DT. The SmartWire-DT system simplifies panel wiring and reduces installation, commissioning, and troubleshooting time. The controller also monitors all necessary temperature and pressure points within the compressor system in order to safely operate the machine and satisfy user air demand. The controller displays a comprehensive overview of the system status and allows easy access to operational parameters such as pressure set points, alarms and language selection.

2.1 Deluxe Controller Features

- ✓ PLC controlled
- ✓ Low voltage 24VDC operation with SmartWire DT communication
- ✓ Expandable I/O to meet the need of large compressor packages
- ✓ 4-20mA analog inputs to support analog pressure transducers
- ✓ Analog PT1000 RTD inputs to support temperature transducers
- ✓ Secured Data (SD) Card slot
- ✓ 3.5" (320x240) full color display with LED back light
- ✓ Resistive touch screen
- ✓ Easy to use, intuitive screen navigation and menu structure
- ✓ Password protection scheme
- ✓ Integral Webserver
- ✓ Multiple language support

SECTION 3
CONTROLLER OPERATION AND NAVIGATION

The Scroll Deluxe Controller is broken down into six areas of control, display, and configuration. Each of these are accessible through the banner located at the bottom of most screens. These six areas are: the Home Screen, System Monitoring, Settings, Alarm Log, Login, and Maintenance. Additionally the home screen's navigation banner provides a direct path to the language selection screen.

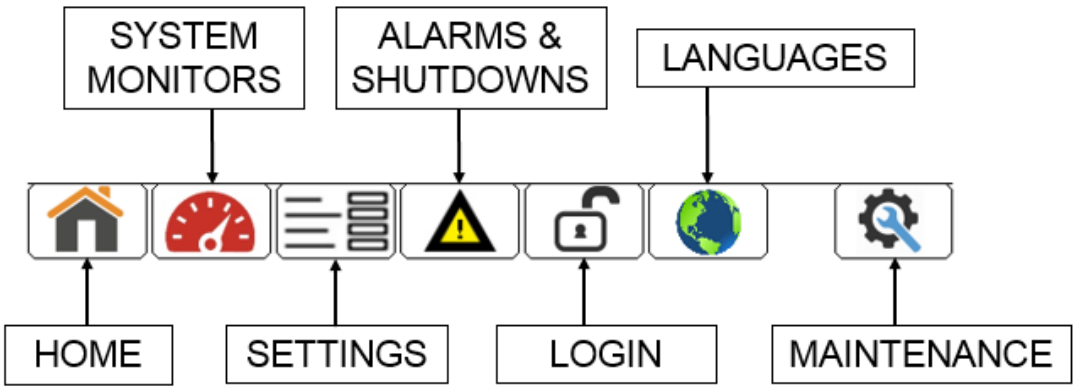


Figure 3-1: Navigational Banner

Some of the menus and functions contained in the controller are password protected, and availability is setup through a four tiered accessibility structure: CUSTOMER, MAINTENANCE, DISTRIBUTOR, and FACTORY. Parameters that have password protection have a lock image next to them, and will be faded when unavailable at the current security level. Before the description of each protected screen in the following section, there is an accessibility chart that shows the read/write access of each of the users. Green represents read and write access, yellow represents read only access, and red represents no access. An example accessibility chart is shown below.

Accessibility:	**Customer**	**Maintenance**	**Distributor**	**Factory**

This chart can be interpreted as: Customer and Maintenance have no access; Distributor has read only access; and Factory has full read and write access.

3.1 Home Screen

The *Home* screen is the primary source of basic system status and operation. This screen can be accessed by pressing the icon on the navigational banner at the bottom of most screens. It includes system pressure, control state, date and time, total system run hours, navigational icons, and an illustration of the system. An annotated image of the *Home* screen is shown below in Figure 3-2.

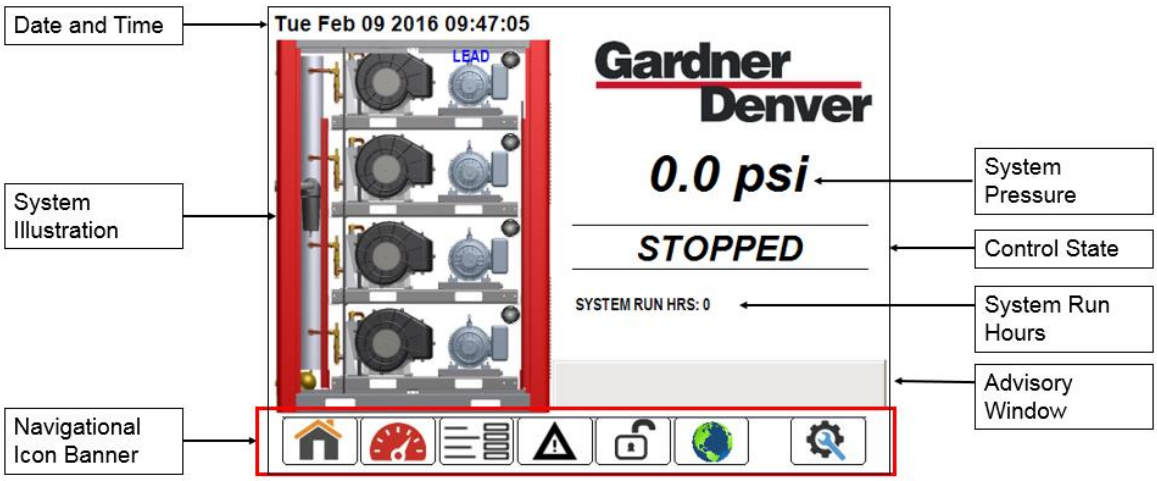


Figure 3-2: Home Screen

The items labeled in Figure 3-2 are detailed in the sections below:

3.1.1 Date and Time

The upper left-hand corner of the *Home* screen displays the day of the week, month, day of the month, year, and time. To adjust the date and time, see section **3.3.2.6**.

3.1.2 System Illustration

The system illustration provides visual information on the running status of each of the scroll pumps. A more detailed annotation of the system illustration is shown below in Figure 3-3.

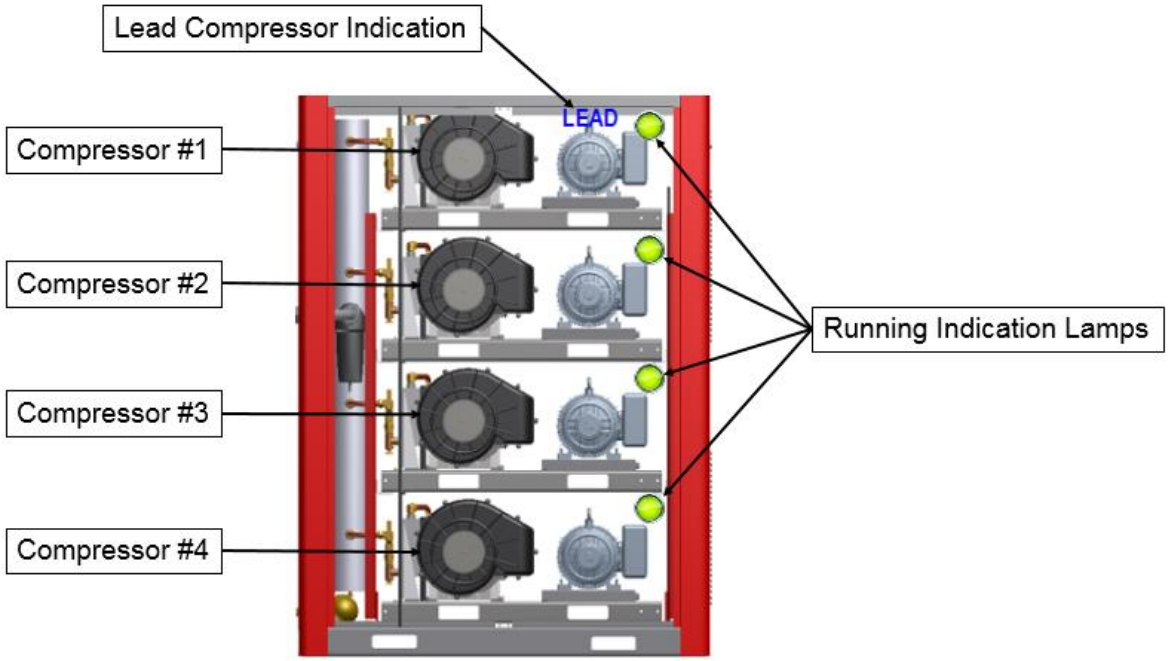


Figure 3-3: System Illustration

Each running indication lamp indicates whether the pump is running. A green lamp indicates that the pump is running, while a grey lamp indicates that the pump is not running. The blue lead pump indication will appear over the pump that is currently assigned as the lead.

