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EWCM9900
User manual

2.99 Bar -14.1 ℃
LP 0.09 HP 35.0
out 0 %

EWCM9900

CONTENTS

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EWCM9900

Electronic controller for compressor packs on 18-Din Rail

GENERAL DESCRIPTION • USING THE MANUAL • WARNINGS

EWCM9900 18DIN are a family of controllers dedicated to the control of the machine room of a refrigeration plant, with simple, multistage or variable power compressors.

Characteristics
• Up to 19 completely configurable relay outputs for controlling simple, multistage or various power compressors and condenser fans
• Up to 3 analogue outputs for controlling **INVERTER** compressors and **INVERTER** fans
• Up to 3 inputs with pressure transducers for the compressor section and the fan section
• Up to 4 temperature inputs for NTC probes configurable as voltage free digital inputs.
• Up to 14 voltage digital inputs and 6 voltage free digital inputs configurable for plant diagnostics and Energy Saving functions.
• Compatibility with a vast range of refrigerants.
• Built-in clock (RTC).

Functions
• **INVERTER** control of compressors and fans
• Proportional Control, PID and Dead Band.
• Selection of homogenous power compressors and fan rotation policies
• Algorithms for Energy Saving.
• Two programmable Setpoints: normal and reduced regime.
• Dynamic suction and delivery setpoints
• Time band management.
• Management of probe alarms and minimum and maximum pressure switch alarms both for the compressors section and for the fans section
• Full alarm handling (self-diagnostics and alarms log).
• Operational log handling.
• Upload/download parameters, alarms log, operational logs and glossaries with USB Copy Card.
• Safety system which, in case of EWCM failure, activates an alarm output to deviate machine room control to an emergency system which ensures minimum operation until technical service is possible.

Navigation and programming
• User-friendly LCD graphic keyboard.
• Menu navigation.
• Quick access menu for immediate status display and setting main operating parameters.
• Display and setting of programmable parameters in Bar, PSI, °C or °F.
• Reduced set of parameters.
• 3 levels of access to programming parameters.
• Quick Start Menu for quick and easy configuration.
• Keystroke function activation

from Remote control
• Connections for TelevisSystem or Modbus RTU remote control systems.
• Display (and modification with the correct privileges) online, with an internet browser, of parameters, states and alarms.

Mounting
• Mounts to 18DIN rail (power board) and panel (keypad).
All machine status control and configuration operations can be performed using the supplied LCD keypad. Menu navigation is user-friendly: two languages are available as standard (English + local language) defined according to the product code.

The configuration and maintenance of the device is protected by several levels of passwords which hide/protect access, for authorised persons only.

The Administrator Menu is dedicated to the System Administrator and permits access to the Quick Start Menu and all configuration and operational parameters: the Administrator will also manage the access passwords for the users and experts (installers and technicians).

The Quick Start Menu is dedicated to initial configuration of the machine/system and permits quick and efficient assignment of the system's resources.

The Service Menu is typically intended for use by the Administrator and Technical Service and allows use of the USB Copy Card (see appropriate chapter) and utilities diagnostics and control.

However, any user can use the function keys and navigation keys to monitor the status of the system, display alarms, activate functions, etc. without the aid of passwords.
The Clock and Time Bands Menu also allows the user to set the date and time and to control use of the plant, using a weekly calendar.

IMPORTANT WARNINGS
The availability and access to information is determined by the model in use and the settings made by the Administrator.
The System Administrator is responsible for enabling access to the various menus for qualified staff who are charged with installing and servicing the system.
The high degree of configurability of the system requires that the system and its applications be thoroughly studied for the device and system to operate at their best.

For any doubts/information, contact Eliwell Technical Service.

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AVAILABLE MODELS

Standard type system
1 suction circuit
FACTORY DEFAULT CONFIGURATION
[501- tyPE = 0]

Single delivery shared drain system
2 suction circuits
501- tyPE = 1]

*NOTE: Configure SIG2 correctly as
circuit 2 suction pressure 2.
Set parameter [624- H402] = ±2.

EWCM9900			
Relay outputs	19	4 Stepped Compressors	5A SPDT
		8 Capacity steps (2 capacity steps x 4 Compressors)	
		5 Configurable	
		1 Alarm	8A SPDT
		1 Refrigerant level alarm	
Analogue outputs	3	1 INVERTER fan	4…20mA
		2 Configurable	4…20mA
Digital Inputs	20	6 Voltage Free	1 Refrigerant level alarm
			1 Economy Suction circuit 1
			1 Economy Delivery
			3 Configurable
		14 High voltage	4 Compressor shutdown
			1 Refrigerant level alarm
			1 Suction pressure switch alarm circuit 1
			1 Delivery pressure switch alarm
			7 Configurable
Analogue inputs	7	4 - NTC	Internal Temperature
			External Temperature
			Sub-temperature
			1 Configurable
		3 - 4...20mA	Suction Pressure
			Delivery Pressure
			1 Configurable
Connections	RS485	YES	
	Ethernet	YES (optional)	
	USB CopyCard	YES	
Menu Languages	2	ENG/ITA - ITA/ENG - SPA/ENG - GER/ENG FRE/ENG	
Power Supply		100-240V~	

EWCM9900			
Relay outputs	19	4 Stepped Compressors	5A SPDT
		4 Full Compressors	
		8 Capacity steps (2 capacity steps x 4 Compressors)	
		5 Configurable	
		1 Alarm	8A SPDT
		1 Refrigerant level alarm	
Analogue outputs	3	1 INVERTER fan	4…20mA
		2 Configurable	4…20mA
Digital Inputs	20	6 Voltage Free	6 Configurable
		14 High voltage	8 Compressor shutdown
			1 Refrigerant level alarm
			2 Suction pressure switch alarms circuit 1/2
			1 Delivery pressure switch alarm
			2 Configurable
Analogue inputs	7	4 - NTC	Internal Temperature
			External Temperature
			Sub-temperature
			1 Configurable
		3 - 4...20mA	Suction Pressure
			Delivery Pressure
			*1 Configurable
Connections	RS485	YES	
	Ethernet	YES (optional)	
	USB CopyCard	YES	
Menu Languages	2	ENG/ITA - ITA/ENG - SPA/ENG - GER/ENG FRE/ENG	
Power Supply		100-240V~	

NOTE ON PARAMETERS

Parameters menu
The parameters menu is accessed from the main display as indicated in the chapter on the Parameters Menu and described in the Keys and Components section.

Structure of the parameters
The parameters have been subdivided into folders (i.e. Quick Start folder). The value of the individual parameter can be displayed and modified in each folder. The parameter is identified by a three-figure number followed by an acronym (i.e. 501 - tyPE)

Reduced parameters menu
Access to the 'reduced' parameters Menu takes place via the Main Display by pressing and holding down the function key F2.
Only a few parameters are visible (that is a 'reduced' set of parameters) of the Parameters Menu:
• Operating
• Configuration

In the description of the parameters, the reduced parameter set is shown **in bold**.

NOTE
• Some parameters can be displayed and modified not just via the Parameters Menu, but also via other Menus (i.e. parameter 133 - SEt Suction Set Point can be displayed and modified via the SET/BAND menu.
• Some parameters can be displayed not just via the Parameters Menu, but also via other Menus (i.e. parameter 646 - SIG12 Probe Type 1/2 can be displayed, but not modified, via the Probe Menu. In order to configure the SIG12 pressure transducers correctly, you need to access the Parameters Menu, Configuration folder.

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INSTALLATION

IMPORTANT! Always make sure the device is switched OFF before operating on the connections. The operations must be carried out by qualified personnel.

Do not install the devices in places subject to high humidity and/or dirt: in fact, they are suitable for use in places with normal or ordinary pollution levels.

Make sure the area near the cooling slots is ventilated.

Keyboard mounting

The keyboard is designed for panel-mounting.
Make a 138x68mm hole.
Remove the front panel (figure 1) and make 6 holes in the panel (figure 2 points A/B/C/D/E/F) of dia. 2.7 mm at the specified spacing (figure 2). Insert the device, fixing it with the screws. Close the front of the keyboard by pressing with fingers.

Power board mounting

To install the BASE on DIN RAIL, proceed as follows:

Move the four spring docking devices to their standby position (use a screwdriver, see figure 3).
Install the 'BASE' on the DIN RAIL, then press the 'spring docking devices' which will go to the closing position.
NB: With the 'BASE' assembled on the DIN RAIL, the 'Spring docking devices' must be turned downwards.

FIG 1
Keyboard
Mounting

FIG 2 - CUTout
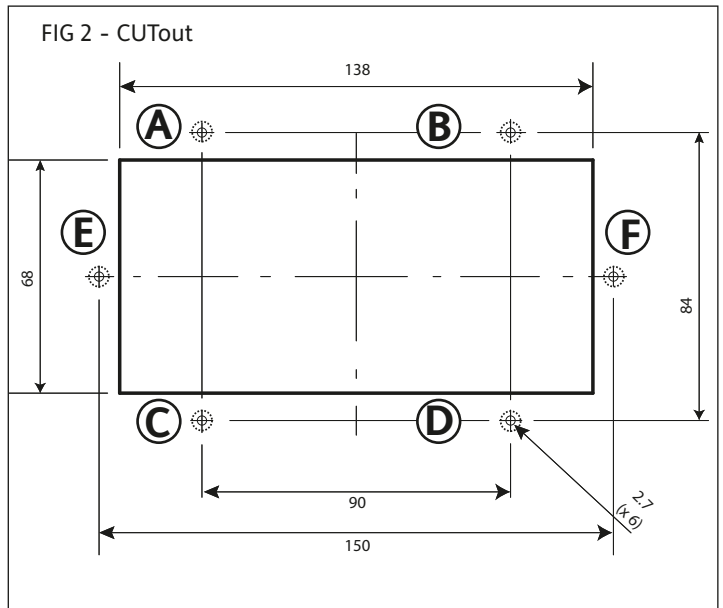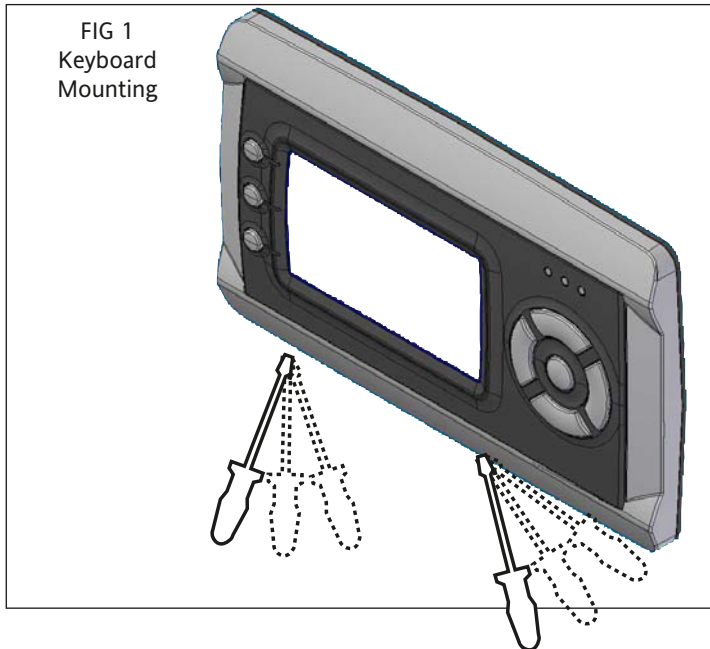
FIG 3 CAP

BASE - KEYPAD CONNECTION

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EWCM keyboard rear

max length 3m
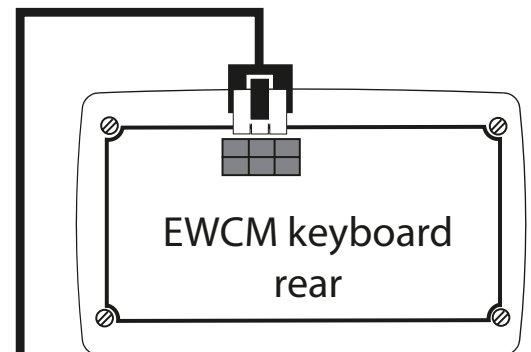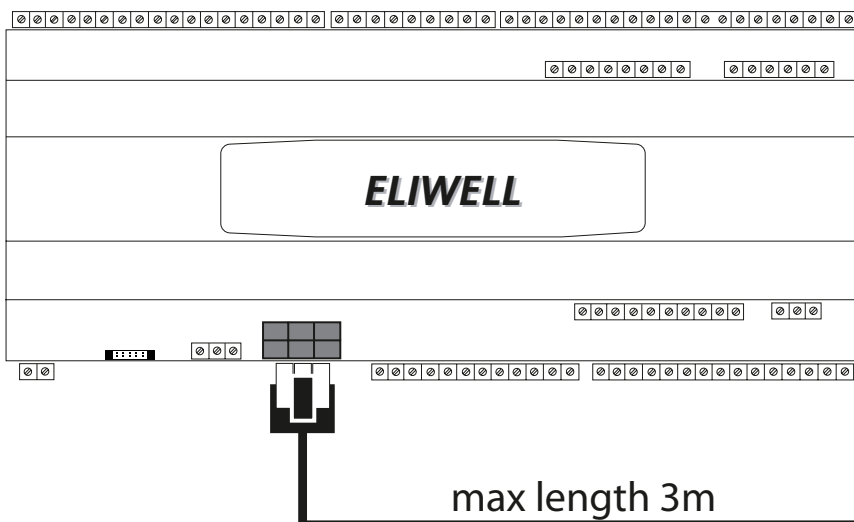
For the connection between the base and the keypad, use the supplied 3 m 6-wire microfit cable. Only use the cable supplied, respecting the maximum distance of 3m.
The cable must be wired separately from the power cables.

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ELECTRICAL HOOKUP PRECAUTIONS

IMPORTANT! Make sure the machine is switched off before working on the electrical connections. The operations must be carried out by qualified personnel.

To ensure proper connections, comply with the following:
• Power supplies other than those specified can seriously damage the system.
• Use cables of suitable section for the terminals used.
• Separate (as much as possible) the cables of probes and digital inputs from inductive loads and power connections to prevent electromagnetic interference. Do not place the probe cables near other electrical equipment (switches, meters, etc.).
• Make connections as short as possible and do not wind them around electrically connected parts. Use shielded cables for the probe connections.
• To avoid causing static discharges, do not touch the electronic components on the boards.
For all electrical connections, refer to the provided wiring diagrams.

The device is provided with screw-in terminals for wires of maximum cross section 2.5 mm^2 (only one wire per terminal for power cables).
The relay outputs are voltage free.
Do not exceed the maximum permitted current; for higher loads, use a contactor with sufficient power capacity.
Make sure that power supply is of the correct voltage for the device.
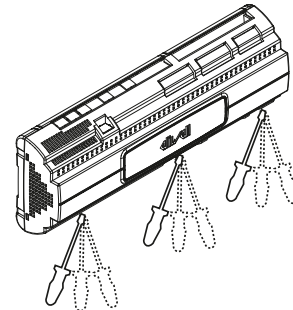The temperature probes have no characteristic insertion polarity and can be extended using standard bipolar cable (note that extending cables can affect the performance of the device in terms of electromagnetic compatibility: great care must be exercised in making the wiring connections). The pressure probes have an insertion polarity which must be observed.

SUPERVISION
The connection:
• to the Televis**System** / Modbus RTU remote control systems
• to the **Param**Manager fast parameter setting software
can be made with a direct RS-485 connection using the RS485/TTL-RS232 PC**Interface** converter and the required software license.

For the installation of the RS-485 network, refer to the provided documentation. See Annex - Accessories.

USB CopyCard
Fit the USB Copy Card TTL side into the slot and up/download the parameters as described in the Copy Card chapter.
On termination of the procedure, disconnect the USB Copy Card.

WebAdapter
The **Web**Adapter module enables display (and modification, given the required permissions) with an internet browser, of parameters, states and alarms.

The controller can be connected to the internet with the **Web**Adapter module, to display the controller's resources via an internet browser without the need for any further software on the pc.
The connection between the controller and the **Web**Adapter is made with a direct RS-485 and software license.

Notes:
• If the module is internally integrated, there is no need for recognition or configuration of the module.
• If the module is external, it must be configured.

For the connection, refer to the **Web**Adapter 8MA*0202 manual.

PCINTERFACE CONNECTION

The PC**Interface** device must be used with:
1) **Param**Manager versions 5.2 or later;
2) versions of OS on PC Win XP, Home or Professional or more recent.
Software Licence
For the device to be recognised by the **Param**Manager software, the Blue**Card** module supplied with the software license must be inserted in its slot.

Files with extensions .DAT, .HIS, .REC are in text format and can be read with any word processor (e.g. WordPad / Notepad).

Files with extension .dat can be used by Param Manager version 5.2 or following.

