OPERATION MANUAL

EC2000

Air Compressor Controller

WARRANTY NOTICE

Failure to follow the instructions and procedures in this manual, or misuse of this equipment, will VOID its warranty!

PART NUMBER:

88290022-798 R03

The information in this manual is current as of its **publication date**:

9/1/2014

SULLAIR®

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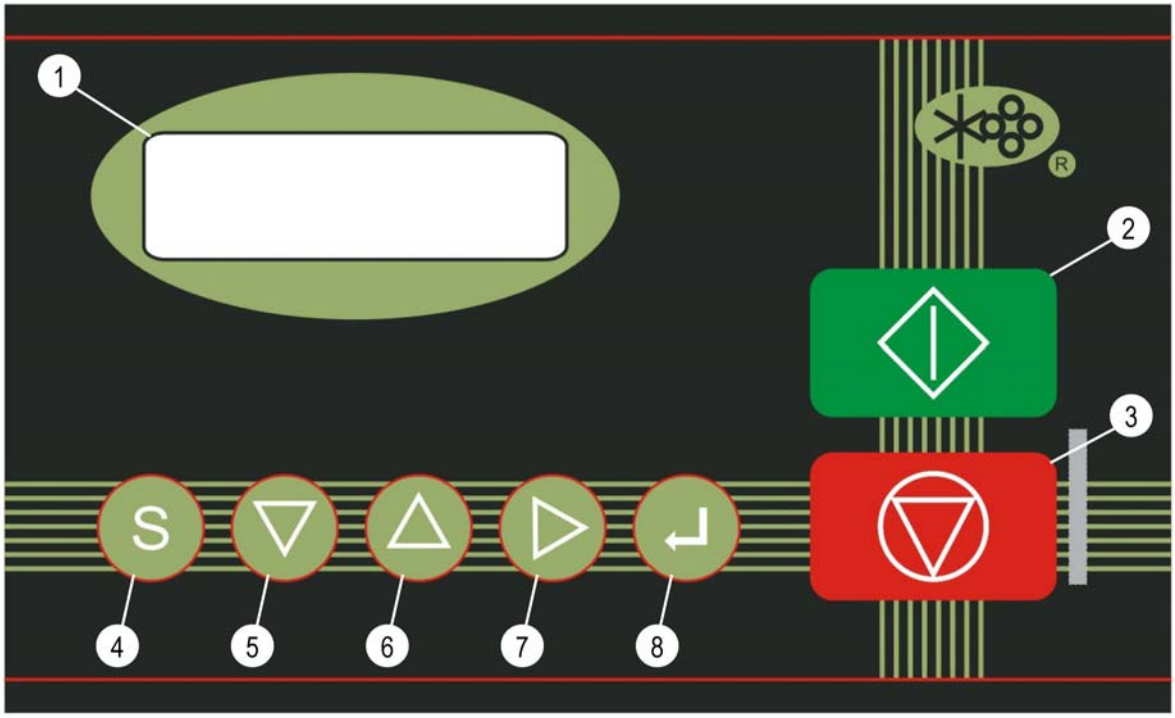
Section 1
Description

1.1 EC2000 control panel



1.	LCD display	5.	Down
2.	Start	6.	Up
3.	Stop	7.	Shift/Enter
4.	Set	8.	Return

Figure 1-1: EC2000 control panel

1.1.1 EC2000 control panel button behavior

- **Start.** Press Start to start the compressor with the no-fault condition or switch the machine from stop to run mode.
- **Stop.** Press Stop to stop the compressor.
- **Set.** When you modify a parameter, press Set to confirm the change.
- **Down.** This button has multiple uses:
  - When navigating through the menus, press Down to move to the next menu item.

- When viewing parameters, press Down to show the next pair of parameters.
- When selecting a parameter to modify, press Down to select the next parameter.
- When modifying a parameter, press Down to decrease the value of the digit.
- At the default screen, press Down to display the main menu.

- **Up.** This key has multiple uses:
  - When navigating through the menus, press Up to select the previous menu item.
  - When viewing parameters, press Up to show the previous pair of parameters.
  - When selecting a parameter to modify, press Up to select the previous parameter.
  - When modifying a parameter, press Up to increase the value of the digit.
  - At the default screen, press Up to display the operating times.
- **Shift/Enter.** This key has multiple uses:
  - When modifying a parameter, press Shift/Enter to move to the next digit.
  - When navigating through the menus, press Shift/Enter to enter the selected menu item.
- **Return.** When navigating through the menus, press Return to go back to the previous menu.