Pressing the image of an individual pump on the system illustration navigates to an additional pump screen. The individual pump screen provides more detailed information for that particular pump. It indicates the system pressure, the discharge temperature of the pump, the status of the pump, its run hours, and displays the advisory window. The five possible states for each pump are enabled, disabled, running, stopped, or shutdown. All five states are detailed in the section **3.1.5 Control State** below. An illustration of the individual pump screen can be seen in figure 3-4.

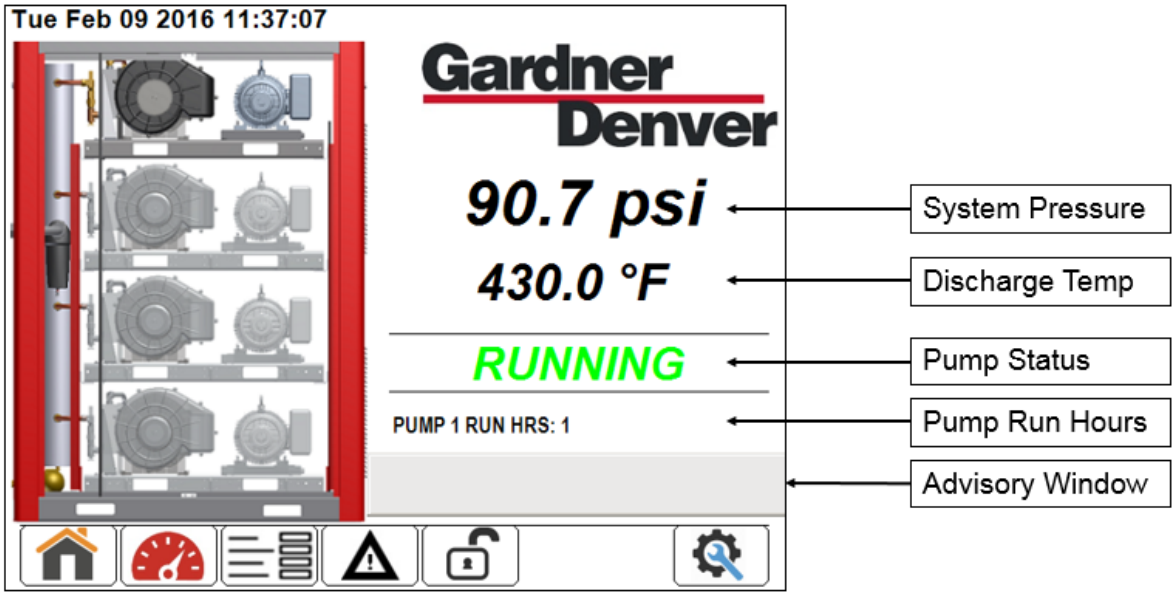


Figure 3-4: Individual Pump Screen

3.1.3 Navigational Icon Banner

The navigational banner provides quick navigation to the controller's main screens, listed at the beginning of this section. This banner appears on the *Home* screen as well as many of the additional supporting screens throughout the controller. The functions of each icon are listed below:


Home Screen


System Monitoring


Settings


Languages


Alarm Log


Login


Maintenance

3.1.4 System Pressure

The system pressure indicates the unit's discharge pressure.

3.1.5 Control State

The control state indicates the current state of the unit and can be useful for quick reference as well as diagnostics. A definition of the available control states that may be displayed is provided in Table 3-1.

Control State	Definition
Enabled	The start button has been activated and the pressure requirement has been met. The unit will start automatically when the pressure requirement is no longer met.
Disabled	The pump has been disabled at the *Compressor Enable* screen, see section **3.6.2**.
Running	The unit is actively running at least one pump.
Stopped	The unit has been stopped normally using the red stop button.
Shut Down	A shutdown fault is active.

Table 3-1: Control State Definition

3.1.6 System Run Hours

The “System Run Hours” line shows the current total hours of the unit. This value is updated in real-time, and will increment any time at least one pump is being driven. To see the run hours of each pump, navigate to the individual pump screens.

3.1.7 Advisory Window

The advisory window displays any active advisory or fault. When an alarm is active, the window will turn either yellow or red and print the type of active alarm. This window will turn yellow when displaying an advisory alarm, and will turn red when displaying a shutdown alarm, as shown below in Figure 3-5.

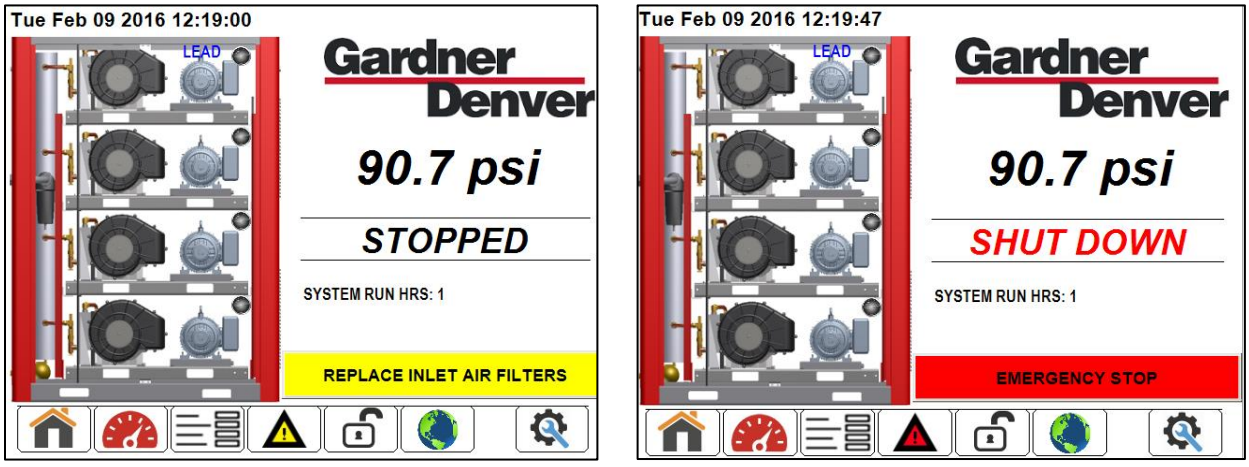


Figure 3-5: Example Advisory and Shutdown Display

3.2 System Monitoring

The *System Monitoring* screens contain visual displays of analog sensor values being monitored by the controller. These screens can be accessed by pressing the  icon on the navigation banner and are arranged in a revolving carousel.

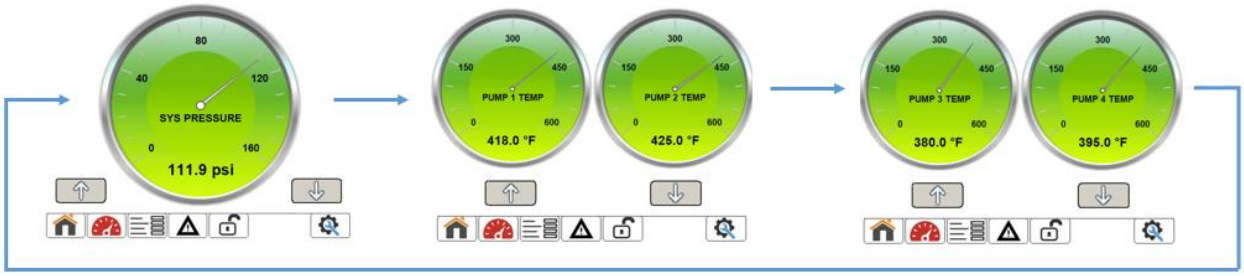


Figure 3-6: System Monitoring Carousel

3.3 Settings

The *Settings* menu contains the parameters used to configure the operation of the scroll system. This menu can be accessed by pressing the  icon on the navigation banner. The *Settings* menu allows the user to: 1) configure the compressor control settings, 2) change display parameters, 3) access the AutoRun schedule, and 4) access factory settings.

