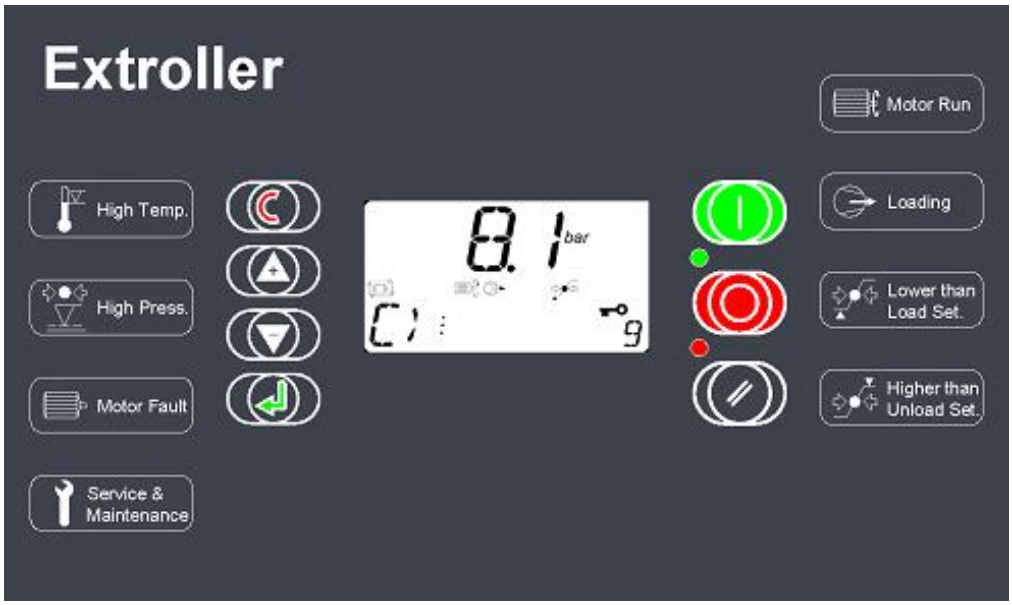
COAIRE

COAIRE
SCREW AIR COMPRESSORS

USER MANUAL
EXTROLLER



SERIAL NO. : _____

MODEL NO. : _____

CAUTION

For proper and safe use of the compressor, please follow all instructions and safety precautions as identified in this manual, along with general safety regulations and practices. Before installing and starting the compressor, read and understand this manual

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CONTENT:

1.0 General Description

1.1 Controller Model Variants

The general default settings and tables shown in this specification are applicable to the standard production S1 controller model S1-20-3#0; functions available for alternative models can be set in configuration menus.

= 3 for KTY temperature sensor (or RTD optional) – S1CMCSTD.E05+
= 7 for PT1000 temperature sensor – S1CMCPT1.E03+

- Temperature detection and setting limits may differ on models fitted with, and set for, alternative temperature sensor ACM types:

For example: S1-10-3**5**0 KTY or RTD temperature sensor, no internal pressure detection
S1-10-3**6**0 PT100 temperature sensor, no internal pressure detection
S1-10-3**7**0 PT1000 temperature sensor, no internal pressure detection
S1-10-3**5**3 KTY or RTD temperature sensor, with internal pressure detection
S1-10-3**6**3 PT100 temperature sensor, with internal pressure detection
S1-10-3**7**3 PT1000 temperature sensor, with internal pressure detection
S1-20-3**5**0 KTY or RTD temperature sensor, no internal pressure detection
S1-20-3**6**0 PT100 temperature sensor, no internal pressure detection
S1-20-3**7**0 PT1000 temperature sensor, no internal pressure detection
S1-20-3**5**3 KTY or RTD temperature sensor, with internal pressure detection
S1-20-3**6**3 PT100 temperature sensor, with internal pressure detection : **Applied to Compressor**.
S1-20-3**7**3 PT1000 temperature sensor, with internal pressure detection

The temperature sensor type must be set in the configuration menu if other than the type applicable to the software variant. All temperature sensor types are available in both software variants and are dependant on the type of ACM hardware fitted.
S1-20-363 Extroller applied to compressor.

- Internal pressure detection, differential pressure detection and related functions will be unavailable on models that are not fitted with a secondary pressure sensor analogue input ACM.
  Internal pressure detection must be enabled in the configuration menu for model types fitted with the secondary pressure detection ACM hardware.
- Variable speed regulation is only available on S1-20 models.

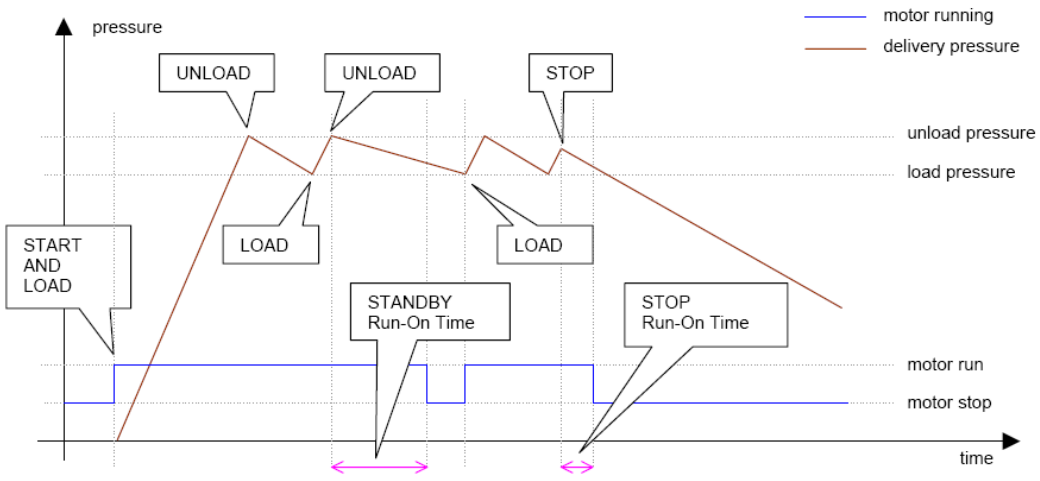
1.2 General Operation

In normal operation, the detected delivery pressure controls regulation of the compressor once the compressor has been started by pushing the start button, or by a remote start command if enabled. The controller will perform safety checks and start the compressor if no inhibiting conditions are detected.

If a start inhibiting condition exists the compressor will not enter the started condition and a start inhibit message is displayed. If a run inhibiting condition exists the compressor will enter the started condition but a main motor start is inhibited; the compressor will remain in the standby condition and a run inhibit message is displayed. If a load request is present, in accordance with internal pressure settings or by remote command, the main motor is started in a star/delta sequence. When running in delta configuration, after the star/delta time (adjustable) has expired, the load delay time (adjustable) prevents loading for a period to allow motor speed to stabilize. The load delay time can be set to one second if required. When the load delay time has expired the load valve output is energized and the compressor will load. If the unload pressure setting is reached, or a remote unload command is received, the load valve output is de-energized and the compressor will run offload for the standby run on time (adjustable) before the main motor stops and the compressor enters Standby mode. The compressor will load again if pressure falls below the load setting before the standby run on time expires. If in Standby mode, a motor start sequence followed by the load delay time is executed before loading.