1.2 Input and output terminals

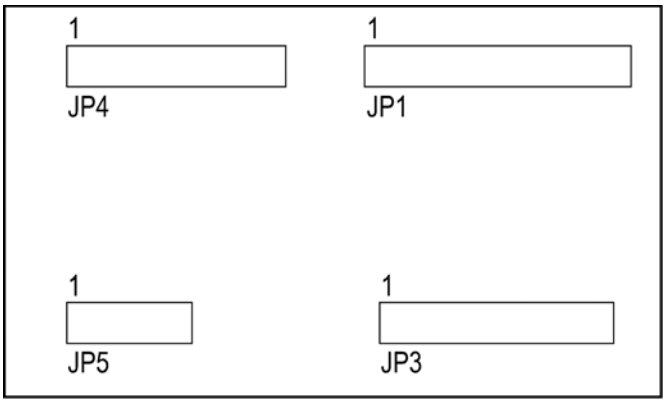


Figure 1-2: EC2000 controller ports

Table 1-1: JP1—analog input (11 pins)

Pin	Name	Description
1	PIN+	Pressure sensor input +
2	PIN-	Pressure sensor input −
3	TIN-	Temperature sensor input −
4	TIN-	Temperature sensor input −
5	TIN+	Temperature sensor input +
6	I1	Main motor current (R) sensor input
7	I2	Main motor current (T) sensor input
8	FIR	Fan motor current (R) sensor input
9	FIT	Fan motor current (T) sensor input
10	VST	ST phase voltage sensor input
11	GND	Ground

Table 1-2: JP4—input signal quantity and RS485 port (8 pins)

Pin	Name	Description
1	DI0	Definable input (normal close)
2	DI1	Definable input (normal close)
3	DI2	Definable input (normal close)
4	DI3	Definable input (normal close)
5	DI4	Emergency stop signal input (normal close)
6	GND	Input common
7	A	RS485 port
8	B	RS485 port

Table 1-3: JP3—binary output quantity (9 pins)

Pin	Name	Description
1	ACIN0	Contactor power input 1 (common output of internal relay
2	ACIN1	Contactor power input 2 (common of internal RC)
3	VD	Loading solenoid valve output
4	KF	Fan motor contactor output
5	RCS	Y contactor RC output
6	KS	Y contactor output
7	RCD	Δ contactor RC output
8	KD	Δ contactor output
9	KM	Main contactor output

Table 1-4: JP5—power input (3 pins)

Pin	Name	Description
1	XGD	To ground
2	ACIN0	~25V power input (same with R-phase)
3	ACIN1	~25V power input (same with S-phase)

Notes:

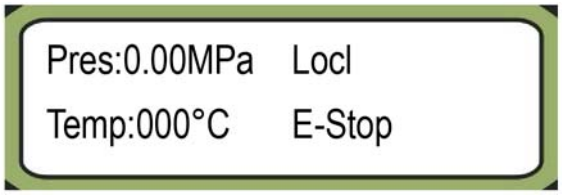
Section 2
Operation

2.1 Startup screen

When the controller is turned on, the power indicator on the panel will light up and the display will show the startup screen.

2.2 Default screen

After five seconds, the controller will display the default screen.



- **Pres:—**the exhaust pressure value
- **Temp:—**the exhaust temperature value
- **Locl—**Local
- **E-Stop—**This area displays the current operating status, alarm, and fault indicators.

If a fault exists in the compressor, the display indicates the fault. If multiple faults exist, the display indicates the earliest one. Upon removal of the fault(s) press the STOP key to return to the default screen.

- For a list of fault indicators and their descriptions, please refer to *Section 3.3*.

If an alarm signal is given, the display alternately indicates the alarm status and operating status. If multiple alarm signals are given, the display indicates them one-by-one by priority.

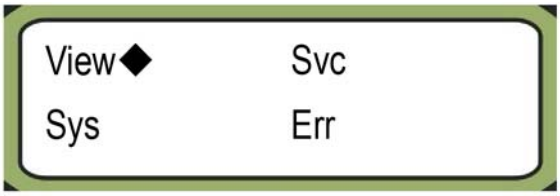
- For a list of alarm indicators and their descriptions, please refer to *Section 3.2*.

