Instruction Manual

Controller v1.01.05

ECO Scroll Series

Oil-Free Compressors – Models ES08, ES11 & ES15

Revision: 2022-02-03

Contents

1.0 Basic Operation

1.1 Description of Controller Interface

The ES08-15 controller features a 7-inch LCD full-colour, touch screen display as the human-machine interface.

The controller is always switched on and active whenever the compressor set is energised from its electrical power supply. It is operated by touching the displayed icons on the screen with a fingertip or stylus pen tip.

An automatic screen-saver function switches off the display after two minutes of inactivity. The display can be reactivated by a single touch.

The controller should be provided with weather protection against precipitation and direct sunlight. Keep the screen clean and dry. If necessary, use a proprietary LCD screen cleaning solution and a soft anti-static, scratch-free cloth to remove any dust and fingerprints. Do not use harsh solvents or abrasive cleaners.

1.2 Password Security

A three-tiered system of passwords is used to safeguard the controller's settings and records.

The lowest-level User password is: **C456**

The mid-level Service password is made available to compressor service technicians upon request.

The highest-level Factory password is reserved for use by the manufacturer.

1.3 Controller Screens Map

A hierarchical systematic view of the interface screens that are accessible via the controller is shown in Figure 1.1.

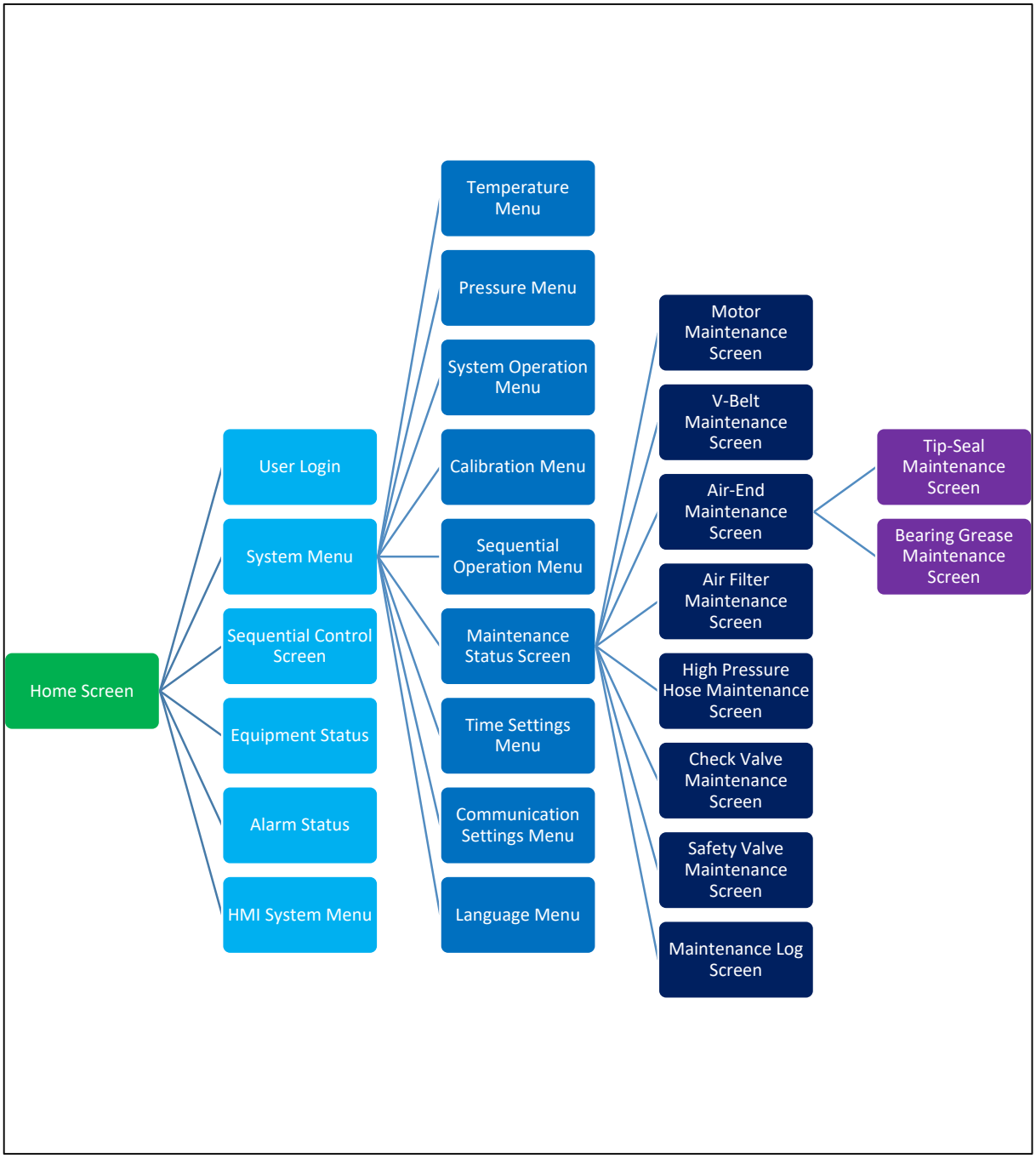

Figure 1.1 – Controller Screens Map

2.0 Controller Screens

2.1 Home Screen

Upon initial power-up and any subsequent restart, the home screen is automatically displayed on the controller as shown in Figure 2.1.

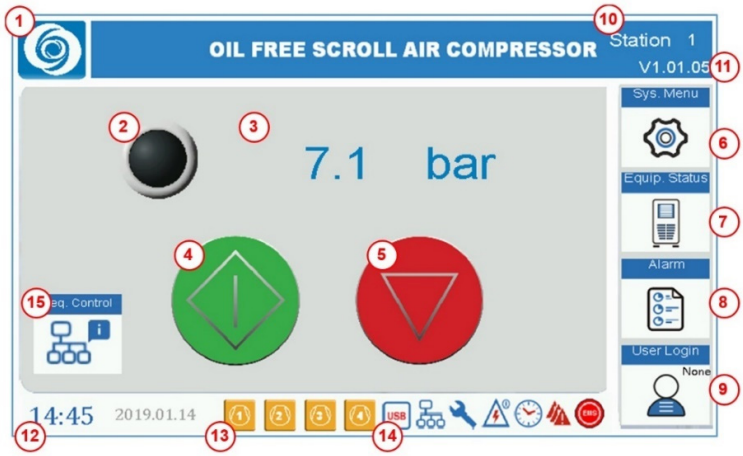

Figure 2.1 – Home Screen

Each of the home screen symbols is described in Table 2.1.

