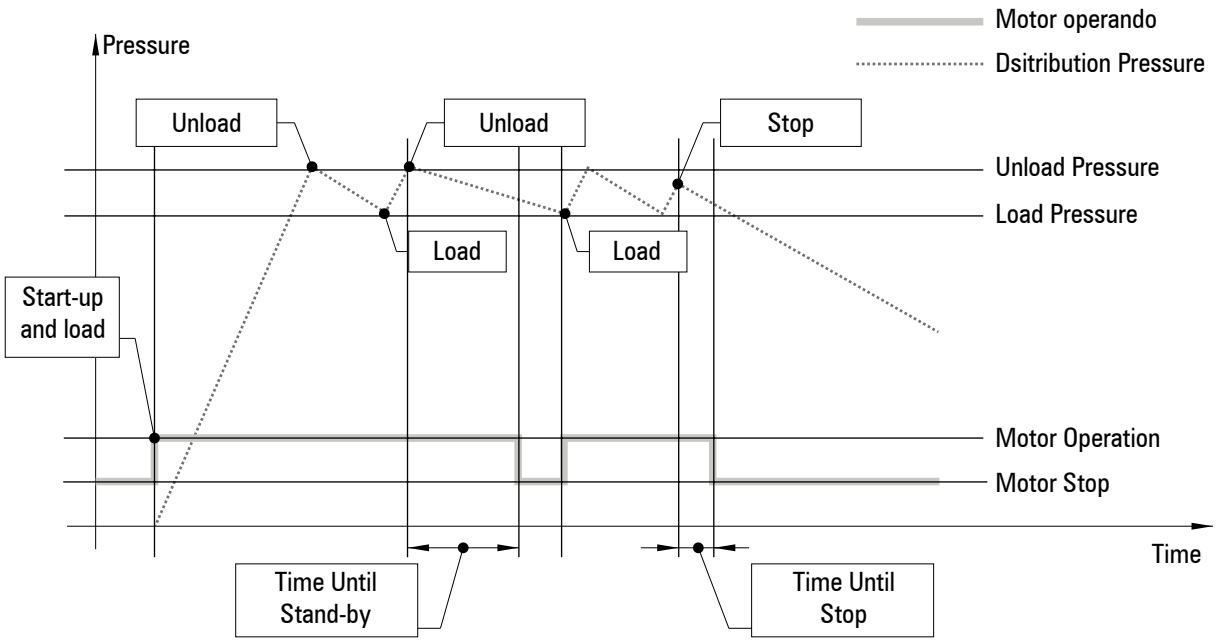
1- GENERAL OPERATION

In normal operation, the compressor outlet pressure is controlled by the electronic interface as soon as the start button is pressed or a remote start command is received. The interface will perform some safety checking before starting the compressor, if no impediment condition is detected.
If there is any impediment condition, the compressor will not start and a message will be shown on the display. If there is an operation impediment condition, the compressor will begin the start-up procedure, but the main motor will not work and the compressor will go to standby mode and a message will be shown on the display. If load solicitation is present, according to pressure values or by an external command, the motor will start. After the star/delta start time as well as the load delay time (adjustable), the compressor will start loading. After the load delay time, the electronic interface will power the load solenoid valve, which will open the inlet valve, enabling the compressor to operate in load mode. If the unload pressure is reached, or an unload remote command is received, the load solenoid valve will be powered off and the compressor will work in unload mode during the unload time (adjustable), before the main motor stops and the compressor goes into standby mode. The compressor will load again if the pressure drops below the load lower limit and if the unload time is not finished. If the compressor is already in standby mode, the main motor will start before loading and in this condition the load delay time will be neglected.
When a main motor stop procedure starts (turn-off button is pressed or standby mode), the standby time (adjustable) begins. If a start-up solicitation is made during the standby time, the compressor will go into standby mode until the standby time is over. The same holds true if a load solicitation happens during the standby time. In compressors with enabled internal pressure detection, a minimum start-up pressure can be adjusted to prevent that the compressor starts up with high pressures. If the internal pressure doesn't drop below the lower limit two minutes after the end of the standby time, an error will be generated and the compressor will shut down due to error.
After the compressor goes into unload mode, the reload timer (adjustable) is started to prevent compressor reload, this time can be adjusted down to 1 second if necessary. The normal automatic operation of the compressor will be terminated when the turn-off button is pressed, a remote stop command is received or if one of the compressor protections is activated. When turned off manually, or by a remote command, the compressor will operate in unload mode and the stop time (adjustable) begins. This time can be adjusted down to 1 second. Safety checking is performed continually, if a danger or a risk-of-burnout condition is detected, the compressor will turn off automatically without applying the stop time, and an error message will be shown on the display indicating the cause of the emergency shutdown. If an alarm condition is detected, a message will be presented on the electronic interface display and the compressor will keep operating normally.



2. DESCRIPTION OF I/O

2.1 - DIGITAL INPUTS

Connector X04:

Pin	Name	Function	ID	Active Status
1	C+	Common in digital inputs		
2	C1	Emergency Stop	Digital Input 1	Fault if open
3	C2	Maintenance Indicator	Digital Input 2	Fault if open
4	C3	Fan Overload	Digital Input 3	Fault if open
5	C4	Phase Fault/sequence	Digital Input 4	Fault if open
6	C5	Remote Start-up/Stop	Digital Input 5	Shut down if open/Start up when shorted
7	C6	Enable Remote Load	Digital Input 6	Remote if Shorted
8	C7	Remote Load	Digital Input 7	Load if shorted, Unload if open
9	C8	PTC motor overload	Digital Input 8	Fault if open

Remote Stop
When the remote start-up/stop function is activated (P07), the compressor will execute a controlled stop, as if the interface stop button was pressed, when the remote start-up/stop input is in open circuit.

Remote Start-up
When the remote start-up/stop function is activated (P07), the compressor will execute a normal start-up sequence when the remote start-up/stop input switches from open to shorted circuit. If it's shorted, the start-up/stop input must be opened and shorted again to start a remote start-up sequence. The local start-up of the control will be disabled.

Enable remote load:
When the digital input to enable remote load is active, the local or the pressure communication settings will be neglected and the compressor will respond to the digital input for remote load. The compressor will automatically respond to the pressure setting method defined in the configurations (local or by communication), when the digital input to enable remote load is not activated.

Remote Load
When the digital input to enable remote load is active, the compressor will load when the digital input to enable remote load is activated and unload when the remote load input is deactivated. All the pressure safety settings remain active when the remote load functions are used.
Note: If the line pressure is higher than the one set for the alarm level, the release solenoid will be powered off. The solenoid will remain unpowered for 10 seconds after the pressured drops below the alarm level.

2.2 - DIGITAL OUTPUTS

Connector X03: relays

Pin	Name	Function	ID	Active Status
1	C-R123	Common for star, delta and main interrupters		
2	NO-R1	Main interrupter	Digital output 1	Powered
3	NO-R2	Star interrupter	Digital output 2	Powered
4	NO-R3	Delta interrupter	Digital output 3	Powered
5	C-R4	Common for load solenoid		
6	R4	Load Solenoid	Digital output 4	Load when powered

Connector X02: additional relays

Pin	Name	Function	ID	Active Status
1	C-R5	Common for relay 5		
2	NO-R5	Open normal contact for relay 5	Digital output 5	Powered
3	NO-R6	Common for relay 6		
4	C-R6	Open normal contact for relay 6	Digital output 6	Powered

The function of relays 5 and 6 can be set in the configuration menu (P07).

2.3 – ANALOG INPUTS AND OUTPUTS

Note: All the analog input devices have functions to detect faults of open-circuit, short circuit, and out of range.
Connector X05: analog inputs

Pin	Name	Function	ID	Type	Interval
1	C-ANA1	Common for line pressure + V			
2	ANA1	Line pressure input	Analog input 1	4-20 mA	Adjustable
3	C-ANA2	Common for temperature			
4	ANA2	Temperature input (menu adjust)	Analog input 2	KTY ou Pt100, Pt1000 ou RTD	-10°C 132°C ou -50°C 250°C ou -40°C 150°C
5	C-ANA3	Common for internal pressure			
6	ANA3	Internal pressure (optional)	Analog input 3	4-20 mA	Adjustable

Entrada analógica 1:tipo 4-20mA fixa.
Entradas analógicas 2 e 3: a Control II usa módulos que permitem que diferentes tipos de sensores e sinais sejam utilizados; o hardware correto deve ser ajustado a cada tipo de sensor.
Conector X06: saída analógica

Pin	Name	Function	ID	Type	Interval
1	AGND	0V analog grounding			
2	ANA - OUT1	Analog output 4 - 20 mA	Analog output 1	4-20 mA	Adjustable

Analog output 1:
Standard: 4-20mA signal, selectable function
Active variable speed control:
4-20mA Signal to frequency inverter; 4mA = minimum speed; 20mA = maximum speed.
The drive is activated and stopped by the output to relay R1; drive fault detection at digital input C4.

DIAGRAM OF MACHINE STATUS

The interface operational logic is presented in the diagram of machine status. The status block determines the functionality of the control at each moment. The control can only be in one status at each moment. The control will move from one status to another according to the defined input and output conditions of each block, and the defined connections between status blocks.

Definitions:
Fault: Is a detected abnormal condition that must be signaled to the operator and might require an automatic safety action, depending on type and fault definition.