If there is no fault or alarm, the display indicates the operating status.

- For a list of operating status indicators and their descriptions, please refer to *Section 3.1*.

2.3 Main menu screen

From the default screen, press the Down button to access the main menu.



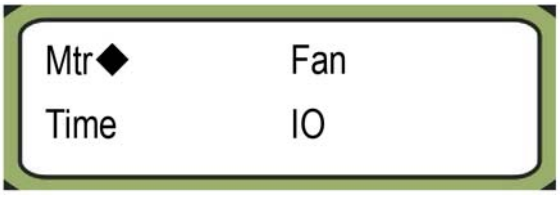
Use the Up and Down keys to select a menu item. The ◆ to the right of a menu item indicates the currently selected item.

The main menu has four menu items:

- **View—**The Compressor View menu allows you to view the compressor's current operating conditions.
- **Sys—**The System Parameter screen displays the current system parameter settings.
- **Svc—**The Compressor Maintenance screen displays used and remaining service life for common maintenance items.
- **Err—**The Compressor Fault screen displays information about the ten most recent compressor faults.

2.3.1 Compressor View menu

To access the View menu, at the main menu select **View** and press the Shift/Enter button.



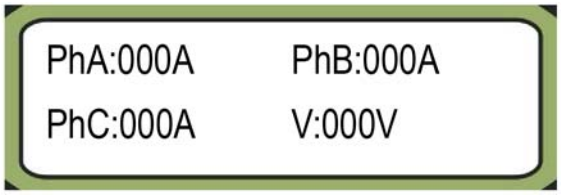
The View menu has four menu items:

- **Mtr—**The Motor screen displays information about the electrical status of the motor.
- **Time—**The Time screen displays information about the compressor's operating and loading time.
- **Fan—**The Fan Motor screen displays information about the electrical status of the fan motor.
- **IO**—The IO Port screen displays the input and output value.

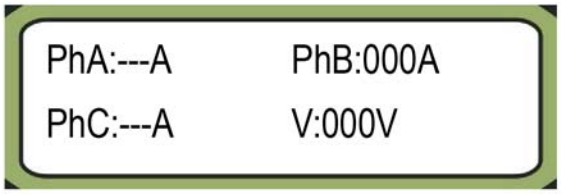
To return to the View menu, press the Return button.

2.3.1.1 Motor screen

To access the Motor screen, at the View menu select **Mtr** and press the Shift/Enter button.

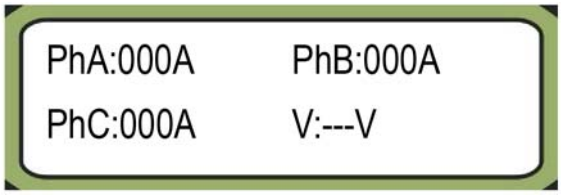


When the main motor current R function definition is not "255", this screen displays the following:



When the main motor current T function definition is not "255", this screen displays the following:

When the supply voltage V function definition is not "255", this screen displays the following:



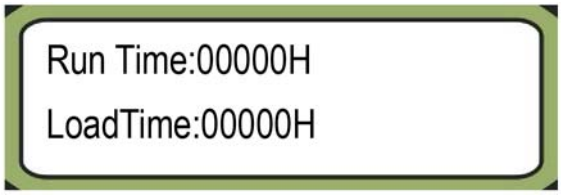
The Motor screen displays information about the electrical status of the main motor.

- **PhA:—**main motor phase A current value
- **PhB:—**main motor phase B current value
- **PhC:—**main motor phase C current value
- **V:—**main motor power voltage value

To return to the View menu, press the Return button.

2.3.1.2 Time screen

To access the Time screen, at the View menu select **Time** and press the Shift/Enter button.



The Time screen displays information about the compressor's operating and loading time.

- **Run Time:—**run time of the compressor
- **LoadTime:—**load time of the compressor

To return to the View menu, press the Return button.

2.3.1.3 Fan Motor screen

To access the Fan Motor screen, at the View menu select **Fan** and press the Shift/Enter button.