Table 2.1 – Home Screen Symbols

Item	Symbol or Field	Name	Description	Password
1		Control Mode	Indicates the control mode setting:  Local On / Off Control  Remote On / Off Control	None

Item	Symbol or Field	Name	Description	Password
2		Compressor Set Status	Indicates the compressor's operating status:  Off  Stand-by  Running  Shutdown (Alarm)	None
3		Outlet Pressure	Indicates the compressor's discharge air pressure.	None
4		Start Button	Press and hold for two seconds to turn this compressor on (i.e. start this compressor). Note: To start an interconnected group of compressors, it is necessary to access the sequential control menu screen on the master unit.	None
5		Stop Button	Press and hold for two seconds to turn this compressor off (i.e. stop this compressor). Note: To stop an interconnected group of compressors, it is necessary to access the sequential control menu screen on the master unit.	None
6		System Menu	Press to access the system menu screen.	User to view or Service to edit.
7		Equipment Status	Press to access the equipment status screen.	None
8		Alarm Status	Press to access the alarm status screen.	None

Item	Symbol or Field	Name	Description	Password
9		User Login	The default user login display is “None” if no password access is active. Otherwise, press to access the user login screen and then enter either the User, Service or Factory password.	User, Service or Factory.
10	Station 1	Compressor Station Number	Indicates the compressor’s assigned Modbus address from 1 to 99 as entered into the communication parameters.	None
11	V.1.01.05	Software Version	Indicates the controller’s software version.	None
12	15:52 2019.04.11	Time and Date	Indicates the current time and date. Note: There is no automatic adjustment for daylight saving time.	None
13		Compressor Module Status	Indicates each motor and air-end module’s operating status:  Stopped (Off or Stand-by)  Running	None
14		USB In Use	Indicates that the controller’s USB port is being used to download software or upload historical operating data.	None
14		Sequential Control Active	Indicates that the compressor is configured for operation in a sequentially controlled group.	None
14		Warning	Indicates an active operation or maintenance warning. It should be investigated via the alarm, system or maintenance menu screens and then rectified as appropriate.	None
14		Auto Restart	Indicates that the compressor is configured for automatic restart after a power outage.	None
14		Timer	Indicates that the compressor is configured for automatic on / off switching by the adjustable timer.	None

Item	Symbol or Field	Name	Description	Password
14		Alarm	Indicates an active shutdown alarm. It should be investigated via the alarm menu, rectified as appropriate and then reset.	None
14		Emergency Stop	Indicates that the emergency stop button has been pressed. It should be investigated, rectified as appropriate and then reset via the alarm menu.	None
15		Sequential Control Screen	Press to access the sequential control screen. Note: This symbol appears only on the controller of the master unit in a sequentially controlled group.	None

2.2 User Login Screen

The user login screen is accessed by pressing the User Login button on the bottom right-hand side of the home screen. The user login screen is shown in Figure 2.2.

Figure 2.2 – User Login Screen

Enter the User, Service or Factory password via the displayed touch screen keypad and then press the “ENT” button. The display will revert to the home screen and indicate “User”, “Service” or “Factory” on the User Login button.

Note: After completing the task(s) for which the password was required, press the Home button on the bottom right-hand side of any subordinate page after the home screen to logout. Check that the User Login button indicates “None” to verify the logged-out status.

2.3 System Menu Screen

The system menu is accessed from the home screen after logging-in using either the user or service passwords. It has limited programmable functions directly, but rather serves as a portal to the various sub-menus for the compressor’s operation and maintenance. The system menu screen is shown in Figure 2.3.

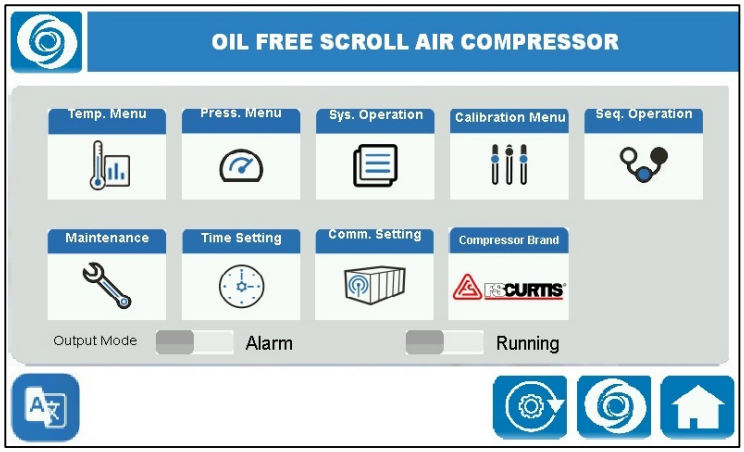

Figure 2.3 – System Menu Screen

Each of the system menu screen symbols is described in Table 2.2.

Table 2.2 – System Menu Screen Symbols

Symbol	Name	Description	Password
	Temperature Menu	Press to access the temperature menu screen.	User or Service.
	Pressure Menu	Press to access the pressure menu screen.	User or Service.
	System Operation Menu	Press to access the system operation menu screen.	User or Service.
	Calibration Menu	Press to access the calibration menu screen.	Service
	Sequential Operation Menu	Press to access the sequential operation menu screen.	User or Service.

Symbol	Name	Description	Password
	Maintenance Status Screen	Press to access the maintenance status screen.	User or Service.
	Time Settings Menu	Press to access the time settings menu.	User
	Communication Settings Menu	Press to access the communication settings menu.	Service
	Compressor Brand	Displays the compressor brand.	Factory
	Language Menu	Press to access the language menu screen. It is recommended to keep English as the selection.	User or Service.
	Reset Button	Press to change all controller parameters to their factory default settings. Note: The factory defaults may differ from the parameter setpoints specified herein.	Factory
 Bottom Right-Hand Side of Screen	Control Mode Switch	Press to toggle between local automatic control via the controller screen or remote on / off control via a hardwired switch or switches. The symbol indicates the control setting:  Local On / Off Control  Remote On / Off Control Note: The control mode symbol in the top left-hand corner of the screen mirrors this one.	User or Service.
	Home Screen	Press to return to the home screen.	None

Symbol	Name	Description	Password
Output Mode Left-Hand Slider Switch	Status Indicator Output #1	With the slider button pushed to the left-hand side and displaying grey colour only as shown in Figure 2.3, the compressor can provide remote indication of an active warning. With the slider button pushed to the right-hand side and displaying green colour, the compressor can provide remote indication of an active shutdown alarm. This is the standard setting. Note: The remote status indicator circuit for Output #1 should be connected across terminals C3 and Y3 on PLC2 in the electrical cabinet. The externally applied voltage and current should not exceed 24 V and 5 A, respectively.	Service
Output Mode Right-Hand Slider Switch	Status Indicator Output #2	With the slider button pushed to the left-hand side and displaying grey colour only as shown in Figure 2.3, the compressor can provide remote indication of when it is running. With the slider button pushed to the right-hand side and displaying green colour, the compressor can provide remote indication of when it is either running or on active standby and ready to run. This is the standard setting. Note: The remote status indicator circuit for Output #2 should be connected across terminals 101 and 102 on TB1 in the electrical cabinet. The externally applied voltage and current should not exceed 24 V and 5 A, respectively.	Service

Warning: The compressor's built-in remote control function allows it to be switched on remotely. This feature does not include provision for any alarm or annunciation that the unit is about to start. The remote control function should therefore NOT be used unless the person conducting a business or undertaking involving the management or control of the plant has first implemented at least the following risk control

recommendations:

a) Do not operate the compressor with any of its maintenance access panels open or removed.

b) Before opening or removing any of its maintenance access panels or performing any maintenance work on the compressor or connected pneumatic system: Switch off the unit; isolate and tag-out the power supply; carefully release the residual air pressure from the internal piping and any external air receiver tank and connected piping; and close the air outlet valve.

2.4 Temperature Menu Screen

The temperature menu is accessed via the system menu. Logging-in with the user password allows limited access to view or edit the parameters; logging-in with the service password is necessary to edit most of the set values. The temperature menu screen is shown in Figure 2.4.