EWCM connected to the PC INTERFACE 2150/2250 with a RS 485 line.
For monitoring, managing and programming the parameters of the instrument

• NOTE 1: instrument powered independently.
• NOTE 2: pay particular attention to the polarity of the RS-485 line (+, - and GND).
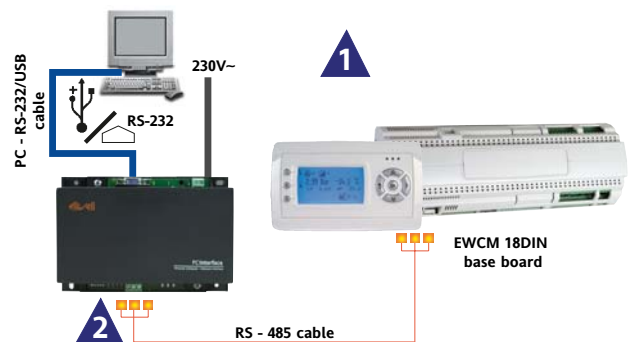
EWCM9900 WIRING DIAGRAM
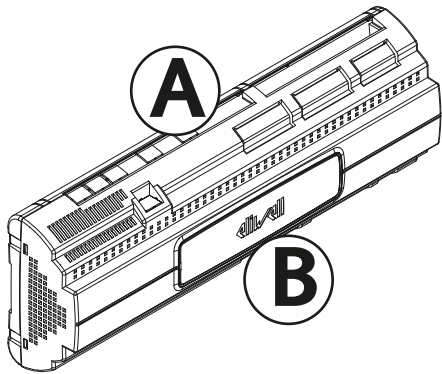
DEFAULT CONFIGURATION
- plant with 4 stepped compressors (2 Capacity Steps x 4 Compressors) + INVERTER fan
- pressurised suction and delivery control (bar)

POSSIBLE CONFIGURATIONS
- management of two suction circuits
- management of suction circuit 1 and/or circuit 2 via INVERTER or INVERTER + digital compressors
- management of suction circuit 1 and/or circuit 2 via INVERTER
- non-homogeneous digital compressor management
- full and/or stepped digital compressor management
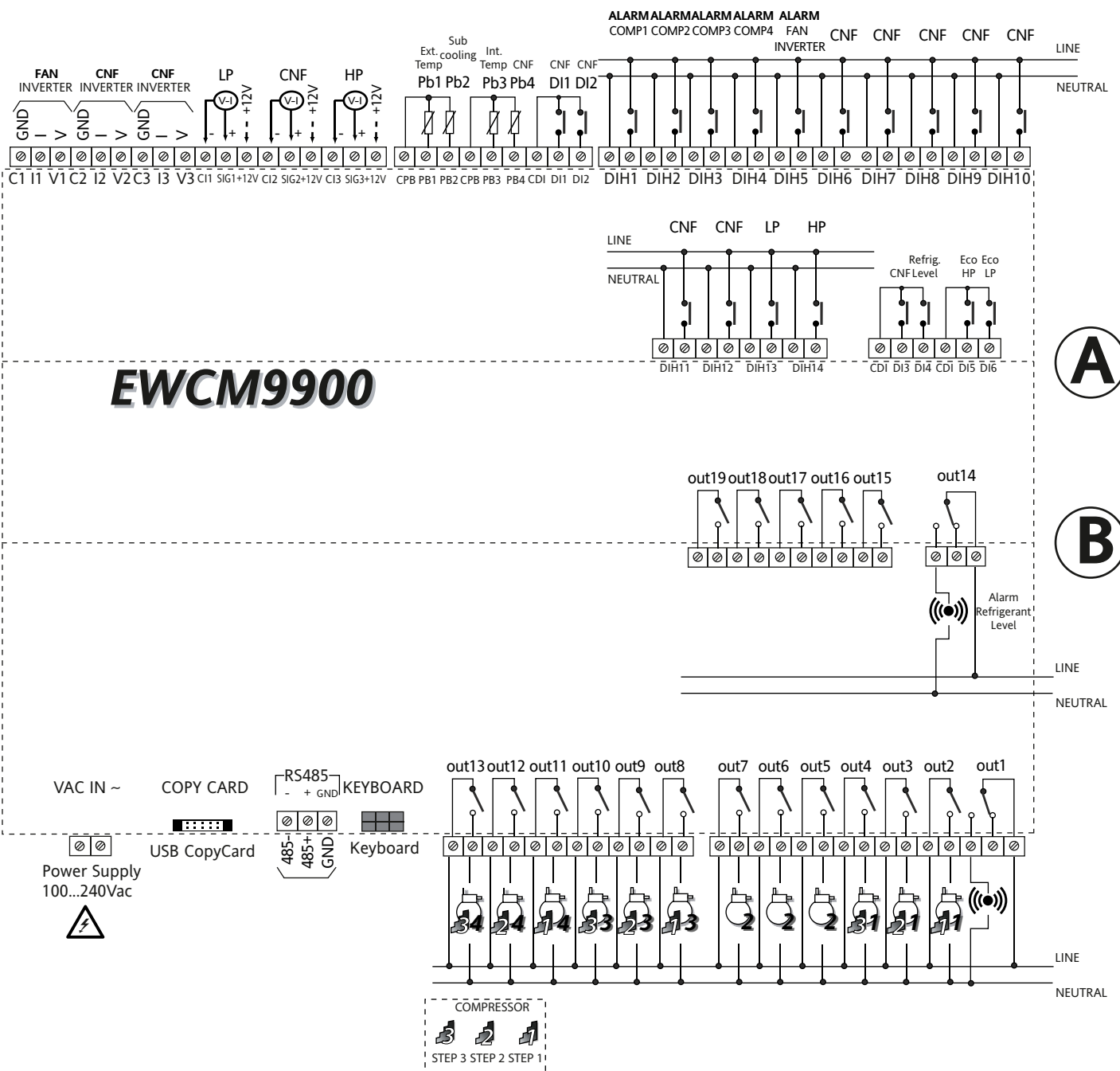
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EWCM9900 TERMINALS DESCRIPTION

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TERMINALS BLOCK SIDE A

LABEL	DESCRIPTION	FUNCTION
VOLTAGE FREE DIGITAL INPUTS [DEFAULT CONFIGURATION]		
DI1	Configurable digital Inputs	CNF - none
DI2	Configurable digital Inputs	CNF - none
DI3	Configurable digital Inputs	CNF - none
DI4	Refrigerant level Alarm	Refrig. level
DI5	Discharge Economy	Eco HP
DI6	Suction Economy	Eco LP
HIGH VOLTAGE DIGITAL INPUTS [DEFAULT CONFIGURATION]		
DIH1	Block Compressor 1	ALARM COMP1
DIH2	Block Compressor 2	ALARM COMP2
DIH3	Block Compressor 3	ALARM COMP3
DIH4	Block Compressor 4	ALARM COMP4
DIH5	Alarm Fan INVERTER	ALARM FAN INVERTER
DIH6	Configurable	CNF - none
DIH7	Configurable	CNF - none
DIH8	Configurable	CNF - none
DIH9	Configurable	CNF - none
DIH10	Configurable	CNF - none
DIH11	Configurable	CNF - none
DIH12	Configurable	CNF - none
DIH13	Configurable	CNF - none
DIH14	Configurable	CNF - none
ANALOGUE INPUTS [DEFAULT CONFIGURATION]		
[CI1] [SIG1] [+12V]	Suction pressure probe in current 4...20mA*	LP
[CI2] [SIG2] [+12V]	Configurable	CNF - none
[CI3] [SIG3] [+12V]	Delivery pressure probe in current 4...20mA*	HP
PB1	Analogue Input External Temperature NTC**	Ext. Temp.
PB2	Analogue input Subtemperature**	Subcooling
PB3	Analogue Input Internal Temperature NTC**	Int. Temp.
PB4	Analogue Input Configurable**	none
*4...20mA / 0-5V / 0-10V Settable by parameter ** NTC/PTC/ Digital input Settable by parameter		
ANALOGUE OUTPUTS [DEFAULT CONFIGURATION]		
INVERTER [C1] [I1] [V1]*	Inverter Fan Analogue Output in Current**	FAN INVERTER
INVERTER [C2] [I2] [V2]*	Configurable Analogue Output in Current**	CNF - none
INVERTER [C3] [I3] [V3]*	Configurable Analogue Output in Current**	CNF - none
*GND [-], I [I+], V [V+] **voltage-current settable by parameter		

TERMINALS BLOCK SIDE B

LABEL	DESCRIPTION	FUNCTION
VAC IN ~	Power supply 100-240V~	Power supply 100...240 Vac
USB CopyCard	USB Copycard	COPYCARD
RS-485 [- + GND]	RS485 Televis**System** connection	RS485
Keyboard	Power board / keypad connection	Connessione a Tastiera
RELAYS [DEFAULT CONFIGURATION]		
OUT1	relay SPDT Alarm	Alarm
OUT2	relay N.O. Compressor 1 Step 1	COMP1 STEP 1
OUT3	relay N.O. Compressor 1 Step 2	COMP1 STEP 2
OUT4	relay N.O. Compressor 1 Step 3	COMP1 STEP 3
OUT5	relay N.O. Compressor 2 Step 1	COMP2 STEP 1
OUT6	relay N.O. Compressor 2 Step 2	COMP2 STEP 2
OUT7	relay N.O. Compressor 2 Step 3	COMP2 STEP 3
OUT8	relay N.O. Compressor 3 Step 1	COMP3 STEP 1
OUT9	relay N.O. Compressor 3 Step 2	COMP3 STEP 2
OUT10	relay N.O. Compressor 3 Step 3	COMP3 STEP 3
OUT11	relay N.O. Compressor 4 Step 1	COMP4 STEP 1
OUT12	relay N.O. Compressor 4 Step 2	COMP4 STEP 2
OUT13	relay N.O. Compressor 4 Step 3	COMP4 STEP 3
OUT14	relay SPDT Refrigerant level Alarm	Alarm Refrigerant Level
OUT15	relay N.O. Configurable	none
OUT16	relay N.O. Configurable	none
OUT17	relay N.O. Configurable	none
OUT18	relay N.O. Configurable	none
OUT19	relay N.O. Configurable	none
- [NO] Normally open; [NC] Normally closed; [C] Common		

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POWER UP

The device is operated with the EWCM KEYBOARD which is equipped with an LCD display, 3 LEDs, 8 keys divided into 3 function keys and 5 menu navigation/editing keys (parameters, function, etc.).
The display and the LEDs are used to monitor the parameters, machine status and operating modes, as well as configuring the parameters.

When the machine is switched on, the LCD display shows 'ELIWELL'. The system information (SYSTEM INFO) is given below, including Hardware (HW), Firmware (FW) and Date versions. Always save and print out this information for use by technical service in case of need.
The instrument will lastly show the main menu (that is the main view). All menus are available in 2 languages (for example Italian (local language) and English (default)) according to the product code.
Check feasibility and availability of codes with Sales Department.

KEYS AND COMPONENTS

Nr.	Key	Main Display		Navigation Menu	Edit Mode
		Press and release	Press and hold (around 5 seconds)	Press And Release	Press and release
1	F1	Opens the Compressors/fans Menu	No Function	No function	No function
2	F2	Opens the set/band Menu	Opens The Reduced Parameters Configuration Menu	No function	No function
3	F3	Alarm acknowledgment	• Opens The Alarms Menu •Upload Glossaries (from reset)	No function	No function
4	UP	No function	No Function	Scrolls through Menu items	Increase Vvalue
5	Rh (Right hand)	Change display discharge value °C -> °F -> Bar -> PSI	Opens the Probes Menu	Opens the next Menu	Save and confirm value
6	Ok (Enter)	No function	Opens the Navigation Menu	• Opens the next Menu • Enters Edit Mode • Activate function	Save and confirm value
7	DOWN	No function	No function	Scrolls through Menu items	Decrease value
8	Lh (Left hand)	Change display suction value °C -> °F -> Bar -> PSI	No function	Return to previous Menu	Quit Edit Mode

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The keypad has 3 LEDs. See the table.
• The LEDs can be off / on steady / flashing.
• The Programming LED (PRG) is off or flashing in the Operation / Configuration / Administrator menus (see above).
• The Economy LED (third from left) can be never flashing.

LEDs	off	Permanently on	blinking
Alarm	no alarm	alarm active (at least one)	alarm acknowledgment
PRG (Programming)	Main menu	N.A.	Operational / Configuration / Administrator Parameters menu Service menu
Economy	Economy function off	Economy function on	N.A.

QUICK MENU

The display is used to monitor the parameters, machine status and operating modes, as well as configuring the parameters.
The Main Menu has 5 sections:
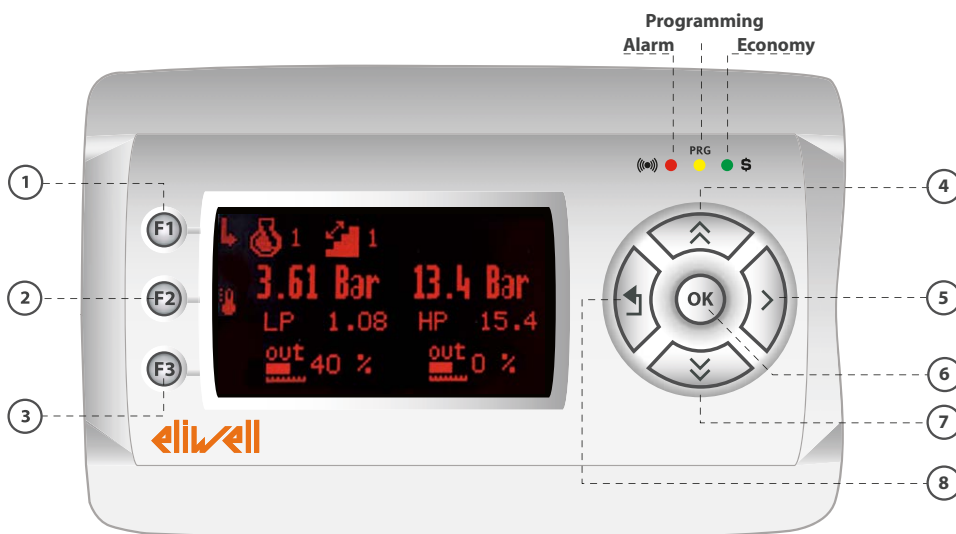
A

'arrow' icon
• associated with key F1 for access to the Compressors/Fans menu.

'key' icon
• associated with key F2 (if so programmed)
 - indicates the state of Keypad lock (LoCK)
 - visible only if the keyboard is locked

'thermometer' icon
• associated with the F2 key to access the Menu SET/BAND.

'alarm' icon
• associated with the F3 key for
 - access to the Alarms Menu
 - acknowledge the alarms
Visible only when there are alarms / probe errors

The described icons are visible only in the Main View. During Menu navigation they are not present.

B

Compressors/FansDIGITAL

• compressor icon followed by a number to indicate the number of active compressors

• active compressor power steps icon followed by the appropriate number

• digital fan icon followed by a number to indicate the number of active digital fans

C **D**

LP suction side
• the first number indicates the value read by the suction probe
• the second number indicates the value of the suction setpoint

HP discharge side
• the first number indicates the value read by the discharge probe
• the second number indicates the value of the discharge setpoint

E

Compressors/Fans INVERTER
suction/discharge side **INVERTER** compressor
• an out icon is displayed
 - the number indicates the percentage output of the **INVERTER**

PS: the percentage is indicated only by the value %: the icon doesn't identify the power delivered, that is it is the same for all the percentages.

suction/discharge side **INVERTER** fan
• an out icon is displayed
 - the number indicates the percentage output of the **INVERTER**
 - no output in the case of digital fans
 Note: in the case of digital fans, the corresponding icon is shown in section B

PS: the percentage is indicated only by the value %: the icon doesn't identify the power delivered, that is it is the same for all the percentages.
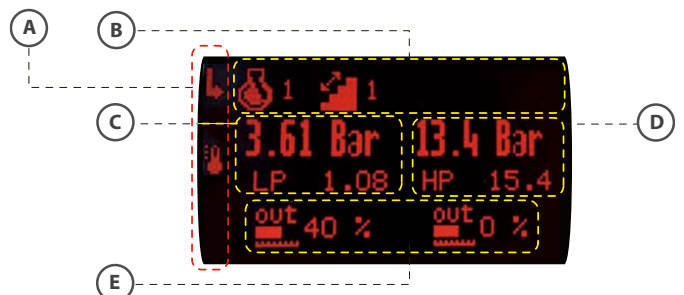
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SHORTCUTS

Specific submenus can also be accessed directly from the main display using the following keypad shortcuts (also see Keys and Components):
• Key F1* Compressor and Fans Status
• Key F2** Unlock keypad (if locked by a parameter)
• Key F2* *Set / Band* (Setpoint and control band menu)
• Key F2** *Parameters > Operation/Configuration* (Reduced menu)
• Key F3* ** *Acknowledge / Diagnostics > Active Alarms* (Alarms Menu)
• Key DX** Probes menu
• Keys SX*/DX* Modify main discharge/suction display
• Key OK *Advanced Navigation* (Menu)
* Press and release / ** hold for about 5 seconds

The setpoint and band values visible in the *Set / Band menu* can also be set with the *Parameters > Compressors menu* or *Parameters > Fans menu*
The menus:
• *Menu Set / band*
• *Compressors / fans menu*
• *Probes menu*
are only accessible from the Main Display and not from the navigation menu.