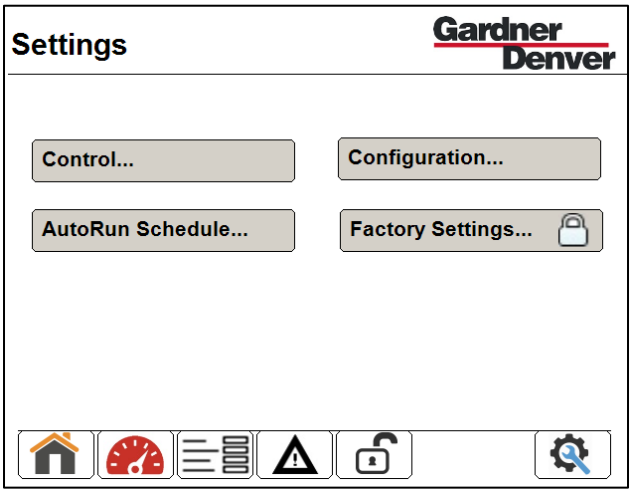


Figure 3-7: Settings Menu

3.3.1 Control

The *Control* menu allows the user to read and change four parameters: 1) target pressure, 2) enable remote halt, 3) enable auto restart, and 4) auto restart delay time.

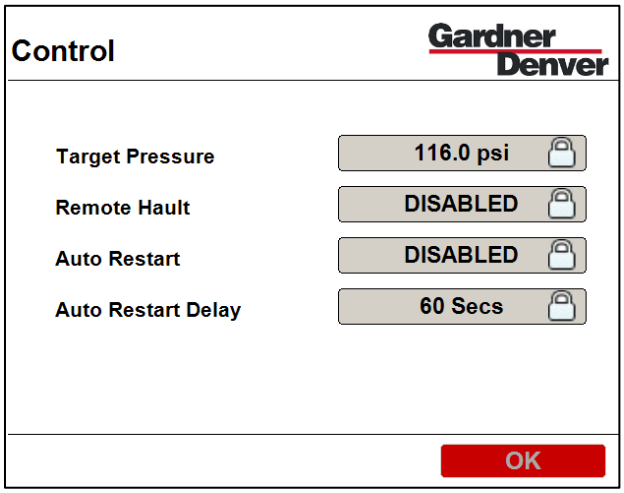


Figure 3-8: Control Menu

3.3.1.1 Target Pressure

Accessibility:	Customer	Maintenance	Distributor	Factory

The target pressure sets the discharge pressure which the system will attempt to produce and maintain. The *Activation Pressure Delta* setpoint value (factory setting) is subtracted from the target pressure to determine the Activation Pressure of the lead pump. The *(Activation Pressure Delta)* x2 is subtracted from the target pressure to determine the Activation Pressure of the second to run pump. Each additional decrease of the *Activation Pressure Delta* from the Target Pressure will cause an additional pump to activate until all remaining pumps are running. Once the system reaches the target pressure, it will stop all running pumps in the system and cycle the lead pump. To change the target pressure value, select the grey box surrounding the current setting and enter the desired value on the number pad that appears and press OK. The target pressure is limited to 116psi for a system comprised of standard pressure pumps and 140psi for a high pressure system.

3.3.1.2 Remote Halt

Accessibility:	Customer	Maintenance	Distributor	Factory

This parameter allows the user to enable a remote halt input for external control of the unit. When in the enabled or running state, the unit will stop if an external halt signal is detected on the controller's digital input programmed for this function. Refer to the appropriate electrical wiring diagram for connection of an external Remote Halt signal. Selecting the grey button where "ENABLED" or "DISABLED" is displayed will toggle between the two settings.

3.3.1.3 Auto Restart

Accessibility:	Customer	Maintenance	Distributor	Factory

This parameter allows the user to determine whether the unit will automatically restart after a power loss. When enabled, if the unit loses power, it will automatically restart when re-energized. After regaining power, the controller will wait the amount of time set as the “Auto Restart Delay” before restarting the unit, and will display a message indicating the amount of time remaining before the automatic restart, see figure 3-9. To toggle between Enable and Disable of the Auto Restart function select the grey box surround the current selection.

Automatic restarting of the compressor can cause injury or death

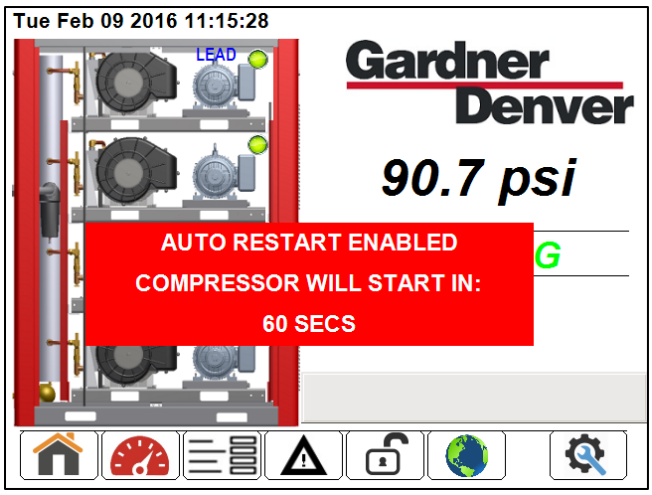


Figure 3-9: Auto Restart Display

3.3.1.4 Auto Restart Delay

Accessibility:	Customer	Maintenance	Distributor	Factory

This parameter sets the amount of time the compressor will wait before automatically restarting when repowered after a power loss. To change, press the area where the value is displayed. Enter the desired value, in seconds, on the number pad that appears and press OK.

Min. Value: 10 seconds
Max. Value: 1200 seconds

3.3.2 Configuration

The *Configuration* menu allows the user to read and change six parameters related to the configuration of the Scroll system: 1) Language, 2) Pressure Units, 3) Temperature Units, 4) Horse Power, 5) Network Configuration, 6) Date/Time Set, and 7) Pump Type.

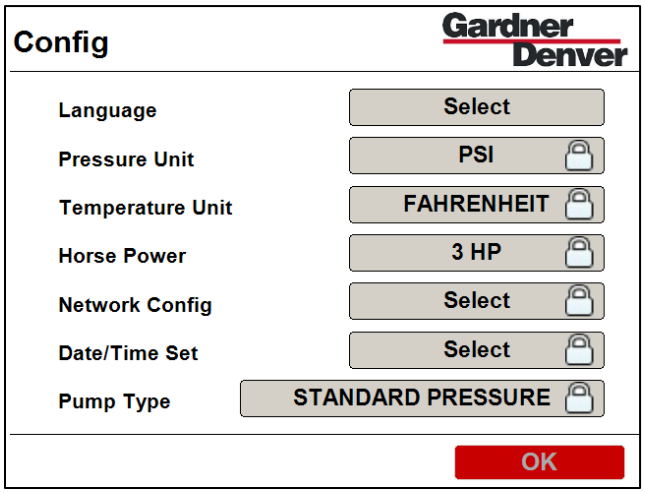


Figure 3-10: Configuration Menu

3.3.2.1 Language

Accessibility:	Customer	Maintenance	Distributor	Factory

Here, the user may choose the language to be used on the controller display. To change, press the grey “Select” button and then press the desired language.

Note: The language menu and also be accessed directly from the Home Screen by selecting the  icon on the navigation banner.

Figure 3-11: Choose Language Screen

3.3.2.2 Pressure Unit

Accessibility:	Customer	Maintenance	Distributor	Factory

This parameter allows the user to choose what pressure unit the controller will display. Pressing the button where the value is displayed will toggle the unit between “PSI” and “BAR”.

3.3.2.3 Temperature Unit

Accessibility:	Customer	Maintenance	Distributor	Factory

This parameter allows the user to choose what temperature unit the controller will display. Pressing the button where the value is displayed will toggle the unit between “FAHRENHEIT” and “CELSIUS”.