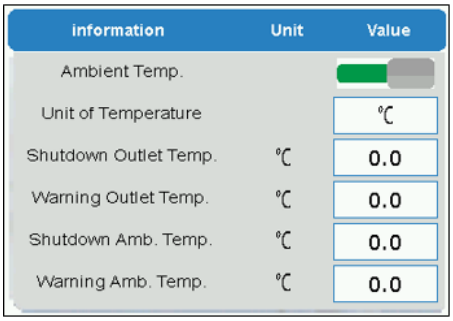

Figure 2.4 – Temperature Menu Screen

Each of the temperature menu parameters is described in Table 2.3.

Table 2.3 – Temperature Menu Parameters

Parameter	Set Value	Function	Password To View	Password To Edit
Ambient Temperature Monitoring	Disable (with the slider pushed to the left-hand side and displaying grey colour only).	Provision for enabling or disabling the ambient temperature warning and shutdown alarms in the future. Note: The compressor set does not have this functionality.	User	Service
Unit of Temperature	°C	Temperature unit of measure.	User	Service

Parameter	Set Value	Function	Password To View	Password To Edit
Shutdown Outlet Temperature	235 °C	A shutdown alarm will be activated if the air-end discharge temperature reaches this set value. Note: Only the over-temperature air-end(s) will be shut down; the other(s) will continue to run.	User	Factory
Warning Outlet Temperature	230 °C	A warning will be activated if the air-end discharge temperature reaches this set value. Note: Only the over-temperature air-end(s) will be flagged.	User	Service
Shutdown Ambient Temperature	This parameter will not be displayed if the ambient temperature monitoring function is disabled.	Provision for a shutdown alarm that will be activated if the ambient temperature reaches this set value and the ambient temperature monitoring function has been enabled. Note: The compressor set does not have this functionality.	Service	Factory
Warning Ambient Temperature	This parameter will not be displayed if the ambient temperature monitoring function is disabled.	Provision for a warning that will be activated if the ambient temperature reaches this set value and the ambient temperature monitoring function has been enabled. Note: The compressor set does not have this functionality.	Service	Service

Note: Compressor operation in ambient temperatures above 30°C will significantly reduce the service life of the consumable parts and necessitate shorter maintenance intervals. Refer to the Instruction Manual.

2.5 Pressure Menu Screen

The pressure menu is accessed via the system menu. Logging-in with the user password allows full access to view but limited access to edit the parameters; logging-in with the service password is necessary to edit most of the set values. The pressure menu screen is shown in Figure 2.5.

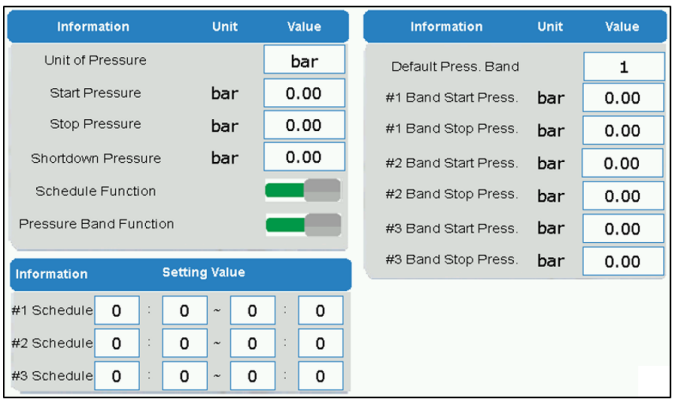

Figure 2.5 – Pressure Menu Screen

Each of the pressure menu parameters is described in Table 2.4.

Table 2.4 – Pressure Menu Parameters

Parameter	Set Value	Function	Password To View	Password To Edit
Unit of Pressure	bar	Pressure unit of measure. Note: 1 bar = 100 kPa. Note: Changing the unit of pressure to MPa, psi or kg/cm^2 will reset all the pressure menu values.	User	Service
Start Pressure	6.00 bar	The compressor set will start running at or below this discharge air pressure.	User	User
Stop Pressure	8.00 bar	The compressor set will stop running at or above this discharge air pressure.	User	User

Parameter	Set Value	Function	Password To View	Password To Edit
Shutdown Pressure	8.50 bar	A shutdown alarm will be activated if the discharge air pressure reaches this set value. Note: The entire compressor set will be shut down.	User	Factory
Schedule Function	Enable with the slider button pushed to the right-hand side and displaying green colour as shown in Figure 2.5; or Disable with the slider pushed to the left-hand side and displaying grey colour only. Disable is the standard setting.	Enables or disables the three adjustable daily on / off timers. Note: These timers will switch the compressor on and off every day provided the power supply is energised.	User	Service
Pressure Band Function	Enable with the slider button pushed to the right-hand side and displaying green colour as shown in Figure 2.5; or Disable with the slider pushed to the left-hand side and displaying grey colour only. Disable is the standard setting.	Enables or disables different start and stop pressures to apply during compressor operation in each of the three schedule timer periods.	User	Service
Schedule On and Off Times	If the schedule function is enabled, up to three different on / off timing pairs can be specified for a single 24-hour period from 00:00 to 23:59. The schedule periods should not overlap, for example: #1 Schedule: 00:00 ~ 07:50 #2 Schedule: 08:00 ~ 15:50 #3 Schedule: 16:00 ~ 23:50	Adjustable daily on / off timers. Note: These timers will switch the compressor on and off every day provided the power supply is energised.	User	Service

Parameter	Set Value	Function	Password To View	Password To Edit
Schedule Start and Stop Pressures	If the schedule and pressure band functions are enabled, different start and stop pressures can be specified for each of daily scheduled operating periods. It is recommended to maintain a pressure differential of at least 1.50 bar between the start and stop pressure settings here.	Start and stop discharge air pressures for each of the scheduled daily operating periods.	User	Service

Warning: The compressor set's built-in schedule function allows it to be switched on and off automatically according to the preset timer(s). This feature does not include provision for any alarm or annunciation that the unit is about to start or stop. The schedule function should therefore NOT be used unless the person conducting a business or undertaking involving the management or control of the plant has first implemented at least the following risk control recommendations:

a) Do not operate the compressor with any of its maintenance access panels open or removed.

b) Before opening or removing any of its maintenance access panels or performing any maintenance work on the compressor or connected pneumatic system: Switch off the unit; isolate and tag-out the power supply; carefully release the residual air pressure from the internal piping and any external air receiver tank and connected piping; and close the air outlet valve.

Note: Reducing the differential between the start and stop pressures will increase the on and off cycling frequency of the compressor modules. This may cause the permissible number of air-end drive motor starts per hour to be exceeded, which will trigger a shutdown alarm for the affected motor(s). Refer to the Instruction Manual for guidance about the pressure differential and recommended air receiver tank volume.

2.6 System Operation Menu

The system operation menu is accessed via the system menu. Logging-in with the user password allows full access to view the parameters; logging-in with the service password is necessary to edit most of the set values. The system operation menu screen is shown in Figure 2.6.