Start-up Fault(S): A start-up impediment fault is a condition that might represent danger or cause damage to the compressor if it starts while the condition is present. Start-up impediment faults are only triggered when trying to start a motor in the “ready to start” condition. Interface start-up impediment faults are not triggered during an automatic motor start-up sequence from standby condition. The interface start-up impediment faults reset themselves. An interface start-up impediment fault code is shown when it is activated, but it is not recorded in the faults register file.

Operation Impediment Fault (R): An operation impediment fault is a condition that might represent danger or cause damage to the compressor if it starts while the condition is present. The operation impediment faults are only triggered if a motor start-up sequence is initiated. The operation impediment faults reset themselves and do not prevent the compressor from going to start-up condition. An operation impediment will keep the compressor in standby mode and allow the motor start-up when the condition is no longer present. A fault code is shown when the fault occurs, but it will not be recorded in the faults register file.

Fault Alarm (A): A fault alarm is a warning of a condition that does not represent immediate danger or a potential risk to the compressor. An alarm status will not shut down the compressor or affect its normal operation. A fault alarm code is shown, and must be reset manually once the condition is solved or no longer exists.

Shut down fault (E): A shutdown fault is a condition that might represent danger or potential damage to the compressor, if the condition persists. A shutdown fault will cause the interface to stop the compressor. A shutdown fault code is shown, and must be reset manually once the condition is solved or no longer exists. Two types of shutdown faults are defined: a) Nonemergency shutdown, an immediate controlled stop is performed; b) emergency shutdown, an instant shutdown is performed.

Unload pressure: The unload pressure is the outlet pressure level (adjustable) at which the interface will power off the load solenoid and the compressor will go into unload mode.

Load Pressure: The load pressure is the outlet pressure level (adjustable) at which the interface will power on the load solenoid and the compressor will go into load mode.

Main Motor Start-up Sequence: The interface will power on the ouput of the star interrupter, followed, 200ms later, by the output of the main interrupter. After the countdown of Star/Delta timer (adjustable) ends, the interface will perform an automatic switch from star to delta interrupter in a 5ms transition time. If a shutdown command is received during the start-up sequence, the control will keep performing the start-up sequence before stopping. This action was designed to limit the transition current on the start-up interrupters of the motor.

Load delay timer: The transition from star to delta is immediately followed by a load delay time (adjustable) that will prevent the powering of the load solenoid until the load delay time ends. It was designed to allow the speed of the main motor to stabilize and other pre-load functions to take place.

Reload delay timer: The reload delay time (adjustable) is a time period that takes place immediately after a transition from load to unload mode, during which the powering of the load solenoid is prevented.

Standby Time: The standby time (adjustable) takes place immediately after a stop event of the main motor. During the standby time, a start--up command is accepted, but is not initiated before the countdown ends. If the internal pressure detection is enabled, the start-up will also depend on the internal pressure dropping below the start-up impediment pressure level (adjustable). If the internal pressure does not drop below the adjusted pressure level within two minutes after the standby time ends, an activation error will take place. The remaining time, in seconds, will be show on the display.

Unload Time: If the compressor remains in the unload condition for the unload time, the main motor will shut down and the compressor will go into standby mode. The compressor will restart and load automatically as required. This function is designed to enhance the performance in periods of low demand and limit the number and intervals between motor start-ups. The remaining time, in seconds, will be show on the interface display.

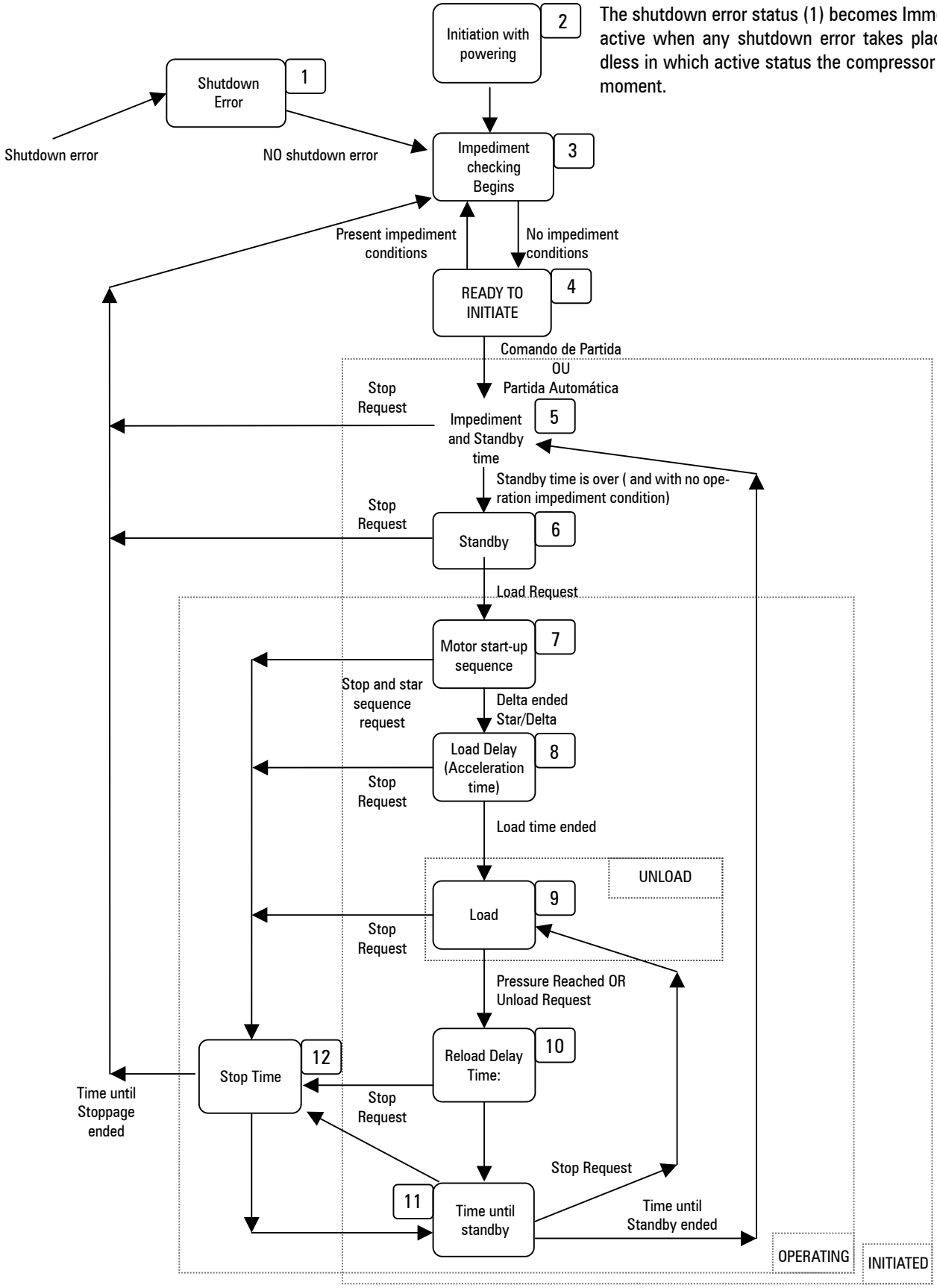
Stop Time: When stopped (Stop button, remote stop input or remote stop command), the compressor will unload and the main motor will remain running for the stop time, before stopping. This function was designed to allow the internal pressure to drop and to limit oil aeration before the main motor stops. The remaining time, in seconds, will be show on the display.

Standby Status: The compressor was activated (Start-up button, start-up remote input or start-up remote command) and is in a start-up condition, ready to respond to pressure changes in the air line.

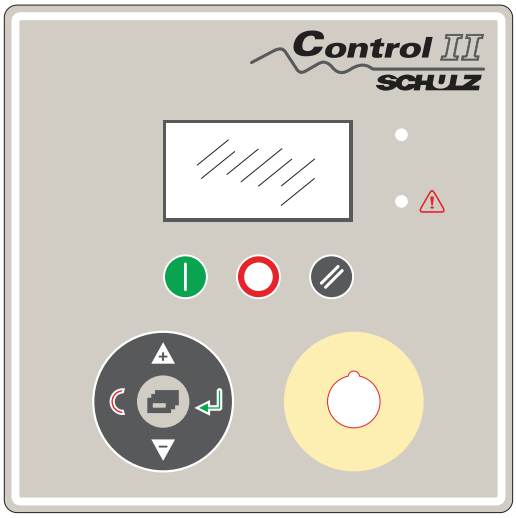
Operation Status: The compressor is in start-up status and the main motor is running.

Load Status: The compressor is in start-up status, operating and the load solenoid is powered on.

The shutdown error status (1) becomes Immediately active when any shutdown error takes place, regardless in which active status the compressor is at that moment.



4- THE USER INTERFACE



Graphic Display; Illuminated monochrome LCD, 128 X 64
2 x LED Indicators
Controller; 8 x tactile button

4.1 - KEYPAD

START: Goes into STARTED condition

STOP: Goes out of STARTED condition

RESET: Resets and clears fault conditions

ENTER: Confirms the selections or value settings

LESS/DOWN: Rolls down the menu, and decreases values

MORE /UP: Rolls up the menu, and increases values

ESC (C): Goes back one navigation level

MENU BUTTON: access to setting pages.

Start and Stop have only one defined function and are used for no other purpose.
The Reset will indicate the fault code on the display, if a fault condition is active, or the compressor status, in case there are no active faults.
If the menu mode is pressed for longer than 2 seconds, it will go out of this mode and return to the interface initial screen.
The Enter will lock a selected item on the display, preventing the return, after a short delay, to the initial screen. A key symbol will be shown when an item is locked. To unlock, press Esc. The Esc will make the interface return to the main menu.
More, Less, Enter and Esc are used in the menu navigation mode to set the menu items.