In the event of a motor stop, initiated by a stop command or when entering standby mode, a blow down timer (adjustable) is started. If a start request is made during the blow down time the compressor will enter standby mode until the blow down time expires. If already in standby mode, and a load request is present, the compressor will remain in standby mode until the blow down time has expired. For units with internal pressure detection enabled, a minimum internal re-start pressure can also be set to prevent a motor start sequence before internal pressure is vented. In the event internal pressure fails to fall below the set minimum re-start pressure within two minutes after the set blow down time has expired, a blow down fault is generated and the compressor will shutdown. After an unload event a re-load timer (adjustable) is initiated that will prevent reloading, this time can be adjusted to a minimum of one second if required. Normal automated operation is ended by pushing the stop button, a remote stop command or in the event of a shutdown fault.

When stopped manually, or by a remote command, the load value is de-energized and the main motor allowed to run-on for the stop run on time (adjustable). This time can be adjusted to a minimum of one second if required. Safety checks are made continuously, if there is a condition detected that presents a hazardous or damaging situation an immediate stop is performed and the reason displayed as a shutdown error message. If a warning condition is detected an Alarm message is displayed and normal operation continues.



2.0 I/O Description

2.1 Digital Inputs

Connector X04:
Connector type: 9 pole mini Combicon with 3.81mm (0.15”) pitch

Pin	name	function	id	active state
1	C+	**Digital inputs common**		
2	C1	**Emergency Stop**	Digital input 1	Fault if open
3	C2	**Oil Filter high DP**	Digital input 2	Fault if open
4	C3	**Air Filter high DP**	Digital input 3	Not used
5	C4	**Air / Oil Separator DP**	Digital input 4	Fault if open
6	C5	**Remote start / stop**	Digital input 5	Stop if open / start on closure
7	C6	**Remote Load enable**	Digital input 6	Remote if closed
8	C7	**Remote Load**	Digital input 7	Load if closed / offload if open
9	C8	**PTC motor overload**	Digital input 8	Fault if open

Remote Stop:
When the remote start/stop function is enabled (P07), the compressor will execute a controlled stop, as if the control panel stop button had been pressed, when the remote start/stop input is open circuit.

Remote Start:
When the remote start/stop function is enabled (P07), the compressor will execute a normal start sequence when the remote start/stop input changes state from open to closed circuit. If closed, the remote start/stop input must be opened and closed again to initiate a remote start sequence. Local controller start is inhibited.

Remote load enable:
When the digital remote load enable input is activated, local or communications pressure regulation is ignored and the unit will respond to the digital remote load input. The unit will automatically respond to the pressure regulation method set in the configuration menu settings (local or communications) when the digital remote load enable is deactivated.

Remote load:
When the digital remote load enable is activated, the unit will load when the digital remote load input is activated and unload when the digital remote load input is deactivated. All pressure safety settings remain active when using remote load functions.

Note: If local detected delivery pressure exceeds the set Alarm level the load solenoid output is de-energized. The load solenoid output will remain de-energized for 10secs after the pressure falls below the Alarm level.

2.2 Digital Inputs

Connector X03: relays
Connector type: 6 pole mini Combicon with 5mm pitch

Pin	name	function	id	active state
1	C-R123	**Common for Star, Delta, and Main contactor**		
2	NO-R1	**Main contactor**	Digital output 1	Energized
3	NO-R2	**Star contactor**	Digital output 2	Energized
4	NO-R3	**Delta contactor**	Digital output 3	Energized
5	C-R4	**Common for load solenoid**		
6	R4	**Load solenoid**	Digital output 4	Load when energized

Connector X03: relays
Connector type: 6 pole mini Combicon with 5mm pitch

Pin	name	function	id	active state
1	C-R5	**Common Relay 5**		
2	NO-R5	**Normal open contact Relay 5**	Digital output 5	
3	C-R6	**Common Relay 6**		
4	NO-R6	**Normal open contact Relay 6**	Digital output 6	

The function of auxiliary relay 5 and 6 can be set in the configuration menu.
(Default: R5-Drain R6-Running(for control box Fan))

2.3 Analogue Inputs And Outputs

Note : All analogue device inputs have open circuit, short circuit and out-of-range fault detection functions

Connector X05: analogue inputs
Connector type: 6 pole mini Combicon with 3.81mm (0.15") pitch

Pin	name	function	id	type	range
1	C-ANA1	**Delivery pressure +V common**			
2	ANA1	**Delivery pressure input**	Analogue input 1	4-20mA	Adjustable
3	C-ANA2	**Temperature 0V common**			
4	ANA2	**Temperature input (menu setting + ACM type)**	Analogue input 2	KTY or PT100, PT1000 or RTD	-10℃ 132℃ or -50℃250℃ or -40℃ 150℃
5	C-ANA3	**Internal pressure +V common**			
6	ANA3	**Internal pressure (option)**	Analogue input 3	4-20mA	

Analogue Input 1 : fixed 4-20mA type
Analogue inputs 2 and 3 :
The S1 uses plug-in analogue conditioning modules (ACM's) that allow different sensor and signal types to be accommodated; for a particular sensor type the correct ACM hardware must be fitted.

Connector X06: analogue output
Connector type: 2 pole mini Combicon with 5.08mm pitch

Pin	name	function	id	type	range
1	AGND	**0V analogue ground**			
2	ANA-OUT1	**4-20mA analogue output**	Analogue output 1	4-20mA	Adjustable

Analogue Output 1:

Standard
4-20mA signal, function selectable

Variable Speed Control Active
4-20mA signal for percentage motor speed; 0% = stopped, 100% = maximum set motor speed

3.0 Machine State Diagram

Controller operational logic is shown in the machine state diagram as state blocks with an associating status block number. The state block determines the functionality of the controller at any given time. The controller can only be in one state at any given time. The controller will move from state to state in accordance with the defined exit and entry conditions of each state block and the defined connections between state blocks.

Definitions:

Fault:

A detected abnormal condition that must be indicated to operator personnel and that may require controller automated safety action, dependant on fault type and definition.

Start Inhibit Fault (S):

A start inhibit fault is a condition that may present a danger or cause damage to the compressor if started whilst the condition is present. Start inhibit faults are only triggered if a compressor start from the ready to start condition is attempted. Start inhibit faults are not triggered during an automated motor start sequence from the standby condition. Start inhibit faults are self-resetting. A start inhibit fault code is displayed when triggered but is not recorded in the fault log.

Run Inhibit Fault (R):

A run inhibit fault is a condition that may present a danger or cause damage to the compressor if the main motor is started whilst the condition is present. Run inhibit faults are only triggered if a motor start sequence is initiated. Run inhibit faults are self-resetting and do not prevent the compressor from entering a started condition. A Run inhibit will hold the compressor in a standby state and will allow a motor start sequence when the condition is no longer present. A Run inhibit fault code is displayed when triggered but is not recorded in the fault log.