3.3.2.4 Horse Power

Accessibility:	Customer	Maintenance	Distributor	Factory

This parameter allows the user to configure the Horse Power level of the pump & motor combinations. This parameter is used in software to determine specific operating limitations and is essential to proper functionality of the unit.

3.3.2.4 Network Configuration

Accessibility:	Customer	Maintenance	Distributor	Factory

Selecting the network configuration button opens a window that will allow the user to configure the IP Network Address of the controller. A proper IP configuration is required for use of the web server.

NOTE: Adjustments to the IP configuration must be made from the actual controller and cannot be completed from the web server.

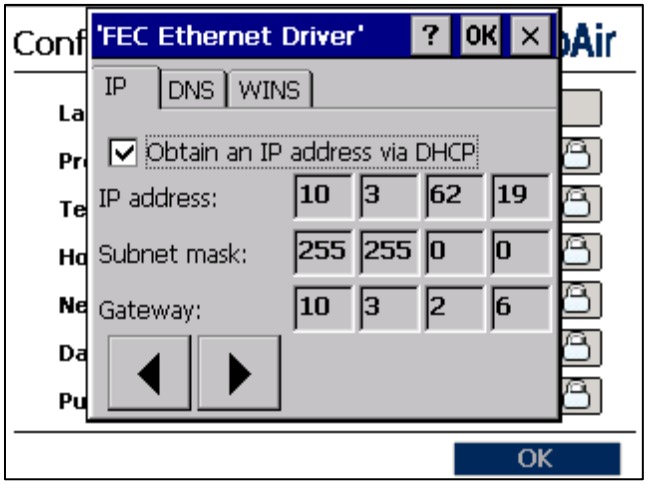


Figure 3-12: IP Configuration Window

3.3.2.6 Date/Time Set

Accessibility:	Customer	Maintenance	Distributor	Factory

Selecting the Date/Time Set button opens a window that will allow the user to configure the Date, Time, and Local Time Zone of the controller. The correct date and time settings is required for proper functionality of the AutoRun schedule. NOTE: Adjustments to the Date/Time must be made from the actual controller and cannot be completed from the web server.

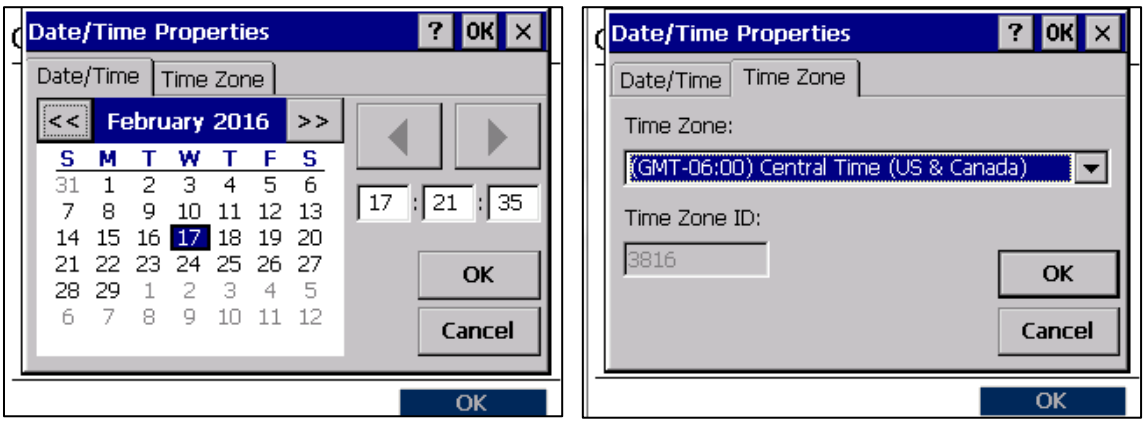


Figure 3-13: Date/Time Window

3.3.2.7 Pump Type

Accessibility:	Customer	Maintenance	Distributor	Factory

This parameter allows the user to configure the Pump Type of the unit, Standard or High Pressure. This parameter is used in software to determine specific operating limitations and is essential to proper functionality of the unit.

3.3.3 AutoRun Schedule

The *AutoRun Schedule* menu allows the user to read and configure the settings for the unit's automatic running functionality. The configurable settings are: 1) AutoRun enable, 2) start time, 3) stop time, and 4) AutoRun mode.

Automatic starting of the compressor can cause injury or death

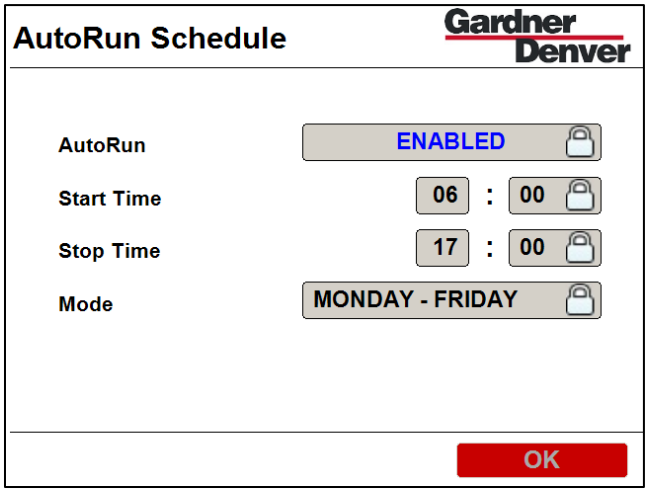


Figure 3-14: AutoRun Schedule Menu

3.3.3.1 AutoRun Enable

Accessibility:	Customer	Maintenance	Distributor	Factory

This setting allows the user to enable or disable the AutoRun functionality of the compressor. These settings set a schedule for the compressor to automatically run throughout a pre-determined time schedule. When enabled, the compressor will automatically start and stop throughout the day depending on the set points of *Start Time*, *Stop Time,* and *Mode* parameters. Selecting the grey the button where "ENABLED" or "DISABLED" is displayed will toggle between the two settings.

NOTE: Proper functionality of the AutoRun schedule is dependent on the controller's internal clock settings. Ensure the controller's clock is set appropriately, if it is not see section 3.3.2.6 for adjusting system date/time.

3.3.3.2 Start Time

Accessibility:	Customer	Maintenance	Distributor	Factory

This parameter sets the time of day when the compressor will automatically start when AutoRun is enabled. The left space enters the hour, while the right space enters the minutes. This time must be set on the 24-hour clock, i.e., 1:00 PM would be entered as 13:00.

3.3.3.3 Stop Time

Accessibility:	Customer	Maintenance	Distributor	Factory

This parameter sets the time of day when the compressor will automatically stop when AutoRun is enabled. The left space enters the hour, while the right space enters the minutes. This time must be set on the 24-hour clock, i.e., 1:00 PM would be entered as 13:00.

3.3.3.4 AutoRun Mode

Accessibility:	Customer	Maintenance	Distributor	Factory

This setting determines the type of schedule used in AutoRun. There are two possible settings: "MONDAY-FRIDAY" and "MONDAY-SUNDAY". "MONDAY-FRIDAY" mode will only automatically run the compressor on weekdays. "MONDAY-SUNDAY" mode will automatically run the compressor every day of the week.

3.3.4 Factory Settings

Accessibility:	Customer	Maintenance	Distributor	Factory

The *Factory Settings* menu contains parameters only meant to be viewed or changed at the "Factory" level of security. This menu cannot be accessed without the factory level password.