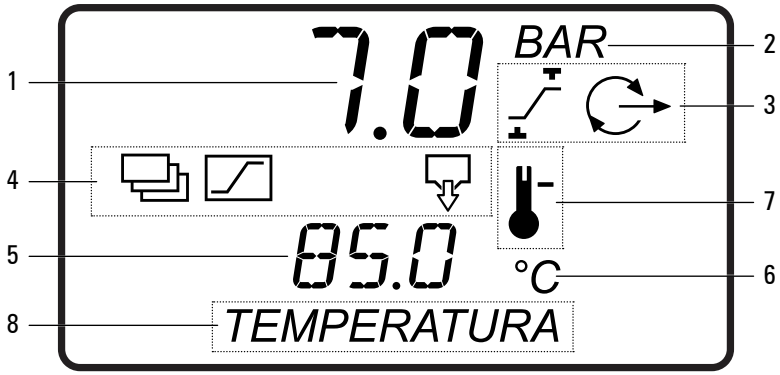
4.2 – LED INDICATORS

STATUS: Green, beside the Start and Stop buttons.
FAULT: Red, beside the Stop and Reset buttons.
Indicators Statuses:
ON: Steady Light
FF: Fast Flash: flashes 4 times per second.
SF: Slow Flash: flashes once a second:
IF: Intermittent Flash: Flashes every four seconds.
OFF: Completely off.

Machine Status No.	Machine Status	Status	Fault
1	Shutdown Error	OFF	FF
2	Start-up initiation	OFF	OFF**
3	Start-up impediment checking	OFF	OFF**
	Start-up impediment condition		
4	Ready to Start	OFF	SF:
5	Progressive Shutdown	(Load required) FF o IF	OFF**
6	Standby		OFF**
7	Star/Delta Motor Start-up	(Load required) FF o IF	OFF**
8	Load Delay	(Load required) FF o IF	OFF**
9	Load		OFF**
10	Load Delay	(Load required) FF o IF	OFF**
11	Unload Time		OFF**
12	Stop Time		OFF**

** SF for alarm condition

4.3 - DISPLAY



The normal operation display offers continuous information about 4 value classes:

Line Pressure:	1: Value	2: Unit
Status:	3: Symbol	
Enabled Functions:	4: Symbol	
Item Selected by the user:	5: Value	6: Unit
	7: Symbol; identification	8: Text; Language

Status
The Status is represented by symbols and is continuously displayed:
Pressure Control

The pressure is below load pressure (P1)

The pressure is between load (P1) and unload (P4) pressure

The pressure is above unload pressure (P4)

Compressor Off

Standby Mode

Operating in unload

Operating in load

Functions
The activated functions are represented by symbols and are displayed continuously.

The condensate drain outlet is powered on.

Line pressure adjusting RS485 (flashing = communication fault)

Automatic Restart due to power loss

Enabled Remote Load/Unload (digital input)

Remote Start-up/Stop control

Pressure Scheduling (flashing = overlapped pressure scheduling)

Item Selected by User
The user can navigate on the list of status items, information and values, using the buttons UP or DOWN.

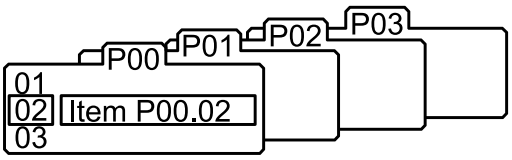
Fault Indications
If a fault condition is active, the code and the fault identification will appear on the display. An active fault code becomes an additional item in the user menu. If more than one fault condition is active; each one will become a separate item in the user menu. The user menu item will disappear when a fault condition is solved and reset.
The fault types are identified by symbols; the symbol of the fault type will alternate with the fault code identification symbol(s).

Shutdown, General Failure, Immediate Stop

Alarm, Warning

Start-up, Load or Operation Impediment
Each fault code is unique and is presented with the identification symbol(s) and a description text (see “Fault Codes”).

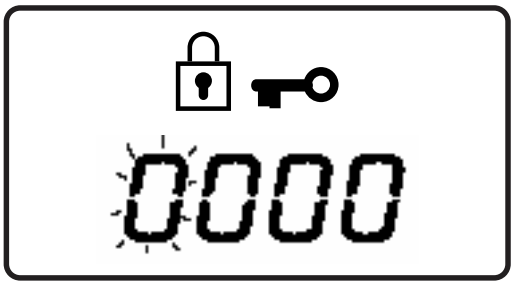
4.4 – DISPLAY STRUCTURE AND MENU NAVIGATION



All the value, parameters and option settings are grouped in lists or menus.
The items are placed on lists according to the type and classification. The items the operator can visualize during the routine operation, such as, for example, pressure or temperature values, are placed on the user menu's list.
Lists are identified by number; the number of the user menu's list is 00. All adjustable parameters and options are placed from list 01 of the configuration mode to subsequent lists. All the items on list 00 are only for visualization and cannot be adjusted; an access code is necessary to enter lists subsequent to list 00.

Normal Operation Mode (list 00):
During start-up of the control, all the display elements and LED indicators turn on for 3 seconds; the display will then show the software version for 3 more seconds, before the start-up is complete and the operation menu (list 00) is shown. All the items available on display (temperature, pressures and hour meters) can be selected at any time using the DOWN and UP buttons. The item shown will return to standard after 35 seconds, if no other selection is made. Pressing the ENTER button will lock any selected item on the display and will prevent the return to the standard screen. A key symbol will appear when an item is locked. To unlock an item, press UP or DOWN to see an alternate screen of items, or press RESET or ESC. No value, option or parameter can be adjusted on list 00; if a fault condition occurs, the fault code becomes the first item on the display list. More than one active fault code item can appear at any moment.

Access Code:



The access to the pages subsequent to page 00 is restricted by an access code. To access the menu pages, press MENU BUTTON; the access code screen will be shown and the first digit of the code will flash. A four-digit code is necessary.
Use MORE or LESS to adjust the value of the first digit, and then press ENTER. The next digit will flash; use UP or DOWN to adjust, and then press ENTER.
Repeat the operation for the four digits. If the code is a number smaller than 1000, the first digit(s) must be zero. To return to a previous digit, press ESC. When all the digits have already been adjusted according to the authorized code number, press ENTER.

 Access Code "accepted"

 Access Code "rejected"

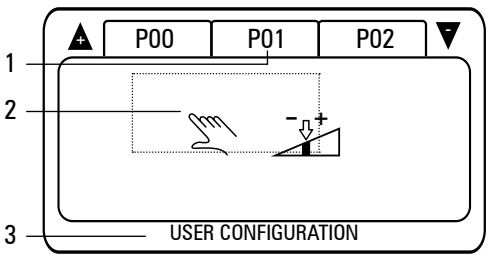
The access to some pages of the menu mode depends on the level of authority determined by the used access code.
An invalid code will cause the screen to return to user menu on page 00.
The pages and access levels used are the following:

Access Level = USER (Code = 0009)	Access Level = SERVICE (Code = 0100)
P00, P01, P02, P11	P00, P01, P02, P03 P04, P05, P06, P07 P08, P09, P11

Access code typing time:
When in the menu mode, if no activity is detected on the screens for a certain period of time, the display will return automatically to the user menu: page 00. This time depends on the level.

User: 1 minute	Service: 10 minutes

Navigation on Menu Mode:



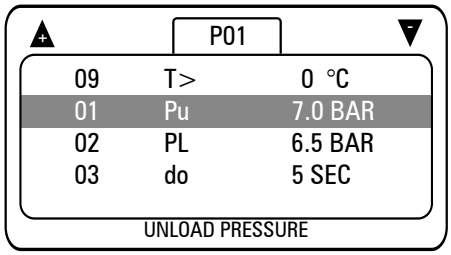
Each page in the menu mode (1) is identified by symbols (2) and by text (3).
The symbolical identification of the menu defines the type of page and access level.

The first symbol (on the left) defines the access level to each page:

User Service

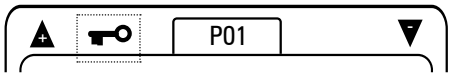
The second symbol (on the left) defines the menu:

User menu
Stops
Speed control
User parameters
Impediments
Calibration
Alarms
Diagnostics
Scheduling



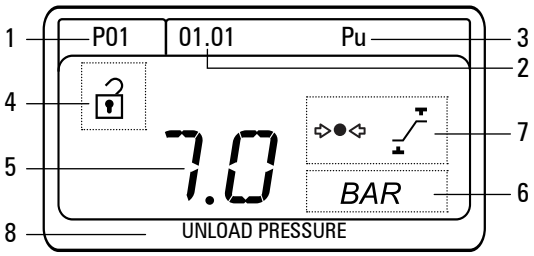
Press UP or DOWN to select the desired menu and then press ENTER.
Each menu contains a certain number or items. The first item on the list will already be selected. Press UP or DOWN to skip the items of the list; the list will scroll automatically.
Note: When the first item is selected, the last item can be seen on top of the list; this immediately indicates the number of items on the list.

To select a list item to adjust, press ENTER.
To go back to menu selection screen press ESC.



A menu might contain items that are only for visualization, the list of errors, for example.