Alarm Fault (A):

An alarm fault is a warning condition that does not present an immediate danger or potential damage to the compressor. An alarm state will not shutdown the compressor or affect normal operation. An alarm fault code is displayed that must be manually reset to clear once the condition has been resolved or no longer exists.

Shutdown Fault (E):

A shutdown fault is a condition that may present danger or potential damage to the compressor if the condition persists. A shutdown fault will cause the controller to stop the compressor. A shutdown fault code is displayed that must be manually reset to clear once the condition has been resolved or no longer exists. Two types of shutdown fault are definable a) non-emergency shutdown, an immediate controlled stop is executed, b) emergency shutdown, an instantaneous stop is executed.

Unload Pressure:

The unload pressure is the delivery pressure level (adjustable) at which the controller will de-energize the load solenoid output and the compressor will offload.

Load Pressure:

The load pressure is the delivery pressure level (adjustable) at which the compressor will energize the load solenoid output and the compressor will load. If in the standby state, an automated main motor start sequence is triggered prior to load.

Main Motor Start Sequence:
The controller will energize the Star contactor output followed by the Main contactor output 200ms later. After the Star/Delta timer (adjustable) expires the controller will execute an automated Star to Delta contactor output changeover with a 50ms star to delta transition time. If a Stop command is received during the start sequence the controller will continue to execute the start sequence before stopping. This action is intended to limit the break current of motor starter contactors.

Load Delay Timer:
The star to delta output transition is immediately followed by a load delay time (adjustable) that will inhibit the load solenoid output from energizing until the load delay time expires. Intended to allow the main motor speed to stabilize and other pre-load functions to occur.

Reload Delay Timer:
The reload delay time (adjustable) is a period of time immediately following a load to unload event during which the load solenoid output is inhibited from energizing.

Blow Down Timer:
The blow down time (adjustable) immediately follows a main motor stop event. During the blow down time a start request is recognized but is not initiated until the timer expires. If the optional internal pressure detection feature is enabled the restart inhibit is also dependant on internal pressure falling below the 'start inhibit pressure level' (adjustable). Failure of internal pressure to fall below the set pressure level for a period of two minutes after the set blow down timer expires will result in a blow down trip fault. The remaining time in seconds is show on the Information Item display.

Standby Run-On-Time:
When off load the standby run-on-timer will start. If the compressor remains in an off load condition and the timer expires the main motor will stop and the compressor will enter the Standby state. The compressor will automatically re-start and load as required. This function is intended to improve efficiency during low demand periods and to limit the number, and interval between, motor start events. The remaining time in seconds is show on the Information Item display.

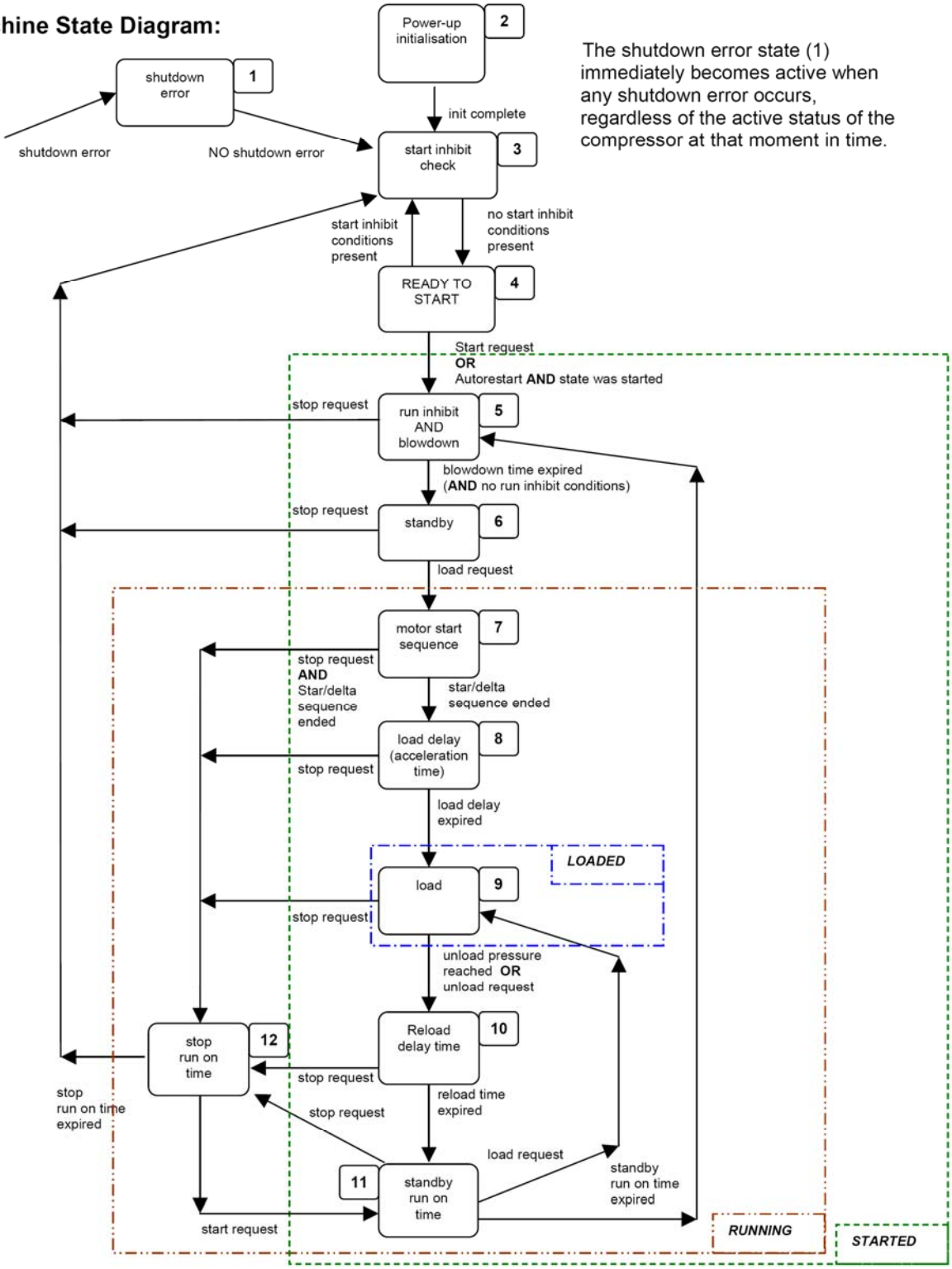
Stop Run-On-Time:
When stopped (stop button, remote stop input or remote stop command) the compressor will unload and the main motor continue to run for the stop run-on-time before stopping. This function is intended to allow for internal pressure venting and to limit lubrication oil aeration prior to the main motor stopping. The remaining time in seconds is show on the Information Item display.

Started State:
The unit has been started (start button, remote start input or remote start command) and is in an active condition ready to respond to changes in delivery pressure.

Running State:
The unit is in the Started state AND the main motor is running.