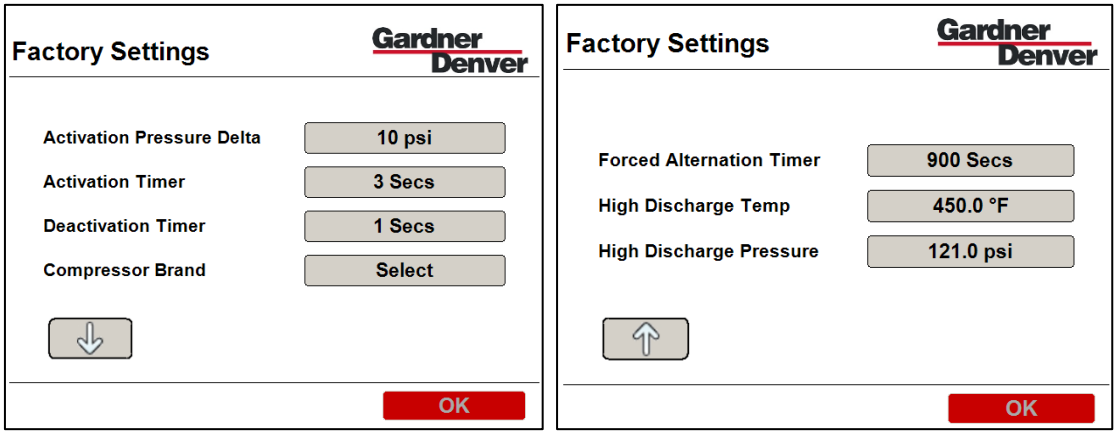


Figure 3-15: Factory Settings Menu

3.3.4.1 Activation Pressure Delta

This setting represents the pressure band for which the software uses to determine the activation of the pumps in the system. As the system discharge pressure drops from the target pressure by multiples of the *Activation Pressure Delta* additional pumps will be activated.

Min. Value: 5 psi
Max. Value: 40 psi
Default Value: Dependent on configuration of machine

3.3.4.2 Activation Timer

This value sets the amount of time, in seconds, the controller will wait before starting another compressor when the system pressure drops below the activation pressure.

Min. Value: 1 second
Max. Value: 600 seconds
Default Value: 3 seconds

3.3.4.3 Deactivation Timer

This value sets the amount of time, in seconds, the controller will wait before stopping the system when the discharge pressure meets the target pressure requirement.

Min. Value: 0 seconds
Max. Value: 30 seconds
Default Value: 0 seconds

3.3.4.4 Compressor Brand

This selections allows the Gardner Denver facility to change the branding and color scheme of the controller.

3.3.4.5 Forced Alternation Timer

This value sets the maximum amount of time a compressor will continuously run as the lead compressor. After this timer expires, the controller will reassign the lead compressor role to the next enabled compressor. The intent of the Forced Alternation Timer is to equalize the run hours of the pumps in the system.

Min. Value: 10 seconds
Max. Value: 1200 seconds
Default Value: 900 seconds

3.3.4.6 High Discharge Temperature

This value sets the temperature threshold at which the controller will shut down the compressor on a high discharge temperature fault. It is not configurable from the menu structure and is determined based on the configuration of the unit (Horse Power and Pump Type).

3.3.4.7 High Discharge Pressure

This value sets the pressure threshold at which the controller will shut down the compressor on a high pressure temperature fault. It is not configurable from the menu structure and is determined based on the configuration of the unit (Pump Type).

3.4 Alarm Log

The *Alarm Log* screen allows the user see active and historical alarms and shutdowns that have occurred in the system. It can be accessed by selecting the  icon from the navigation banner. The *Alarm Log* stores the type and time of occurrence of the event and uses a color scheme to differentiate alarms from shutdown as well as active from cleared events. An active shutdown will be color coded red while an active alarm will be yellow. Once an alarm or shutdown event has become inactive and the condition has cleared the entry in the *Alarm Log* will change to a grey background with blue text. See the two figures below for examples of active and cleared alarm log entries.

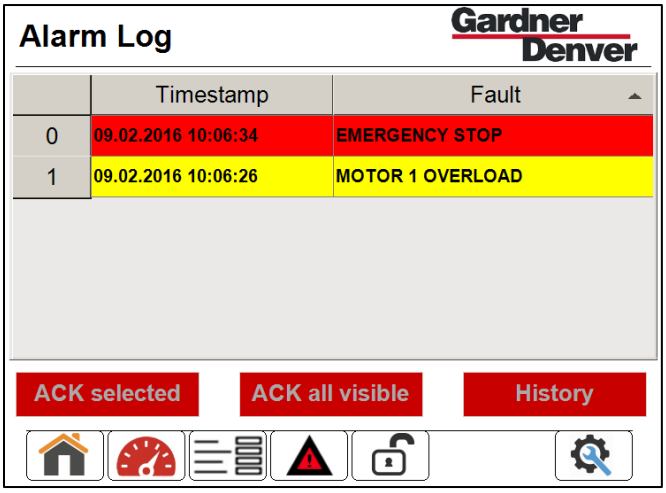


Figure 3-16: Active Alarm & Shutdown

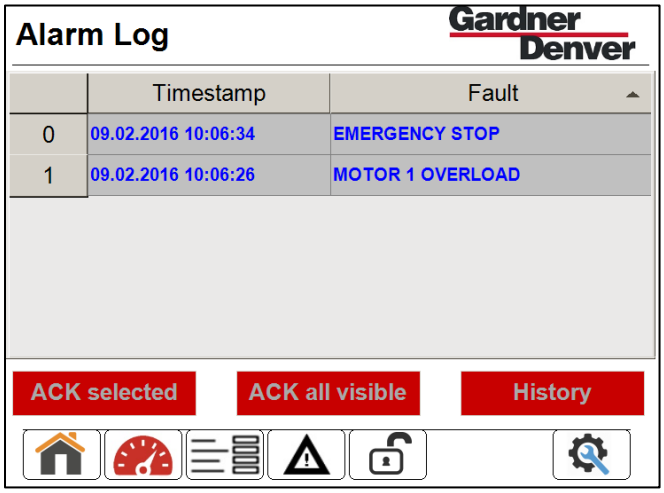


Figure 3-17: Inactive Alarm & Shutdown

The *Alarm log* also contains a cleanup or acknowledge feature. The user can select individual inactive entries from the *Alarm Log* and then select the *ACK selected* button which will remove the event from the log and store it on the *Historical Alarm Log.* You can also clear the entire *Alarm Log* by selecting *ACK all visible* button which will move all inactive entries to the *Historical Alarm Log*. Then to toggle between the *Alarm Log* and the *Historical Alarm Log* simply select the *History* button. An example of the Historical Alarm Log is seen in figure 3-18 below.

NOTE: Active alarms and shutdowns cannot be acknowledge and moved to the *Historical Alarm Log* until there condition is cleared.

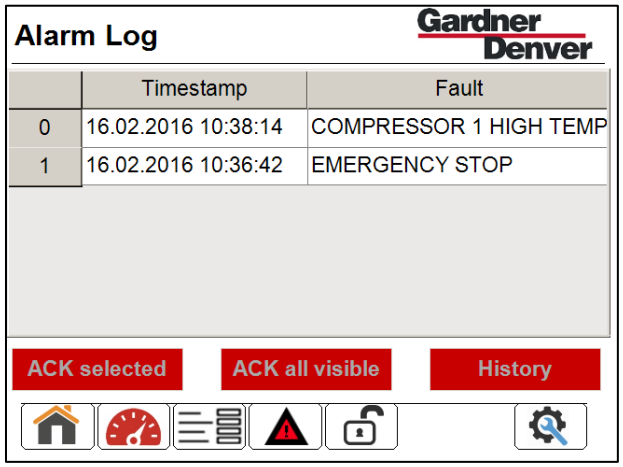


Figure 3-18: Historical Alarm Log

3.5 Login

The *Login* screen allows the user to log in to the controller at the appropriate level of security. It can be accessed by selecting the  icon on the navigation banner. The availability of locked parameters is setup through a four tiered accessibility structure:

- CUSTOMER – This level requires no password, and is the default login level.
- MAINTENANCE – This level is meant to provide access for maintenance personnel to make basic adjustments and do routine maintenance. – Password : 407
- DISTRIBUTOR – This level is meant to provide access for qualified distributors to make appropriate configuration changes to the unit.
- FACTORY – This is the highest level of security, which allows access to all settings available on the controller. This level should not be entered without the consent of the appropriate Gardner Denver personnel.