When the fan motor current R function definition is not "255", this screen displays the following:

When the fan motor current T function definition is not "255", this screen displays the following:

The Fan Motor screen displays information about the electrical status of the fan motor.

- **PhA:—**value of fan motor phase A
- **PhB:—**value of fan motor phase B
- **PhC:—**value of fan motor phase C

To return to the View menu, press the Return button.

2.3.1.4 IO Port screen

To access the IO Port screen, at the View menu select **IO** and press the Shift/Enter button.

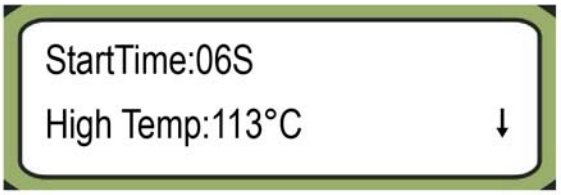
The IO Port screen displays the input and output value.

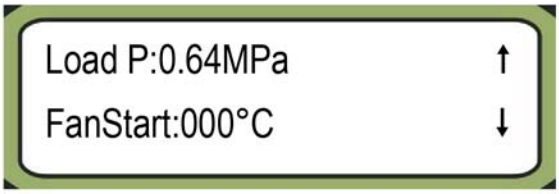
- **In**—input value
- **Out**—output value

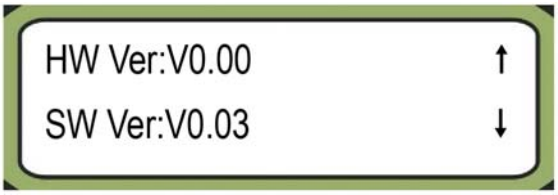
To return to the View menu, press the Return button.

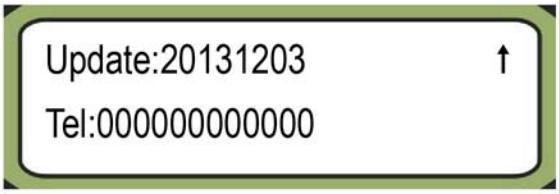
2.3.2 System Parameter screen

To access the System Parameter screen, at the main menu select **Sys** and press the Shift/Enter button.









The System Parameter screen displays the current settings for the system parameters.

- **StartTime:**—start up time
- **High Temp:**—high exhaust alarm temperature
- **Low Temp:**—low exhaust alarm temperature

- **Unload P:**—unload pressure
- **Load P:**—load pressure
- **FanStart:**—fan start temperature
- **Fan Stop:**—fan stop temperature
- **Auto Stop:**—idle stop time
- **Baudrate;**—baud rate of communication
- **Unit No.:**—number of compressor in combined mode
- **CommMode:**—communication mode
- **Seq. Start:**—sequence starting time
- **Seq. Uload:**—sequence unloading time
- **Seq Turns:**—sequence rotation time
- **HW Ver:—**hardware version
- **SW Ver:—**software version
- **Update:—**date of last update
- **Tel:—**not used

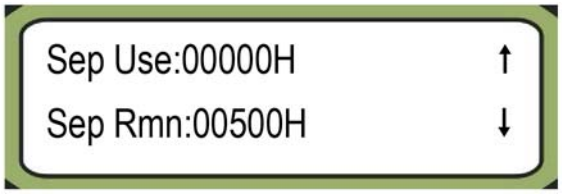
An up arrow indicates there are more parameters before the current pair. A down arrow indicates there are more parameters after the current pair.

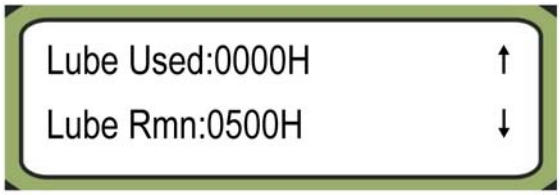
- You can view the previous pair of parameters by pressing the Up button.
- You can view the next pair of parameters by pressing the Down button.

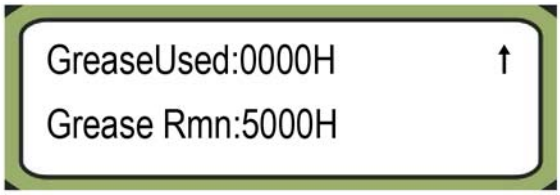
To return to the main menu, press the Return button.