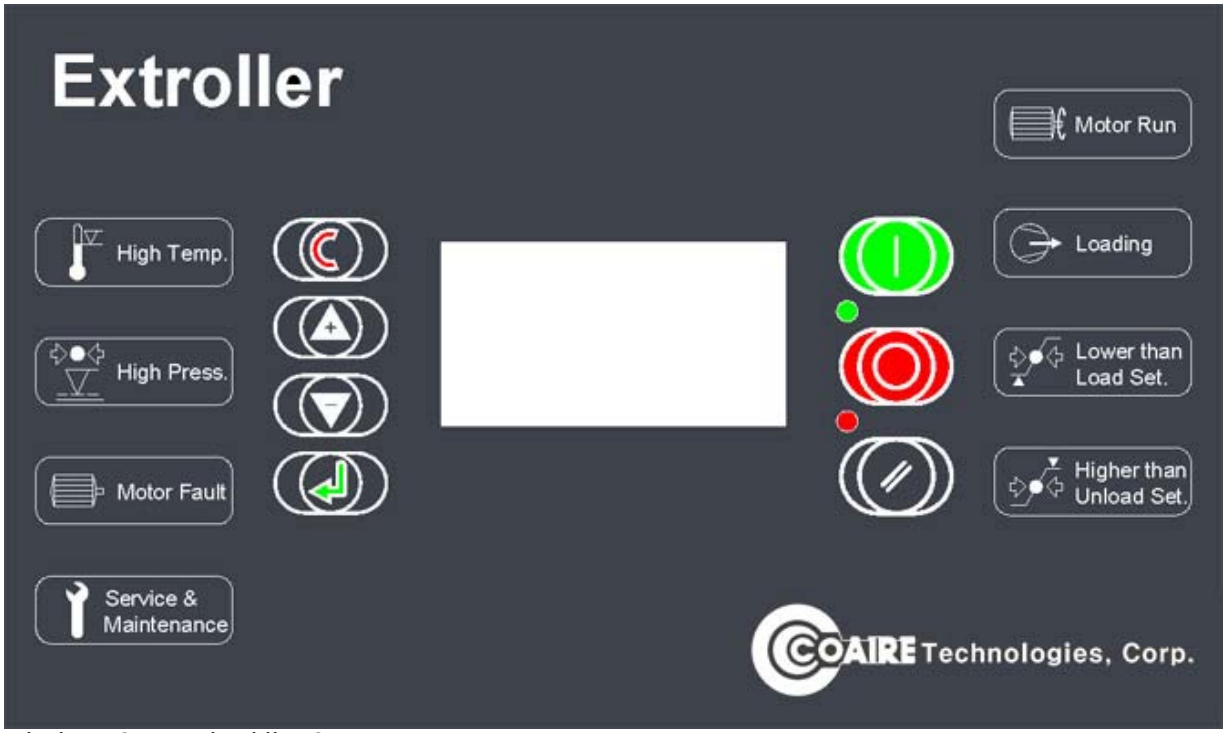
Loaded State:
The unit is in the Started state AND Running state AND the load solenoid output is energized.

Machine State Diagram:



The shutdown error state (1) immediately becomes active when any shutdown error occurs, regardless of the active status of the compressor at that moment in time.

4.0 User Interface



Display : Custom backlit LCD
Indicators : 2 x LED
Controls : 7 x Tactile push buttons

4.1 Keypad

START:	Enter STARTED condition
STOP:	Exit STARTED condition
RESET:	Reset and clear fault conditions
ENTER:	Confirm selection or value adjustments
MINUS/DOWN:	Scroll down through menu, menu item options or decrement value
PLUS/UP:	Scroll up through menu, menu item options or increment value
ESCAPE (C):	Step back one menu navigation level

Start and Stop have one defined function and are not used for any other purpose.

Reset will initiate a display jump to the fault code item if a fault condition remains active or initiate a display jump to the information item if no active faults exist in normal display mode. If pressed and held for longer than two seconds in menu mode will exit menu mode to the normal operational display mode, page 00.

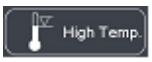
Enter will lock a selected value display preventing return, after a short delay, to the default Td value display.
When locked the 'key' symbol will flash. To unlock press Escape.

Escape will initiate a display jump to the information item in normal display mode, page 00.
Plus, Minus, Enter and Escape are used to navigate menu mode and adjust menu parameters.

Keypad Symbol

Symbol	Description
	START
	STOP
	RESET
	ENTER
	PLUS/UP
	MINUS/DOWN
	ESCAPE (C)

Status Symbol

Symbol	Description	Symbol	Description
	High Temperature Alarm		Motor Run
	Overpressure Alarm		Load Operation
	Motor Overload		Lower Pressure
	Maintenance Alarm		Higher Pressure

4.2 Led Indicators

STATUS: Green, adjacent to Start and Stop buttons
FAULT: Red, adjacent to Stop and Reset buttons

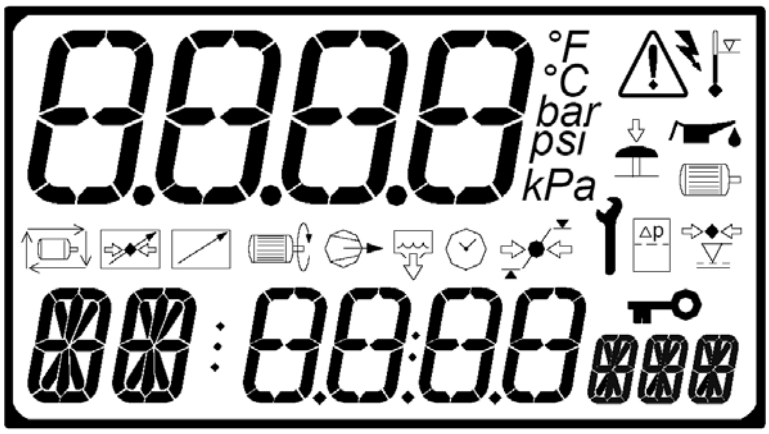
Indicator States:

ON: Illuminated continuously.
FF: Fast Flash: on/off four times per second.
SF: Slow Flash: on/off once per second.
IF: Intermittent Flash: on/off every four seconds.
OFF: Extinguished continuously.

Machine State Number	Machine State	Status	Fault
1	Shutdown Error	OFF	FF
2	Startup Init	OFF	OFF**
3	Start Inhibit Check	OFF	OFF**
	Start inhibit condition		SF
4	Ready to Start	OFF	OFF**
5	Blowdown	if (load request) FF, else IF	OFF**
6	Standby	IF	OFF**
7	Start Motor in Star / Delta	if (load request) FF, else IF	OFF**
8	Load Delay	if (load request) FF, else IF	OFF**
9	Load	ON	OFF**
10	Reload Delay	if (load request) FF, else IF	OFF**
11	Standby Run on Time	IF	OFF**
12	Stop Run on Time	SF	OFF**

** SF for Alarm condition

4.3 Display



The display is divided in to 4 areas.