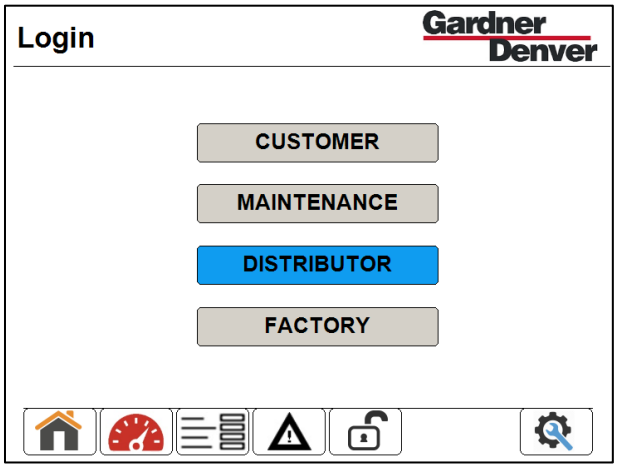


Figure 3-19: Login Menu

The user may log in to a security level by pressing the button of the desired level and entering the corresponding password. If the password is entered correctly, the chosen level will be highlighted blue, as the FACTORY level is in Figure 3-19. When logged in to a level other that CUSTOMER, the controller will automatically log out of that level and default to CUSTOMER after eight minutes.

3.6 Maintenance

The *Maintenance* menu provides access to various settings and information corresponding to maintenance on the compressor. It can be accessed by selecting the  icon on the navigation banner. From this menu the user can: 1) access maintenance timers, 2) enable/disable individual compressors, 3) jog motors, and 4) monitor system diagnostics.

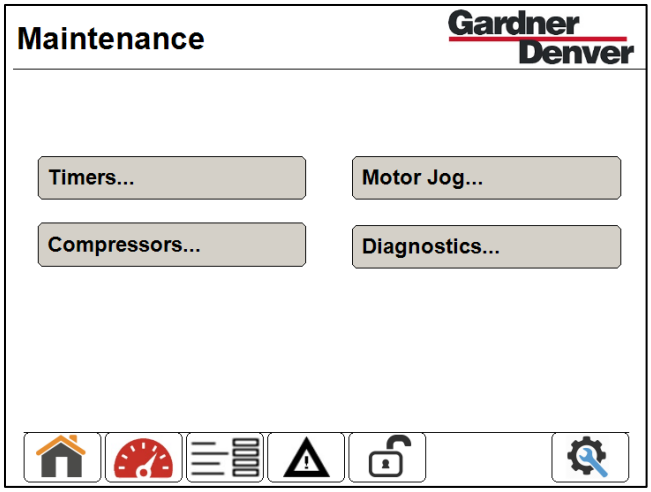


Figure 3-20: Maintenance Menu

3.6.1 Maintenance Timers

Accessibility:	Customer	Maintenance	Distributor	Factory

The maintenance timers are used to keep track of the life span of consumable compressor parts. When these timers expire, an alarm will be triggered to notify the user that the component needs to be serviced or replaced. The *Maintenance Timers* screen displays the remaining time for each service interval. The timers that are displayed on this screen include:

- Hours until Air Filter Replacement
- Hours until Tip Seal Replacement
- Hours until Pump Bearing Service
- Hours until Pump Replacement

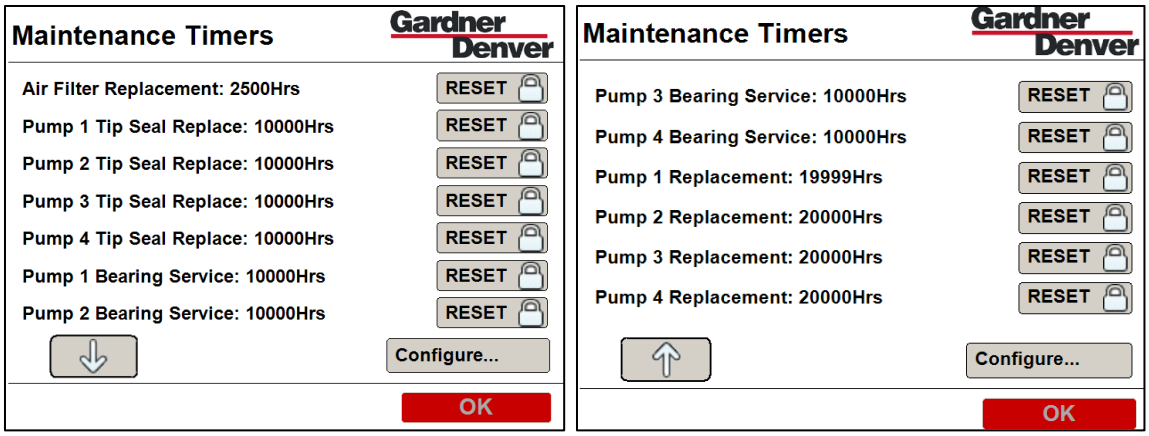


Figure 3-21: Maintenance Timers

The maintenance timer screens also allow the user to reset these timers once the proper maintenance has been completed. Once logged in at the MAINTENANCE level or above, pressing the RESET button next to a timer will reset the timer. Do not reset timers until parts have been properly replaced or serviced.

3.6.1.1 Maintenance Timers Configuration

Accessibility:	Customer	Maintenance	Distributor	Factory

To configure the lifespan of consumable components, press the “Configure…” button on the *Maintenance Timers* screen. This will navigate to a screen on which the factory may change the time after which an alarm will be triggered to notify that a part needs to be replaced or serviced.

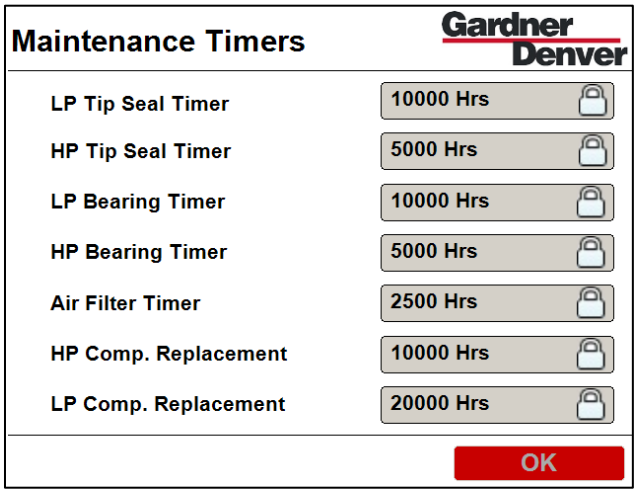


Figure 3-22: Maintenance Timers Configuration Menu

Press the button next to the name of each timer where the value is displayed to edit the value.

3.6.2 Compressor Enable

Accessibility:	Customer	Maintenance	Distributor	Factory

The *Compressor Enable* screen allows the user to enable and disable individual compressors. Pressing the buttons labeled either “ENABLED” or “DISABLED” will toggle between these two values for the corresponding compressor motor. This menu may not be entered while the unit is enabled or running; stop the unit before enabling or disabling individual motors.

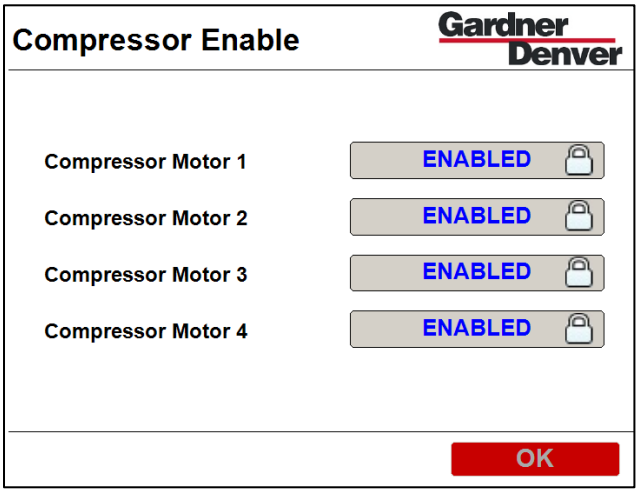


Figure 3-23: Compressor Enable Menu

NOTE: If all compressors are disabled, the unit will shut down on an “All Motors Disabled” fault.

3.6.3 Motor Jog

Accessibility:	Customer	Maintenance	Distributor	Factory

The *Motor Jog* screen allows the user to jog individual compressor motors. To jog a motor, press the “Jog Motor #” button corresponding to the motor to be jogged. A clarification will appear to confirm the motor jog, as shown below in Figure 3-25. To continue with the jog, press “YES”. The motor run for 1 second after a 5 second delay.