LOCK KEYPAD

Parameter 549 - LoCK (see parameters description) allows you to lock the keypad to prevent inadvertent operation.
The keys are immediately disabled.

When the keypad is locked, the key icon ⟊ is displayed
(see Quick Menu) and it is not possible to operate the device until it is unlocked again.
To unlock the keypad, hold down F2 (default).
Parameter 550-HKUnL allows you to chose which key to use for unlocking the keypad.

SETPOINT AND CONTROL BAND MODIFICATION

Access to the SET/BAND Menu takes place via the Main Display by pressing function key F2.
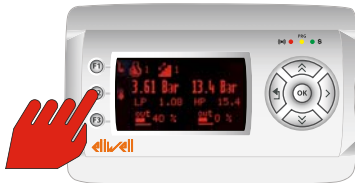
This menu displays the suction and discharge setpoints and bands

Change setpoint
For example, the suction setpoint is 0.09 bar.
To modify it select Set Asp and press the OK key.
The parameter 133 - Set displays
The corresponding discharge parameter is 333 - Set
Both can be modified as described in the Parameters chapter.

SET/BAND	01/02
Suc Set	0.09 Bar
Suc Band	0.25 Bar
Del Set	14.4 Bar

SET/ SUC	001/001
133 - SEt	
Suction setpoint	
0.09 bar	

Modify band
Similar to setpoint modification. the suction band is 0.25 Bar and the associated parameter is 134-Pbd (334-Pbd for discharge).
NOTES:
• The setpoint displayed by default is a relative pressure value (absolute pressure - 1 bar). In the example, 0.09 bar = 1.09 - 1 bar.
• To display the absolute pressure value, set parameter 543-rELP.
• The unit of measure shown on the display may differ from the control unit (this is determined by 548-UMFn).
• The setpoint may be lateral or central depending on the value of parameter 551-Stty.

REDUCED MENU

Access to the 'reduced' parameters Menu takes place via the Main Display by pressing and holding down the function key F2.

Only a few parameters are visible (that is a 'reduced' set of parameters) of the Parameters Menu:
• Operating
• Configuration

If a password has been enabled, you will first be presented with the label 'PASSWORD'.
In the description of the parameters, the reduced parameter set is shown in **bold**.

Note: The configuration folder includes the folder and the QuickStart parameters described in the Advanced Functions chapter

PARAMETERS	01/01
Operating	
Configuration	

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PROBES MENU

Access to the Probes Menu takes place via the Main Display by pressing and holding down the RH function key.

5 sec

This Menu shows the values of the pressure transducers and the probes in the plant.

Display of the values of the probes
Scroll through the probe values with the UP and DOWN keys.

PROBES	01/05
SIG1	13.4 Bar
SIG1	13.4 PSI
SIG2	3.61 Bar

PROBES	02/05
SIG2	3.61 PSI
SIG3	13.4 Bar
SIG3	13.4 PSI

PROBES	03/05
PB1	15.6 °C
PB1	32.4 °F
PB2	Err

PROBES	04/05
PB2	Err
PB3	Err
PB3	Err

Note that each input has two separate values.
SIG1/2/3 in Bar and PSI, PB1..4 in °C and °F.

Configuration of analogue inputs
The Probes Menu only allows you to view the analogue input values. To configure them, use the Configuration folder in the Parameters menu.
The analogue inputs are configurable in pairs, with the following parameters:
• 646 - Sig12   Probe Type SIG1/2
• 647 - Sig34   Probe Type SIG3   SIG4 is NOT present
• 648 - Pb12   Probe Type PB1/2
• 649 - Pb34   Probe Type PB3/4

EWCM9900 default configuration:
• The SIG1 transducer is used as a current suction transducer
• The SIG2 transducer is not used
• The SIG3 transducer is used as a current delivery transducer
• PB1 is an NTC probe for measuring the internal temperature for the suction dynamic setpoint
• PB2 is an NTC probe for measuring the external temperature for the delivery dynamic setpoint
• PB3 is an NTC probe for measuring the internal subtemperature for the delivery dynamic setpoint
• PB4 is an NTC probe - Not used
Model EWCM9900 - configuration [501-tyP=501]
• The SIG2 transducer is used as a suction transducer for **circuit 2** when powered (place [654 - H402] =2)
NOTE:
• SIG1 and SIG2 are ALWAYS of the same type* (e.g. 4...20mA)
• PB1 and PB2 are ALWAYS of the same type* (e.g. NTC)
• PB3 and PB4 are ALWAYS of the same type* (e.g. digital input)
* in other words, configurable in pairs. See the wiring diagrams.
Pressure transducers resolution
The resolution of transducers SIG1 and SIG2 is settable by parameter:
• 650 - HSig1   SIG1 High Precision (0= No, 1 = Yes)
• 651 - HSig2   SIG2 High Precision (0= No, 1 = Yes)
The default setting is High Precision (1 = Yes):
• Suction: in hundredths of bar / tenths of PSI
• Delivery: in tenths of bar / tenths of PSI
Also see the table at the bottom of the Value Displays page.
Analog inputs calibration
Analog inputs calibration can be set by parameters:
655 - CALSIg1   Calibration SIG1 bar
655 - CALSIg1   Calibration SIG1 PSI
656 - CALSIg2   Calibration SIG2 bar
656 - CALSIg3   Calibration SIG3 PSI
656 - CALSIg3   Calibration SIG3 bar
656 - CALSIg2   Calibration SIG2 PSI
659 - CALPb1   Calibration PB1 °C
659 - CALPb1   Calibration PB1 °F
...
662 - CALPb4   Calibration PB4 °C
662 - CALPb4   Calibration PB4 °F
Note that each parameter can be given a double calibration depending on the unit of measurement.
The calibration is significant when analogue inputs are configured as digital.

Probe errors
If the pressure probe/transducer is in error, the message Err appears in place of its value.

VALUE DISPLAYS

resolution of the regulation and accordingly the display is determined by the following table:

Unit of measurement	Resolution Suction*	Resolution Discharge**	Range
Bar	0,01	0,1	-1999...1999
PSI	0,1	1	-1999...1999
°C	0,1	0,1	-1999...1999
°F	0,1	0,1	-1999...1999

Note:
If • 650 - HSig1 = 0 we have

Unit of measurement	Resolution Suction	Resolution Discharge	Range
Bar	0,1	0,1	-1999...1999
PSI	1	1	-1999...1999

Example
Case of two suction circuits, shared drainage system

Unit of measurement	Resolution Suction 1*	Resolution Suction 2*	Resolution Delivery**
Bar	3.69	3.69	13.7
PSI	53.5	53.5	198
°C	0.1	0.1	0.1
°F	0.1	0.1	0.1

Note:
* SIG1 Circuit suction 1; SIG2 Circuit suction 2 - if present - see par. [501-tyPE]=2 and [654 - H402] =2
**SIG3 delivery

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COMPRESSORS/FANS STATUS

This Menu shows the state of the compressors and the fans.

The first screen displays the status of the compressors:
Compressors
The display shows:
upper side for compressors/fans of the main menu • **fig. A**
• compressor symbol
• LP Low Pressure symbol (suction side)
• value read by the suction probe in the unit of measurement defined in the main display (e.g. 9.55 Bar)
lower side for the compressor and analogue outputs • **fig. B**
left side
• the state of the compressors present* and the number of steps* (e.g. 2 compressors / 4 steps) - see the two boxes highlighted by a double frame - the first one indicates the compressors, the second one steps.
In the example, in fact, there are 2 compressors present and turned on. Both are active; the first one has 1 active step, the second one all 4 steps active.
right side
• the presence or otherwise** of the analog outputs and their percentage of use identified by a vertical bar divided into 6 'notches' (in sixths, or 1 'notch' corresponds to 1/6 of power) - see box with dotted frame -
** in the case of an **INVERTER** compressor on circuit 1 / circuit 2 not visible otherwise.

To view the state of the fans it is necessary to press the DOWN key. A second screen will display: *Fans Menu*.

Depending on the type of fans configured two types of menu will display **(Fig C or D)**

The display shows:
• Fan symbol
• HP - High Pressure symbol (condensation / discharge side)
• value read by the discharge probe in the unit of measurement defined in the main display (e.g. 45.6 Bar)
• discharge setpoint value in the unit of measurement defined in the main display congruent with the value read by the probe (e.g. 34.5 Bar) - box with dotted frame -

Fans • Digital type • fig. C
The display shows:
Menu for compressors/fans of the main menu • **fig. C**
• the state of the digital fans (ON or OFF) identified by a rectangular symbol - see legend (in the example 5 out of 8 fans on)

Fans • Continuous control • fig. D
Menu for analogue output of the main menu • **fig. D**
• the presence** of the analogue output and its percentage of use identified by a vertical bar divided into 6 'notches' (in sixths, or 1 'notch' corresponds to 1/6 of power) - see box with dotted frame -
** analogue output always present if this menu appears; otherwise the displayed menu is that of the digital fans.

Note: unlike the compressors menu both values read by the discharge probe and discharge SetPoint are displayed
Fig. C • Note that in the main display you can only read the number of active fans and active power steps (in this case, 5 fans). From this Menu it is besides possible to know how many relays are configured as digital fans (8 that also represents the maximum number that can be set).
Fig. D • Note that from the main display you can see the percentage of power delivered by the **INVERTER** output. In this example, the percentage is 70%.
From this Menu it is possible besides to know the approximate power delivered in 6/6. See Compressors Menu Notes.

Notes
Notice that from the Main View it is possible to read only the number of active compressors and the active segmentations (in the example 2 active compressors - 7 steps / power steps on - see legend).
From this Menu it is possible besides to know how many segmentations there are for each compressor and the real number of compressors in the

plant, even if off (in the example 10 steps / power steps (5 for each compressor) while the number of compressors (2) coincide).

Note that from the main display you can see the percentage of power delivered by the **INVERTER** output (compressor). In this example, the percentage is 70%.
From this Menu it is possible besides to know the approximate power delivered in 6/6. In this example, the approximation is 4/6 so that there may be a discrepancy with the main display due to the approximation itself.
The length of the 'notch' is fixed: the notches graphically display the minimum/average/maximum speeds.
The 'notch' turned on indicates power 1/6.

Note:
• In case of probe not configured, the display reads '- - -'.
• In case of probe failure/error, the display reads 'Err'.

Compressors Menu • fig. A
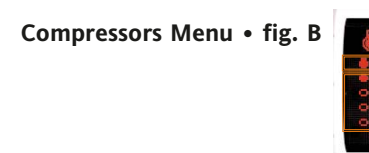
Compressors Menu • fig. B
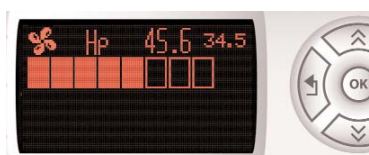
Fans Menu • digital • fig. C
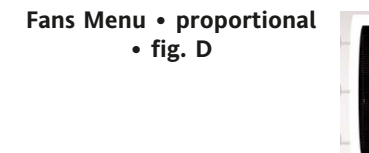
Fans Menu • proportional • fig. D

• full symbol: indicates utility active (power step on)
• empty symbol: indicates utility present but not active (power step off)
• flashing symbol: indicates that there are safety times for utility activation

* digital fans
• full symbol: indicates utility active (fan on)
• empty symbol: indicates utility not active (fan off)

** proportional fan
• full symbol: indicates % 1/6 active
• empty symbol: indicates % 1/6 not active

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MODIFYING THE DISPLAYED UNIT OF MEASUREMENT

IT is possible to modify the displayed unit of measurement for suction (all models) and discharge

• Suction: Press the LH key
• Discharge: Press the RH key

The display toggles between Bar >PSI > °C > °F

The default display and control is pressure (bar).

Compressor control is a function of the **LP** control probe.
Use parameter 547-UMCP to select both pressure control (bar/PSI) and temperature control (°C/°F).
Fan control is a function of the **HP** control probe.
Use parameter 548-UMFP to select both pressure control (bar/PSI) and temperature control (°C/°F).

Note that, if using temperature control and the control probe is a pressure transducer, control is a function of the value converted into temperature of the selected gas, of the control probe.
Behaviour is dual if the control probe is a temperature probe and the control selected with 547-UMCP / 548-UMFP is pressure control.

Note: The unit of measure shown on the display may differ from the control unit.

DISPLAYING AND ACKNOWLEDGING ALARMS

Alarms are notified by the red LED on the keypad.
The alarm is also indicated by the activation of the corresponding alarm relay if so configured.

In this case you can:
1. acknowledge the alarm by pressing and releasing F3

• The LED configured as alarm LED will blink
• The relay configured as an alarm relay will be deactivated.
• In case of new alarms/probe errors, the LED changes from flashing to steady on and the alarm relay is reactivated.

2. access the Alarms Menu to determine which type of alarm is in question. Press and hold down F3:

The Alarms menu displays with the first alarm.
to display the other alarms, use the UP and DOWN keys.

ALARMS	01/03
Err. Ambient Temp	
Plant	
Active	

The example shows 3 alarms.
For details, see the Diagnostics chapter.
If there are no alarms and/or probe /generic errors the display will show EMPTY.

ADVANCED NAVIGATION

Access to the Advanced Navigation Menu takes place via the Main Display by pressing and holding down function key OK.

The Navigation Menu (headed MENU) contains the following folders:
• Diagnostics – See Alarms section
• Service – see Service Menu
• Clock and Time Bands – see Clock and Time Bands chapter
• Functions – see Functions menu
• Parameters – See Parameters chapter
Scroll with the DOWN key through the various folders (items) and select the desired folder (item) with the OK key.

EWCM9900

ADVANCED FUNCTIONS

CONFIGURING THE MACHINE

The EWCM18DIN can be configured in two ways:
• Automatic configuration (using the Quick Start Menu)
• Manual configuration

QUICK START PARAMETERS

Quick Start parameters menu
To access the Quick Start parameters menu select the Quick Start folder with UP and DOWN and press OK: this opens the Quick Start menu which contains two items/folders:
• Enable
• Parameters
Enable
Unlike the other parameters the Quick Start parameters should be 'enabled' for writing to be able to be modified:
Select Enable with the UP and DOWN keys and press OK to enable modification (No—>Yes on the display).
To disable parameter editing, repeat the procedure.
NB: If Enable =Yes the EWCM behaves as follows:
• all the outputs are deactivated (that is the machine doesn't adjust)
• the Functions menu is disabled
• Manual resource assignment is disabled
Parameters (Quick Start)
Select the Parameters menu with UP and DOWN and press OK to display the Quick Start parameters themselves.
If Enable=No in the Quick Start menu, the parameters will be displayed but not modifiable.

QUICKSTART	01/01
Enable	No
Parameters	

If Enable=Yes in the Quick Start menu, the parameters will be displayed and modifiable. To change the value of a parameter follow the procedure described in 'Display and modification of parameters'.