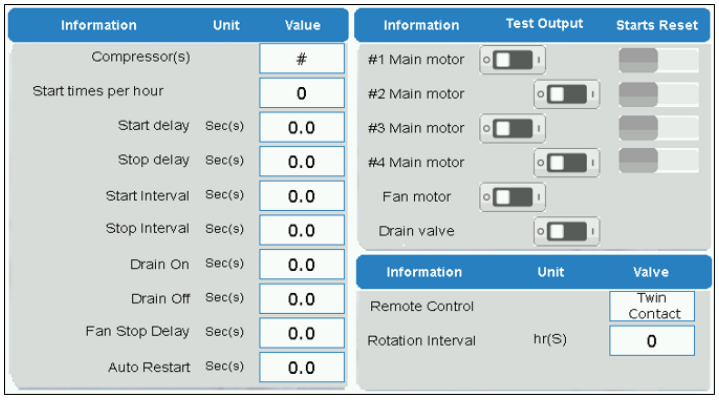

Figure 2.6 – System Operation Menu Screen

Each of the system operation menu parameters is described in Table 2.5.

Table 2.5 – System Operation Menu Parameters

Parameter	Set Value	Function	Password To View	Password To Edit
Compressors	2 [ES08] 3 [ES11] 4 [ES15]	The number of motor and air-end modules in the compressor set.	User	Factory
Motor Starts per Hour	30	The maximum permissible number of motor starts per hour for each module.	User	Factory
Start Delay	2 seconds	The response delay time for a start signal to the first module.	User	Service
Stop Delay	2 seconds	The response delay time for a stop signal to the first module.	User	Service
Start Interval	2 seconds	The response delay time for a start signal to each successive module.	User	Service
Stop Interval	2 seconds	The response delay time for a stop signal to each successive module.	User	Service

Parameter	Set Value	Function	Password To View	Password To Edit
Drain On	4 seconds	The duration of the condensate drain valve being open each cycle.	User	Service
Drain Off	600 seconds	The interval between successive condensate drain valve opening cycles during which time the valve is closed.	User	Service
Fan Stop Delay	120 seconds	The run-on time for the electric cooling fan after all compressor modules have stopped running.	User	Service
Auto Restart Delay	0 seconds is the standard setting, which disables this function. The function can be enabled, if required, by setting a value of 1 ~ 1,200 seconds.	The elapsed time after a power supply interruption is rectified before the compressor will automatically restart if it was previously operating in automatic on / off mode.	User	Service
#1 Main Motor Test Output #2 Main Motor Test Output #3 Main Motor Test Output [ES11 & ES15] #4 Main Motor Test Output [ES15] Fan Motor Drain Valve	Push and hold the slider to the right-hand side on (“I”) position for 2 seconds to initiate a momentary motor rotation or drain valve opening test. The slider automatically resets to the left-hand side off (“O”) position after use.	For use during commissioning or after electrical repairs to check the direction of motor rotation or drain valve function.	User	Service

Parameter	Set Value	Function	Password To View	Password To Edit
#1 Main Motor Starts Reset #2 Main Motor Starts Reset #3 Main Motor Starts Reset [ES11 & ES15] #4 Main Motor Starts Reset [ES15]	Push and hold the slider to the right-hand side for 2 seconds to reset the cumulative motor start counter to zero. The slide will temporarily appear green in colour to acknowledge the command. The slider automatically resets to the left-hand side and appears all-grey in colour after use.	For use as required to reset the cumulative motor start counter to zero. Check the equipment status display screen for confirmation of this action.	User	Service
Remote Control	Single Contact is the standard setting. Double Contact is the alternate setting.	Specifies the type of hard-wired remote control switch(es) and switching logic.	User	Service
Rotation Interval	48 hours	The interval in running hours between the starting sequence being cycled so as to maintain equal run time across all the modules.	User	Service

Warning: The compressor set's built-in auto restart function allows it to be switched on automatically after a power supply interruption has been rectified. This feature does not include provision for any alarm or annunciation that the unit is about to start. The auto restart function should therefore NOT be used unless the person conducting a business or undertaking involving the management or control of the plant has first implemented at least the following risk control recommendations:

a) Do not operate the compressor with any of its maintenance access panels open or removed.

b) Before opening or removing any of its maintenance access panels or performing any maintenance work on the compressor or connected pneumatic system: Switch off the unit; isolate and tag-out the power supply; carefully release the residual air pressure from the internal piping and any external air receiver tank and connected piping; and close the air outlet valve.

Note: To utilise the single contact remote control function, connect one latching switch between terminals 24G and X06 on Terminal Board 1 (TB1) inside the compressor's electrical cabinet. Closing this 24 V DC control circuit by means of the switch will send an "on" or "start" signal to the controller and opening the circuit will send an "off" or "stop" signal. The compressor's on or off status can be ascertained visually by checking the two-position remote-control switch or an indicator light wired into this circuit.

It is recommended to use the single contact option for remote control operation.

Note: To utilise the double contact remote control function, connect one non-latching switch between terminals 24G and X06 for the "start" command and another non-latching switch between terminals 24G and X07 for the "stop" command. Momentarily closing either of these 24 V DC control circuits by pulsing one switch or the other will send the relevant "on" (i.e. "start") or "off" (i.e. "stop") signal to the controller.

Note: Neither the single nor double contact remote control functions are compatible with sequential control operation of multiple compressor sets. Only a single standalone compressor set can be operated by remote control.

Note: Incorrect rotation of the drive motor will cause permanent damage to the compressor air-end that is not a warrantable fault. Ensure that the 3-phase electrical power supply is connected with clockwise red → white → blue phase sequence rotation BEFORE starting the compressor. When using the main motor test function after carrying out any electrical installation, maintenance or repair work, visually check and confirm that each drive motor and air-end is rotating COUNTER-CLOCKWISE when viewed looking onto its drive shaft.

Note: When using the fan motor test function, check and confirm that the fan discharges upwards and away from the cooling air exhaust vent on top of the compressor set. Temporarily affixing a piece of A4 paper with adhesive tape along one long edge only above the vent can provide reliable indication of the cooling airflow's direction.

Note: Increasing either the stop delay or stop interval above the recommended 2-second value may cause nuisance activation of the discharge air pressure shutdown alarm.

2.7 Calibration Menu

The calibration menu is accessed via the system menu using either the service or factory passwords. The set values should NOT be altered without first seeking guidance from the manufacturer. The calibration menu screen is shown in Figure 2.7.

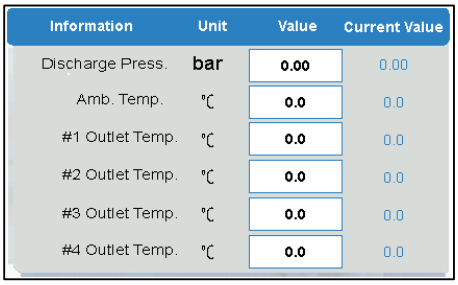

Figure 2.7 – Calibration Menu Screen

Each of the calibration menu parameters is described in Table 2.6.

Table 2.6 – Calibration Menu Parameters

Parameter	Set Value	Function	Password To View	Password To Edit
Discharge Pressure	0.00 bar	The calibration value (either positive or negative) is added to the raw output value from the measuring instrument (sensor) to obtain the corrected (true) value.	Service	Service
Ambient Temperature	0.0 °C	The calibration value (either positive or negative) is added to the raw output value from the measuring instrument (sensor) to obtain the corrected (true) value.	Service	Service
#1 Outlet Temperature	0.0 °C	The calibration value (either positive or negative) is added to the raw output value from the measuring instrument (sensor) to obtain the corrected (true) value.	Service	Service
#2 Outlet Temperature [ES08, ES11 & ES15]	0.0 °C	The calibration value (either positive or negative) is added to the raw output value from the measuring instrument (sensor) to obtain the corrected (true) value.	Service	Service
#3 Outlet Temperature [ES11 & ES15]	0.0 °C	The calibration value (either positive or negative) is added to the raw output value from the measuring instrument (sensor) to obtain the corrected (true) value.	Service	Service

Parameter	Set Value	Function	Password To View	Password To Edit
#4 Outlet Temperature [ES15]	0.0 °C	The calibration value (either positive or negative) is added to the raw output value from the measuring instrument (sensor) to obtain the corrected (true) value.	Service	Service

2.8 Sequential Operation Menu

The sequential operation menu is accessed via the system menu. Logging-in with the user password allows full access to view the parameters; logging-in with the service password is necessary to edit the set values.