In this example, a key symbol will be shown to indicate that all the menu items are locked and cannot be adjusted. The menus can also be locked and available only for visualization when the compressor is operating; stop the compressor before trying any parameter adjustment.



Each menu item has a unique identification code regarding the menu(1); the item number (2) and a sub-item number Each menu item has also a twodigit identification (3), unique inside the menu.
The sub-items are only applicable in some cases: pressure scheduling, for example. In most cases there can be only one adjustment associated to one list item.

When a menu item is selected, the value or menu option (5) will be selected. Each item is shown together with its unit (6), symbolical identification (7) and description text (8). Press UP or DOWN to adjust the item configuration; press ENTER to set the new adjustment in the permanent memory.
The menu settings can only be adjusted when the item is unlocked (4). Some items are only available for visualization, or cannot be adjusted when the compressor is running; in this case, a “locked” symbol will be shown and the setting is blocked.

The menu settings can only be adjusted when the item is unlocked (4).

Some items are only available for visualization, or cannot be adjusted when the compressor is running; in this case, a “locked” symbol will be shown end the setting is blocked.

To exit an adjustment at any moment, press ESC. The original value or option will be kept in the memory and the screen will return to the list of items.

Press and hold RESET for some seconds at any time to immediately exit the menu mode and return to the operation screen (page 00). Any value or option setting that was not confirmed and saved in the memory will be discarted and the previous settings will be kept.

4.4.1 - Menu Structure

P00: User

- 01 Status / Clock
- 02 Information *
- 03 temperature
- 04 Line pressure
- 05 Internal pressure**
- 06 Differential pressure **
- 07 Hours working
- 08 Hours in partial load ***
- 09 Hours in full load
- 10 Hours to oil filter change
- 11 Hours to air filter change
- 12 Hours to oil change
- 13 Hours to separator change
- 14 Grease service
- 15 Motor speed in rpm ++
- 16 Motor speed in % ++

Will only be shown if:
*Information screen is enabled
**Internal pressure is enabled
*** Partial load is enabled
++ Speed control mode is enabled

Access Code

User level

P01: User parameters

- 01 P4 unload pressure
- 02 P3 partial load pressure (drop)
- 03 P2 partial load pressure (rise)
- 04 P1 load pressure
- 05 do drain open
- 06 dt drain interval
- 07 Rt unload time
- 08 St stop time
- 09 Bt standby time
- 10 P> pressure unit
- 11 T> temperature unit
- 12 L> language

P02: Errors List

- 01 registered error Nº 1 up to
  15 registered error Nº 15

P11: Scheduling

- 01 PS enables pressure scheduling
- 02 Ct Clock configuration
- 03 01 scheduling 1 up to
  30 28 scheduling 28

Service Level

P03: Stops

- 01 Td Shutdown temperature
- 02 Pd maximum outlet pressure
- 03 PI maximum internal pressure
- 04 DP maximum differential pressure
- 04 PR internal control pressure

P04: Alarms

- 01 H4 Hours to oil filter change
- 02 H5 Hours to air filter change
- 03 H6 Hours to oil change
- 04 H7 Hours to separator change
- 05 Td Alarm temperature
- 06 Pd Outlet pressure alarm
- 07 PI Internal pressure alarm
- 08 ΔP Different pressure alarm

P05: Impediments

- 01 Td Minimum temperature
- 02 PI Maximum internal pressure

P06: Diagnostics

- 01 D1 Digital Input 01
- 02 D2 Digital Input 02
- 03 D3 Digital Input 03
- 04 D4 Digital Input 04
- 05 D5 Digital Input 05
- 06 D6 Digital Input 06
- 07 D7 Digital Input 07
- 08 D8 Digital Input 08
- 09 R1 Output Relay 01
- 10 R2 Output Relay 02
- 11 R3 Output Relay 03
- 12 R4 Output Relay 04
- 13 R5 Output Relay 05
- 14 R6 Output Relay 06
- 15 A1 Analog Input 01
- 16 A2 Analog Input 02
- 17 A3 Analog Input 03
- 18 Ao Analog Output

P07: Maintenance

- 01 人 Δ Star/delta time
- 02 Lt Load delay
- 03 Rt Reload delay
- 04 LS Load source
- 05 SS Start-up source
- 06 Ad address RS485
- 07 R5 Relay 5 function
- 08 R6 Relay 6 function
- 09 ΔP Differential pressure delay
- 10 IS Information
- 11 At Auto restart
- 12 ud Unload drain
- 13 Sh Start-ups per hour
- 14 Ao Analog input function
- 15 FH Fan turn-on temperature
- 16 FL Fan turn-off temperature
- 17 Ft Fan running
- 18 Mo Mode

P08: Speed Control

- 01 SC Speed control
- 02 SH Maximum speed
- 03 SL Minimum speed
- 04 So Optimum speed
- 05 Su Shutdown speed
- 06 S> Actual speed
- 07 A>Actual current
- 08 Pf Constant P
- 09 If Constant I
- 10 C>% de control
- 11 rr Speed variation rate

P09: Calibration

- 01 do Outlet pressure Offset
- 02 dr Outlet pressure range
- 03 Io Internal pressure Offset
- 04 Iv Internal pressure range

4.4.2 - P00 User Menu

The user menu displays normal operation values and information. This is the standard interface screen, no access code is required.

Item Nº	Description	Units	Step	Mín.	Máx.	Display
01	Status/Clock		Leitura	...	...	Status + relógio ou contador de evento
02*	Information		Leitura	...	...	Conforme parâmetro
03	Outlet temperature	°C/°F	Leitura	...	...	85°C
04	Line pressure	bar/psi	Leitura	...	...	7.0 bar
05**	Internal pressure	bar/psi	Leitura	...	...	7.8 bar
06**	Differential pressure	bar/psi	Leitura	...	...	0.8 bar
07	Hours Working	h	Leitura	...	...	1430 hrs
08***	Hours in partial load	h	Leitura	...	...	300 hrs
09	Hours in full load	h	Leitura	...	...	1130 hrs
10	Hours to oil filter change	h	Leitura	...	...	570 hrs
11	Hours to air filter change	h	Leitura	...	...	570 hrs
12	Hours to oil change	h	Leitura	...	...	570 hrs
13	Hours to separator change	h	Leitura	...	...	2570 hrs
14	Grease service	h	Leitura	...	...	2570 hrs
15 # #	Motor Speed	Rpm	Leitura	...	...	2700 rpm
16 # #	Motor Speed	%	Leitura	...	...	80.0 %

* only shown if the "information" item is enabled
** only shown if the internal pressure function is enabled
only shown if the variable speed control mode is enabled

4.4.3 - P01 User Parameters Menu

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

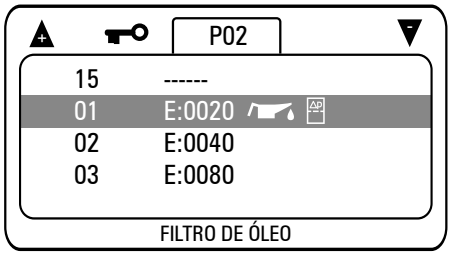
Item Nº	Description	Units	Step	Mín.	Máx.	Display
01	Unload Pressure	bar/psi	0,1	P2+0,2	15,0	P4 8,0 bar
02	Partial Load Pressure (drop)	bar/psi	0,1	P1	14,8	P3 7,8 bar
03	Partial Load Pressure (rise)	bar/psi	0,1	P1	14,8	P2 7,8 bar
04	Load pressure	bar/psi	0,1	3,0	P4-0,2	P1 7,5 bar
05	Drain open	s	1	1	30	do 5 s
06	Drain interval	s	1	30	3600	dt 60 s
07	Unload time	s	1	1	3600	Rt 360 s
08	Stop time	s	1	1	60	St 30 s
09	Standby time	s	1	1	600	Bt 10 s
10	Pressure Unit	---	1	0	2	P>0 0=bar/1=psi/2=Kpa
11	Temperature Unit	---	1	0	1	T>0 0=°C/1=°F
12	Language	---	1	0	4	L>4

The minimum difference between the load and unload adjusted points is 0,2 bar.

Pressure Settings:
The general failure cannot be adjusted to a value above the superior limit of the sensor's range.
The alarm cannot be adjusted to a value above (Max.P. -0,2 bar) or below (P4 + 0,2 bar)
The unload cannot be adjusted to a value above (Alarm P. -0,2 bar) or below (P3 + 0,2 bar)
The load pressure cannot be adjusted to a value above (P2-0,2 bar) or below 5,0 bar.

Pressure and Temperature Units:
Selects the units for the presented values. The control operates internally with mBar (0,001 bar) and Celsius (0,001ºC). The presented values are calculated based on the internal operation values.
Language: The language is applied to the text that appears in the lower part of each menu.
This text can be disabled by selecting the value 0 (zero) in the settings.

4.4.4 - P02 Errors List Menu



The list of errors page contains the last 15 fault codes in chronological order. The most recent fault is recorded as item 01. If all the 15 fault registers are full and a new fault event occurs, the new fault status is added as item 01, all the item register entries move to one number above, and the item 15 register entry is lost.

Press ENTER to see all the details of a register entry. The register item screen will show the fault code together with the symbolical identification and the operating hours, recorded time and date of the moment the fault occurred. The types of fault are identified by the initial letter of the fault code: E = Shutdown/General Failure, A = Alarm/Warning, R = Operation/Load Impediment. All these items are only for visualization.