QUICKSTART	01/01
Enable	Yes
Parameters	

QUICK START PARAMETERS

• 501 - tyPE Type of plant
Defines the type of plant
0 = plant with standard type compressors
1 = plant with single delivery shared drain compressors
2 = chiller. Analogous to the case 0. In this case, it is controlled in temperature (in reference to the water)
Note: If 501 - tyPE = 1, the parameters from the Compressors folder will be displayed [2]

• 502 - PC1 Power COMP 1
Defines the:
- value proportional to the power
- number of compressor steps (COMP) 1:
PC1= 1: whole compressor
PC1 = 2: compressor 2 steps (1 segmentation)
...
PC1 = 6: compressor 5 steps (4 segmentations)
if • 522 - CtyP = 0 or 2
PC1 must be less than 6
NOTE: a maximum of 12 compressors are permitted per system.
...
• 503 - PC2 Power COMP 2- as above
• 504 - PC3 Power COMP 3- as above

• 505 - PC4 Power COMP 4- as above
• 506 - PC5 Power COMP 5- as above
• 507 - PC6 Power COMP 6- as above
• 508 - PC7 Power COMP 7- as above
• 509 - PC8 Power COMP 8- as above
• 510 - PC9 Power COMP 9- as above
• 511 - PC10 Power COMP 10- as above
• 512 - PC11 Power COMP 11- as above
• 513 - PC12 Power COMP 12- as above
• 514 - EAAL Enable DO Alarms
Defines whether to assign the cumulative alarm automatically to a digital output on relay. 0= No; 1= Yes
• 515 - EACI Enable COMP INV
Defines whether to automatically assign the **INVERTER** compressor 1 and 2 to the analogue outputs. 0= No; 1= Yes
• 516 - EAFI Enable INV FANS
Defines whether to assign the **INVERTER** fan automatically to an analogue output. 0= No; 1= Yes
• 517 - EACIE Enable ERR COMP INV
Defines whether to automatically assign the **INVERTER** compressor 1 and 2 thermal switch to the digital inputs. 0= No; 1= Yes
• 518 - EAFIE Enable ERR INV FANS
Defines whether to assign the **INVERTER** fan thermal switch automatically to a digital input. 0= No; 1= Yes
• 519 - EAgA Enable DI Alarm
Defines whether to assign the generic alarm automatically to a digital input. 0= No; 1= Yes
• 520 - Fnty Fan mode
0 = condensation control disabled;
1= **INVERTER** control
2= digital
• 521 - nFn Fan number
Defines the number of fans in fan coil. Range 1...8 (a maximum of 8 digital fans).
Parameter significant if 520 - Fnty = 2
• 522 - CtyP Type Circuit 1
Defines the type of circuit 1, the suction section:
0= HOMOGENEOUS STEPS
1= NON-HOMOGENEOUS STEPS
2 = HOMOGENEOUS STEPS + INVERTER / INVERTER*
• 523 - CPnU Num. COMP circuit 1
Defines the number of segmented compressors. Range 0...12 (a maximum of 12 compressors per system**).
*Note: value 0 (no segmented compressors) is only allowed if 522-CtyP = 2. In this case, the type of circuit 1 is **INVERTER**
**Note: The sum [523-CPnU] + [525 - CPnU2] must be less than or equal to 12.
• 524 - CtyP2 Type Circuit 2
Defines the type of circuit 2, the suction section:
See 522 - CtYP
• 525 - CPnU2 Num. COMP circuit 2
See 523 - CPnU
*Note: value 0 (no segmented compressors) is only allowed if 524-CtyP2 = 2. In this case, the type of circuit 2 is **INVERTER**

CONFIGURING THE MACHINE

AUTOMATIC I/O ASSIGNMENT
Set the QuickStart parameters as follows:
They are assigned automatically in the order:
Digital outputs
They are assigned automatically in the order:
• **OUT1 ALARM** cumulative alarm digital output
- only if 514-EAAL = 1
• **OUT2** Enable INVERTER compressor - only if
515-EACI = 1
• **OUT3** Switch on compressor N
• **OUT...** Switch on Segmentation 1 Compressor N
(in case of SEGMENTED COMPRESSORS)
• **OUT...** Switch on Segmentation 2 Compressor N
...
• **OUT...** Switch on Compressor N+1
• **OUT...** Switch on Segmentation 1 Compressor N+1
...
• **OUT...** Enable INVERTER fan - only if 516-EAFI
= 1
Digital Inputs
The automatic order is high voltage digital inputs
followed by voltage free inputs:
• **DIH1** INVERTER Compressor shut-down
• **DIH2** Compressor N shut-down
• **DIH3** Compressor N+1 shut-down
...
• **DIH...** INVERTER fan shut-down
• **DIH...** Digital fan 1 thermal switch
• **DIH...** Digital fan 2 thermal switch
...
• **DIH...** Suction pressure switch
• **DIH...** Discharge pressure switch
• **DI1...** INVERTER compressor error - only if
517-EACIE =1
• **DI1...** INVERTER fan error - only if 518-EAFIE
=1
• **DI1...** INVERTER compressor error - only if
519-EAgA =1
Analogue outputs
They are assigned automatically in the order:
• **INVERTER** Switch on INVERTER compressor
• **INVERTER** Switch on INVERTER fan

**NOTE: Analogue inputs are NOT assigned
automatically.**

Once the Quick Start parameters have been set
quit the Quick Start Parameters menu and select
Enable with the UP and DOWN keys and press
OK:
• if the word No appears the parameter setting -
that is the automatic assignment of resources
according to the new configuration parameters -
has been successful.
Modification of the Quick Start parameters
implies that the Resource Allocation parameters
have been forced to the automatic I/O resource
assignment.
• if the word Yes remains the setting is wrong
and in the Alarms menu the I/O Config. Err.
alarm appears (see Alarms Menu).

Configuration Error

```
ALARMS                    01/01
          IO Config. Err

             Active
```

The I/O Config. Err. alarm appears if:
• the number of assigned digital outputs exceeds
those available
• the number of assigned analog outputs
exceeds those available
• the number of assigned digital inputs (high
voltage or voltage free) exceeds those available
In addition:
• there may not be more than 12 compressors
• in refrigeration units with **HOMOGENEOUS
STEP** or **NON-HOMOGENEOUS STEP**
compressors, at least one compressor must be
present
• in refrigeration units with **HOMOGENEOUS
STEP** or **HOMOGENEOUS STEP + INVERTER**
compressors, the number of steps per
compressor must be less than 6.

EXAMPLE: AUTOMATIC I/O ASSIGNMENT
EWCM8400 default configuration:
**machine room with 4 full homogeneous
compressors**
Digital outputs
They are assigned automatically in the order:
• **OUT1 ALARM** cumulative alarm digital output:
514-EAAL = 1
Note: No INVERTER compressor is enabled - 515-
EACI = 0
• **C1-OUT2** Switch on compressor 1
Note: 502-PC1=1
• **C2-OUT3** Switch on compressor 2
Note: 503-PC2=1
• **C3-OUT4** Switch on compressor 3
Note: 504-PC3=1
• **C4-OUT5** Switch on compressor 4
Note: 505-PC4=1
Digital inputs
The high voltage inputs will be assigned
automatically in order.
Note:
• there are no voltage free digital inputs:
• there is no INVERTER compressor shut-down
• **AL**IN1-**DIH1** Compressor 1 shut-down
• **AL**IN2-**DIH2** Compressor 2 shut-down
• **AL**IN3-**DIH3** Compressor 3 shut-down
• **AL**IN4-**DIH4** Compressor 4 shut-down
• **LP-DIH5** Suction pressure switch
Note: 519-EAgA = 0
Analogue outputs
Not configured.

MANUAL I/O ASSIGNMENT

Manual assignment allows you to modify the
default configuration or the outcome of
automatic I/O assignment.
NOTE: automatic I/O assignment is also allowed
during normal operation of the device.

Manual assignment of digital outputs
To assign the relay outputs OUT1...OUT13 set
parameters
584-H201...596-H213.

Manual digital input assignment
• To assign high voltage digital inputs
DIH1...DIH10 set parameters 603 - H101...612 -
H110
• To assign voltage free digital inputs DI1...DI4
set parameters 617 - H301...620 - H304

Manual assignment of analogue outputs
To assign analogue outputs
V1/I1...V2/I2 set parameters
631 - H501 and 632 - H502.

Manual assignment of analogue inputs
• To assign analogue inputs SIG1 and SIG2 set
parameters 623 - H401 and 624 - H402.
• To assign analogue inputs PB1...PB4 set
parameters 627 - H405...630 - H408.
Note: analogue inputs PB1...PB4 can also be
configured as digital: to do this you must
configure parameters 648 - Pb12 and 649 - Pb34.

EXAMPLES
EWCM9900 default configuration:
• add refrigerant level alarm,
• add refrigerant leak alarm
• move fan relay 4 from OUT13 to OUT11.

Configuring the refrigerant level alarm
Configure DI1 and refrigerant level by setting
617 - H301=10.
depending on the value of parameter
571 - gtSAE, the actuation of digital input DI1
will either result in an alarm signal or shut down
the plant.
Configuring the refrigerant leak alarm
Configure DI2 as refrigerant leak by setting
parameter 618 - H302=12 while, to configure the
central gas expulsion output (for example on
OUT8) set 591 - H208=5. Depending on the
value of parameter 572 - gLSAE, actuation of DI2
may result in an alarm signal or also actuate the
central gas expulsion relay.
Moving fan relay 4 from OUT13 to OUT11.
To deactivate OUT13 set 596 - H213=0 and to
activate OUT11 as fan 4 set 594-H211=13.

EWCM9900

COMPRESSOR CONTROL

COMPRESSORS FOLDERS
• Case Quick Start parameter **[501-tyPE=0]**: Default configuration. Standard system with 1 suction circuit. The Compressors folder displayed (relative to the first and only circuit) and the relative parameters are displayed;
• Case Quick Start parameter **[501-tyPE=1]**: System with 2 suction circuits, single delivery. The Compressors folder (relative to the first circuit) and Compressors folder [2] (relative to the second circuit) and the relative parameters are displayed;
• Case Quick Start parameter **[501-tyPE=2]**: System with 1 suction circuit. See case **[501-tyPE=0].**

SHARED COMPRESSOR PARAMETERS
• 551 - Central Stty Set
Adjustment enablement with central or lateral set
• 552 – PoLI Activation Policy
Fixed or rotation sequence enablment depending on the compressor activation operating time
• 553 - SEr COMP time limit
Limit on using compressors. In hours.
These parameters are shared by both the suction circuits and are only displayed in the Compressors folder

COMPRESSOR PARAMETERS
The parameters:
• 101 - CCFn COMP control type
...
• 130 - InLt INV time at min speed.
• 145 - AtdS Set dynamic amb Tp
• 146 - AtdS differential
• **131 - LSE Minimum setpoint**
...
• 144 - InLPt INV min pot limit
relative to the first suction circuit (circuit 1 or C1) and always displayed.

COMPRESSOR PARAMETERS [2]
The parameters:
• 201 - CCFn COMP control type
...
• 230 - InLt INV time at min speed.
• 245 - AtdS Set dynamic amb Tp
• 246 - AtdS differential
• **231 - LSE Minimum setpoint**
...
• 244 - InLPt INV min pot limit
relative to the second suction circuit (circuit 2 or C2) and only displayed if the Quick Start **501 - tyPE** parameter = 1 (plant with single delivery shared drain compressors).
Their meaning is analogous to those in the Compressor Menu (see for ref.). The correspondence between the Compressors and Compressors [2] parameters is as follows: 1xx -> 2xx
Example: 133 - SEt suction set point corresponds to 233 - SEt suction set point.

The following chapter always refers to the first circuit C1, but the points made are completely analogous for the second circuit C2

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COMPRESSOR CONTROL

ENABLING

• Control is activated after a delay of 565-odo
• a temperature probe or pressure probe must be configured for suction control (control probe **LP**)

One of the following types of circuits can be selected by parameter:

1. 522-CtyP=0: circuit composed of step compressors, segmented or not segmented, with steps of the same power (**HOMOGENEOUS STEPS**);
2. 522-CtyP=1: circuit composed of step compressors, not segmented, with steps of different power (**NON-HOMOGENEOUS STEPS**);
3. 522-CtyP=2: circuit composed of a combination of a single compressor controlled by **INVERTER** + type 1 system (**HOMOGENEOUS STEPS + INVERTER**);
4. 522-CtyP=2: circuit composed of a single compressor controlled by **INVERTER** (**INVERTER**).
    NOTE: This system is derived from case 3 by setting the number of step compressors to 0, 523-CpnU=0);

Compressor control is a function of the **LP** control probe.
Use parameter 547-UMCP to select both pressure control (bar/PSI) and temperature control (°C/°F). Note that, if using temperature control and the **LP** control probe is a pressure transducer, suction control is a function of the value converted into temperature of the selected gas, of the **LP** control probe.
Behaviour is dual if the **LP** control probe is a temperature probe and the control selected with 547-UMCP is pressure control.

Parameter 547-UMCP can be modified during normal operation.
The default suction control is pressure (bar).
Note: The unit of measure shown on the display may differ from the control unit.

Three controls can be selected with parameter 101-CCFn:
0 = Proportional band control (BP)
1 = Dead band control (ZN)
2 = P.I.D. control (PID)

In case of proportional band control, parameter 551-Stty controls the lateral and central setpoint relative to the control band.

HOMOGENEOUS STEPS

The circuit is composed of 523-CpnU step compressors, segmented or not segmented, with steps of the same power (max. 12 compressors).
The number of steps of each compressor is defined by parameters 502-PC1 to 513-PC12 (if 502-PC1=1 the first compressor is of the full type).

HOMOGENEOUS STEP compressors are controlled by the switch on relays and, if required, buy the segmentation relays.

NON-HOMOGENEOUS STEPS

The circuit is composed of 523-CpnU compressors of variable power, non-segmented (set no more than 4 compressors although the nominal maximum is 12).
Parameters 502-PC1 to 513-PC12 define the power of each compressor on the circuit.

NON-HOMOGENEOUS STEP compressors are controlled by their switch on relays.

HOMOGENEOUS STEPS + INVERTER

The circuit is composed of a combination of an **INVERTER** compressor and 523-CpnU step compressors, segmented or not segmented, with steps of the same power.
In this configuration the **INVERTER** compressor varies its output from 0% to 100% depending on the type of control selected by parameter 101 - CCFn.
• If 101-CCFn=0 the **INVERTER** varies its output from 0% to 100% by switching on/off two successive power steps
• If 101-CCFn=1 the **INVERTER** modulates its power within the dead band of the ZN controller.

Parameters 502-PC1 to 513-PC12 define the number of steps of each compressor.
Step compressors are controlled by the switch on relays and, if required, buy the segmentation relays.
The **INVERTER** compressor is controlled by an analogue output and digital **INVERTER** enabling output (optional).

INVERTER

The circuit is composed of a single continuous control compressor.
This is obtained from a **HOMOGENEOUS STEPS + INVERTER** circuit by setting 523-CpnU=0.
The **INVERTER** compressor is controlled by an analogue output and digital **INVERTER** enabling output (optional).
Parameters 502-PC1 to 513-PC12 and 120-nCPC are ignored.

Each compressor, including the continuous control unit, has its own digital shut-down input.
The following may also be present as options, which are common to all compressors on the same circuit:

• differential pressure switch digital input;
• digital input **HP**
• digital input **LP**
• thermal switch digital input.

The shut down input immediately stops the affected compressor and sends a compressor shut down alarm signal, while the optional inputs only deliver an alarm signal. Given the matrix handling of optional alarms, the cause of the alarm may not be uniquely identifiable.

The continuous control compressor also has, if so desired, a digital **INVERTER** error input (optional).

With the exception of the circuit controlled by a single INVERTER compressor, you can define a compressor to be the 'Master' of the step compressors by setting parameter 120-nCPC > 0. For example, if 120-nCPC=1 then the first step compressor on the circuit is the master. If 120-nCPC = 0 no compressor is the Master.

The compressor oil level digital input is the same for all compressors on the same circuit.

COMPRESSOR CONTROL

TIMINGS FOR STEP COMPRESSORS

The switching on/off of a compressor must satisfy the following requirements:

- Minimum off-on time 121-oFon.
  This is the minimum delay between switching off and switching on;
- Minimum on-off time 122-donF.
  This is the minimum delay between switching on and switching off;
- Minimum on-on time 123-onon.
  This is the minimum delay between switching on and switching on again;

Activating and deactivating power steps must respect the activation/release times for resources 124-don and 125-doF and is a function, not only of the type of compressors (**HOMOGENOUS STEPS** or NON-HOMOGENEOUS), but also of parameters 126-FdLy and 127-FdLF.
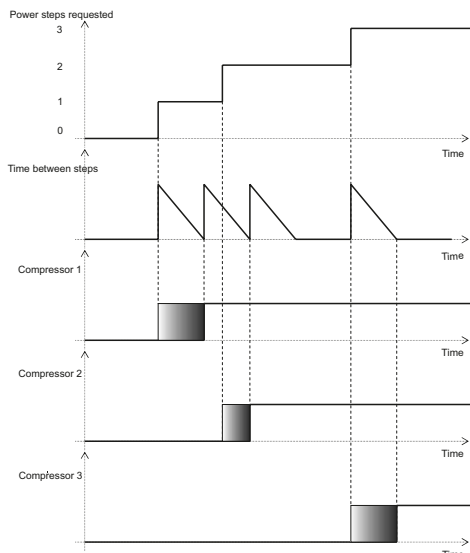
HOMOGENEOUS STEPS - activation

- if 126-FdLy=0 is NO it is sufficient that the increment interstep time 124-don be observed, which starts when each resource is activated;
- if 126-FdLy=1 we have two cases:
    - If the increment interstep time count was already underway due to a previous step being activated, then this delay must expire before another resource can be activated;
    - If the increment interstep time count has already expired, the increment interstep time is reloaded when a resource is called by the controller;

HOMOGENEOUS STEPS - deactivation

- If 127-FdLF=0 it is enough that the decrement interstep time 125-doF be observed, which starts when a resource is switched off;
- If 127-FdLF=1 we have two cases:
    - If the decrement interstep time count was already underway due to a previous step being deactivated, then this delay must expire before another resource can be deactivated;
    - If the decrement interstep time has already expired, then it is reloaded when the controller calls for another resource to be deactivated;

Example of step activation in the case of three homogeneous step compressors with 126-FdLy =1:

Example of step activation in the case of four homogeneous step compressors with 126-FdLy =0:

NON-HOMOGENEOUS STEPS - activation

- If 126-FdLy=0 it is sufficient that the increment interstep time 124-don be observed, which starts when each resource is activated;
- If 126-FdLy=1 the increment interstep time is reloaded when a resource is called by the controller only if the activation would result in quitting the dead band;
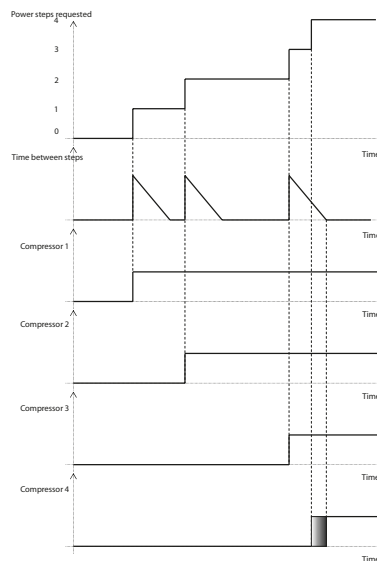
NON-HOMOGENEOUS STEPS - deactivation

- If 127-FdLF=0 it is enough that the decrement interstep time 125-doF be observed, which starts when a resource is switched off;
- If 127-FdLF=1 then the decrement interstep time is reloaded when the controller calls for another resource to be deactivated, if this would result in quitting the dead band.