2.3.3 Compressor Maintenance screen

To access the Compressor Maintenance screen, at the main menu select **Svc** and press the Shift/Enter button.







The Compressor Maintenance screen displays used and remaining service life for common maintenance items.

- **AirF Use:**—air filter used time
- **AirF Rmn:**—air filter remaining time
- **OilF Use:**—oil filter used time
- **OilF Rmn:**—oil filter remaining time
- **Sep Use:**—oil/air separator used time
- **Sep Rmn:**—oil/air separator remaining time
- **Lube Used:**—fluid used time
- **Lube Rmn:**—fluid remaining time
- **GreaseUsed:**—grease used time
- **Grease Rmn:**—grease remaining time

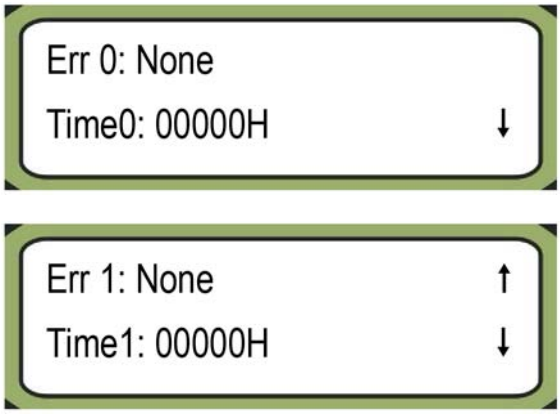
An up arrow indicates there are more parameters before the current pair. A down arrow indicates there are more parameters after the current pair.

- You can view the previous pair of parameters by pressing the Up button.
- You can view the next pair of parameters by pressing the Down button.

To return to the main menu, press the Return button.

2.3.4 Compressor Fault screen

To access the Compressor Fault screen, at the main menu select **Err** and press the Shift/Enter button.



The Compressor Fault screen displays information about the ten most recent compressor faults.

- **Err #:**—name of failure
- **Time#:**—time of failure

An up arrow indicates there are more parameters before the current pair. A down arrow indicates there are more parameters after the current pair.

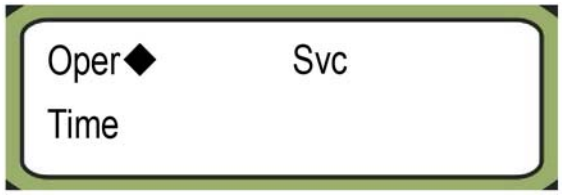
- You can view the previous pair of parameters by pressing the Up button.
- You can view the next pair of parameters by pressing the Down button.

To return to the main menu, press the Return button.

2.4 Compressor settings menu

To change the compressor settings, at the default screen press the Set button (“S”). The controller will prompt you for the four digit password.

- To enter the four digit password (0607), use the buttons on the controller. The blinking cursor indicates the current digit.
  - Press the Up button to increase the value of the current digit by 1.
  - Press the Down button to decrease the value of the current digit by 1.
  - Press the Shift/Enter button to move the cursor to the next digit.
  - Press the Set button to enter the password.