Item Nº	Description	Units	Step	Mín.	Máx.	Display
01	Registered error n° 1	---	Reading	---	---	01...E:0020
02 a 15	Registered errors n° 2 a n° 15	---	Reading	---	---	02 A 15

4.4.5 - P03 Stops Menu
The settings that determine the level or condition in which a shutdown fault is created.

Item Nº	Description	Units	Step	Mín.	Máx.	Display
01	Shutdown Temperature	°C / °F	1	8,0	130	Td 115°C
02	Maximum outlet pressure	bar/psi	0,1	7,0	16,0	Pd 10,0bar
03	Maximum internal pressure	bar/psi	0,1	7,1	16,0	Pd 11,0bar
04	Maximum differential pressure	bar/psi	0,1	Alarme + 0,2	5,0	ΔP 1,0bar
05	Internal control pressure	bar/psi	0,1	0,0	0,3	Pr 0,3bar

** the maximum outlet temperature limit can be higher when alternate temperature sensors are used.

High Level of Differential Pressure:
Will be enabled if the condition remains above the adjusted limit for longer than the delay time (see menu 07) and the outlet temperature is higher than 50°C.

Minimum Internal Pressure Level:
The internal pressure is checked after the compressor start-up. If the detected pressure is lower than the adjusted limit, a shutdown error will be created. This function was designed to offer protection against incorrect speed of the motor, or internal connection or piping failure.

4.4.6 - P04 Alarms Menu
The settings that determine the level or condition in which an alarm is created.

Item Nº	Description	Units	Step	Mín.	Máx.	Display
01	Hours to oil filter change	Hours	1	0	10.000	H4 1000
02	Hours to air filter change	Hours	1	0	10.000	H5 1000
03	Hours to oil change	Hours	1	0	10.000	H6 1000
04	Hours to separator change	Hours	1	0	10.000	H7 3000
05	Temperature Alarm	°C / °F	1	70	120	Td 110°C
06	Outlet Pressure Alarm	bar/psi	0,1	7,0	15,9	Pd 8,0bar
07	Internal Pressure Alarm	bar/psi	0,1	7,1	16,0	PI 9,0bar
08	Differential Pressure Alarm	bar/psi	0,1	0,2	shutdown -0,2	DP 0,8bar

Maintenance Hourmeters
The hourmeters will count from the adjusted value, according to the operating hours. When the item is visualized, the value of the maintenance hourmeter will indicate the remaining hours for the maintenance moment (zero hours). When zero hours is reached, a maintenance need alarm will be shown. The alarm can only be reset when the maintenance hours are adjusted to a value above zero. The maintenance hour countdown will continue with negative values until the timer is reset. This function was designed to promote propitious routine maintenance and indicate how many operating hours elapsed since the maintenance need alarm went off. The value can be adjusted back to the necessary maintenance interval every time the maintenance is completed.

Differential pressure alarm:
Will be activated if the condition remains above the adjusted level for longer than differential pressure delay time (see menu 07), and the outlet temperature is higher than 50°C.

4.4.7 - P05 Impediments Menu
Settings that determine the level or condition in which a start-up impediment occurs.

Item Nº	Description	Units	Step	Mín.	Máx.	Display
01	Minimum temperature	°C/°F	0,1	-20	10	Td 1°C
02	Maximum internal pressure	bar/psi	1	0,1	2,0	PI 0,5bar

Low outlet temperature prevents the start-up if the temperature drops below the adjusted limit.
Maximum internal pressure: prevents start-up if the pressure is above the adjusted value.
Operation impediments (R) permit that the compressor be initiated, but prevents the start-up of the main motor until the condition is solved. When the condition is no longer present, the alarm will reset automatically and the main motor will be automatically liberated to start when required.

4.4.8 - P06 Diagnostics Menu
This menu permits that a technician checks all the inputs and tests all the outputs individually without the compressor operating.

Item Nº	Description	Units	Step	Mín.	Máx.	Display
01	Digital input 1	---	Reading	---	---	D1 0 ---
02	Digital input 2	---	Reading	---	---	D2 0 ---
03	Digital input 3	---	Reading	---	---	D3 0 - / -
04	Digital input 4	---	Reading	---	---	D4 0 ---
05	Digital input 5	---	Reading	---	---	D5 0 ---
06	Digital input 6	---	Reading	---	---	D6 0 - / -
07	Digital input 7	---	Reading	---	---	D7 0 - / -
08	Digital input 8	---	Reading	---	---	D8 0 ---
09	Relay Output 1	---	1	0	1	R1 0 - / -
10	Relay Output 2	---	1	0	1	R2 0 - / -
11	Relay Output 3	---	1	0	1	R3 0 - / -

Item Nº	Description	Units	Step	Mín.	Máx.	Display
12	Relay Output 4	---	1	0	1	R4 0 - / -
13	Relay Output 5	---	1	0	1	R5 0 - / -
14	Relay Output 6	---	1	0	1	R6 0 - / -
15	Analog Input 1	---	Reading	---	---	A1 4,00mA
16	Analog Input 2	---	Reading	---	---	A2 0,467mA
17	Analog Input 3	---	Reading	---	---	A3 4,00mA
18	Analog Output 1	mA	0,10	4,0	20,0	A4 4,00mA

Digital Inputs: The display will indicate the actual status of the inputs "_/_" (open circuit) or "_ _ _" (shorted circuit) and the status of the corresponding input function: active (1) or inactive (0).
Note: The numerical value on the screen indicates the function, and not the input status (example: Emergency Stop = 0 "_ _ _" the input is in shorted circuit, and the emergency Stop function is not active).
Outputs to relay: The relays can be powered (1) and unpowered (0). The outputs of the main motor relay, from 1 to 3, can only be powered one at a time; the output will power itself off when the selected item is changed.
Analog inputs: The analog output values will alternate between the adjusted associated engineering units for real mV (tension and temperature inputs) or mA (current loop inputs), detected at the corresponding analog input connector. The value of the mV or mA can be checked independently with a meter.
The output analog values can be adjusted (from 4,0 mA to 20,0 mA, in 0,1 mA steps) to force the output to a mA level desired for processes of diagnosis or calibration. The output will automatically revert when exiting the menu.

4.4.9 - P07 Maintenance Menu

Item Nº	Description	Units	Step	Mín.	Máx.	Display
1	Star/delta timeStep	s	0,2	1	30	YΔ 10,0sec
2	Load delay	s	0,2	1	30	Lt 1,0sec
3	Reload delay	s	0,2	1	10	Rt 1,0sec
4	Load source	0= pressure sensor 1= remote communication	1	0	1	Ls 0
5	Start-up source	0= interface 1= remote communication 2= digital inputs	1	0	2	SS 0
6	Address Rs485	---	1	1	99	Ad 1
7	Relay 5 function	1 a 13 see function	1	1	13	R5 1
8	Relay 6 function	1 a 13 see function	1	1	13	R6 1
9	Differential pressure delay	s	1	1	600	ΔP 10sec
10	Information	0=no indication 1=network address 2= Status number 3= Average cycle time 4= maximum time cycle 5= # registered start-ups	1	0	5	Is 1
11	Auto restart	s	1	0	120	At 10sec
12	Drain in release	s	1	0	30	ud 0
13	Start-ups per hour	---	1	0	20	Sh 0
14	Analog input function	---	1	0	17	Ao 15
15	Fan Turn-on Temperature	°C / °F	1	60	100	Fh 85°C
16	Fan Turn-off Temperature	°C / °F	1	59	99	FL 75°C
17	Fan Running	s	1	0	120	Ft 10sec
18	Mode	---	1	0	1	

Relays 5 and 6 Output Functions:

1	Alarm	Unpowered for any active alarm (excluding Start-up/Operation Impediments)
2	Shut-down	Unpowered for any active shutdown fault (excluding Start-up/Operation Impediments)
3	Fault Group	Unpowered for any Alarm and Start-up/Operation or Shutdown Impediments.
4	Maintenance Alarm	Unpowered when maintenance alarms are active.
5	Maintenance	Powered only when maintenance services are needed.
6	Heater	Powered when temperature drops below the level adjusted for operation temperature impediment (+2°C). Unpowered when temperature rises above the level adjusted for operation temperature impediment (+3°C). Can be used to power the interrupter of the anti-condensate or an auxiliary output for low-temperature warning.
7	Drain	Enables and disables drain function.
8	Fan	Powered in every operation status, except during the start-up of the compressor. Can be used to power the interrupter of the fan motor.
9	Standby	Powered in Standby status.
10	Operation	Powered in all OPERATION conditions.
11	Load	Powered in all LOAD conditions.
12	Start	Powered every time the compressor is starting-up.
13	Fan (temperature control)	Enabled to operate in all OPERATION statuses, except during start-up. If enabled to operate, the output will be powered only if the outlet temperature exceeds the "FH" temperature setting. If the outlet temperature drops below the value adjusted for "FL", the output will be powered off. Once powered, the output will remain powered for at least the "Fan Minimum Operation Time (FT)", regardless the outlet temperature. Can be used to power the fan motor interrupter; the minimum operation time was designed as a means to limit the number of fan motor start-ups.

Information item configuration on the display:
This configuration determines the item shown on "information" on the user menu (page 00):
Network Address: the network address set up for the compressor (standard)
Machine Status Number: the active actual condition of the block status (see diagram of machine status)
Average Variation Time: the average variation time of the software control in ms (milliseconds).
Registered Start-ups: The number of motor start-ups that occurred in a one-hour period.
The "information item" was designed for general information or diagnostics purposes; to disable, select (0).