The sequential operation menu screen is shown in Figure 2.8.

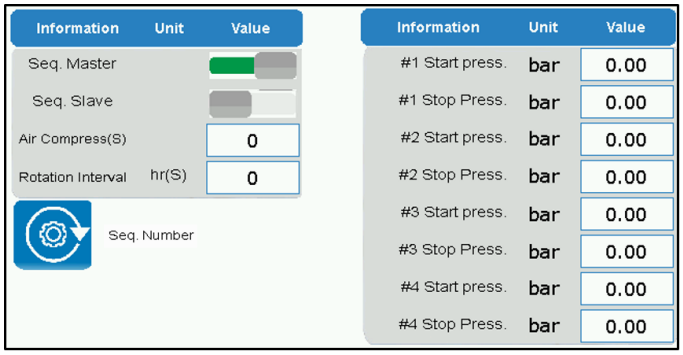

Figure 2.8 – Sequential Operation Menu Screen

Each of the sequential operation menu parameters is described in Table 2.7.

Table 2.7 – Sequential Operation Menu Parameters

Parameter	Set Value	Function	Password To View	Password To Edit
Seq. Master	Enable with the slider button pushed to the right-hand side and displaying green colour as shown in Figure 2.8 if this compressor set is the master unit in an interconnected group; or Disable with the slider pushed to the left-hand side and displaying grey colour only if this compressor set is a standalone unit or a slave unit in an interconnected group. Disable is the standard setting.	Identifies this compressor set as the master unit in an interconnected group operating under sequential control.	User	Service
Seq. Slave	Enable with the slider button pushed to the right-hand side and displaying green colour if this compressor set is a slave unit in an interconnected group; or Disable with the slider pushed to the left-hand side and displaying grey colour only as shown in Figure 2.8 if this compressor set is a standalone unit or the master unit in an interconnected group. Disable is the standard setting.	Identifies this compressor set as a slave unit in an interconnected group operating under sequential control.	User	Service

Parameter	Set Value	Function	Password To View	Password To Edit
Air Compressors	2, 3 or 4 according to the number of compressor sets in the interconnected group. Note: This parameter can only be viewed or edited on the master unit.	Specifies the number of compressor sets in the interconnected group operating under sequential control.	User	Service
Rotation Interval	48 hours	The interval in running hours between the starting sequence being cycled so as to maintain equal run time across all the compressor sets in the interconnected group.	User	Service
#1/2/3/4 Start Pressure	6.00 bar Note: Use the same value for each compressor set in the interconnected group.	The lead compressor set in the interconnected group will start running at or below this discharge air pressure.	User	Service
#1/2/3/4 Stop Pressure	8.00 bar Note: Use the same value for each compressor set in the interconnected group.	The lead compressor set in the interconnected group will stop running at or above this discharge air pressure.	User	Service

Warning: The compressor set's built-in sequential operation function allows it to be switched on and off automatically according to the sequential control parameters. This feature does not include provision for any alarm or annunciation that the unit is about to start or stop. The sequential operation function should therefore NOT be used unless the person conducting a business or undertaking involving the management or control of the plant has first implemented at least the following risk control recommendations:

a) Do not operate the compressor with any of its maintenance access panels open or removed.

b) Before opening or removing any of its maintenance access panels or performing any maintenance work on the compressor or connected pneumatic system: Switch off the unit; isolate and tag-out the power supply; carefully release the residual air pressure from the internal piping and any external air

receiver tank and connected piping; and close the air outlet valve.

Note: The interconnected group of compressor sets operating under sequential control can include one or more ES04 models.

Note: The sequential operation parameters must also be keyed-in manually to each of the other ES08, ES11 or ES15 compressor sets in the interconnected group as per the guidance provided in Table 2.7, or as per the guidance provided in the ES04 Controller Manual for that model only.

Note: To utilise the sequential operation function, it is necessary to interconnect the compressors by hard-wiring between their RS-485 communication terminals as described below. The parameters in the communication settings menu must also be set appropriately as per the guidance provided in Table 2.11.

a) Locate the RS-485 “+”, “-” and “SG” (i.e. signal ground) terminals on the underside of PLC1 inside the electrical cabinet of each interconnected ES08, ES11 or ES15 compressor set as shown in Figure 2.9.

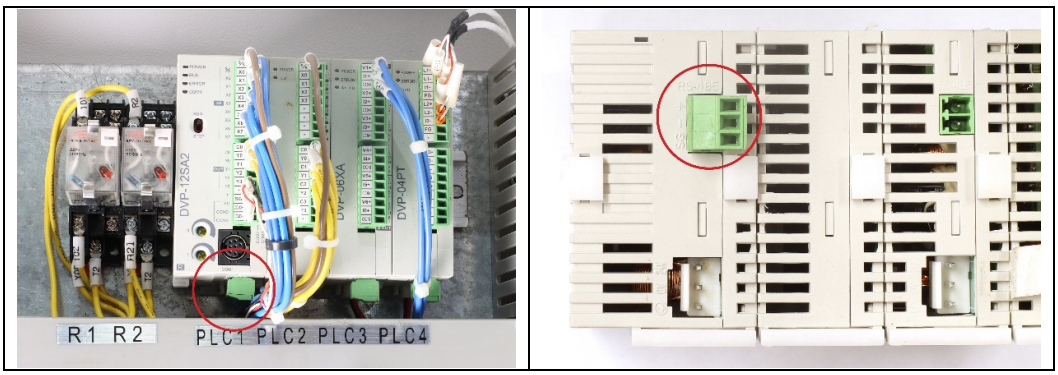

Figure 2.9 – RS-485 Terminals on ES08-15 Controller

b) Locate the RS-485 “D1+”, “D1-” and “SG” terminals on the rear of the controller fitted to each interconnected ES04 compressor set as shown in its Controller Manual.

c) Connect all the RS-485 “+” and “D1+” terminals together in a daisy chain using one signal core of a single twisted-pair, screened data or instrumentation cable. Connect all the RS-485 “-” and “D1-” terminals together in a daisy chain using the other signal core.

d) Connect all the “SG” terminals together in a daisy chain using the cable screen and drain wire core.

2.9 Maintenance Status Screen

The maintenance status screen is accessed via the system menu after logging-in using either the user or service passwords. It does not have any programmable functions directly, but instead provides an overview of any maintenance warning alarms and also serves as a portal to the individual component maintenance screens.

The maintenance status screen is shown in Figure 2.10.