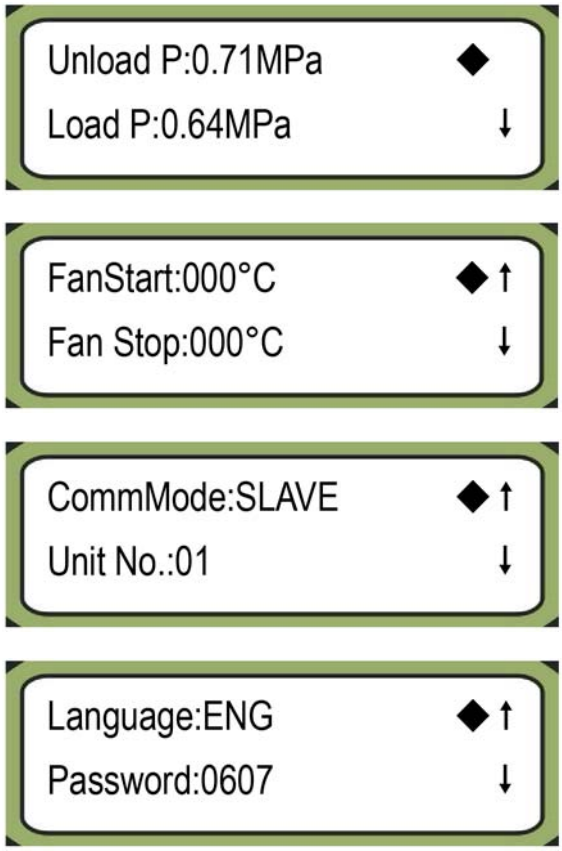


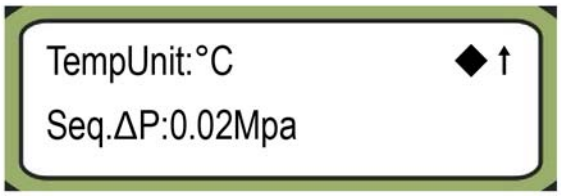
The Compressor settings menu has three menu items.

- **Oper**—operating parameter settings
- **Time**—time parameter settings
- **Svc**—maintenance parameter settings

2.4.1 Operating parameter settings

To access the Operating parameter settings, at the compressor settings menu select **Oper** and press the Shift/Enter button.





- **Unload P:**—unload pressure
- **Load P:**—load pressure
- **FanStart:**—fan motor start
- **Fan Stop:**—fan motor stop
- **CommMode:**—communication mode
- **Unit No.:**—unit number
- **Language:**—language
- **Password:**—password
- **CtrlMode:**—control mode
- **PresUnit:**—pressure unit
- **TempUnit:**—temperature unit
- **Seq.ΔP:**— sequence control use P

The ◆ to the right of the display indicates the currently selected parameter.

An up arrow indicates there are more parameters before the parameters shown. A down arrow indicates there are more parameters after the parameters shown.

- You can move to the previous parameter by pressing the Up button.
- You can move to the previous parameter by pressing the Down button.

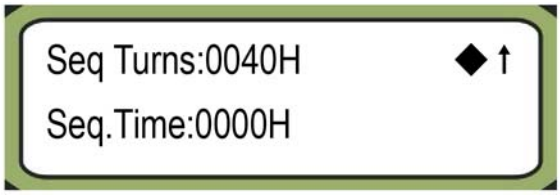
To edit the currently selected parameter, press the Shift/Enter key. The blinking cursor indicates the current digit.

- Press the Up button to increase the value of the current digit by 1.
- Press the Down button to decrease the value of the current digit by 1.
- Press the Shift/Enter button to move the cursor to the next digit.
- Press the Set button to save the new parameter value.

To return to the compressor settings menu, press the Return button.

2.4.2 Time parameter settings

To access the Time parameter settings, at the compressor settings menu select **Time** and press the Shift/Enter button.



- **StartTime:**—starting time
- **Load Del:**—loading delay
- **Auto Stop:**—idle stop time
- **StopTime:**—stop delay
- **Seq. Start:**—sequence starting time
- **Seq. Unload:**—sequence unloading time
- **Seq Turns:**—sequence rotation time
- **Seq.Time:**—sequence control use time

The ◆ to the right of the display indicates the currently selected parameter.

An up arrow indicates there are more parameters before the parameters shown. A down arrow indicates there are more parameters after the parameters shown.

- You can move to the previous parameter by pressing the Up button.

- You can move to the previous parameter by pressing the Down button.

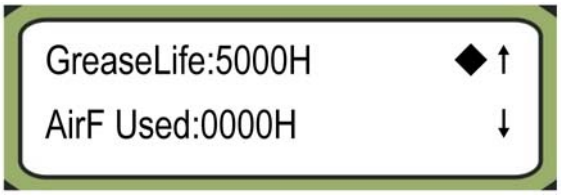
To edit the currently selected parameter, press the Shift/Enter key. The blinking cursor indicates the current digit.

- Press the Up button to increase the value of the current digit by 1.
- Press the Down button to decrease the value of the current digit by 1.
- Press the Shift/Enter button to move the cursor to the next digit.
- Press the Set button to save the new parameter value.

To return to the compressor settings menu, press the Return button.

2.4.3 Service parameter settings

To access the Service parameter settings, at the compressor settings menu select **Svc** and press the Shift/Enter button.