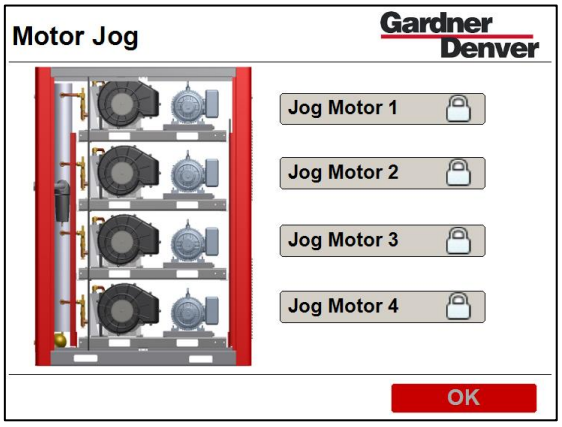
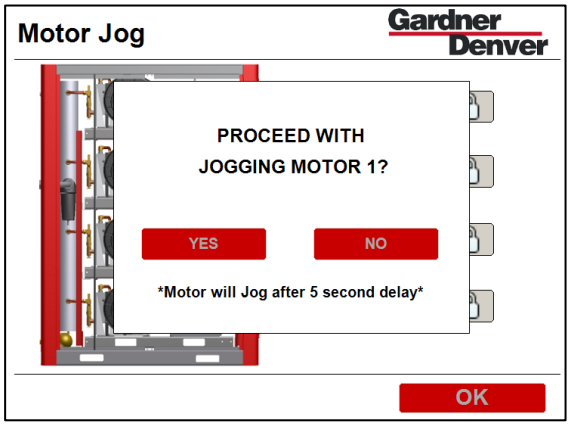


Figure 3-24: Motor Jog Menu Figure



3-25: Motor Jog Confirmation Window

3.6.3 Diagnostics

Accessibility:	Customer	Maintenance	Distributor	Factory

The *diagnostics* page provides a convenient summary of the operating parameters of the entire unit all on one screen. It displays the status, run hours, and discharge temperature of each pump, and the discharge pressure and run hours of the compressor system.

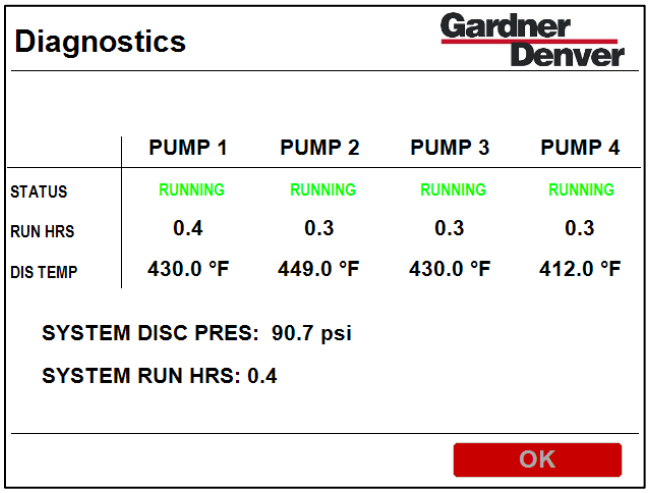


Figure 3-26: Diagnostics Screen

SECTION 4
WEB SERVER ACCESS

The industrial Scroll deluxe controller has a built in Web Sever that allows the user to remotely connect to and monitor the operating parameters of the unit. In order to access the web server the following requirements must be met.

- Network connection via Ethernet port on back of controller
- Proper IP network configuration, see section **3.3.2.4**
- Up-to-date web browser with Java script and support of HTML5 canvas, i.e. Firefox, Chrome, Internet Explorer 9 or later

To start the webserver from a PC or mobile device that has a network connection to the controller follow the steps below.

1) Open your web browser
2) Browse to the Link **http://*ipaddess*:8080/webvisu.htm** where *ipaddress* is the address configured in **3.3.2.4**.
3) The Web Server Login page will open as shown in Figure 4-3 below.
4) Log in to the webserver using the password

   NOTE: The default password for the webserver is **1234**, it is highly recommended that the user change the password on the first Log In. Select the *Change Password* button which will open a window as seen in figure 4-3. Record the new password for safe keeping.

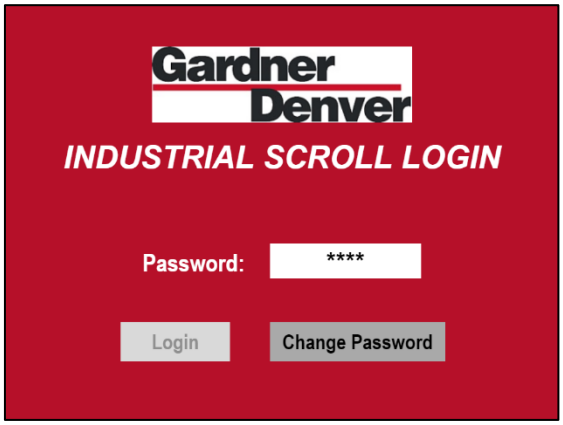


Figure 4-2: Web Server Login

Figure 4-3: Password Change

SECTION 5
ERROR MANAGEMENT

The industrial Scroll controller has multiple analog and digital inputs which monitor system conditions to determine if adverse conditions are present that require operator awareness or system shutdown. The advisory banner displays the active warning and alarms while the alarm log provides a historical database of the past events. Each type of warning and shutdown condition is detailed below.

5.1 Advisory Warnings

The advisory warnings in the controller are designed to alert the user of needed service or that certain adverse conditions are met that do not require system shutdown. Advisory warnings will be saved to the alarm log and will clear from the advisory banner as there conditions are remedied.

Advisory	Description	Action
MOTOR 1 OVERLOAD	Motor 1 overload or fault	Check motor 1 overload and wiring
MOTOR 2 OVERLOAD	Motor 2 overload or fault	Check motor 2 overload and wiring
MOTOR 3 OVERLOAD	Motor 3 overload or fault	Check motor 3 overload and wiring
MOTOR 4 OVERLOAD	Motor 4 overload or fault	Check motor 4 overload and wiring
REPLACE COMPRESSOR 1	Maintenance timer for compressor 1 replacement has expired	Replace Scroll Pump 1 and reset timer from maintenance screen
REPLACE COMPRESSOR 2	Maintenance timer for compressor 2 replacement has expired	Replace Scroll Pump 2 and reset timer from maintenance screen
REPLACE COMPRESSOR 3	Maintenance timer for compressor 3 replacement has expired	Replace Scroll Pump 3 and reset timer from maintenance screen
REPLACE COMPRESSOR 4	Maintenance timer for compressor 4 replacement has expired	Replace Scroll Pump 4 and reset timer from maintenance screen
REPLACE PUMP 1 TIP SEALS	Maintenance timer for pump 1 tip seal replacement has expired	Replace Scroll Pump 1 tip seals and reset timer from maintenance screen
REPLACE PUMP 2 TIP SEALS	Maintenance timer for pump 2 tip seal replacement has expired	Replace Scroll Pump 2 tip seals and reset timer from maintenance screen
REPLACE PUMP 3 TIP SEALS	Maintenance timer for pump 3 tip seal replacement has expired	Replace Scroll Pump 3 tip seals and reset timer from maintenance screen
REPLACE PUMP 4 TIP SEALS	Maintenance timer for pump 4 tip seal replacement has expired	Replace Scroll Pump 4 tip seals and reset timer from maintenance screen
REPLACE INLET AIR FILTERS	Maintenance timer for inlet air filter replacement has expired	Replace inlet air filters and reset timer from maintenance screen
GREASE PUMP 1 BEARINGS	Maintenance timer for pump 1 bearing maintenance has expired	Service pump 1 bearings and reset timer from maintenance screen
GREASE PUMP 2 BEARINGS	Maintenance timer for pump 2 bearing maintenance has expired	Service pump 2 bearings and reset timer from maintenance screen
GREASE PUMP 3 BEARINGS	Maintenance timer for pump 3 bearing maintenance has expired	Service pump 3 bearings and reset timer from maintenance screen
GREASE PUMP 4 BEARINGS	Maintenance timer for pump 4 bearing maintenance has expired	Service pump 4 bearings and reset timer from maintenance screen

Table 5-1: Advisory Warning Definitions

5.2 Shutdown Faults

The shutdown faults in the controller are designed to protect the compressor from component failure or extreme environmental conditions. Shutdown faults can be reset after the compressor has stopped by pressing the STOP button. If the error condition still exists, the shutdown fault cannot be reset.