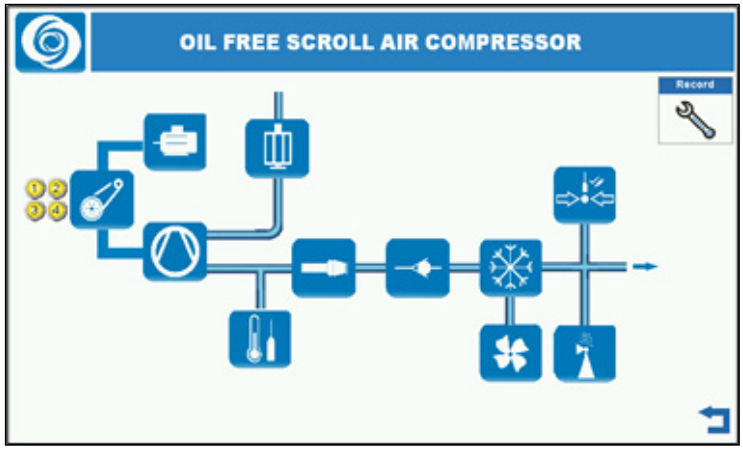

Figure 2.10 – Maintenance Status Screen

Each of the maintenance status screen symbols is described in Table 2.8.

Table 2.8 – Maintenance Status Screen Symbols

Symbol	Name	Description	Password To View	Password To Edit
	Motor	Press to access the motor maintenance screen.	User	Service
	V-Belt	Press to access the V-belt maintenance screen.	User	Service
	Air-End	Press to access the air-end, tip seal and bearing grease maintenance screens.	User	Service
	Air Filter	Press to access the air filter maintenance screen.	User	Service
	Temperature Sensor	[Not in use.]	n/a	n/a

Symbol	Name	Description	Password To View	Password To Edit
	High Pressure Hose	Press to access the high-pressure hose maintenance screen.	User	Service
	Check Valve	Press to access the check valve maintenance screen.	User	Service
	After-Cooler	[Not in use.]	n/a	n/a
	Cooling Fan	[Not in use.]	n/a	n/a
	Pressure Sensor	[Not in use.]	n/a	n/a
	Safety Valve	Press to access the safety valve maintenance screen.	User	Service
	Maintenance Warning Alarm	Indicates an active maintenance warning for the component tagged with one or more of these circular symbols. Press the relevant component maintenance screen to investigate and rectify the maintenance problem. The numerical value identifies the motor and air-end module.	n/a	n/a
	Maintenance Log	Press to access the maintenance log screen.	User	n/a

For air-end related maintenance warnings only, the indicator lights are colour-coded to identify the maintenance task more specifically as follows:

Indicator Light Colour	Maintenance Item
	Tip Seal
	Air-End
	Bearing Grease

2.10 Motor, V-Belt, Air-End, Air Filter, High Pressure Hose, Check Valve and Safety Valve Maintenance Screens

The component maintenance screens are accessed via the maintenance status screen. Logging-in with the

user password allows full access to view the parameters and hour meters; logging-in with the service password is necessary to edit the set values or reset the meters.

The component maintenance screens all have a similar format, an example of which – the air filter maintenance screen – is shown in Figure 2.11.

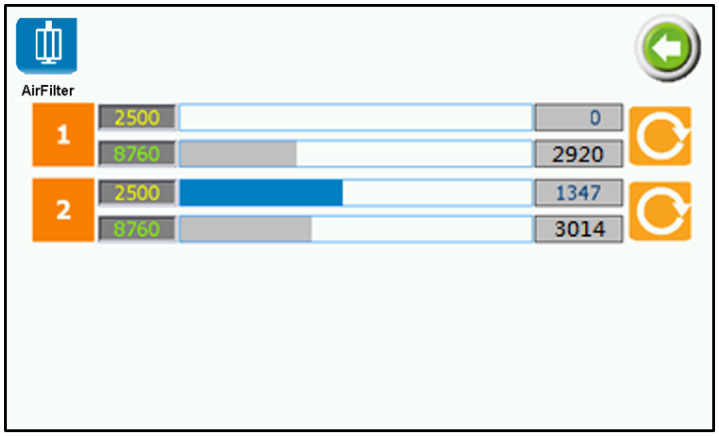

Figure 2.11 – Air Filter Maintenance Screen (Model ES08)

Each of the air filter maintenance screen symbols, parameters and data fields is described in Table 2.9. This format is typical of all the component maintenance screens.

Table 2.9 – Air Filter Maintenance Screen Symbols

Symbol or Field	Name	Description	Password To View	Password To Edit
1	Module	Assigned motor and air-end module identification number: 1 or 2 [ES08] 1, 2 or 3 [ES11] 1, 2, 3 or 4 [ES15]	User	n/a
2500	Run Time Maintenance Interval	Scheduled maintenance interval in compressor running hours.	User	Service
8760	Elapsed Time Maintenance Interval	Scheduled maintenance interval in elapsed hours.	User	Service

Symbol or Field	Name	Description	Password To View	Password To Edit
1347	Run Time Remaining	Running hours until next scheduled maintenance.	User	Service
3014	Elapsed Time Remaining	Elapsed hours until next scheduled maintenance.	User	Service
	Timer Reset Button	AFTER completing the relevant maintenance task(s) as described in the Instruction Manual, press and hold for two seconds to reset both the run time remaining and elapsed time remaining values.	User	Service
	Previous Screen	Press to go back to the previous screen, which is usually the maintenance status screen.	User	n/a
	Next Screen	Press to go forward to the next screen, which is limited to moving between the air-end, tip seal and bearing grease maintenance screens.	User	n/a

The set values for the run time and elapsed time maintenance intervals for each of the component maintenance screens are listed in Table 2.10. Please refer to the Instruction Manual for detailed guidance about the maintenance procedures.

Table 2.10 – Run Time and Elapsed Time Maintenance Interval Settings

Component	Run Time Maintenance Interval (hours)	Elapsed Time Maintenance Interval (hours)
Motor	20,000	70,080
V-Belt	2,500	8,760
Air-End	20,000	70,080
Tip Seal	10,000	35,040
Bearing Grease	10,000	35,040
Air Filter	2,500	8,760
High Pressure Hose	10,000	35,040
Check Valve	5,000	17,520
Safety Valve	2,500	8,760

Note: The elapsed time measurement is only accumulated while the compressor set's power supply is

switched on, which can detract from the accuracy of this timer as a machine condition indicator. Compressor run time and elapsed calendar time are the most reliable values to compare with the recommended maintenance intervals.

2.11 Maintenance Log Screen

The maintenance log screen is accessed via the maintenance status screen. It can be viewed by logging-in with the user password. There are no editable fields on this screen; it serves only to display a record of maintenance alarm reset actions as per the example shown in Figure 2.12.

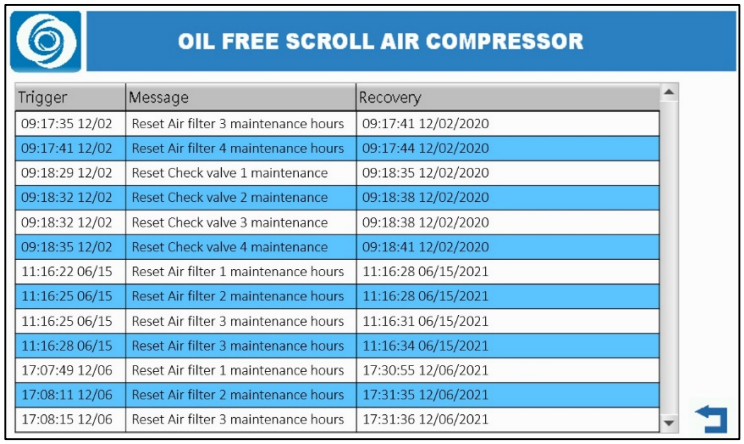

Figure 2.12 – Maintenance Log Screen

2.12 Time Settings Menu

The time settings menu is accessed via the system menu. Logging-in with the user password allows full access to view the parameters or edit the set values. The time settings menu screen is shown in Figure 2.13.