SEGMENTATION OF HOMOGENEOUS STEP COMPRESSORS

The configuration of a circuit with segmented compressors is done with parameters 502-PC1 to 513-PC12 which define the number of steps of each compressor (number of segmentations plus one).
Up to 5 segmentation relays can be handled.
Parameter 118-PtSE defines the mode of actuation of the segmentations (see table).

- If, for example, 502-PC1 = 1 segmentation is not available, hence the compressors are full and can deliver 0% or 100% of their power only.

- If, for example, 502-PC1 = 4 (4 power steps), 3 segmentations are available, hence the compressors are full and can deliver 0%, 25%, 50%, 75% or 100% of their power.

Power	ACC	118 - PTSE = 0			118 - PTSE = 1			118 - PTSE = 2		
		Segmentation			Segmentation			Segmentation		
		1	2	3	1	2	3	1	2	3
100%	ON							ON	ON	ON
75%	ON			ON			ON	ON	ON	
50%	ON		ON	ON		ON		ON		
25%	ON	ON	ON	ON	ON					
0%	ON									

COMPRESSOR CONTROL

INVERTER COMPRESSOR TIMINGS

The On and Off times of a compressor must meet the following requirements:

- Minimum off-on time 121-oFon.
  This is the minimum delay between switching off and switching on;
- Minimum on-off time 122-donF.
  This is the minimum delay between switching on and switching off;
- Minimum on-on time 123-onon.
  This is the minimum delay between switching on and switching on again;

INVERTER COMPRESSOR - max. speed

If the suction controller requires a power greater than 116-InSSP, the INVERTER will nonetheless be controlled at 116-InSSP.

INVERTER COMPRESSOR - min. speed

- If 114-InLSP= 0 the INVERTER is controlled at the speed defined by the suction controller;
- If 114-InLSP is non-zero, there are two options:
  - the suction controller request is less than 114-InLSP but non-zero: the INVERTER is forced to the minimum speed set in 114-InLSP.
  In this case if the LP control probe < 144-InLPt and delay 565 - PAo (alarm de-activation at switch on) has expired, the INVERTER switches off and the enabling digital output is de-activated.
  - the suction controller request =0; the INVERTER continues to be controlled at the minimum speed defined by 114-InLSP for the period 229-Ino after which the INVERTER is switched off and the enabling digital output is de-activated.
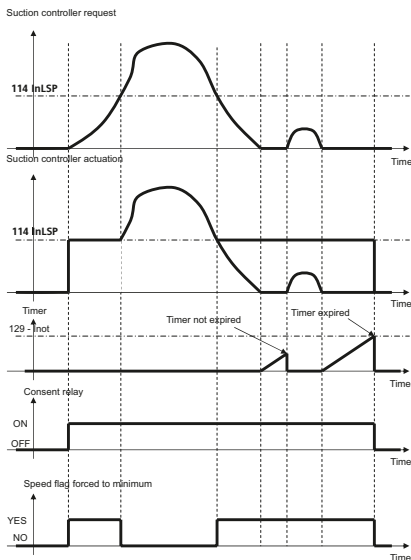
INVERTER COMPRESSOR - modulation in HOMOGENEOUS STEP systems

The on/off timings and dynamics of the Inverter compressor for a circuit composed of homogeneous step + Inverter compressors are a function of the chosen control mode (parameter 101 - CCFn).

In the case of dead band (ZN) control, the **INVERTER** modulates its power inside the dead band of the dead band controller.
Instead, in the case of proportional band control (BP) or P.I.D. control (PID), the **INVERTER** modulates its power from 0% to 100% between successive power step on/offs

The diversity of behaviour between BP and PID control is linked to the fact that in PID control of power steps hysteresis is ignored.

BP control

The figure shows the relation between power discharge in suction and the value of the LP probe when the controller request differs by ±1 step from that actuated. Note the following by the **INVERTER** compressor to achieve fine control inside the step.
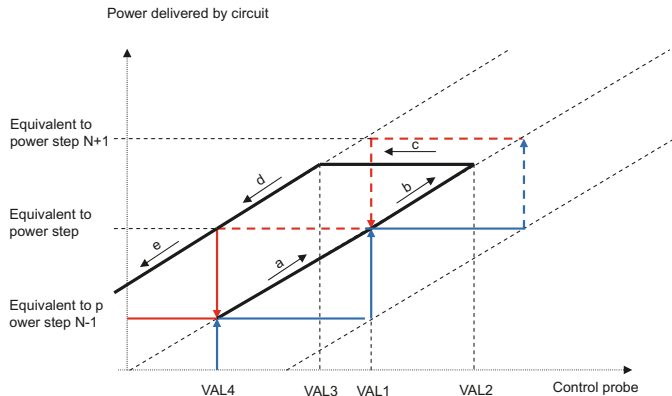
The following table illustrates this in relation to time:
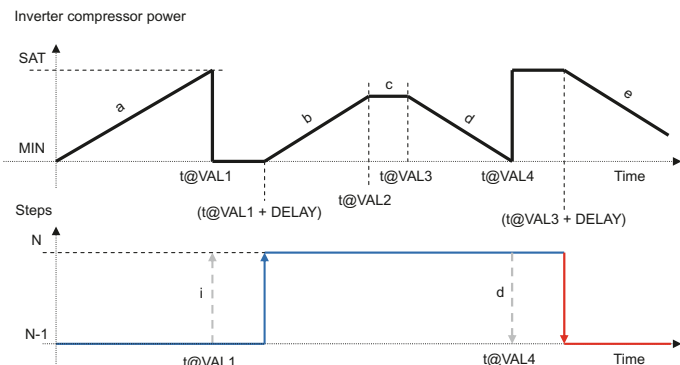
DELAY	This time is a minimum of 130-InLt and is in the range from 124-don to 125-doF
i	Logical request for increment of one step of the step controller
d	Logical request for decrement of one step of the step controller

If the power request from the controller exceeds by more than one step the actuated power, the **INVERTER** compressor immediately runs at maximum speed 116-InSSP and the steps are activated according to the selected policy. Only when the request is 1 step away from the actuated power does the **INVERTER** compressor resume modulation within the step. If the power request from the controller is more than one step below the actuated power, the **INVERTER** compressor immediately runs at minimum speed 114-InLSP and the steps are deactivated according to the selected policy. Only when the request is 1 step away from the actuated power does the **INVERTER** compressor resume modulation within the step.

PID control

In this situation the section indicated as c) in the figures above does not exist. Sections a) and b) overlap with sections d) and e).
Modulation within the step persists, but without hysteresis in this case also.

RESOURCE SELECTION POLICIES

The resource selection policies are generally employed to optimise the use of the compressors so as to increase their service life and reduce maintenance. They are also used to emphasise dynamic behaviours of the plant such as saturation and balancing.
The policies apply to all types of circuit which have step compressors.

HOMOGENEOUS STEPS and HOMOGENOUS STEPS + INVERTER

The selection policies come into play when the controller requests the activation/deactivation of a step. This request is distributed to the most suitable compressor in terms of the policy in force.
The selection policies are based mainly on the hours of operation of the compressors. Parameter 552-PoLI selects one of the following policies:
- 552-PoLI = 0: fixed sequence;
- 552-PoLI = 1: balancing;
- 552-PoLI = 2: saturation 1
- 552-PoLI = 3: saturation 2 (also called saturation algorithm);

Fixed sequence (552-PoLI = 0)
The fixed sequence policy distributes all resources starting from the compressor with the lowest index, so far as this is compatible with other requirements, such as compressor safety timings. the resulting allocation is such as to obtain, at any given time, a maximum discharge of the compressors with lower indexes.
Note that:
- on request for a step increment, the components which may increment are considered and that with the lowest index is selected;
- on request for a step decrement, the components which may decrement are considered and that with the highest index is selected;

Balancing (552-PoLI = 1)
The balancing policy distributes all resources equally over the largest possible number of compressors, so far as this is compatible with other requirements, such as compressor safety timings. The resulting allocation is intended to have the greatest possible equalization of power output levels in the compressors at any one time.
Note that:
- on request for a step increment, the components which may increment are considered and that with the smallest distance from the minimum number of deliverable steps at that time is selected; If more than one compressor is at the same distance, the one with the least hours of operation is chosen;
- on request for a step decrement, the components which may decrement are considered and that with the largest distance from its minimum number of deliverable steps at that time is selected. If there are more than one at equal distance, the component with the highest hours of use is selected;

Saturation 1 (552-PoLI = 2)
The saturation 1 policy distributes all resources equally over the smallest possible number of compressors, so far as this is compatible with other requirements, such as compressor safety timings. The resulting allocation is intended to have the largest possible number of compressors switched off at any one time.

Note that:
- on request for a step increment, the components which may increment are considered and that with the smallest distance from the maximum number of deliverable steps at that time is selected. If more than one compressor is at the same distance, the one with the least hours of operation is chosen;
- on request for a step decrement, the components which may decrement are considered and that with the smallest distance from the minimum number of deliverable steps at that time is selected. If more than one compressor is at the same distance, the one with the greatest hours of operation is chosen;

Saturation 2 (552-PoLI = 3)
Like saturation 1, except that when a decrement request occurs, before switching off the last step to be turned on of a compressor it is wise to switch off a step of another compressor, to avoid requests for switching the same compressor back on.

NON-HOMOGENEOUS STEPS

When the delivered power is varied, the selection criteria for the new active compressor configuration are as follows:
- In the case of increased power, the configuration which results in the smallest increase is given priority;
- In the case of decreased power, the configuration which results in the smallest decrease is given priority;
- For a given delivered power, the configuration which requires switching the smallest number of compressors is given priority; if more than one configuration meets this requirement, then that which requires the use of the smallest number of compressors is chosen, and after that, the configuration which has least hours of operation.
- If the delivered power is stable, and an alarm shutting down one or more of the active compressors occurs, a power increase request is issued to obtain the maximum power which does not exceed the initial discharge. Once the new situation obtains, the actuated power is considered to be stable.

MASTER COMPRESSOR

For all systems with step compressors, independently of the type of control and policy, one of the step compressors may be defined to be the master. It is selected with parameter 120-nCPC.
The master compressor is the one which turns on first and switches off last. In the case of segmented compressors, in response to power step increment requests the master compressor will always be augmented before the other compressors on the circuit are considered to be available.

The compressor activation policy (parameter 552-PoLI) influences the way in which the master compressor is used. In detail:

If the policy is **Fixed Sequence** (552-PoLI=0) the master compressor is always turned on first and taken to saturation, after which the other compressors are turned on and saturated in sequence without reference to the master unit. When decrementing, the sequence excluding the master is switched off (as per saturation policy) and the master is the last to be deactivated.

If the policy is **Balancing** (552-PoLI=1) the master is activated first and then all the others in balancing mode, including the master. In deactivation, all compressors including the master are switched off in balancing mode, but the master is the last to be turned off.

If the policy is **Saturation 1** (552-PoLI=2) the master compressor is always turned on first and taken to saturation, after which the other compressors are turned on and saturated. In deactivation, all compressors including the master are switched off in saturation mode, except for the master which is the last to be turned off.

The **Saturation 2** policy (552-PoLI=3) differs in deactivation, in which all compressors, except for the master, are decremented until they are providing only one step, then they are switched off, after which the master is decremented until it switches off.

COMPRESSOR CONTROL

Non nominal cases

- If the master compressor has an alarm or is deselected when it is active it is switched off and the selection of successive power steps follows the selected policy as if the master compressor did not exist.
- If the circuit to which the master compressor belongs is switched off and the master compressor is in alarm or deselected then if the controller for the circuit in question requests power, the available compressors are activated according to the current policy. In substance, if the master compressor cannot be used due to an alarm or deselection, this does not make it impossible to activate resources.
- If the circuit to which the master compressor belongs is switched off and the master compressor is not in alarm and is selected but its safety timing is counting down, then if the controller for the circuit in question requests power the master compressor is switched on first as soon as its safety timing has expired. In the meantime, the other compressors are kept switched off.
- If the master compressor quits an alarm condition when some of the compressors on its circuit are already active, it loses its privileges when the controller requests power steps. If the controller requests deactivation of steps, then the master compressor gets its privileges back.

TYPE OF CONTROL

	Proportional band	PID	Dead band
Digital compressors	x (Steps)	x	x
INVERTER compressors	x (Continuous)	x	x

Enabling

- 101 - CCFn=0

The power request from the suction controller is proportional to the difference between the setpoint and the control probe **LP**.

STEP COMPRESSORS - proportional band

The controller activates a number of power steps to reach the setpoint given in parameter 133-SEt. The number of resources required is linked to the difference between the value measured by the control probe LP and the setpoint; the greater this difference, the greater the number of resources required to reach the setpoint.
The temperature or pressure interval between power steps is a function of the proportional band 134-Pbd and the number of resources present.

Example with 551 - Stty (lateral setpoint)

Example: 4 compressors*
Δ = 124-Pbd / Σ Compressor power
Σ = 502-PC1 + ...+ 504-PC4

*1 full compressor
*3 power stage compressors
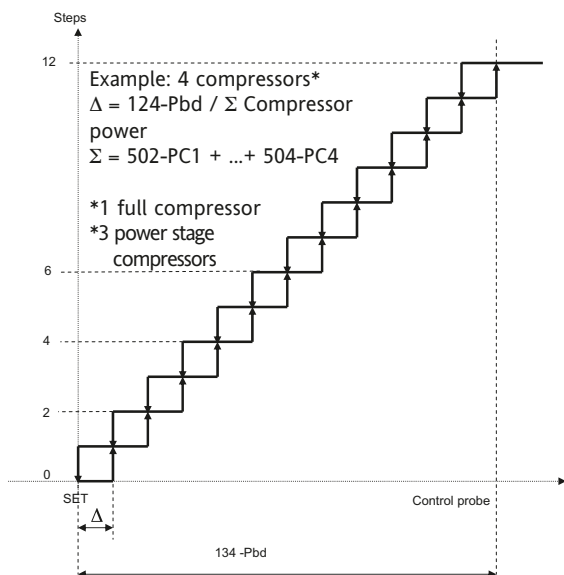
Note that for **HOMOGENEOUS STEP+INVERTER** systems, while the number of power steps is actuated on the basis of the difference between the value of the LP and the setpoint, the power at which the continuously controlled compressor is driven varies from 0% to 100% between the activation/deactivation of a power step on the step compressors.
For setpoint + proportional band < LP control probe < setpoint the continuously controlled compressor is switched off.

INVERTER - proportional band

Example with 551 - Stty = 0 (lateral setpoint) and 117-CoIE = 1 (enable cut-off)
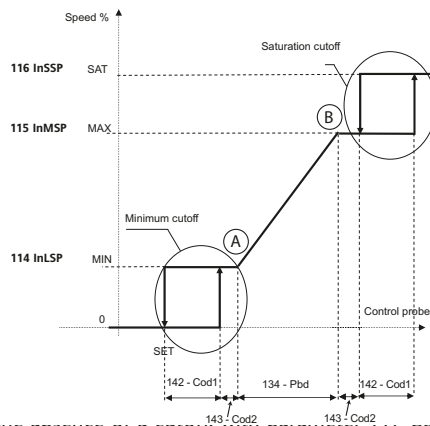
loses the cutoff hysteresis:

- **minimum cut-off**: the speed of the INVERTER goes from 0 to MIN when the LP control probe reaches 'A' from below. If the **LP** control probe reaches 'A' from above, the speed changes from MIN to 0.

- **saturation cut-off**: the speed of the INVERTER goes from continuous control to MAX when the LP control probe reaches 'B'.
If the LP control probe reaches 'B' from above, we have continuous control from MAX to MIN.