- **AirFLife:**—air filter life
- **OilFLife:**—oil filter life
- **Sep Life:**—separator life
- **LubeLife:**—lubricant life
- **GreaseLife:**—grease life
- **AirF Used:**—air filter life used
- **OilF Used:**—oil filter life used
- **Sep Used:**—separator life used
- **Lube Used:**—lubricant life used
- **GreaseUsed:**—grease life used

The ◆ to the right of the display indicates the currently selected parameter.

An up arrow indicates there are more parameters before the parameters shown. A down arrow indicates there are more parameters after the parameters shown.

- You can move to the previous parameter by pressing the Up button.
- You can move to the previous parameter by pressing the Down button.

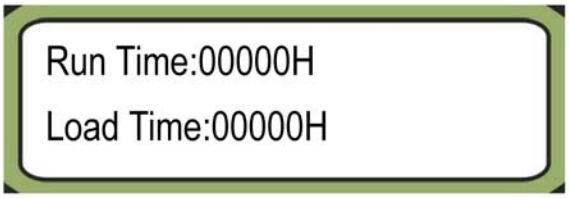
To edit the currently selected parameter, press the Shift/Enter key. The blinking cursor indicates the current digit.

- Press the Up button to increase the value of the current digit by 1.
- Press the Down button to decrease the value of the current digit by 1.
- Press the Shift/Enter button to move the cursor to the next digit.
- Press the Set button to save the new parameter value.

To return to the compressor settings menu, press the Return button.

2.5 Working Status screen

To display the working status screen, press the Up button at the default screen.



- **Run Time**—running hours
- **Load Time:**—on-load time

To return to the default screen, press the Return button.

Section 3
Condition Indicators

3.1 Operating status indicators

Item	Status Indicator	Description
1	**Stop**	The machine is stopped normally and can be started.
2	**E-Stop**	Emergency stop button is pressed.
3	**Stat000S**	The machine is starting.
4	**Loading**	The machine is running normally.
5	**Ulod000M**	The machine is off-load since the unload pressure has been reached.
6	**AutoStop**	Machine has stopped after long time of unloading. Machine starts automatically when pressure drops.
7	**Stop000S**	Required unload time before stop.
8	**Ovld000M**	The machine must delay for a period of time if the main motor has been overloaded.
9	**Contact**	The machine needs to be serviced.
10	**Rsta000**	Power restored and waiting for restart of compressor, or motor shutdown restart Display Countdown.
11	**Fqc:000%**	Frequency control output

3.2 Alarm indicators

LCD of the controller will show corresponding minor fault alarm message in alternation. The machine will not stop within a certain period of time in case of minor fault. System will prompt to service the compressor.

Item	Alarm Indicator	Description
1	**AirFLife**	Air filter has reached its life. Replace and reset.
2	**AirF Jam**	Air filter fault. Replace.
3	**OilFLife**	Oil filter has reached its life. Replace and reset.
4	**OilF Jam**	Oil filter fault. Replace.
5	**Sep Life**	Oil/air separator has reached its life. Replace and reset.
6	**Sep Jam**	Oil/air separator clogged. Replace.
7	**LubeLife**	Fluid has reached its life. Replace and reset.
8	**HighTemp**	Air end is overheating. Check cooling/ventilation conditions.
9	**Low Temp**	Raise ambient temperature
10	**OverCurr**	Current of main motor is too high. Check output and lubrication conditions.
11	**HighVolt**	Input voltage is too high. Check power supply conditions.
12	**Low Volt**	Input voltage is too low. Check power supply conditions.

3.3 Fault indicators

The compressor will stop automatically in case of major fault and will not restart. Remove fault condition and reset[1] before restarting the machine. LCD of the controller will give current major fault alarm message.

Item	Fault Indicator	Description
1	**HighTemp**	Temperature of air end rotary screw is too high. Check ventilation and lubrication conditions.
2	**HighPres**	Discharge pressure is higher than requirement. Check bleed valve.
3	**TSnsWire**	Temperature sensor signal is abnormal. Check temperature sensor and cable.
4	**PSnsWire**	Pressure sensor signal is abnormal. Check pressure sensor and cable.
5	**MtrOverL**	Main motor is overloaded. Check transmission/lubrication.
6	**FanOverL**	Fan motor is overloaded. Check fan motor conditions.
8	**PhaseErr**	Reverse rotation of air end rotary screw is not allowed. Switch phase sequence of power supply.
9	**Curr Err**	3-phase current is not balanced. Current is too high during unloading. Check power supply and bleed valve.
10	**WaterPre**[2]	Check cooling water
11	**ElectErr**	Electrical Fault
12	**VarFault**	Inverter Fault
13	**F H TEMP**	Fan motor high temperature

[1] To reset the fault, press the emergency button, turn it and then release.
[2] Applicable to water cooler machines only.