Automatic restart:
If an automatic restart time is specified, the interface will execute an automatic restart-up after a power loss if the compressor was operating when the power loss occurs. The delay time specifies the warning period after the interface initialization, before the restart is executed. The time before the restart is indicated on the display.
No restart will occur if the interface is not in the Start status before the power loss.

Start-ups per hour:
Every time a start-up event of the main motor occurs, an entry is registered.
To disable this function, and keep the adjusted time for the period until the operation, regardless the motor start-up events, set the configuration of start-ups per hour to 0 (zero).

Analog Output Selection:
In the standard mode for the fixed speed on the motor, the analog output can be selected to follow the line pressure "14", the outlet temperature "15" or the internal pressure "16". To disable the output, select "0".
The analog output can also be used to power an auxiliary relay; this relay's contacts can then be used to alternate between the remote devices.
! Configurations: 1 to 13 = same functions described for the options R5 and R6 from 1 to 13
Use only a 24Vdc relay that has an interrupter and does not accumulate current superior to 20mA.
Note: In the variable speed control modes, the analog output will be the 4-20mA control signal of the frequency inverter.
In this case, the analog output will show the configuration "17" (variable speed control); the configuration will be locked and not able to be adjusted.

4.4.10 - P08 Speed Control Menu

The speed control function provides a loop control P I of the frequency inverter (using the 4-20mA output) to keep a stable target pressure level (load pressure P1).

The speed control is used to keep the line pressure at the adjusted level for the load pressure. If the pressure rises to the level adjusted for the unload pressure, the solenoid is powered off and the compressor goes into unload mode.

While in unload status, the interface will keep the compressor at minimum speed. When the unload time (Rt) ends, the compressor will go into standby mode. When the pressure drops to a value lower than the one adjusted for the load pressure, the motor will restart and the load solenoid will power on, if it's in standby status. The maximum speed control will then be applied.

If connected to a Schulz compressors manager, and the system has more than one FLEX compressor (variable speed), any FLEX compressor designated as main will be adjusted to operate at the optimum speed value. Any FLEX compressor designated as slave will use the maximum speed control. In addition to this, the target pressure of each FLEX compressor will be automatically informed to the manager to keep a precise pressure control, independent from the pressure differential among the compressors.

Item Nº	Description	Units	Step	Min.	Máx.	Display
01	Speed control	---	1	0	2	SC 0=Disabled 1= Fixed speed control 2=Variable Speed control
02	Maximum speed	rpm	100	100	10000	SH
03	Minimum speed	rpm	100	0	9900	SL
04	Optimum speed	rpm	100	100	10000	So
05	Shutdown speed	rpm	100	1	9900	Su
06	Actual Rpm	rpm	---	---	---	S> Visualization only for information
07	Actual Current	mA	---	---	---	S> Visualization only for information
08	Constant P	---	1	0	100	Pf
09	Constant I	---	1	0	100	If
10	Control Percentage	%	---	---	---	C> Visualization only for information
11	Speed variation rate	%	1	5	100	rr

Speed control mode:

To disable the speed control for a fixed speed motor, select the mode "0". To operate in fixed speeds, select the mode "1".

The motor will operate at the adjusted optimum speed, and at the unload speed when in unload mode. The speed transition is determined by the maximum acceleration rate. To use a compressor regulated by the maximum variable speed, select mode "2".

Maximum Speed	Sets the motor speed at a 20mA output
Minimum Speed	Sets the motor speed at a 4mA output
Optimum Speed	Optimum Speed when loading
Unload Speed	Motor speed when unloading
P Factor	PI loop proportional factor
I Factor	PI loop integration factor
Speed variation rate	Maximum permitted rate for variation, expressed in % of maximum speed per second (example: Max 3000rpm, min 1500rpm, 10% acceleration rate = 150rpm/second at maximum)

Control Percentage: Shows the speed variation percentage in which the minimum speed is represented by 0% and the maximum is 100%.

Digital Input for Remote Load Function:

If enabled for variable speed control, the digital input for remote load will operate the compressor in speed control mode "1" , independent from the mode configuration. If adjusted in mode "2", the compressor will go to operation mode "2" when the input that enables remote load is deactivated.

4.4.11 - P09 Calibration Menu

Calibration settings for the pressure sensor.

Calibration settings for analog pressure sensors.

When an item is selected, the "Line pressure" item will show the real pressure for the selected item, using the existing calibration values.

As the calibration values are adjusted, the item will immediately show the new value adjusted for the pressure.

Note: Before the calibration is initiated, make sure the "nominal interval" configuration of the sensor is correct.

Offset: To calibrate the offset, expose the appropriate sensor to the atmosphere and adjust the offset to make the pressure display show 0,0 bar.

Range: To calibrate the range, apply a known pressure on the sensor and adjust the range value until the pressure value on screen is the same as the applied. The range value can be calibrated with a static of variable pressure.

Item Nº	Description	Units	Step	Min.	Máx.	Display
01	Line pressure, offset	bar/psi	0,1	-0,5 bar	0,5 bar	do 0,0 bar
02	Line pressure, range	bar/psi	0,1	-10% do intervalo	+10% do interval	dr 16,0 bar
03	Internal pressure, offset	bar/psi	0,1	-0,5 bar	0,5 bar	Io 0,0 bar
04	Internal pressure, range	bar/psi	0,1	-10% do intervalo	+10% do interval	Ir 16,0 bar

Warning: Calibration values that are adjusted incorrectly for pressure sensors will affect the performance and the safetyrelated functions of the compressor.

4.4.12 - P11 Scheduling Menu

Item Nº	Description	Units	Step	Min.	Máx.	Display
01	Enable pressure scheduling	---	---	---	---	PS (0=no activo), (1= activo)
02	Clock	---	---	---	---	Ct 1.07:00
03	Configuration 1	---	---	---	---	01 1.06:30
até						
30	Configuration 28	---	---	---	---	28 5.18:30

Pressure Scheduling:
Pressure scheduling can be used to change the values set for operation pressure, or force the compressor to go into standby, at specific moments and on specific days of the week. The pressure scheduling varies according to weekly based settings; from 00:00 hours of day 1 of the week (Monday) until 23:59 hours of day 7 of the week (Sunday).
The configuration of the day "8" of the week is used to specify that the instruction must be executed at the same moment on every weekday (days 1 to 5 inclusive; not including the weekend days, 6 and 7). The configuration "9" is used to specify that the instruction must be executed on every day of the week (days 1 to 7, inclusive).
The "week day" and "time of the day" can be specified for each configuration together with the "unload" and "load" pressure values. The control will use the specified pressure values from the set time and day of the week until a new chronologic configuration changes the pressure values, the pressure scheduling is disabled or an superior command is activated.
If the unload pressure 0 (zero) is specified, the compressor will unload and, after some time, stop in standby mode. The compressor will remain in standby until the next configuration specifies an operation pressure above zero. There are 28 available configurations, of which some or all can be used. There is no limit for the number of configurations that can be set for a day of the week in particular. The control will immediately operate according to configurations of the schedule, when a pressure scheduling is activated and the compressor has already initiated.
Nota: The pressure scheduling will not start up or shut down the compressor; the compressor must be initiated before the scheduling function goes into effect.

When the pressure scheduling is activated, the function symbol of pressure scheduling will appear.

The pressure scheduling will have less priority than the digital inputs for pressure control by communication or remote pressure control. The "pressure scheduling control" symbol will flash, and the "remote pressure control" symbol will appear during a situation of superior remote command.

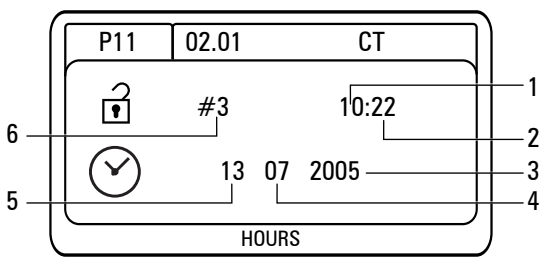
The pressure scheduling can be suspended remotely, by activating the digital input for remote load without activating the input to enable remote load. This function can be used to temporarily overrule the pressure scheduling, through a single remote interrupter, in unforeseen or periods out of the routine. The "pressure scheduling control" symbol will flash in a situation of superior control.

Navigation on the Pressure Scheduling Menu

The pressure scheduling menu page uses sub-items. All the pages' items, except PS ("enable pressure scheduling"), consist of a number of sub-items that are selected in a sequential way after going into the primary item for setting.

The "pressure scheduling" function must be deactivated (item 01; PS = 0),or the compressor must be turned off before any configuration adjustment can be made.

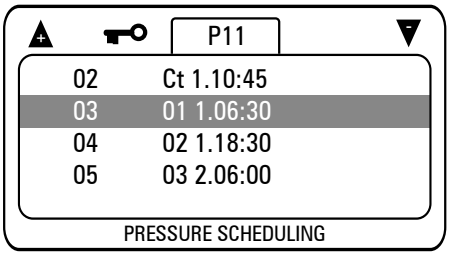
Adjusting the clock:
Select page 11 on the menu and select item "02" (Ct) on the list. The item on the list will flash and the screen will show the actual "day of week" and "time" adjusted in the 24h mode. To select an item on the list to adjust, press ENTER.