DEAD BAND CONTROL

Enabling

- 101 - CCFn = 1

The suction controller power request is proportional to the time the LP control probe stays outside the proportional band.
The proportional band is symmetrical relative to the setpoint value.
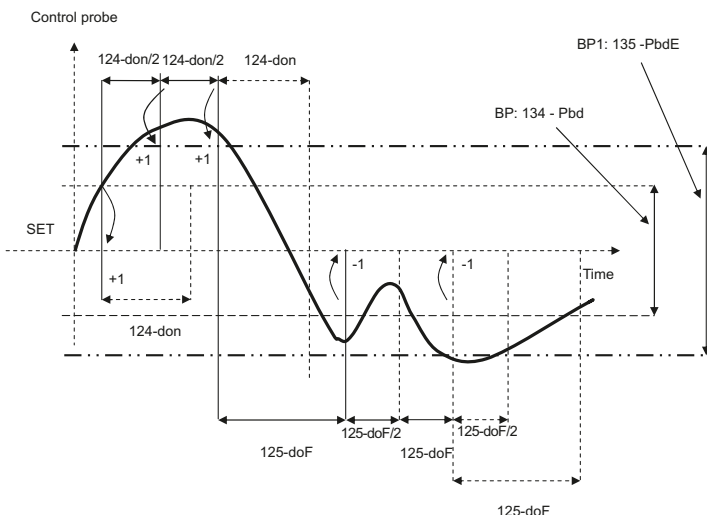
COMPRESSOR CONTROL

Two dead bands are expected: 134 – Pbd and 135 - PbdE.
The latter one typically is larger than the former one and indicates the region outside which increment interstep time could be faster.

HOMOGENEOUS STEPS - dead band

When the LP control probe value exceeds the threshold SET+BP/2 but is still below the value SET+BP1/2, if the increment interstep time 124-don has already expired a step is immediately (*) actuated and the interstep time starts again. If the value of the LP control probe stays in this band, a further power step is actuated every 124-don seconds. When the LP control probe value exceeds the threshold SET+BP1/2 and if the increment interstep time has already expired a step is immediately (*) actuated and the time 124-don/2 starts again. In order for the LP control probe value to stay above this latter threshold, the power steps are incremented every 124-don/2 seconds.
The same applies to power step decrements, with the times set in 125-doF. Power variations are not requested inside the proportional band. In this Algorithm there is no hysteresis.
All interstep times are resycnhronised at the activation/deactivation of a new step.
The step to be activated/deactivated is determined by the selection policy for the circuit in question set in parameter 552-PoLI.

(*) In relation to timings, see also **TIMINGS FOR STEP COMPRESSORS**, in particular as regards parameters 126-FdLy and 127-FdLF.

NON-HOMOGENEOUS STEPS - dead band

When the LP control probe value exceeds the threshold SET+BP/2 but is still below the value SET+BP1/2, if the increment interstep time 124-don has already expired a step is immediately (*) actuated and the interstep time starts again. If the value of the LP control probe stays in this band, a further power step is actuated every 124-don seconds. When the LP control probe value exceeds the threshold SET+BP1/2 and if the increment interstep time has already expired a step is immediately (*) actuated and the time
124-don/2 starts again. In order for the LP control probe value to stay above this latter threshold, the power steps are incremented every 124-don/2 seconds.
The same applies to power step decrements, with the times set in 125-doF. Power variations are not requested inside the proportional band. In this Algorithm there is no hysteresis.
All interstep times are resycnhronised at the activation/deactivation of a new combination of compressors.
In relation to the amount of actuatable increment/decrement of power see **RESOURCE SELECTION POLICIES** for **NON-HOMOGENEOUS STEP** systems.

(*) In relation to timings, see also **TIMINGS FOR STEP COMPRESSORS**, in particular as regards parameters 126-FdLy and 127-FdLF.

Note: For **NON-HOMOGENEOUS STEP** systems, +1 indicates a request for a power increment, while -1 indicates a request for a power decrement.

INVERTER - dead band

Operation is analogous to the case of **HOMOGENEOUS STEPS**, note that for **INVERTER** systems the number of continuous power steps is defined by parameter 128-InPC.

P.I.D. CONTROL

Enabling

• 101 - CCFn = 2

This applies to any type of circuit except for **NON-HOMOGENEOUS STEPS**.

The power request from the suction controller is a function of the difference between the LP control probe and the setpoint and is equal to the sum of three terms:

P proportional to the error: considers the divergence between the LP control probe value and the setpoint, it inserts an action which is directly proportional to it; the action of the proportional component decreases as the error approaches zero;
I proportional to the integral of the error: integrates the measured error over time, reducing the final divergence from the setpoint; this function tracks the previous control values, providing a corrective action capable of adding/subtracting power gradually so as to reach the setpoint value.
D proportional to the derivative of the error: considers the speed with which it varies the process control value; this provides a faster response in system control, inasmuch as the correction is greater the greater the rate of change of the error;

The control signal applied to the actuator is thus:

$P + I + D = Kp \cdot (error) + Ki \cdot (integral\ of\ error) + Kd \cdot (derivative\ of\ error)$

Where:

$Kp = 1000/Bp$
$Ki = Kp \cdot Tc/Ti$
$Kd = Kp \cdot Td/Tc$

You can set the following with parameters:

• enable integral component Ki (102-ItEn=1)
• enable proportional component Kp (104-PbEn=1)
• enable derivative component Kd (105-dtEn =1)
• the integrative time constant Ti
• the proportional band constant Bp
• the derivative time constant Td

Correspondence of parameters

Bp	134 – Pbd
Ti	103 - It
Td	106 - dt
Tc	Application cycle time (1.0 sec)

HOMOGENEOUS STEPS - PID
The control signal u(t) results in the activation of a number of power steps which is proportional to u(t) itself.

HOMOGENEOUS STEPS + INVERTER - PID
The number of actuatable power steps is proportional to the signal u(t) while the power at which the **INVERTER** is driven varies linearly from 0% to 100% between two discrete compressor power step increments/decrements.

INVERTER - PID
The control signal u(t) represents the power actuated directly by the **INVERTER**.

FAN CONTROL

ENABLING
- Control is activated after a delay of 565 - odo
- Parameter 520-Fnty must be non-zero
- a temperature probe or pressure probe must be configured for discharge control (control probe **HP**)

YOU can select digital output fan control by setting 520-Fnty = 2 (max. 8 fans).
If 520-Fnty = 1 the fan battery will be controlled by a single analogue output (control by means of **INVERTER**).

Fan control is a function of the **HP** control probe.
Use parameter 548-UMFn to select both pressure control (bar/PSI) and temperature control (°C/°F). Note that, if using temperature control and the **HP** control probe is a pressure transducer, discharge control is a function of the value converted into temperature of the selected gas, by the **HP** control probe.
Behaviour is dual if the **HP** control probe is a temperature probe and the control selected with 548-UMFn is pressure control.

Parameter 548-UMFn can be modified during normal operation.
The default discharge control is pressure (bar).
Note: The unit of measure shown on the display may differ from the control unit.

Three controls can be selected with parameter 301 - FCFn:
0 = Proportional band control (BP)
1 = Dead band control (ZN)
2 = P.I.D. control (PID)

In case of proportional band control, parameter 551-Stty controls the lateral and central setpoint relative to the control band.

Fans can be activated by reference to 302-FACt:
0 = independently of compressor status;
1 = if at least 1 compressor is on.

DIGITAL FANS

To control the fans by digital outputs, set parameter 520-Fnty =2:

Digital output fan control
Error conditions are signalled by digital inputs (digital fan thermal switch).

Digital fans - timings
- Parameter 324-don defines the delay, in seconds, between the calls for two different steps (activation of two different fans).
- Parameter 325-doF defines the delay, in seconds, between the release of two different steps (de-activation of two different fans).

Digital fans - rotation
Parameter 322-rot defines the rotation of fans during calls and releases to obtain the same number of hours of operation.
- 0 = fixed sequence: the activation sequence is fan 1, 2, 3... with de-activation in the inverse order.
- 1 = rotation: during activation, the fan with least hours of operation is chosen; during de-activation, the fan with the most hours of operation. The aim is balance out the hours of operation between all fans.

INVERTER FAN

To configure fan control by a single analogue output, set parameter 520-Fnty = 1:

- Analogue output fan control
- Digital output to activate INVERTER (optional)
- Digital output for INVERTER error (optional)
- Error conditions are signalled by digital inputs (fan thermal switch with continuous control).

Note: Parameter 521-nFn (number of fans) is not significant in this case inasmuch as the INVERTER analogue output is used.

INVERTER fan - max. speed
If the discharge controller requires a power greater than 311-InSSP, the INVERTER will nonetheless be controlled at 311-InSSP.

INVERTER fan - min. speed
- If 309-InLSP = 0 the INVERTER is controlled at the speed defined by the discharge controller;
- If 309-InLSP is non-zero, there are two options:
   - the discharge controller request is less than 309-InLSP but non-zero: the INVERTER is forced to the default minimum speed set in 309-InLSP. In this case if the control probe **HP** < 345-InLPt and delay 565-PAo (alarm de-activation at switch on) has expired, the INVERTER switches off and the enabling digital output is de-activated.
   - the discharge controller request = 0 the behaviour of the INVERTER is determined by 330 - InoS:
      - If 330-InoS =0 the INVERTER continues to be controlled at the minimum speed defined by 309-InLSP for the period 328-Inot after which the INVERTER is switched off and the enabling digital output is de-activated.
      - If 330-InoS =1 the INVERTER continues to be controlled at the minimum speed defined by 309-InLSP
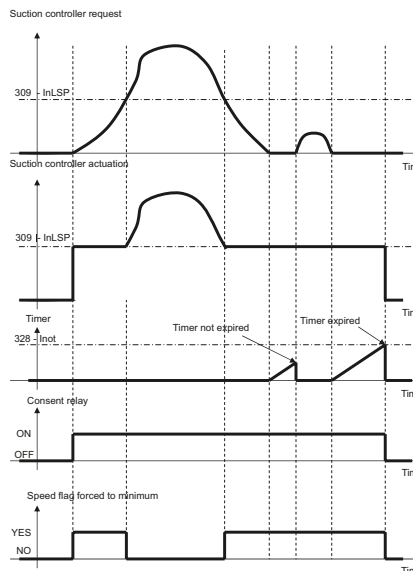
FAN PICKUP

When first switched on, the fans are forced to maximum power for the time defined by 323-Clt:
- Maximum power is 100% for digital fans
- Maximum power is determined by parameter 311 - InSSP for INVERTER fans.

If 323 - Clt = 0 there is no pickup.

After pickup, the fans are run as required by the discharge controller.
In case of an alarm which locks out the fan battery, the fans are switched off in any case.

FAN CONTROL

Digital fans

• Digital fan pickup with discharge controller request stable at the end of pickup:
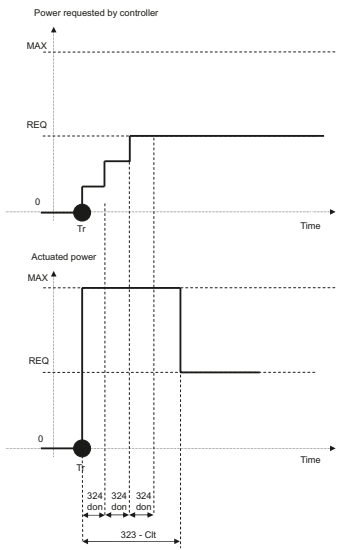
LEGEND
- tr = ventilation request
- MAX = max. number of available steps
- REQ = number of steps requested

- Power requested by controller
- Actuated power

• Digital fan pickup with discharge controller request increasing at the end of pickup:

Inverter fan
• **INVERTER** fan pickup with discharge controller request zero during pickup. After the pickup time, the fans are forced to the minimum for the period 328 - Inot after which they switch off:

• Pickup with constant controller request greater than 309-InLSP. After the pickup period the fans are forced to the value REQ:
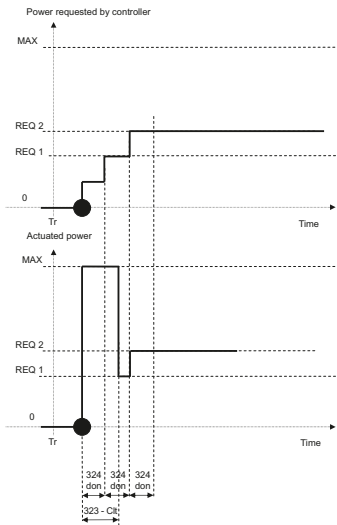
MAXIMUM FANS STOP TIME

Parameter 326-FStt defines the maximum fans off time
(in other words, fans not running). After this time, the fans are forced to maximum speed for time 323-Clt
• if 326 - FStt = 0 the fans can stay off indefinitely.
• if 326 - FStt is non-zero and 323 - Clt = 0 the fans stay off until 323 - Clt is set to a non-zero value.

TYPE OF CONTROL

	Proportional band	PID	Dead band
Digital fans	x (Steps)	x	x
INVERTER fan	x (Continuous)	x	x

PROPORTIONAL BAND CONTROL

Enabling

• 301 - FCFn = 0

The power request from the discharge controller is proportional to the difference between the setpoint and the control probe **HP.**

Digital fans - proportional band

The controller activates a number of power steps to reach the setpoint given in parameter 333-SEt. The number of resources required is linked to the difference between the value measured by the control probe HP and the setpoint; the greater this difference, the greater the number of resources required to reach the setpoint.
The temperature or pressure interval between power steps is a function of the proportional band 334 - Pbd and the number of resources present.

eliwell

FAN CONTROL

Example: with 551 – Stty (lateral setpoint)

Power Steps

4

2

0

SET

Δ

334 -Pbd
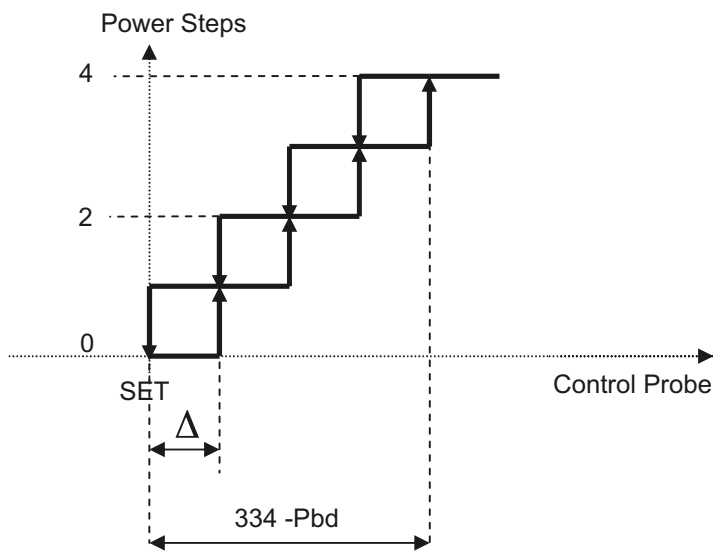
Control Probe

INVERTER fan - proportional band

Speed %

311 InSSP SAT

Saturation cutoff

B

310 InMSP MAX

Minimum cutoff

A

309 InLSP MIN

0

Control probe

SET

335 - Cod1   334 - Pbd   335 - Cod1

336 - Cod2   336 - Cod2
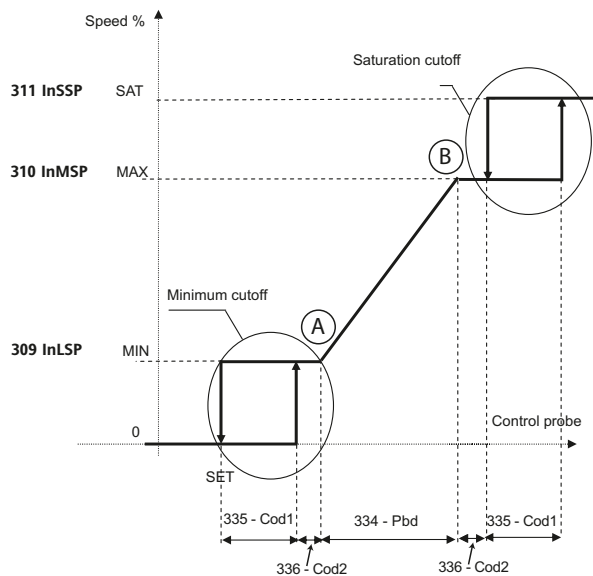
Note that in the absence of a cutoff, with parameter 303 – CoIE = 0 the graph loses the cutoff hysteresis:

- **minimum cutoff**: the speed of the fans goes from 0 to MIN when the control probe **HP** reaches 'A' from below.
  If the control probe **HP** reaches 'A' from above, the speed changes from MIN to 0.
- **saturation cutoff**: the speed of the fans goes from continuous control to MAX when the control probe **HP** reaches 'B'.
  If the control probe HP reaches 'B' from above, we have continuous control from MAX to MIN.

DEAD BAND CONTROL
Enabling

- 301–FCFn = 1

The discharge controller power request is proportional to the time the HP control probe stays outside the proportional band.
The proportional band is symmetrical relative to the setpoint value.