Shutdown Condition	Description	Action
EMERGENCY STOP	Compressor stopped using Emergency Stop button	Return the Emergency Stop Push Button to its normal position
HIGH DISCHARGE PRESSURE	System Discharge Pressure has exceeded factory limits	Ensure pump type is set correctly on Configuration screen Ensure discharge piping and valves are configured correctly
COMPRESSOR 1 HIGH TEMP	Pump 1 discharge air temperature has exceeded factory limits	Reduce ambient temperature to below 113˚F (45˚C) Check cooling fan operation
COMPRESSOR 2 HIGH TEMP	Pump 2 discharge air temperature has exceeded factory limits	Reduce ambient temperature to below 113˚F (45˚C) Check cooling fan operation
COMPRESSOR 3 HIGH TEMP	Pump 3 discharge air temperature has exceeded factory limits	Reduce ambient temperature to below 113˚F (45˚C) Check cooling fan operation
COMPRESSOR 4 HIGH TEMP	Pump 4 discharge air temperature has exceeded factory limits	Reduce ambient temperature to below 113˚F (45˚C) Check cooling fan operation
ALL MOTORS DISABLED	All of the motors in the system have been disabled from the compressor enable screen	Enable motors that are suitable for operation
FAN OVERLOAD	Digital input programmed for fan motor(s) Over Temperature has tripped	Check fan motor(s) and wiring If this error has occurred on a unit without cooling fans, ensure jumper is installed across DIN per wiring diagram
MOTOR OVERLOAD (simplex only)	Main motor or cooling fan fault	Check main motor overload and wiring Check fan motor and wiring If this error has occurred on a unit without cooling fans, ensure jumper is installed across DIN per wiring diagram

Table 5-1: Shutdown Fault Definitions

SECTION 6
MODBUS COMMUNICATION

The Scroll Deluxe Controller supports remote monitoring via Modbus TCP/IP. The controller acts as a Modbus slave which can be polled for information by accessing the Modbus registers detailed in the tables below. To communicate over with the controller over Modbus TCP/IP, the IP address of the controller must be configured correctly (see section **3.3.2.4**) and a connection to the Ethernet port on the back of the controller must be established.

NOTE: Per the TCP/IP protocol port number 502 is used for Modbus communication. For more information on Modbus messaging over TCP/IP, refer to www.modbus.org/specs.php

6.1 Modbus Address Map

6.1.1 Advisory & Shutdown Registers

Address	Bit #	Parameter Description	Units	Data Type
40001	0	Alarm State	0 = Inactive 1 = Active	BOOL
	1	Motor 1 Overload		BOOL
	2	Motor 2 Overload		BOOL
	3	Motor 3 Overload		BOOL
	4	Motor 4 Overload		BOOL
	5	Pump 1 Bearing Maintenance Timer Expired		BOOL
	6	Pump 2 Bearing Maintenance Timer Expired		BOOL
	7	Pump 3 Bearing Maintenance Timer Expired		BOOL
	8	Pump 4 Bearing Maintenance Timer Expired		BOOL
	9	Pump 1 Tip Seal Maintenance Timer Expired		BOOL
	10	Pump 2 Tip Seal Maintenance Timer Expired		BOOL
	11	Pump 3 Tip Seal Maintenance Timer Expired		BOOL
	12	Pump 4 Tip Seal Maintenance Timer Expired		BOOL
	13	Inlet Air Filter Maintenance Timer Expired		BOOL
	14	NOT USED		------
	15	NOT USED		------
40002	0	Shutdown State	0 = Inactive 1 = Active	BOOL
	1	Emergency Stop		BOOL
	2	High System Discharge Pressure		BOOL
	3	NOT USED		------
	4	Pump 1 High Discharge Temperature		BOOL
	5	Pump 2 High Discharge Temperature		BOOL
	6	Pump 3 High Discharge Temperature		BOOL
	7	Pump 4 High Discharge Temperature		BOOL
	8	Pump 1 Replacement Timer Expired		BOOL
	9	Pump 2 Replacement Timer Expired		BOOL
	10	Pump 3 Replacement Timer Expired		BOOL
	11	Pump 4 Replacement Timer Expired		BOOL
	12	All Pumps Disabled Shutdown		BOOL
	13	Cooling Fan Overload		BOOL
	14	NOT USED		------
	15	NOT USED		------

6.1.2 System Operating Parameter Registers

Address	Parameter Description		Units	Data Type
40003	System Discharge Pressure		PSI	Unsigned Integer (16-bit)
40004			BAR	Unsigned Integer (16-bit)
40005	Pump 1 Discharge Temperature		˚F	Unsigned Integer (16-bit)
40006			˚C	Unsigned Integer (16-bit)
40007	Pump 2 Discharge Temperature		˚F	Unsigned Integer (16-bit)
40008			˚C	Unsigned Integer (16-bit)
40009	Pump 3 Discharge Temperature		˚F	Unsigned Integer (16-bit)
40010			˚C	Unsigned Integer (16-bit)
40011	Pump 4 Discharge Temperature		˚F	Unsigned Integer (16-bit)
40012			˚C	Unsigned Integer (16-bit)
40013	Bit 0	System Enable	0 = Disabled 1 = Enabled	BOOL
	Bit 1	Remote Halt Enable		BOOL
	Bit 2	Auto Restart Enable		BOOL
	Bit 3	AutoRun Enable		BOOL
	Bit 4	Pump 1 Enable		BOOL
	Bit 5	Motor 1 Start Signal		BOOL
	Bit 6	Pump 2 Enable		BOOL
	Bit 7	Motor 2 Start Signal		BOOL
	Bit 8	Pump 3 Enable		BOOL
	Bit 9	Motor 3 Start Signal		BOOL
	Bit 10	Pump 4 Enable		BOOL
	Bit 11	Motor 4 Start Signal		BOOL
	Bit 12	NOT USED		------
	Bit 13	NOT USED		------
	Bit 14	NOT USED		------
	Bit 15	NOT USED		------
40014	Hours Until Pump 1 Tip Seal Replacement		Hrs.	Unsigned Integer (16-bit)
40015	Hours Until Pump 2 Tip Seal Replacement		Hrs.	Unsigned Integer (16-bit)
40016	Hours Until Pump 3 Tip Seal Replacement		Hrs.	Unsigned Integer (16-bit)
40017	Hours Until Pump 4 Tip Seal Replacement		Hrs.	Unsigned Integer (16-bit)
40018	Hours Until Pump 1 Bearing Maintenance		Hrs.	Unsigned Integer (16-bit)
40019	Hours Until Pump 2 Bearing Maintenance		Hrs.	Unsigned Integer (16-bit)
40020	Hours Until Pump 3 Bearing Maintenance		Hrs.	Unsigned Integer (16-bit)
40021	Hours Until Pump 4 Bearing Maintenance		Hrs.	Unsigned Integer (16-bit)
40022	Hours Until Inlet Air Filter Replacement		Hrs.	Unsigned Integer (16-bit)
40023	Hours Until Pump 1 Replacement		Hrs.	Unsigned Integer (16-bit)
40024	Hours Until Pump 2 Replacement		Hrs.	Unsigned Integer (16-bit)
40025	Hours Until Pump 3 Replacement		Hrs.	Unsigned Integer (16-bit)
40026	Hours Until Pump 4 Replacement		Hrs.	Unsigned Integer (16-bit)
40027 40028	System Run Hours		1/10 Hrs.	Unsigned Integer (32-bit)
40029 40030	Pump 1 Run Hours		1/10 Hrs.	Unsigned Integer (32-bit)
40031 40032	Pump 2 Run Hours		1/10 Hrs.	Unsigned Integer (32-bit)
40033 40034	Pump 3 Run Hours		1/10 Hrs.	Unsigned Integer (32-bit)
40035 40036	Pump 4 Run Hours		1/10 Hrs.	Unsigned Integer (32-bit)
40037	System Target Pressure		PSI	Unsigned Integer (16-bit)
40038			BAR	Unsigned Integer (16-bit)

NOTES:

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