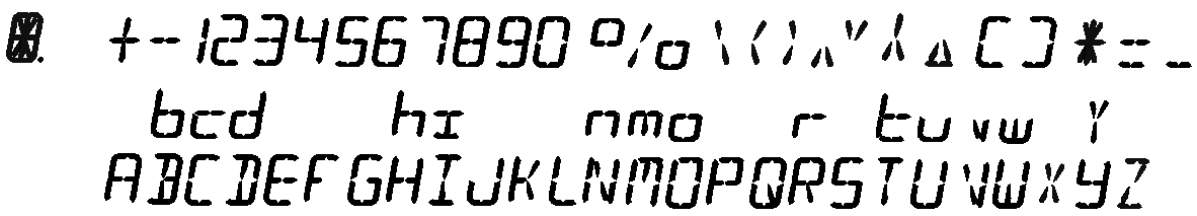
Top, Left: Display Field:-
4 character numeric display, with unit symbols, used to continuously show delivery pressure in normal operating mode or menu page number in menu mode

Top, Right: Fault Symbol Field:-
Symbolic displays used to indicate common general fault conditions

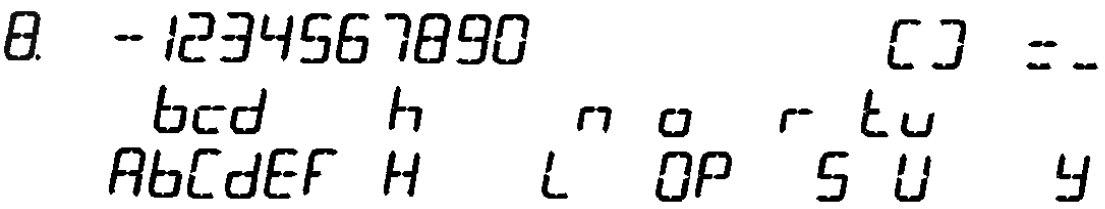
Middle: Symbolic displays used to reinforce meaning of selected item, fault condition.
Symbolic status information in normal operational mode 'Information Screen' item

Bottom: Item and Value Field:-
Item identification: 2 character alphanumeric, 14 segment
Item Value: 4 character numeric, 7 segment
Item Unit: 3 character alphanumeric, 14 segment

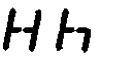
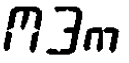
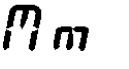
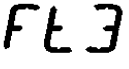
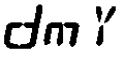
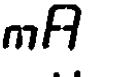
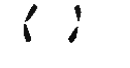
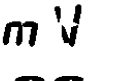
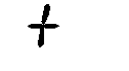
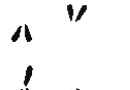
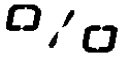
14 Segment Display Character Set:



7 Segment Display Character Set:



Display Character Examples, Units:

	bar		kPa		cfm		cfm
	psi		hour		m^3/min		m^3 cubic metres
	kW KiloWatt		minute		ft^3 cubic feet		time hours/minutes
	kV KiloVolt		seconds		spm bearing monitoring		date day/month/year
	rpm		mA milliAmp		dBn spm unit		greater than less than
	°C		mV milliVolt		+ positive		up down
	% percent		°F		- negative		star delta

Operational Display Symbols:

 Motor Running

 Loaded

 Amount of time, timer

 Filter, differential pressure

 Pressure set point indication (upper and lower set point indicators displayed independently)

 Condensate drain active (optional function)

 Power failure autorestart enabled (optional function)

 Remote load or remote pressure regulation active

 Remote start/stop

 Normal Operational: selected item locked as temporary default display
Menu Mode: page item locked (adjustment inhibited)

Fault Display Symbols:

 General fault

 Emergency stop

 Excess pressure

 Power failure

 Above set temperature limit

 Lubrication, oil, oil level

 Dewpoint

 Motor

 Service due, maintenance

 Filter differential, filter service

4.4 Display Structure and Menu Navigation

Display Item Structure:

All value, parameter or option selection displays are grouped into menu lists. Items are assigned to a list according to type and classification. Items that can be used to select options or modify functions are assigned to 'menu mode' lists. Items that an operator may require to view during routine operation, detected pressure or temperature values for example, are assigned to the normal operational mode list. Lists are identified by page number, the normal operational display list is page 0. All parameters and options are assigned to menu mode pages 1 or higher. All Page 0 items are view only and cannot be adjusted.

Normal Operational Mode (Page 0):

At controller initialization, all display elements and LED indicators are switched on for three seconds, the display will then show the software version code for a further 3 seconds before initialization is complete and the normal operating display (Page 0) is shown. In page 0 'normal operational display mode' the Display Field will show the final delivery pressure continuously and the Item and Value Fields will initially show the Information Item display for 35 seconds before reverting to the default temperature display item. All available Item and Value field option displays (temperatures, pressures, hours counters) can be selected using the Up or Down buttons at any time.

The Item display will revert to the default item after 35 seconds if no further selection is made. Pressing the Enter button will lock any selected Item display and inhibit return to the default display. When an Item display is locked the lock key symbol will slow flash. To unlock an Item display press Up or Down to view an alternative Item display or press Reset or Escape. In page 0 Escape will select the Status Information Item display and Reset will select any active fault code display or the Status Information Item display if no faults are active. Unless a selected Item display is locked, the display will automatically jump to the Status Information Item display at key status change events. The timeout period before returning to the default Item display is modified in some instances to enable the full range of a set countdown timer to be shown. No Item values, options or parameters can be adjusted in page 0. If a fault condition occurs the fault code becomes the first list item and the display will automatically jump to display the fault code. More than one active fault code item can exist at any one time.

Access Code:

Access to page list displays higher than page 0 are restricted by access code. To access menu mode pages press UP and DOWN together, an access code entry display is shown and the first code character will flash. Use PLUS or MINUS to adjust the value of the first code character then press ENTER. The next code character will flash; use UP or DOWN to adjust then press ENTER. Repeat for all four code characters. If the code number is less than 1000, then the first code character will be 0(zero). To return to a previous code character press ESCAPE. When all four code characters have been set to an authorized code number press ENTER.

Access to certain menu mode pages is dependent on authority level determined by the access code used. An invalid code will return the display to normal operational mode; page 0.

The following pages and access levels are used:

ACCESS LEVEL = USER (code=0302)	ACCESS LEVEL = Service 1 (Engineer password)	ACCESS LEVEL = Service 2 (Engineer password)
P00, P01, P02	P00 ~ P09	P00 ~ P10

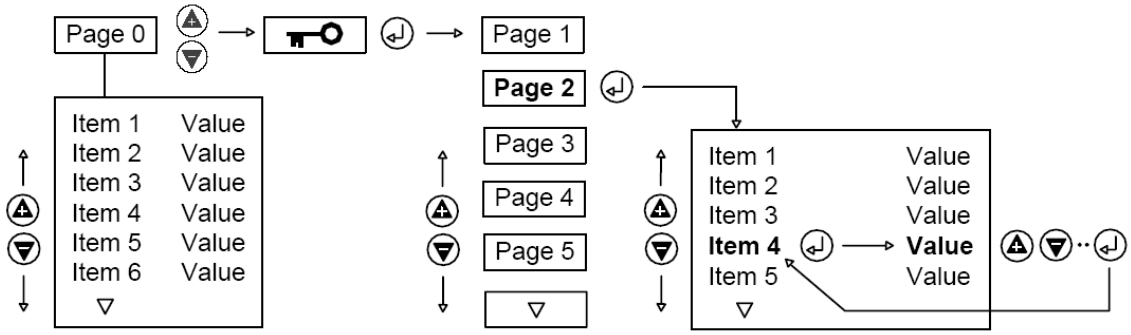
Access Code Timeouts:

When in menu mode, if no key activity is detected for a period of time the display will automatically reset to the normal operational display; Page 0. The timeout period is dependant on the access code used:

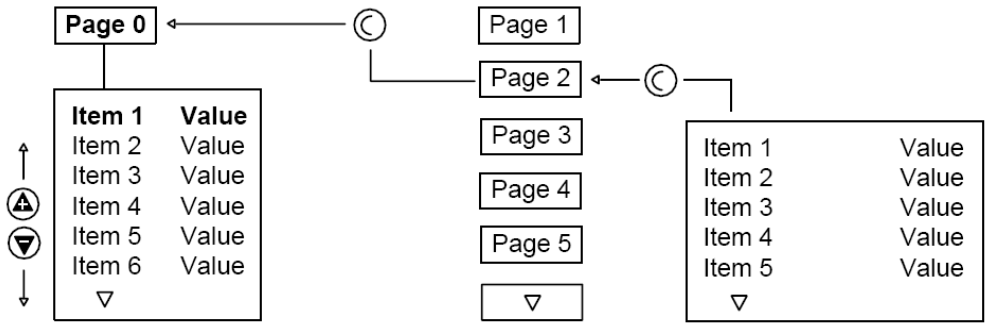
User: *1 minute* **Service 1:** *10 minutes* **Service 2:** *1 hour*

Menu Mode Navigation:

In menu mode the Display Field will flash and show the Page number. To select a page press UP or DOWN. For each page the Item and Value field will display the first Item of the page list. To view a page list press ENTER, the Page number will stop flashing and the Item display will flash. Press UP or DOWN to view the selected page list items. To select an Item value for modification press ENTER, the Item display will stop flashing and the Value display will flash. The value or option can now be modified by pressing UP(Plus) or DOWN(Minus). To enter a modified value or option in memory press ENTER; alternatively the modification can be abandoned, and the original setting maintained, by pressing ESCAPE.



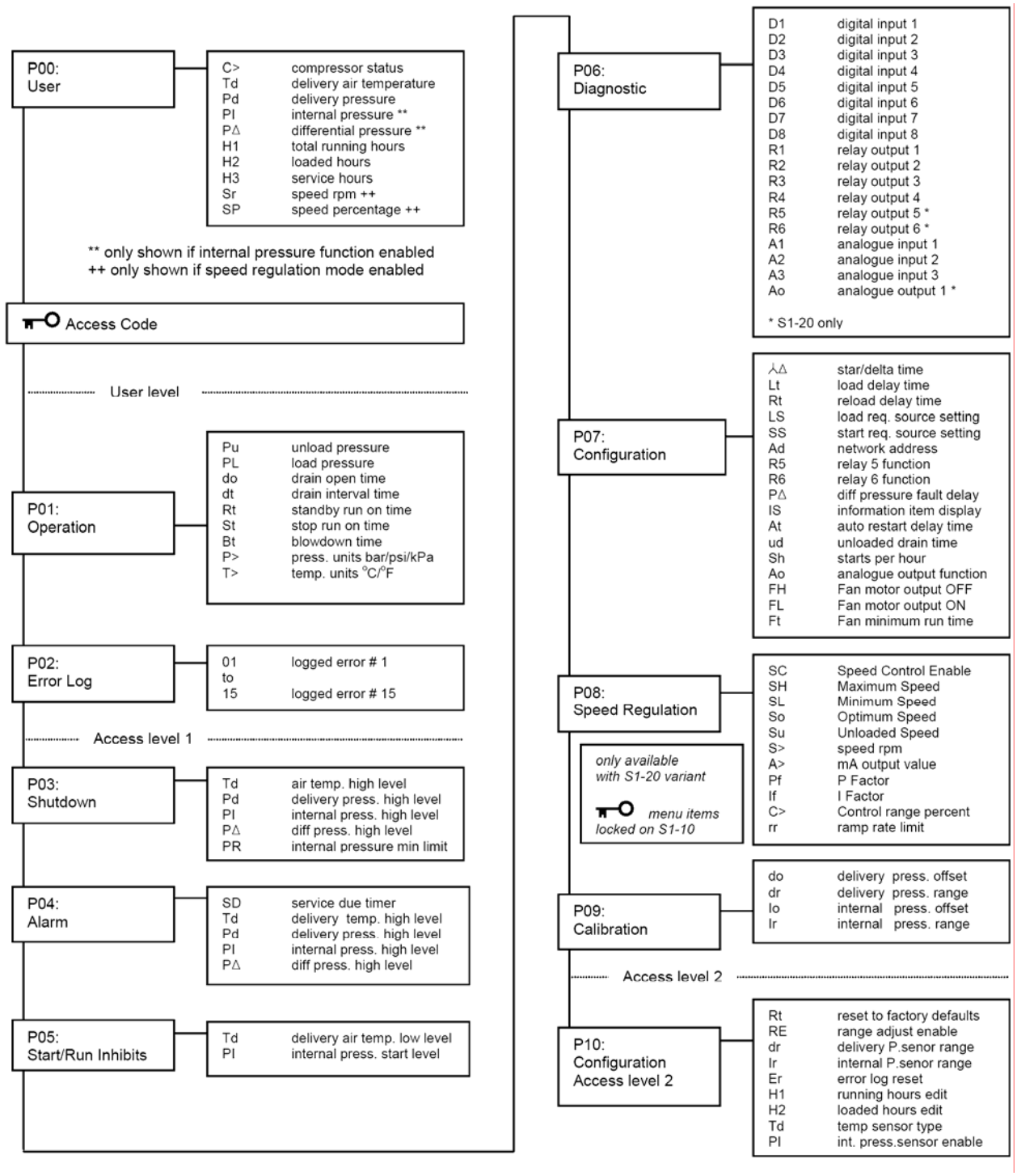
Press ESCAPE at any time in menu mode to step backwards one stage in the navigation process. Pressing ESCAPE when the page number is flashing will exit menu mode and return the display to normal operational mode; page 0.



Press and hold RESET for two seconds at any time to immediately exit menu mode and return to the normal operational mode display. Any value or option adjustment that has not been confirmed and entered into memory will be abandoned and the original setting maintained.

A flashing Key symbol displayed with any Item indicates the Item is locked and cannot be modified. This will occur if the Item is view only (non adjustable) or in instances where the item cannot be adjusted while the compressor is in the operational STARTED state.

4.4.1 Menu Structure



4.4.2 P00 User Menu

The User menu shows normal operational values and information displays. This is the default display menu; no access code is required.