Appendix A: Parameters

A.1 User parameters

Menu	Parameter	Setting value	Default	Function
Oper	**Unload P**	0.3~1.3MPa	0.86MPa[1]	Unloading pressure value (compressor will unload and idle if discharge pressure exceeds set value).
	Load P	0.1~1.2MPa	0.79MPa[1]	Loading pressure value (compressor will load to full capacity if discharge pressure drops to set value).
	FanStart	60~100°C	73°C	Start the fan motor (fan motor starts if discharge temperature exceeds set value when fan motor thermal control is valid).
	Fan Stop	50~80°C	65°C	Stop the fan motor (fan motor stops if discharge temperature drops to set value when fan motor thermal control is valid).
	CommMode	n/a	n/a	
	Unit No.[2]	1~32	1	No. of machine in sequence mode (unrepeatable from 1; no greater than 7 in Broadcast mode).
	Language	ENG	ENG	Language of display.
	Password	0~9999	0607	Can be modified.
	CtrlMode	Auto/manu	Auto	Whether the control valve is activated at unloading pressure (compressor will unload in Auto mode, or keep running until the machine stop by alarm in Capacity control mode).
	PresUnit	MPa/bar/psi	MPa	Display pressure unit
	Temp unit	°C / °F	°C	Display temperature unit
	Seq.ΔP[2]	0.01~0.5MPa	0.02MPa	Sequence control use P
Time	**StartTime**	5~40 s	06s	Star-delta switch time (time of motor in star mode).
	Load Del	5~30 s	02 s	The compressor delay such a period of time after star-delta starting and before loading (the motor delay for the set value in delta mode before loading to full capacity).
	Auto Stop	4~60 min	15 min	The compressor stops automatically if it has been in idle mode for such a continuous period of time (the compressor will stop if it idles for the set time and will restart once discharge pressure drops to loading value).
	StopTime	10~60 s	15 s	The compressor delays for such period of time before it stops (press Stop key to unload the compressor and the machine stops after set time).
	Seq. Start[2]	5~90 s	30 s	Sequence starting time of sequence mode w/o main unit (in sequence broadcast mode, system will delay for the set time if the pressure is too low before starting the next compressor).
	Seq. Unload[2]	5~90 s	30 s	Sequence unloading time of sequence mode w/o main unit (in sequence broadcast mode, system will delay for the set time if the pressure is too high before unloading the next compressor).
	Seq Turns[2]	50~5000 h	100 h	Sequence rotation time of sequence mode w/o main unit (in sequence broadcast mode, system will switch between the compressors according to set time if the pressure is stable).
	Seq.Time[2]	0~5000h	0h	Sequence control use time

Menu	Parameter	Setting value	Default	Function
Svc	**AirFLife**	500~9999 h	2000 h[1]	Estimated useful time of air filter.
	OilFLife	500~9999 h	1000 h[1]	Estimated useful time of oil filter.
	Sep Life	500~9999 h	4000 h[1]	Estimated useful time of separator.
	LubeLife	500~9999 h	8000 h[1]	Estimated useful time of fluid.
	GreaseLife	500~9999 h	2000 h[1]	Estimated useful time of motor grease.
	AirF Used	500~9999 h	0 h	User may modify the used time (timer for air filter).
	OilF Used	500~9999 h	0 h	User may modify the used time (timer for oil filter).
	Sep Used	500~9999 h	0 h	User may modify the used time (timer for separator).
	Lube Used	500~9999 h	0 h	User may modify the used time (timer for fluid).
	GreaseUsed	500~9999 h	0 h	User may modify the used time (timer for motor grease).

[1] Setting may vary by region. Refer to your compressor's Operation Manual for region-specific settings.
[2] Sequencing is not available on all configurations.

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