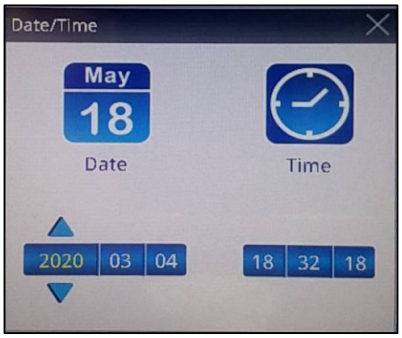

Figure 2.13 – Time Settings Menu Screen

To change the date or time:

a) Select the year, month, day, hours, minutes or seconds field by pressing it on the touch screen. The selected field value digits will change from white to yellow colour and the increase and decrease arrows will appear above and below the field, respectively.

b) Press the increase ( ) or decrease ( ) arrows to change the value.

c) Repeat steps (a) and (b) above until all the necessary changes have been made.

d) Exit the time settings menu screen by pressing the close ( ) button at the top right-hand side of the screen.

2.13 Communication Settings Menu

The RS-485 communication settings menu is accessed via the system menu. Logging-in with the service password is necessary to view the parameters or edit the set values. The communication settings menu screen is shown in Figure 2.14.

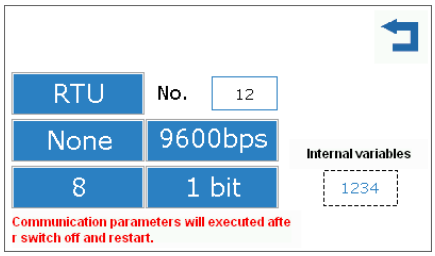

Figure 2.14 – Communication Settings Menu Screen

Each of the RS-485 communication settings menu parameters is described in Table 2.11. These are relevant to sequential operation of multiple compressor sets in an interconnected group and also to integration of one or more compressor sets in an automated monitoring and control system using the Modbus protocol.

Table 2.11 – Communication Settings Menu Parameters

Parameter	Set Value	Function	Password To View	Password To Edit
Transmission Mode	RTU	Modbus serial data transfer protocol.	Service	Service

Parameter	Set Value	Function	Password To View	Password To Edit
Device Address No.	1 if the compressor set is a standalone unit or the master unit in an interconnected group. 2, 3 or 4 if the compressor set is a slave unit in an interconnected group. Each unit must have a unique address number. 1 is the standard setting.	Connected device identification.	Service	Service
Parity Checking	None	Transmission error checking.	Service	Service
Baud Rate	38400 bps	Data transmission rate.	Service	Service
Data Bits	8	Data bits per byte in a Modbus message.	Service	Service
Stop Bits	1 bit	Stop bits per byte in a Modbus message.	Service	Service

Note: After making any changes to the set values, press on the back ( ) button to exit from this menu. The compressor set must then be powered off and back on again for the changes to take effect.

Note: All devices on the interconnected network must have the same RS-485 communication settings except for the device addresses that must be assigned uniquely.

Note: For ease of setup, operation and maintenance, it is recommended that each compressor set in an interconnected group be physically labelled with its address number, e.g. “Compressor #1”.

2.14 Language Menu

The language menu is accessed via the system menu. Log-in with the user password to view the parameter choices or change the set value. The language menu screen is shown in Figure 2.15.

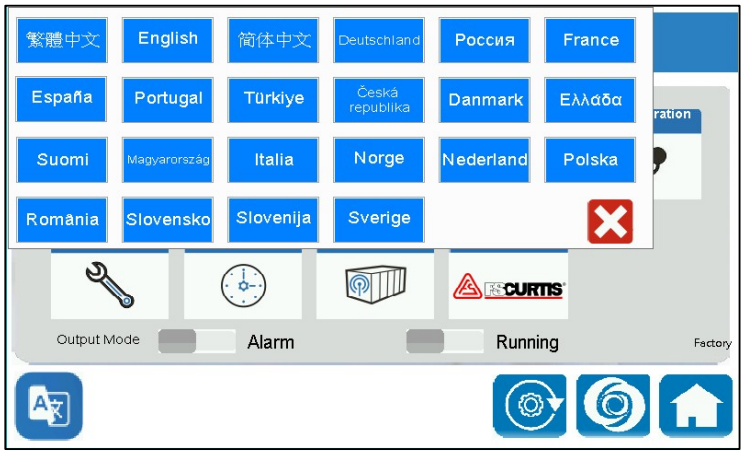

Figure 2.15 – Language Menu Screen

Press the desired language button on the touch-screen as required. It is recommended to keep the standard setting, English, as the selection. Then press on the close ( ) button to exit from this menu.

2.15 Sequential Control Screen

The sequential control screen can be accessed via the home screen without any password provided that the compressor set is configured as the master unit in an interconnected group operating under sequential control. Pressing on the sequential control screen symbol on the home screen as described in Section 2.1 will then bring up the sequential control screen as shown in Figure 2.16.

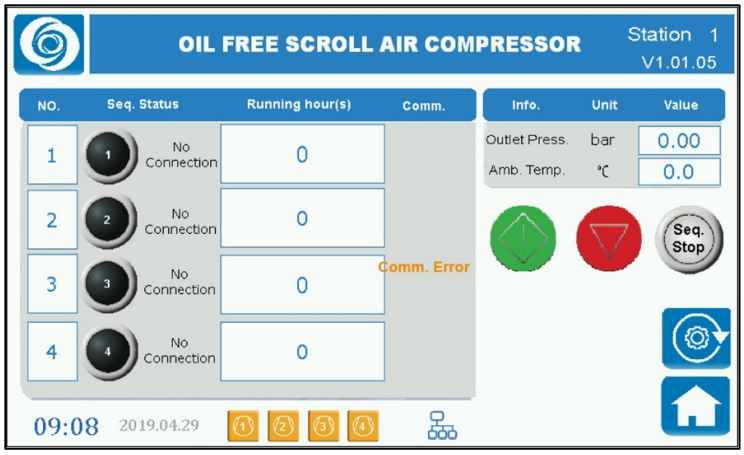

Figure 2.16 – Sequential Control Screen

Each of the sequential control screen symbols or fields is described in Table 2.12.

Table 2.12 – Sequential Control Screen Symbols

Symbol or Field	Name	Description
No.	Compressor Number	Compressor unit number (address) as configured in the communication settings menu.
Seq. Control	Sequential Control Status	Sequential control operating status of each interconnected compressor set. The colour of the circular symbol indicates the unit's status as follows:  Off or Stopped (Stand-by)  Running  Shutdown (Alarm) The adjoining text provides further information about each unit's status as follows: "No Connection" = Not connected for sequential control operation. "Connecting" = Connected for sequential control operation.
Running Hours	Cumulative Running Hours	Each interconnected compressor set's cumulative lifetime running hours.
Comm. Status	Communication Status	The message "Comm. Error" is displayed for any compressor set in the interconnected group that is not properly communicating with the master unit via the RS-485 link. Otherwise, this field will appear blank.
Outlet Press.	Outlet Pressure	The compressed air discharge pressure from the master unit of the interconnected group.
Amb. Temp.	Ambient Temperature	[Note: The compressor set does not have the functionality to measure or display the ambient temperature.]
	Start Button	Press and hold for two seconds to turn on (i.e. start) the interconnected group of compressors under sequential control.
	Stop Button	Press and hold for two seconds to turn off (i.e. stop) the interconnected group of compressors under sequential control.