Item#	description	units	step	min	max	default	display
1	Compressor status	---	no_edit	---	---	---	**C>**
2	Delivery air temperature	℃/°F	no_edit	---	---	---	**Td** 55℃/131°F
3	Delivery pressure	bar/psi	no_edit	---	---	---	**Pd** 4.5bar/64psi
4**	Internal pressure	bar/psi	no_edit	---	---	---	**PI** 1.3bar/19psi
5**	Differential pressure	bar/psi	no_edit	---	---	---	**P△** 0.4bar/6psi
6	Running hours	h	no_edit	0	99999	---	**H1** 1430
7	Loaded hours	h	no_edit	0	99999	---	**H2** 1275
8	Service hours	h	no_edit	9999	9999	---	**H3** 0570
9##	Motor speed	rpm	no_edit	0	7200	---	**Sr** 3000rpm
10##	Percent speed	%	no_edit	0.0	100.0	---	**SP** 100.0%

** only shown if internal pressure sensor function activated
only shown if variable speed regulation mode is activated (S1-20 only)

Status Information Item:
The page 0 'Status Information Item' provides a basic overview of status using symbols:


Main motor running


Compressor on load


Delivery pressure relative to pressure set points, not displayed when remote pressure control active.


Pressure equal to, or below, load pressure set point


Pressure equal to, or above, unload pressure set point

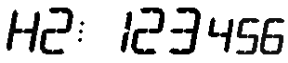

Pressure between load and unload pressure set points


Condensate drain valve output is energised (if function enabled)


Countdown timer function is occurring (Run-On-Time, Stop Run-On-Time, Blowdown Time).
During a countdown time function the remaining time in seconds is displayed.

Unless a timer function is active and the timer count is being displayed, the 'units' display field will show the selected Information item, see P07 'In' menu item.

Hours Display Items:
Hours are displayed using the 'value and units' display fields together. This feature enables a maximum of 9999999 hours to be displayed.


(Loaded Hours 'H2' = 123456 h)

Note: hour values less than 1000 are shown with leading zeros (10 hours = 0010)

4.4.3 P01 Operation Menu

Contains general operation parameters that may be modified by the user from time to time.

Item#	description	units	step	min	max	default	display
1	Unload pressure	bar/psi	0.1	**PL**+0.2	14.0	7.0	**Pu** 7.0 bar
2	Load pressure	bar/psi	0.1	5.0	**Pu**-0.2	6.5	**PL** 6.5bar
3	Drain open time	s	1	1	30	5	**do** 5s
4	Drain interval time	s	1	30	3600	60	**dt** 60s
5	Standby run on time	s	1	1	3600	300	**Rt** 300s
6	Stop run on time	s	1	1	60	30	**St** 30s
7	Blowdown time	s	1	1	600	10	**Bt** 10s
8	Pressure units	---	1	0	2	0	**P>** 0=bar 1=psi 2=kPA
9	Temperature units	---	1	0	1	0	**T>** 0=℃ 1=°F

Minimum differential between load and unload set points is 0.2bar

Pressure Settings:
Trip cannot be adjusted above maximum sensor range
Alarm can not be adjusted above (Shutdown – 0.2bar) or below ('Pu' Unload + 0.2bar)
Unload can not be adjusted above (Alarm – 0.2bar) or below ('PL' Load + 0.2bar)
Load cannot be adjusted above ('Pu' Unload – 0.2bar) or below 5.0bar

Pressure and Temperature Units:
Selects the units for displayed values. Internally the controller operates using mBar (0.001bar) and mCelsius (0.001°C). The values displayed are calculated from the internal operating values.

4.4.4 P02 Error Log Menu

Contains the last 15 fault states in chronological order. The most recent fault (alarm, start inhibit or shutdown) is stored as item 1. Each item consists of two values: the fault code number and the running hours when the fault occurred. The display will automatically alternate between these two values. All items are view only.

Item#	description	step	min	max	default	display
1	Logged error #1	no_edit	---	---	---	**01** . . . Er: 0010E <> 12345*
2	Logged error #2 to error #15	no_edit	---	---	---	**02 to 15**

***** example: last detected error = Emergency Stop shutdown (fault code 0010E) at 12345 running hours.

◆ EXTROLLER MENU STRUCTURE and DEFAULTS

Access Level	Menu	Item	Description	Defaults		Display
				Screw	Mini	
Pass code not required	P00 : User	C>	Compressor Status	Display Mode		**C>** Machine state : From 1 through 12
		Td	Delivery Air Temperature			**Td** 55℃/131℉
		Td	Delivery Pressure			**Pd** 4.5bar/64psi
		PI	Internal Pressure**			**PI** 1.3bar/19psi
		P△	Differential Pressure**			**P△** 0.4bar/6psi
		H1	Total Running Hours			**H1** 1430
		H2	Loaded Hours			**H2** 1275
		H3	Service Hours			**H3** 0570
		Sr	Speed RPM##			**Sr** 3000rpm
		SP	Speed Percentage##			**SP** 100.0%
User Level (Pass Code)	P01 : Operation	Pu	Unload Pressure	150/125 / 110		psi
		PL	Load Pressure	130/105 / 90		psi
		do	Drain open time	2		sec
		dt	Drain interval time	600		sec
		Rt	Standby run on time	300		sec
		St	Stop run on time	30		sec
		Bt	Blowdown time	10		sec
		P>	Pressure unit	1(psi)		0=bar, 1=psi, 2=kPA
		T>	Temp. unit	1(℉)		0=℃, 1=℉
	P02 : Error Log	1~15	Logged error #1~#15			no edit
Access Level 1 (Pass Code : 2042)	P03 : Shutdown	Td	air temp. high level	220.6		℉
		Pd	delivery press. high level	165/140 / 125		psi
		PI	internal press. high level	--		not used
		P△	diff. press. high level	--		not used
		PR	internal press. min limit	--		not used
	P04 : Alarm	SD	Service due timer	2000 / 3000		Up to 30Hp: 2000 Hr, 50Hp ~: 3000 Hr
		Td	delivery temp. high level	210.7		℉
		Pd	delivery press. high level	160/135 / 120		psi
		PI	internal press. high level	--		not used
		P△	diff. press. high level	--		not used
	P05 : Start/Run Inhibits	Td	delivery air temp. low level	14.1		℉
		PI	internal press. start level	--		not used
	P06 : Diagnostic	D1~D8	digital input 1~8			no edit
		R1~R6	relay output 1~6			
		A1~A3	analogue input			
		Ao	analogue output			