The setting screen of the RTC (clock) will appear and the item "Hours" (1) will be selected. Press UP or DOWN to adjust the hour, and then press ENTER. The item "minutes" (2) will be selected, press UP or DOWN to adjust the minutes, and then press ENTER. Repeat this procedure for the items "Year" (3), "Month" (4) and "Day of Month" (5). When the last item is adjusted, the item "Day of week" (6) will be automatically calculated and applied; the screen will return to the menu list.
If it's not necessary to adjust any sub-item, press ENTER immediately to move to the next sub-item.

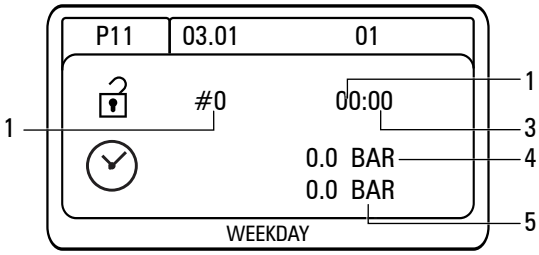
If it's not necessary to adjust any sub-item, press ENTER immediately to move to the next sub-item.

Pressure Scheduling Configuration:



There are 28 pressure scheduling configurations available; they are the items 03 to 30 of page P11. Each item of the pressure scheduling indicates the "Day of week" and the "time":
D.HH:MM (1.06:30)
D (1) Day of week (1=Monday to 7=Sunday)
HH (06) Hour of day (24 Hours)
MM (30) Minutes.

To set a new pressure scheduling:

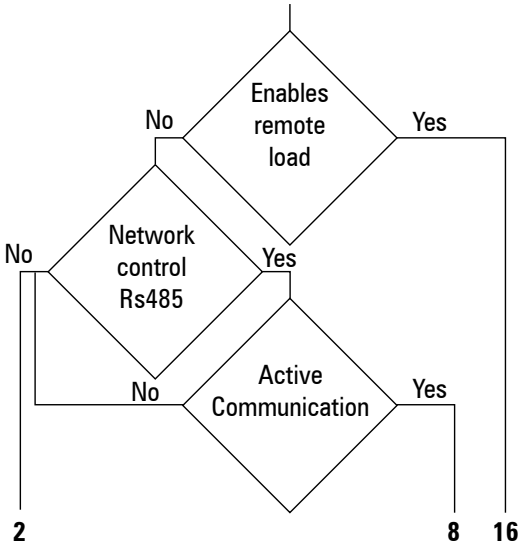


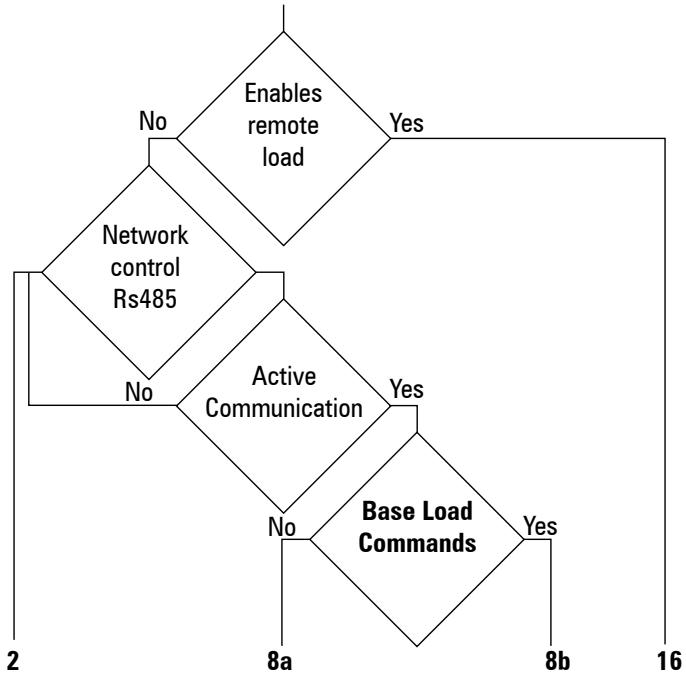
Select an empty pressure scheduling item; an item that shows "0.00:00". Press ENTER to select the item to be adjusted; the screen of the pressure scheduling item will appear and the sub-item "day of week" (1) will be selected. Press UP or DOWN to adjust the number to the desired configuration of "day of week"; then press ENTER.
The sub-item "hours" (2) will be selected.
Press UP or DOWN to adjust the configuration, and then press ENTER. The sub-item "minutes" (3) will be selected. Press UP or DOWN to adjust the setting, and then press ENTER. The sub-item "unload pressure" (4) will be selected. Press UP or DOWN to adjust the setting and then press ENTER.
This setting will overrule the "unload" pressure setting (P4 of user menu) when the configuration becomes active.
The sub-item "load pressure" (5) will be selected. Press UP or DOWN to adjust the setting, and the press ENTER; the screen will return to the menu list.
Note: all the pressure scheduling adjustments are kept in chronological order. When a configuration is inserted, it changes the position on the list automatically; this will be shown clearly.
To force the compressor to go into standby status, adjust the unload pressure setting to 0 (zero). The item for load pressure setting will be skipped in this case.

To adjust a pressure scheduling setting:
Select the pressure scheduling item that requires adjustment and press ENTER. Follow the same procedure to adjust a new pressure schedule, adjust the sub-items when necessary. If a sub-item requires no adjustment, press ENTER to move to the following sub-item.
To erase a pressure scheduling setting:
Navigate to the pressure scheduling item and press ENTER. Press DOWN to adjust the item "day of week" to 0 (zero) and then press ENTER. All remaining sub-item settings will be automatically reset to zero and the configuration will be deleted from the pressure scheduling list.
! The screen will go back to menu list.
The setting of the value for the unload pressure is limited to 0,2bar below the limit set for the line pressure alarm. If the limit for the line pressure alarm is adjusted to a higher value, it's possible that pressures set higher will result in "Alarm", "Shutdown", or "General Failure" fault conditions.

4.4.13 – Priority of the Pressure Control Sources
The pressure control can be done by a certain number of sources, internal or remote ones. Each potential source has a different priority from others. The priority diagram shows which pressure control mode the interface will use in all the selections of potential configurations, conditions of remote connection or failure modes.
The digital input to enable remote load (mode 16) has priority over all pressure control sources. If, for example, the line control RS485 is selected as primary source (8), and the communications are interrupted, the interface will automatically restore the pressure control to network RS485 (8).

For the Fixed Speed Mode:
1 Overlapping of the over pressure alarm
2 Load and unload settings on menu 01.
8 Load and unload commands of communication Rs485
16 Digital input for load and unload remote control.



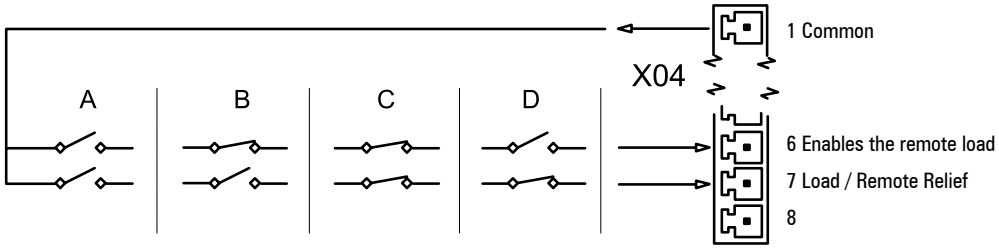


For the Variable Speed Mode
1 Overlapping of the overpressure alarm
2 Load and unload settings on menu 01.
8a Load and unload remote commands of communication Rs485
8b Communication RS485 remote base load (motor speed = forced to optimum speed)
16 Digital input for load and unload remote control.
17 (load = optimal speed; relief = speed of relief)

Safety
Independently from the source of pressure control, the limits set for safety pressure Alarm and Overpressure remain active and are not detected by the line and internal (in case there is) pressure sensors. If the internal pressure sensor is not in use, the line pressure sensor must never be disconnected.

Line pressure higher than alarm pressure:
If the line pressure exceeds the limit set for the alarm pressure, independently from source of pressure control, the solenoid will be immediately powered off. The solenoid will remain unpowered for as long as the pressure is above the limit set for the alarm and for a 10-second period after the pressure drops below the Alarm limit. This is a safety feature designed to prevent incorrect adjustments for the sources of pressure control, causing the compressor to exceed the project pressure limits. As long as there is an overlapping condition of the alarm pressure, the number of the load source will be increased in "1" (for example: active digital input to enable remote load (16) and active overlapping of the unload pressure (1) = 17).

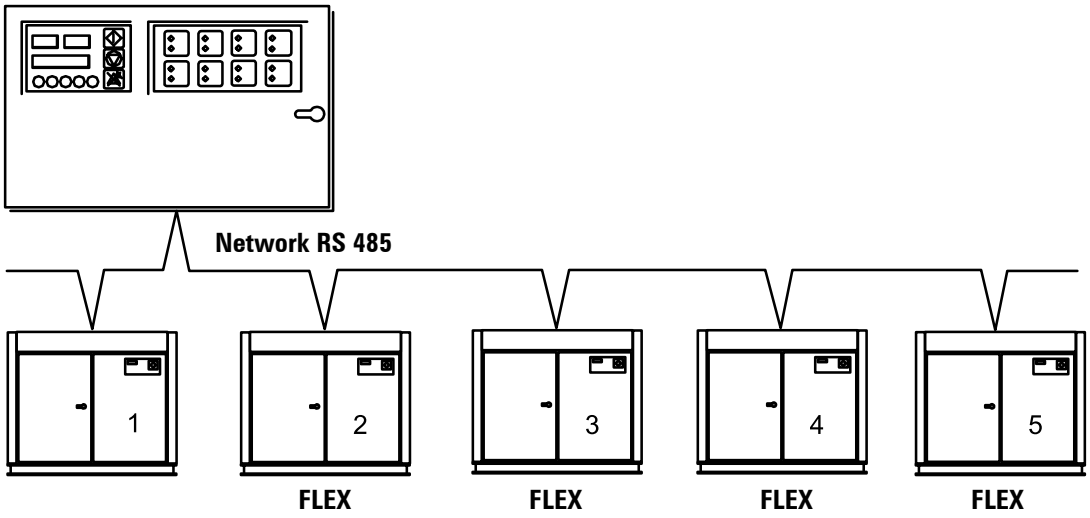
4.4.14 - Function of the Digital Input for Remote Load:



A Enable Remote Load not active.
B Enable Remote Load active, compressor unload command, P4…P1 ignored.
C Enable Remote Load active, compressor unload command, P4…P1 ignored.
D Enable Remote Load not active, remote load input ignored.