Symbol or Field	Name	Description
	Sequential Control Started	The interconnected group of compressors is operating under automatic sequential control irrespective of whether any of the units are running or on stand-by.
	Sequential Control Stopped	The interconnected group of compressors is not operating under automatic sequential control. One or more units may nonetheless be running or on stand-by under local (individual) control.
	Time and Date	Indicates the current time and date. Note: There is no automatic adjustment for daylight saving time.
 	Compressor Module Status	Indicates the operating status of each motor and air-end module within this (master) compressor set:  Stopped (Off or Stand-by)  Running
	Sequential Control Active	Indicates that the compressor is configured for operation in a sequentially controlled group.
	Reset Button	After any attempt to rectify a communication error, press this button to retest the connection.
	Home Screen	Press to return to the home screen.

2.16 Equipment Status Screen

The equipment status screen can be accessed via the home screen without any password. There are no editable fields on this screen; it serves only to display the current status of each motor and air-end module and also the cooling fan. An example of this screen for an ES15 compressor set equipped with four modules is shown in Figure 2.17.

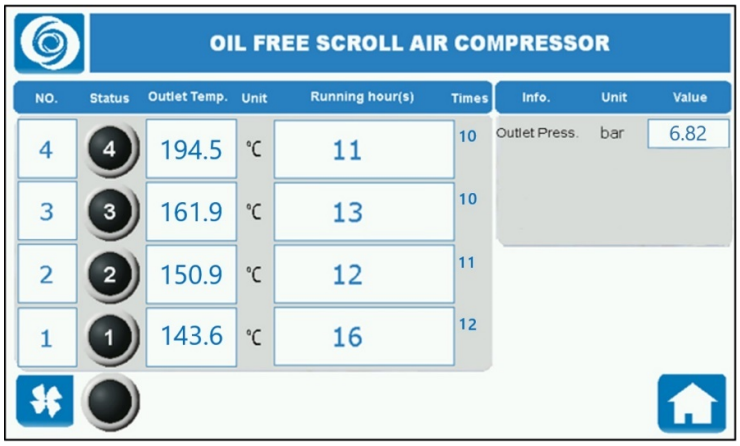

Figure 2.17 – Equipment Status Screen

Each of the equipment status screen symbols or fields is described in Table 2.13.

Table 2.13 – Equipment Status Screen Symbols

Symbol or Field	Name	Description
NO. 4	Module Number	Assigned motor and air-end module identification number: 1 or 2 [ES08] 1, 2 or 3 [ES11] 1, 2, 3 or 4 [ES15]
Status 4	Module Status	Indicates each motor and air-end module's operating status: 4 Off or Stopped (Stand-by) 4 Running 4 Warning (Alarm) 4 Shutdown (Alarm)
Outlet Temp. 0.0	Outlet Temperature	The discharge temperature for each air-end.
Running hour(s) 1154	Running Hours	The cumulative lifetime running hours for each motor and air-end module.

Symbol or Field	Name	Description
	Motor Starts	The cumulative lifetime number of starts for each motor and air-end module.
	Cooling Fan Status	 Off or Stopped (Stand-by)  Running
	Outlet Pressure	Indicates the compressor's discharge air pressure.
	Home Screen	Press to return to the home screen.

2.17 Alarm Status Screen

The alarm status screen can be accessed via the home screen without any password. There are no editable fields on this screen; it serves only to display any current (active) and historical (cleared) alarms and warnings. An example of this screen is shown in Figure 2.18.

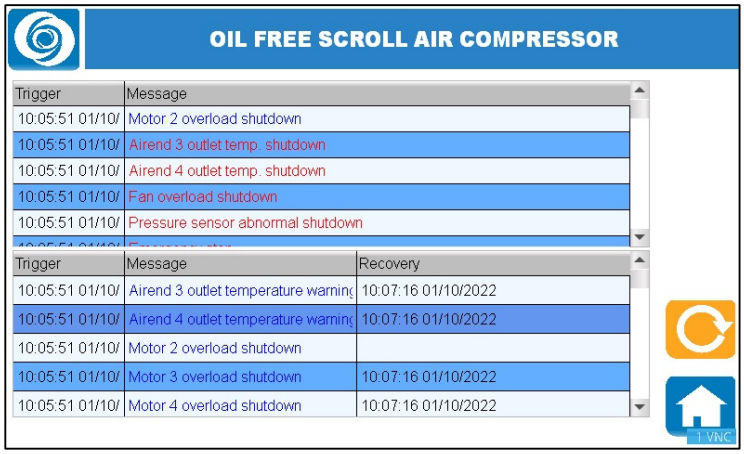

Figure 2.18 – Alarm Status Screen

The upper section of the screen displays a listing of any current (active) alarms and warnings including the time at which each was initiated. The lower section displays the historical (cleared) events including the time at which each was resolved. Alarm messages are displayed in red text and warning messages are displayed in blue text. One can use the scroll bars to move up or down through the listings or else swipe through the listings vertically up or down.

The alarm symbol ( ) will appear at the bottom of the home page screen in the event of an active alarm and it may be preceded by the appearance of a pop-up message box, an example of which is shown in Figure 2.19.

Figure 2.19 – Pop-Up Alarm Message

Press on the OK ( ) button to acknowledge the message and then proceed to the alarm status screen to ascertain the details. The alarm condition should be investigated, rectified as appropriate and then cleared by pressing the reset ( ) button for two seconds. If properly resolved, the alarm message will move from the current (active) list to the historical (cleared) list on the alarm status screen.

The warning symbol ( ) will appear at the bottom of the home page screen in the event of an active operating or maintenance warning. The warning condition should be investigated, rectified as appropriate and then cleared by pressing the reset ( ) button for two seconds. If properly resolved, the warning message will move from the current (active) list to the historical (cleared) list on the alarm status screen.

The following events will initiate an operating or maintenance alarm:

a) Air-end outlet temperature above warning value (see Table 2.3).
b) Maintenance task overdue (see Table 2.10).

The following events will initiate a shutdown alarm of an individual motor and air-end module:

a) Air-end outlet temperature above shutdown value (see Table 2.3).
b) Air-end drive motor starts per hour above shutdown value (see Table 2.5).
c) Air-end drive motor overload.

Where possible, the automatic shutdown of one or more modules will not prevent any other operable modules from running.

The following events will initiate a shutdown alarm of the entire compressor set:

a) Compressor set discharge pressure above shutdown value (see Table 2.4).
b) Pressure sensor fault.
c) Fan motor overload.

2.18 HMI System Menu

Pressing on any blank space on the home screen for more than three seconds will cause the human-machine interface (HMI) system menu to appear as a dropdown at the top left-hand corner of the screen (see Figure 2.20).

Figure 2.20 – HMI System Menu

Note: DO NOT proceed further in this menu, which is reserved for use by the manufacturer. Press only on the close (☒) button to exit from this menu.

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