Access Level	Menu	Item	Description	Defaults		Display
				Screw	Mini	
Access Level 1 (Pass Code)	P07 : Configuration	Y△	star/delta time	1/ 5	1	Direct Starting: 1, Y-△: 5 [sec]
		Lt	load delay time	10		sec
		Rt	reload delay time	1		sec
		LS	load req. source setting	0		0: Press. sensor, 1: RS485
		SS	start req. source setting	0		0: keybord, 1: RS485, 2: digital input
		Ad	network address	1		
		R5	relay 5 function	7		1: Alarm, 2: Shutdown, 3: Group Fault 4: Alarm Service, 5: Service, 6: Heater 7: Drain, 8: Fan, 9: Standby, 10: Running 11: Loaded, 12: Started, 13: Fan(temp ctl.)
		R6	relay 6 function	10	4	
		P△	diff. press. fault delay	10		not used
		IS	information item display	2		0: no indication, 1: network address 2: machine state No. 3:average cycle time 4: max cycle time, 5: #starts registered
		At	auto restart delay time	0		0: auto restart function disable above 0: auto restart function enable
		ud	unloaded drain time	0		
		Sh	starts per hour	0		not used
		Ao	analog output function	0		0: diable, 14: delivery pressure 15: delivery temp. 16: internal pressure 1~13: same to the function of R5/6
		FH	Fan motor output OFF	183.8		°F
		FL	Fan motor output OFF	165.9		°F
		Ft	Fan minumun run time	180		sec
	P08 : Speed Regulation	NOT USED				
	P09 : Calibration	do	delivery press. offset	0.0		psi
		dr	delivery press. range	232		psi
		Io	internal press. offset	0.0		psi
		Ir	internal press. range	232		psi
Access Level 2 (Pass Code)	P10 : Access Level 2	Rt	reset to factory defaults	--		
		RE	range adjust enable	0		0: disable 1: ON
		dr	delivery P. sensor range	232		psi
		Ir	internal P. sensor range	--		not used
		Er	error log reset	0		0: disable rst: reset
		H1	running hours edit	--		hour
		H2	loaded hours edit	--		hour
		Td	temp. sensor type	2		2: PT100 / PT1000, 3: KTY, 4: RTD
		PI	int. press. sensor enable	0		0: not used, 1: used

** only shown if internal pressure sensor function activated
only shown if variable speed regulation mode is activated (S1-20 only)

5.0 Fault Messages

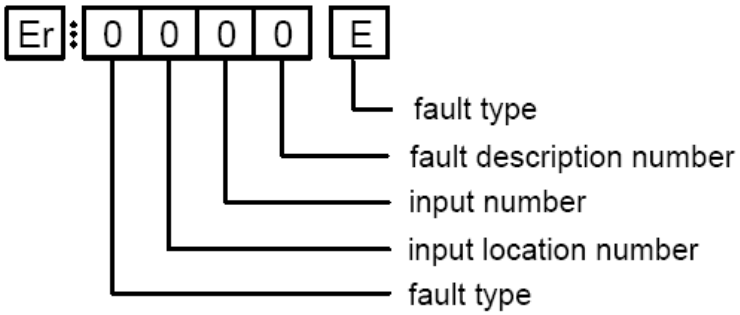
Faults are abnormal operating condition states. Alarms are fault states that indicate normal operating conditions have been exceeded but do not present an immediate hazard or potentially damaging condition. Alarms are intended as a warning only and will not stop the compressor or prevent the compressor from being started and run.

Start inhibits are fault states that prevent the compressor from initially being starting. Start inhibit faults are conditions that may present a hazard or damaging situation if the compressor was to be started. A start inhibit will self reset when the condition being monitored returns to normal operational levels. Start inhibit conditions are only checked during the initial start procedure and will not stop the compressor once started and in the 'started' state. Start inhibit conditions are not checked during an automated motor start from Standby.

Run inhibits are fault states that prevent the compressor from starting and running the main motor. Run inhibit faults are conditions that may present a hazard or damaging situation if the main motor is run. A run inhibit will self reset when the condition being monitored returns to normal operational levels and the compressor will then be allowed to exit the standby condition and run without further manual intervention. Run inhibit conditions are checked prior to a main motor start sequence and will not stop the compressor motor once started. Run inhibit conditions do not prevent the compressor from entering the 'started' state condition.

Shutdown trip errors are fault states that present a hazardous or damaging condition, the compressor is stopped immediately. The Shutdown trip error condition must be resolved, and the fault reset, before the compressor can be re-started.

The different fault state conditions are indicated on the screen with specific codes; the last character indicating the fault type: E = Shutdown Trip Error, A= Alarm, S = Start Inhibit, R = Run Inhibit. Shutdown trip errors are divided into two different categories: immediate shutdown errors and controlled stop errors. Immediate shutdown errors stop the compressor instantly (Emergency Stop button activated for example). Controlled stop errors stop the compressor in a controlled way using a normal Stop command; the motor will continue to run for the set stop run-on-time. Immediate shutdown errors have an error code where the first character is 0 (zero).
Controlled stop faults have a "1" as the first character. Alarm faults are also divided into two different categories: alarms and service alarm messages. Alarms start with a "2", service alarm messages with a "4". Start Inhibit fault codes start with a "3".



Fault description number	Fault description
9	high level shutdown trip
8	high level alarm
7	high level start inhibit
6	special function
5	sensor error
4	timeout
3	low level start inhibit
2	low level alarm
1	low level shutdown trip
0	digital input

Input number	Input
#	Input number for controller input terminal/location

Input location number	Input location description
0	Digital input
1	Analogue input
2 to 7	Not used
8	Special function
9	Special functions slave unit

Fault category number	Fault category description
0	Immediate shutdown trip error
1	Controlled shutdown trip error
2	Alarm
3	Start or run inhibit
4	Service

Fault type	Fault type description
E	Shutdown trip error
A	Alarm (or service message alarm)
S	Start inhibit
R	Run inhibit

5.1 Immediate Stop Shutdown Errors

5.1.1 Digital input errors

Er:0010 E emergency stop
Er:0020 E oil filter differential pressure switch
Er:0040 E air/oil separator differential pressure switch
Er:0080 E motor fault (fault relay contact; reverse phase, overload device contact or PTC thermistor)

5.1.2 Analogue input errors

Er:0115 E delivery pressure sensor fault
Er:0119 E delivery pressure high
Er:0125 E delivery temperature sensor fault
Er:0129 E delivery temperature high
Er:0131 E internal pressure below the set minimum limit 'PR'
Er:0135 E internal pressure sensor fault
Er:0139 E internal pressure high

5.1.3 Special function errors

Er:0809 E differential pressure high
Er:0814 E blowdown timeout (internal pressure failed to fall below minimum level after 120 seconds)
Er:0821 E low resistance, short circuit or short circuit to earth condition exists on an analogue input or digital input (incorrect connection, cable fault or sensor fault)
Er:0836 E Excessive electrical interference detected
Er:0846 E Delivery pressure sensor range is set too low for default pressure settings to be applied.
Er:0856 E Internal pressure sensor range is set too low for default pressure settings to be applied.

5.2 Controlled Stop Shutdown Errors

none

5.3 Alarms

5.3.1 Digital input alarms

Er:2030 A air filter differential pressure switch

5.3.2 Analogue input alarms

Er:2118 A delivery pressure high
Er:2128 A delivery temperature high
Er:2138 A internal pressure high

5.3.3 Special function alarms

Er:2808 A differential pressure high
Er:2816 A power failure occurred while compressor was in the Started state

5.4 Start Inhibits

none

5.5 Run Inhibits

Er:3123 R delivery temperature Td below the set low temperature run inhibit level, controller will allow motor start when temperature increases above the set level
Er:3137 R internal pressure PI higher than the set run inhibit pressure level, controller will allow motor start when pressure decreases below the set level, see blowdown timeout E0814

5.6 Service Alarms

5.6.1 Special function service alarms

Er:4804 A service hours time expired, service due (reset service hours countdown timer)

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