Control probe

324 - don

Pbd/2
SET

Pbd/2   +1   +1   -1   -1   TIME

334 - Pbd

325 - doF   325 - doF
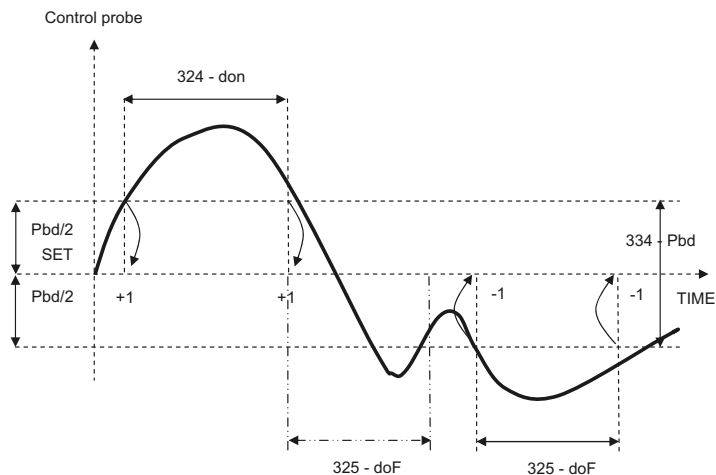
Digital fan - dead band

The principal function of the controller consists in activating a number of power steps in proportion to the time since the moment in which the LP control probe has exceeded the threshold SET + BP/2.
The proportional band is symmetrical relative to the setpoint value.
When the LP control probe has exceeded the threshold a new resource is activated every 324 – don seconds until the LP control probe enters the half band. The same holds for resource deactivation every 325 – dof seconds.

INVERTER fan - dead band

Operation is analogous to that of digital fans, the number of discrete steps is given in 329-InPC

P.I.D. CONTROL

Enabling

- 301 FCFn = 2

The power request from the discharge controller is a function of the difference between the control probe HP and the setpoint and is equal to the sum of three terms:

P proportional to the error: considers the divergence between the LP control probe value and the setpoint, it inserts an action which is directly proportional to it; the action of the proportional component decreases as he error approaches zero;

P proportional to the integral of the error: integrates the measured error over time, reducing the final divergence from the setpoint; this function tracks the previous control values, providing a corrective action capable of adding/subtracting power gradually so as to reach the setpoint value.

D proportional to the derivative of the error: considers the rate of change of the process control value; this provides a faster response in system control, inasmuch as the correction is greater the greater the rate of change of the error;

FAN CONTROL

The control signal applied to the actuator is thus:

$P + I + D = Kp \cdot (error) + Ki \cdot (integral\ of\ error) + Kd \cdot (derivative\ of\ error)$

Where:

$Kp = 1000/Bp$
$Ki = Kp \cdot Tc/Ti$
$Kd = Kp \cdot Td/Tc$

Parameters allow you to set:

• enable integral component (304 - ItEn=1)
• enable proportional component (306 - PbEn=1)
• enable derivative component (307 - dtEn=1)
• the integrative time constant Ti
• the proportional band constant Bp
• the derivative time constant Td

Correspondence of parameters:

Bp	334 - Pbd
Ti	305 - It
Td	308 - dt
Tc	Application cycle time (1.0 sec)

The discrete control signal applied to the actuator is thus:

Digital fans - PID

The control signal u(t) results in the activation of a number of power steps which is proportional to u(t) itself.

INVERTER fan - PID

the control signal u(t) represents the power actuated directly by the
INVERTER.

EWCM9900

CLOCK AND TIME BANDS MENU

The Clock and Time Bands Menu is used to set the date/time and the device's operational time bands.

NB: check that the parameter 640 - rtCE is set to 'Yes' (RTC present). if it is not, the correct display and the change of the date/time will not be guaranteed.

Menu composed of 2 folders:

• **Date and Time**: sets the device's date and time
• **Time Bands**: each week can be divided into 6 periods in which controls can be set, such as dynamic suction setpoint, energy saving, and so on. The calendar is weekly: the week can also be divided into two periods (week and weekend) with separate controls.

Date and Time

DATE/TIME	01/01
24/05/08	14:30
Change Date	
Change Time	

The current date and time will be displayed and the two folders for the modification:

• **Change Date**
• **Change Time**

Change Date

CHANGE DATE	01/01
DD	24
MM	May
YY	8

Open the Change Date menu, select which setting to change - day (DD), month (MM), year (YY)- and make the change.

Note: The year is displayed as a two digit integer (2008 is displayed as 8, 2010 as 10)

Change Time

As described above for the date, set the time (HH) and minutes (MM).

The hour is in the format HH:0...23: MM:0...59. The time can be specified to within a minute.

Leap years are contemplated. For example: February 2008 will have 29 days. The change from GMT to BST and vice versa is not contemplated.

Clock not active

If the clock is not active (parameter 640 - rtCE =No) the indicated date and time will not be accurate.

Whenever the machine is switched off and on again, the time will display as 00/00/00 00:00. Re-setting the parameter 640 - rtCE=Yes will return to the correct display.

The clock in fact has a buffer battery to prevent interruptions in power and/or blackouts.

Clock error (RTC error)

If the battery is drained or the clock is faulty, an RTC error will be signalled by the Alarms Menu.

Time Bands

Menu composed of 3 folders:

• **Enable**
• **Mode**
• **Settings**

Enable

Click on OK to enter the Time Bands menu.

Enable F.O. appears (Time Bands): Click on OK or Right to enter Edit Mode: change the value from No to Yes with the UP key. Confirm with the OK key; To quit press the Left key.

Mode

Menu for selecting the method of using the Time Bands

The weekly mode (indicated with 24H) indicates that every day will have the same settings. Mode 1 indicates that from Monday to Friday there will be one setting and at the weekend another. Mode 2 requires Sunday to have a different setting to the rest of the week.

To access and change the F.O. (Time Bands) mode, proceed as described above. The values are:

• 0 = weekly mode
• 1= weekdays + Saturday / Sunday or Monday -> Friday plus Saturday -> Sunday
• 2= weekdays including Saturday plus Sunday or Monday -> Saturday plus Sunday

Settings

Menu for changing the parameters of each single band. To access and change the F.O. (Time Bands) mode, proceed as described above. The display is determined by what is set in the Mode Menu.

In the example, the F.O mode is set to 1.

For each group of days it is possible to set 6 independent and separately activatable time bands.

One function can be enabled/disabled for each time band.

Example

Mode We have selected mode 1, week divided into **Monday ->Friday** and **Saturday -> Sunday**

In the settings menu, we access **Mon-Fri**

Days Mon-Fri

• We consider the first time band NOT active - 'Band 1 No'.
  - the start time is nonetheless determined by 'Band 1 hours' and 'Band 1 minutes' (default 0:00 i.e. midnight)
• We consider the first time band active - 'Band 2 Yes'.
• With Band 2 hours' we set the starting time in hours of time band 2 (e.g. 8 o'clock)
• With 'Band 2 minutes' we set the starting time in minutes of time band 2 (e.g. 30 minutes). Note that the settings for time band 1 terminate when time band 2 starts
• Use 'Energy Saving No' to de-activate energy saving during time band 2.

Days Sat-Sun

• We consider the first time band active - 'Band 1 Yes'.
• We use 'Band 1 hours' and 'Band 1 minutes' to set the start of time band 1 as described above for Mon->Fri.
• We use 'Suc. Dynamic set 1' to enable the dynamic suction setpoint during time band 1.

Notes:

• The duration of the time band runs from its starting time to the starting time of the next time band.
• The functions enabled for the time band are activated when the time band starts (the same applies to disabled functions).
• The status of the functions may be modified within the time band by:
  - dedicated digital input for the function in question;
  - key;
  - Functions menu;
  - remote (supervision system or web);
• if the parameter 'Band 1' is also enabled for the days Mon-Fri ('Band 1 Yes') we have 2 offset controls on the setpoint for the weekdays and the weekend.
• if the Energy Saving function is enabled, the setpoint offset settings will be ignored
• if the Heat Recovery function is enabled the settings of the offsets on the condensation setpoint will be ignored

By default all time bands are enabled at intervals of 4 hours (Band 1-> 0:00, band 2 ->04:00, ... Band 6-> 20:00) and all functions are enabled.

FUNCTIONS MENU

The Functions Menu allows manually setting and checking by keyboard some of the functions that can be associated with the Function keys.

By default the functions are all disabled.
To activate the desired function move onto the function with the UP and DOWN keys and press the OK key. The function will activate and the word No related to the function will be updated to Yes.

AVAILABLE FUNCTIONS

Mute
If the displayed value is On, following an alarm condition, the alarm will immediately be acknowledged.

Eco. Asp (Suction Economy function)
Eco. Cond (Discharge Economy function)
Function that enables / disables the reduced set for the sections respectively of suction and discharge.
Note: activation/de-activation of these functions is also determined by the **En function. Saving (°):**

En. Saving (Energy Saving)
The energy saving function controls all suction and discharge economy functions.
The activation mode is defined by parameter 556 - ESFn (Menu *Parameters > Functions*).
If the displayed value is On the Energy Saving LED will be on steady.
See dedicated paragraph.

Funzioni Aux (Auxiliary functions) Aux1...Aux4
The device can control up to 4 auxiliary relay outputs.
CTRitLiq (Liquid Return Control)

Active only when the compressors (on the same circuit) are off.

Recovery (Heat)
Function used for exploiting the heat developed by the condenser (for instance to heat water for sanitary use, water for rooms, etc)
The function can be enabled in the Time Bands menu.
If you modify the **Eco. Cond** function, the **Recovery** function will be de-activated if active (Yes ->No)

SbGasCa (Hot Gas Defrosting)
Function enabled after digital input activation appropriately configured

NB
The state of the functions:
• **Recovery**
• **CTRitLiq**
• **Hot gas defrost**
can be displayed but not modified in this menu.

(°) **Example En. Saving (Energy Saving)**
If parameter 556 - ESFn = 5 which means Suction Economy + Discharge Economy
activating En. Saving will also enable:
• Suction Economy
• Discharge Economy
in other words, the 2 functions will be automatically enabled (No —> Yes)

ENERGY SAVING

En. Saving (Energy Saving)
The energy saving function controls all suction (circuit 1 and circuit 2) and discharge economy functions.
The function is enabled as shown in the table and depending on the setting of parameter 556 - ESFn.
The activation request may come from:
• scheduled time band;
• dedicated digital input for the function in question;
• key;
• functions menu;
• remote (supervision system or web);
Note: If the heat recovery function is active and the activation of the Energy Saving function results in a change in the state of the discharge economy function, the recovery function is de-activated.

The de-activation occurs as per the exclusion table for disabling via time bands (°).
Energy Saving is disabled also when the status of a function indicated in the table as being 'with economy function active' (✔ symbol) is modified (for example, by a keystroke).
Example: If Discharge Economy is disabled and 556-ESFn = 5 the Energy Saving function is disabled in Suction Economy (circuit 1) (further to Discharge Economy itself, naturally). Suction Economy (circuit 2) will undergo no change.
Note: The Energy saving LED will go out.

If the request originates from a digital input, the Energy Saving function will be activated/de-activated by changing the status of the digital input (active with contact open).
Keystroke, Functions menu and remote requests toggle (activate/de-activate) the funtion.

(°) Time Bands
• If time band control is already active, the status specified for the current time band is forced when the time band itself starts.
• If, during a given time band, other requests from keystrokes, the function

menu or remote controls occur, these are considered by the system.
• If they are disabled by time bands, the discharge and suction economy functions are determined by the time band settings.
Example: if at 18.30 band 2 starts, in which the Energy Saving function is disabled, the discharge and suction economy functions are determined by their respective settings within the time band itself.

556 - ESFn	Economy Suction C1	Economy Suction C2	Economy Discharge
0	disabled	disabled	disabled
1	//	//	✔
2	//	✔	//
3	//	✔	✔
4	✔	//	//
5	✔	//	✔
6	✔	✔	//
7	✔	✔	✔
✔	Economy function active		
//	no changes		

Table legend

• **Economy function active** ✔ symbol indicates that the corresponding function will be activated (e.g. 556 - ESFn = 1 Suction Economy circuit 1 will be activated)
• **//** indicates that there will be no change for the corresponding function (e.g. 556 - ESFn = 1 if Discharge Economy is active, it stays active, and if inactive it stays inactive)

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ECONOMY FUNCTION • SUCTION SET POINT

The Economy function controls the regulation SetPoint
The function allows obtaining control on the suction regulation SetPoint depending on the ambient temperature (for instance the temperature of the display area of the supermarket)

The activation request may come from:
• scheduled time band;
• dedicated digital input for the function in question;
• key;
• functions menu;
• remote (supervision system or web);
• Energy Saving function;

The Set can be fixed or variable (function of a differential) defined by:
• 107 - dSS Mode Set Dyn. Suc. =0 indicates that the suction SetPoint will be dynamic, that is a function of a differential.
• 107 - dSS Mode Set Dyn. Suc. =1 indicates that the suction SetPoint will be fixed

Case 107=0 dynamic setpoint
• 145 - AtdS Set dynamic amb Tp
• 146 - dAtdS AtdS differential

Case 107=1 fixed setpoint
• If the activation request is determined by a time band, the correction is added to the setpoint (fixed offset):
  • 136 - dSPo1 offset 1 for dyn set (24h /Mon-Fri / Mon-Sat)
  • 137 - dSPo2 Offset 2 for dyn set (Sat-Sun / Sun) depending on the time band mode setting.
• In all other cases the setpoint is added to 136 - dSPo1.
If 146-dAtdS=0 the correction is equal to 136-dSP01 (137 - dSP02) for ambient temperature values < SET, for higher values there is no correction.

If the internal ambient temperature probe is in error or not configured, the function is not enabled and the correction is always =0.

• If the request originates from a digital input, the Energy Saving function will be activated/de-activated by changing the status of the digital input (active with contact open).
• If the request originates from the Energy Saving function, the economy will be activated/de-activated by changing the status of the Energy Saving function. It will be activated if the Energy saving function requires it, and de-activated otherwise.
• Keystroke, Functions menu and remote requests toggle (activate/de-activate) the funtion.
(•) Time Bands
• If time band control is already active, the status specified for the current time band is forced when the time band itself starts.
• If, during a given time band, other requests from keystrokes, the function menu or remote controls occur, these are considered by the system.

ECONOMY FUNCTION • DISCHARGE SET POINT

The Economy function manages the control of the regulation SetPoint
The function allows obtaining control on the discharge regulation SetPoint depending on the external ambient temperature (for instance the temperature of the condenser).

The activation request may come from:
• scheduled time band;
• dedicated digital input for the function in question;
• key;
• functions menu;
• remote (supervision system or web);
• Energy Saving function;

The Set can be fixed or variable (function of a differential) defined by:
• 314 - dSd Mode Set Dyn. Del.=0 indicates that the discharge SetPoint will be dynamic, that is a function of a differential.
• 314 - dSd Mode Set Dyn. Del. =1 indicates that the discharge SetPoint will be fixed

Case 314=0 dynamic setpoint
The function can be enabled only if the external temperature is < 348-dSMEt Max Ext Temp Set dyn.
The condensation setpoint is derived by summing the external temperature to the CR factor (see drawing), where:
CR=346-dSdo * power % delivered by the system/100.
Notes:
• The CR factor is limited below by 347-dSLdo.
• The effective value of the fluctuating setpoint is limited below by 349-LdSP (areas A and B)
To prevent fluid returns to the condenser, prevent the gas subcooling.
Subcooling UCtemp (see diagram) is calculated by using the sub-temperature probe value, positioned upstream of the liquid receiver, and that of the discharge probe:

Correction to condensation setpoint due to undercooling
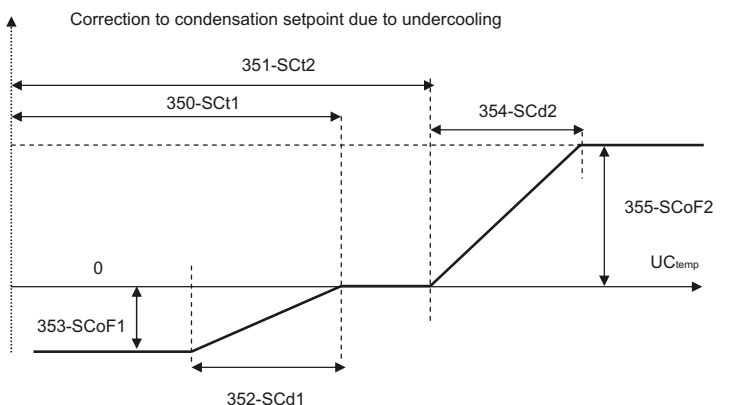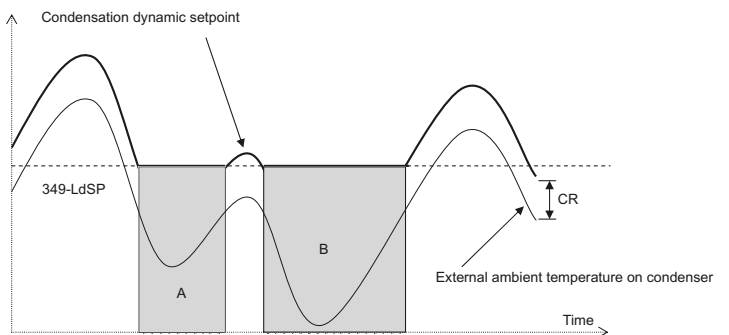
ECONOMY FUNCTION • DISCHARGE SET POINT

- If the control is by temperature:
  UCtemp = discharge gas temperature - subcooling probe
- If the control is by pressure:
  UCtemp = value converted to temperature (discharge gas pressure) - subcooling probe

In accordance with the second diagram, a further correction is applied to the fluctuating setpoint (summed to the actual setpoint).
Note:
- 350-SCt1 and 351-SCt2 represent the two minimum and maximum subcooling values.
- If 350-SCt1<UCtemp<351-SCt2 there will be no correction
- For external values:
  - the correction is proportional with divergences < to 352-SCd1 or 354-SCd2.
  - the correction is fixed for divergences greater than or equal to 353-SCoF1 or 355-SCoF2

No correction is made to the setpoint if:
- the external temperature probe on the condenser is in error or not configured;
- the discharge probe is in error or not configured;
- the subcooling probe is in error or not configured;

- the temperature measured by he subcooling probe > external temperature probe on condenser + 356-EtPr Tp Ext protection if 356-EtPr not equal to 0;

Case 314=1 fixed setpoint
from the setpoint is subtracted 339 - dSFo.