Note: The configuration "D" is used to disable the "pressure scheduling" when the pressure scheduling is active.

4.4.15 - Communication RS485 for Compressors Management Systems

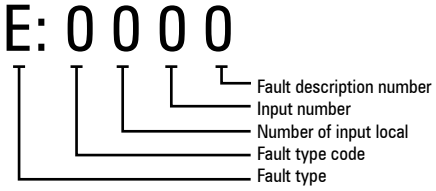


The combination with the Control Ar Schulz manager is standard for the interface Control II.
More than one FLEX compressor (variable speed) can be controlled by a Control Ar Schulz manager. One FLEX compressor, selected depending on the control strategy, will be designated as the main compressor and will work at its full range. Other FLEX compressor(s), designated as base units, will operate at the optimum speed set by each control. If the demand exceeds the total capacity of the system at any time, all the FLEX compressors will increase the speed above the optimum configuration (up to the set maximum speed) accordingly to keep the pressure.
The Schulz compressors manager is capable of controlling any combination of fixed or variable speed compressors with great energy-saving gains.

FAULT MESSAGES

5- FAULT MESSAGES

Faults are abnormal operating statuses or conditions. Alarms are fault statuses that indicate that normal operating conditions were exceeded, but represent no immediate risk or condition of potential damage. Alarms were designed only as warnings and will not stop the compressor or prevent it from initiating and going into operation.
The start-up impediments are fault statuses that prevent the compressor from initiating. The start-up impediments are conditions that can represent immediate risk or condition of potential damage if the compressor is initiated.
A start-up impediment will reset when the condition being monitored returns to normal operational levels. The start-up impediment conditions are only checked during the initial start-up procedure and will not stop the compressor, once it has already started and is in the "initiated" status. The start-up impediment conditions are not checked during an automatic motor start-up from standby mode.
The operation impediments are fault statuses that prevent the compressor's initiation. The operation impediment faults are conditions that might represent risk or potential damage if the main motor operates. An operation impediment will be reset when the condition being monitored returns to the normal operational levels. The compressor will be liberated to go out of the standby condition and operate without other intervention. The operation impediment conditions are checked before the main motor startup and will not stop the compressor once it has already initiated. The operation impediment conditions do not prevent that the compressor goes into "initiated" condition, that is, when the impediment condition ends, the compressor will start automatically.
The shutdown failures are fault statuses that represent a risk or damage condition, and the compressor is turned off immediately. The shutdown failure condition must be solved, and the fault reset, before the compressor can be restarted.
The different conditions of fault status are indicated on the display by specific codes, with the last digit indicating the type of fault: E=Shutdown or General Fault, A= Alarm or Warning, S=Start-up Impediment, R= Load or Operation Impediment. The shutdown errors by general failure are divided in two different categories: Errors of immediate shutdown and errors of controlled stop. Errors of immediate shutdown 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 keep operating for the set time until stopping. Errors of immediate shutdown have an error code, in which the first digit is 0 (zero). Faults of controlled stop have "1" as the first digit. Alarm faults are also divided into two different categories: alarms and maintenance alarm messages. Alarms begin with "2", maintenance alarm messages with "4". Start-up impediment codes begin with "3".



Fault Description Nº	Fault Description
9	High-level shutdown general failure
8	High-level alarm
7	High-level start-up impediment
6	Special Function
5	Sensor Error
4	Timing
3	Low-level start-up impediment
2	Low-level alarm
1	Low-level shutdown general failure
0	Digital input

Input Number	Input
#	Input number in the electronic interface

Input Local Nº	Description of Input Local
0	Digital input
1	Analog input
2 a 7	Not used
8	Special Functions
9	Special Functions, Slave Unit

Code of Fault Type	Description of the Fault Category
0	Error of immediate shutdown failure
1	Error of controlled shutdown failure
2	Alarm
3	Operation or start-up impediment
4	Service

Fault Type	Description of the Fault
E	General failure or shutdown
A	Alarm or warning (or service alarm)
S	Operation or start-up impediment
R	Operation Impediment

5.1 – IMMEDIATE SHUTDOWN AND STOP ERRORS

5.1.1 – Digital input errors

E:0040 Phase fault, phase sequence or inverter defect

E:0080 Motor fault (fault on the relay interrupter, overload on the interrupter device or on the PTC thermistor)

E:0030 Overload on the fan motor

5.1.2 – Analog input errors

E:0115 Failure on the line pressure sensor

E:0119 Overpressure

E:0125 Failure on the outlet pressure sensor

E:0129 Overheat

E:0131 Internal Pressure below the minimum limit

E:0135 Failure on the Internal Pressure Sensor

E:0139 High Internal Pressure

5.1.3 – Fuction special errors

E:0809 High differential pressure

E:0814 Shutdown time (internal pressure didn't drop below the minimum level within 120 seconds)

E:0821 Condition of low resistence, or there is a short-circuit at one digital or analog input (incorrect connection, fault on the sensor or cable)

E:0846 Range of the line pressure sensor was set below the pressure settings applied.
E:0856 Range of the internal pressure sensor was set below the pressure settings applied.
E:0866 Tension below the minimum level or incorrect DC polarity.

5.2 – CONTROLLED SHUTDOWN AND STOP ERRORS
None

5.3 - ALARMS
5.3.1 – Digital input alarms
A:2020 High oil filter differential pressure
5.3.2 – Analog input alarms
A:2118 High line pressure
A:2128 High outlet temperature
A:2138 High internal pressure
5.3.3 - Special function alarms
A:2808 High differential pressure
A:2816 Power loss occurred while compressor was in standby mode

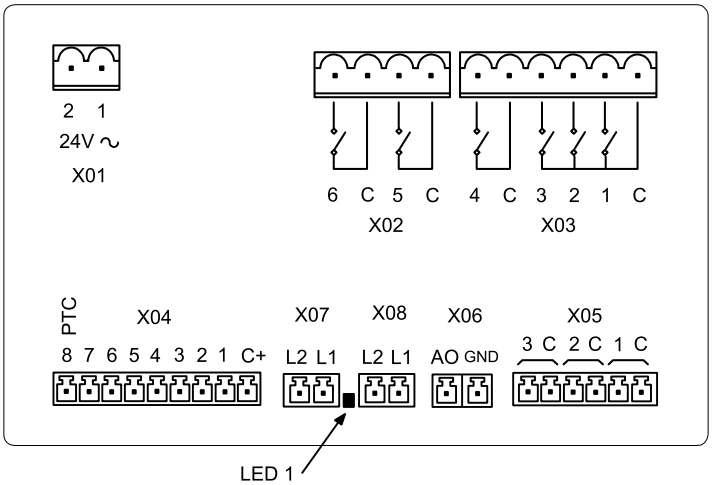
5.4 - START-UP IMPEDIMENTS
None

5.5 - OPERATION IMPEDIMENTS
R:3123 Outlet temperature below the minimum operation temperature, the interface will allow that the motor starts when the temperature is above the set value.
R:3137 Internal pressure PI above the impediment level set on the interface will pertmit that the motor starts when the pressure drops below the set level.

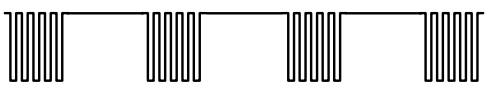
5.6 - MAINTENANCE ALARMS
5.6.1 - Maintenance alarms
A:4804 Change oil filter
A:4814 Change air filter
A:4824 Change oil
A:4834 Check separating element
A:4844 Grease motor bearings

CONTROL II – LEDs INDICATION

The LED 1 is located on the electronic board between the connectors X07and X08 and can be seen from the back of the interface, without removing the back protection cover. This LED supplies diagnostics information about different functions of Control II.

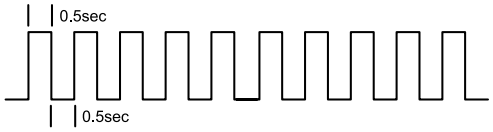


Production; internal testing



Production; testing mode

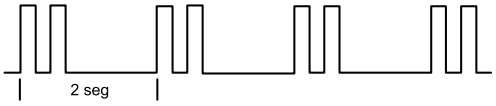
Normal operation mode
No communication



Note: A two-second interruption in this sequence will occur every 10 seconds, as Control II sends output data through the communication port Rs485.

Normal operation mode
Communication RS485#1

Normal operation mode
Communication RS485#2



Normal operation mode
RS485#1 and RS485#2