- If the request originates from a digital input, the Energy Saving function will be activated/de-activated by changing the status of the digital input (active with contact open).
- If the request originates from the Energy Saving function, the economy will be activated/de-activated by changing the status of the Energy Saving function. It will be activated if the Energy saving function requires it, and de-activated otherwise.
- Keystroke, Functions menu and remote requests toggle (activate/de-activate) the funtion.

LIQUID RETURN CONTROL

Control active after delay 565-odo and if not active, the configuration mode (QuickStart Menu: enable=No).
The liquid return relay control is determined by 584 - H201 Relay OUT1, ..., 596 - H213 Relay OUT13 if at least one of these = 6.
Activation with delay in relation to turning off the compressors defined by:
- 559 - LrCd Liq Ret Ctrl Delay
The ON/OFF times are defined by:
- 560 - Lron d.c. ON time. Liq Ret
- 560 - LroF d.c. OFF time. Liq Ret
If at least one of the compressors on which the function is active turns on, the control deactivates.
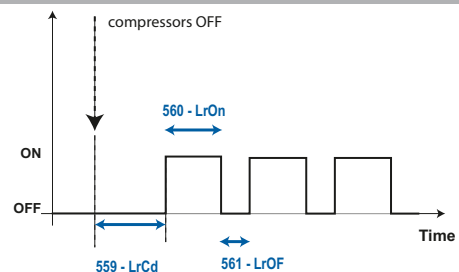
- If 560-Lron = 0 and 561-LroF = 0 the output is always deactivated
- If 560-Lron = 0 and 561-LroF is not equal to 0 the output is always deactivated
- If 560-Lron is not equal to 0 and 561-LroF = 0 the output is always active

HEAT RECOVERY

The heat recovery control is determined by parameters
627 - H405... 630 - H408 if at least one of these = 7 (recovery water temperature).
The function can be enabled only in the Time Bands menu and is defined by
- 557 - Hrto Max Tp OUT Recovery
- 558 - Hrdt Delta Tp Recovery
The discharge Economy function will be deactivated if the recovery water temperature is less than 557 - Hrto.
The Discharge Economy function returns to active in the current time band if the recovery water temperature is greater than 557+558.

The function will not be active in case of recovery probe failure.

the function is disabled when the discharge economy function is modified.
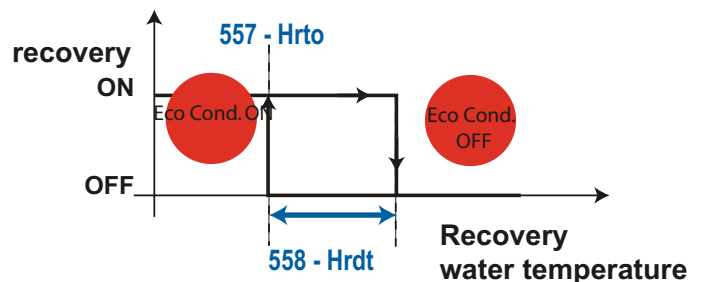
AUXILIARY CONTROL (AUX)

Controls directly up to digital auxiliary outputs.
The AUX activation request may come from:
- scheduled time band;
- dedicated digital input for the function in question;
- key;
- functions menu;
- remote (supervision system or web);

If the request originates from a digital input, the AUX output will be activated/de-activated by changing the status of the digital input (active

with contact open).
Keystroke, Functions menu and remote requests toggle (activate/de-activate) the function.
- If time band control is already active, the status specified for the current time band is forced when the time band itself starts.
- if other requests occur during the time band they are always considered.
Auxiliary control is active immediately after the device is switched on (no delay 565-odo).

HOT GAS DEFROST

Control active after delay 565-odo.

When a hot gas defrost is required for a refrigerated counter (or set of counters) on a single circuit, the controller must have at least one compressor on the circuit in question which remains active during defrosting to ensure a supply of gas.

On activation of the digital input configured as 'Hot Gas Defrosting Request' for a circuit, the compressors on the circuit are controlled so as to deliver a power equal, or as close as possible in excess, to the minimum power given by 109-PoPr.

If the system is already delivering a power greater than 109-PoPr, the situation remains unchanged.

In particular, for systems with **UNEQUAL STEPS** the system will attempt to guarantee a power as close as possible in excess relative to that requested, in line with the available resources at the time of the decision.

SERVICE MENU

The Service Menu is dedicated to personnel cleared for maintenance of the device.

Access to the Service Menu requires a password.

Access Password

When you attempt to access the Service Menu, the text 'PASSWORD' displays: press 'OK' and set the password with the 'UP' and 'DOWN' keys. If the password is correct, pressing 'OK' opens the parameters menu.

The password '637 - PSW4 Password 4' is composed of 5 alphanumeric characters.

The default password is '*****'.

Note: The default password '*****' immediately accesses the Service Menu, so that it is not necessary to enter it.

The Service Menu folders are shown here; Select the folder you require with the UP and DOWN keys and press OK to enter.

Recordings Menu

Menu composed of 2 folders:
• Upload to Copy Card: allows 'uploading' the operating log to Copy Card - see Copy Card chapter.
• Reset recordings: cancels (resets) all the recordings - log of the recordings of operation. Confirmation for deletion will be requested (Confirm Del.). Confirm with the OK / RH (right) key; To quit press the LH (left) key.

Loads Status Menu

Menu composed of 2 folders:
• Compressors
• Fans

Menu that allows displaying the state of the compressors / fans and to delete (Res) the hours of operation. Move onto the selected utility with the UP and DOWN keys and confirm resetting with the OK / RH (right) key. For example:

Compressors

Comp1 Res	0 hour

Fans

VInv Res	0 hour

In the Compressors Menu it will besides be possible to select/deselect each single compressor:

Compressors

...

Comp1 Sel	YES
Comp2 Sel	NO

...

Reset alarm history

Menu to clear (reset) the alarm log. Confirmation for deletion will be requested (Confirm Del.). Confirm with the OK / RH (right) key; To quit press the LH (left) key.

Copy Card Menu

See Copy Card chapter

IO Test menu

Menu that allows manual management (test) of the present outputs: the Menu is composed of 3 folders
• **Manual Mode**

To test the outputs it is necessary to enable manual mode:

Access the menu by pressing OK, press the RH key and press UP to change from No to Yes. Exit the Menu with the LH (left) key. The display will show:

Manual   YES

At this stage, access the folders:
• **Outx Test**

From this folder it will be possible to set (Set) in a similar way to what was described above the digital outputs from No to Yes.

Example (On corresponds to the setting Yes, Off to the setting No):

Out1	On
Out2	On
Out3	Off

• **Vx/Ix Test**

Similarly to what was described above, the analogue outputs will be activated in a percentage:

with the OK key, use the RH (right) key and with the UP/DOWN keys to increase or decrease the percentage of the analog output.

Exit the Menu with the LH (left) key.

Example:

V1/I1	0%
V2/I2	100%

IO State menu

Menu which displays the inputs/outputs:
• **SIGx/PBx** - displays the values read by the analogue inputs (see Probes menu)
• **Vx/Ix** - displays the values read by the analogue outputs (see IO Test menu)
• **DIx/DIHx** - displays the values read by the digital inputs (which may be On or Off). Example:
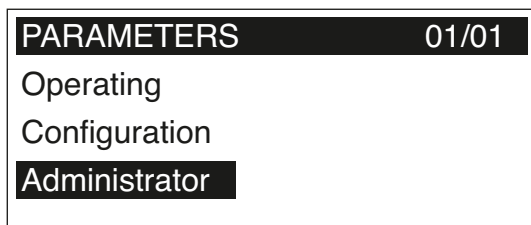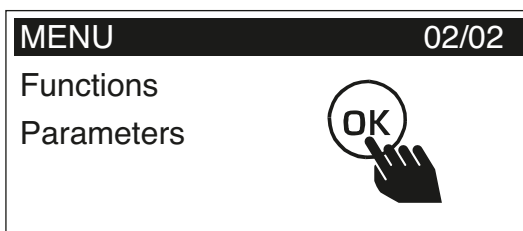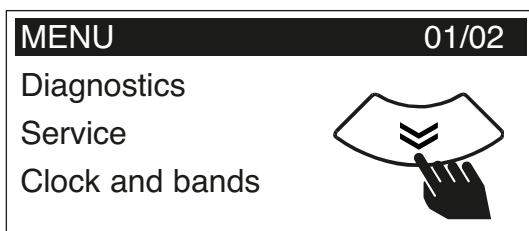
DIH1	Off
...	
DIH14	Off
DI1	On

...
• **Outx** - displays the values read by the digital outputs (which may be On or Off)- see IO Test menu.

MENU PARAMETRI

MENU	01/02
Diagnostics	
Service	
Clock and bands	

OK

MENU	02/02
Functions	
Parameters	

OK

PARAMETERS	01/01
Operating	
Configuration	
Administrator	

ADMINISTRATOR • CONFIGURATION • OPERATIVE PARAMETERS

Parameters menu
The parameters menu is accessed from the main display as indicated in the figure and described in the Keys and Components section.

If a password has been enabled, you will first be presented with the label 'PASSWORD'.

Enabling the programming and access password
When you attempt to access the parameters menu, the label 'PASSWORD' displays: press 'OK' and set the password with the 'UP' and 'DOWN' keys. If the password is correct, pressing 'OK' opens the parameters menu.
The password is composed of 5 alphanumeric characters.
The default password is '*****'.
Note: the password '*****' provides immediate access to the parameters Menu (that is without requesting the password).

Access and structure of the parameters
Select the desired folder (if the folder is Quick Start see the Quick Start Parameters Description chapter) with the 'UP' and 'DOWN' keys and press 'OK' to display the parameters.
After entering the selected folder (example Compressors folder) the display will show in the heading the name of the folder in lowercase followed by two numbers that identify the number of the parameter / total number of the parameters of the folder (example 002/047 indicates the second parameter of 47 parameters in the Compressors folder).
The acronym of the parameter will follow preceded by a univocal number that identifies the parameter (example 552 - PoLI, the second in the list)

Display and modification of parameters
Scroll through the parameters with the UP and DOWN keys; To modify a value press OK; to modify the value use the UP and DOWN keys; to confirm the change press OK again. To exit without saving, press LH.

Reduced parameters menu
Access to the 'reduced' parameters Menu takes place via the Main Display by pressing and holding down the function key F2.
Only a few parameters are visible (that is a 'reduced' set of parameters) of the Parameters Menu:
• Operating
• Configuration
If a password has been enabled, you will first be presented with the label 'PASSWORD'.
In the description of the parameters, the reduced parameter set is shown in **bold**.

Access the Administrator Parameters Menu from the Main Display as follows (example with Password disabled - see the successive paragraph for password management):
• Press and hold the OK function key
• accesses the Navigation Menu (MENU): scroll DOWN through the various folders until you reach the Parameters folder: select the folder with the OK key.
• you access the Parameters Menu (PARAMETERS): Scroll with the DOWN key through the various folders and select the 'Administrator' folder with the OK key.
The sequence to access the Operational and Configuration Parameters is entirely analogous.

The parameters are managed in 'folders' that group a substantial set of programming parameters.
Administrator Parameters
This menu contains all the parameters folders:
• **Quick Start**
The Quick Start parameters are described in a separate chapter
• all the other folders (Compressors, Fans, etc)
• Operating passwords
• Config. password.
• Amministr. Password.
All parameters in the folder are described in the Administrator Parameters section and the Parameters Table
There will besides be the possibility of accessing and changing the 3 Passwords indicated making it possible to protect the system from unwanted access.
Configuration Parameters
In this Menu there are the folders and the related parameters:
• **Quick Start**
• Configuration
• Resource allocation
• Files Setup
• Config. password.
There will besides be the possibility of accessing and modifying only the Configuration Password.
Operational parameters
In this Menu there are the folders and the related parameters:
• Compressors
• Fans
• Safety measures
• Display
• Functions
• Operating passwords
There will besides be the possibility of accessing and modifying only the Operating Password.
Note that the Administrator Menu is composed of the Configuration Menu + Operational Menu + Administrator Password
Note that the Operational Menu does not allow you to enable the QuickStart.

ADMINISTRATOR PARAMETERS DESCRIPTION

COMPRESSOR PARAMETERS

• 551 - Central Stty Set
Enables suction/delivery control with central (Yes)/ lateral (No) set

• **552 - PoLI Activation Policy**
Used to enable the fixed sequence or rotation according to the hours of operation in activating the compressors (including the compressor set as 'Master' - see 120 - nCPC).
0 = fixed sequence;
Policy of distribution of resources starting from the compressors with a smaller index that is the principle must prevail of activating the first compressor in the sequence - turning on the steps of the first compressor (if applicable) - activating the second compressor, etc.
1 = rotation of compressors;
Policy of distribution of resources starting from the compressors with a smaller index that is the principle must prevail of activating the first compressor in the sequence - turning on the steps of the first compressor (if applicable) - activating the second compressor (in terms of operation), etc.
The aim is to balance the hours of operation between the various resources.
2 = saturation 1;
Policy of distribution of resources over the smallest possible number of compressors that is the principle must prevail of having the greatest number of compressors off.
3 = saturation 2 (also called saturation algorithm);
When turning on steps in a segmented compressor system, the principle must prevail of completely saturating a compressor before switching on another one.
When turning off a step in systems of the same type, the logic is modified because before switching off the last step to be turned on of a compressor it is wise to switch off a step of another compressor, to avoid requests for switching the same compressor back on.

• **553 - SEr COMP time limit**
Limit on using compressors. In hours.

• 101 - CCFn COMP control type
Selection of type of compressor control:
0=Proportional; 1=Dead band; 2= PID
Note: The following parameters 102-ItEn…106-dt are significant when 101 - CCFn =2 (PID).

• 102 - ItEn Full control
Use of the full component of PID setting (0=No; 1 = Yes)

• 103 - It Full time
Time in seconds of the full component of PID setting

• 104 - PbEn Proportional control
Use of the proportional component of PID setting (0=No; 1 = Yes)

• 105 - dtEn Derivative control
Use of the derivative component of PID setting (0=No; 1 = Yes)

• 106 - dt Derivative time
Time in seconds of the derivative component of PID setting

• 107 - dSS St Din. mode. Suc.
Selection of dynamic setpoint
0= dynamic set; 1= fixed set
See Economy Function section

• **108 - CPP Enable ERR-control**
Enable power to activate with faulty suction probe. 0 = No; 1 = Yes

• **109 - PoPr ERR power value**
Power to activate with faulty suction probe. In percentage.

• **111 - PEn High alarm. LPr times**
Number of errors of the suction pressure switch which must occur in the time 112-PEI for the alarm to change from automatic to manual
If = 0 the alarm is always automatic.

• **112 - PEn interval**
Time interval for the calculation of the number of errors of the suction pressure switch 111-PEn.

• 113 - byPS HPr–LPr bypass time
Suction pressure switch high/low pressure trip bypass time.

• 114 - InLSP minimum speed
Minimum speed (%) **INVERTER**

• 115 - InMSP top speed
Maximum speed (%) **INVERTER** at end of ramp

• 116 - InSSP saturation speed
Maximum speed (%) **INVERTER**

• 117 - CoIE Enable INV cut-off
Enable cutoff **INVERTER**. 0 = No; 1 = Yes.
If = 0 the cutoff hysteresis is ignored (parameter 142 - Cod1 not significant)

• 118 - PtSE Part. sequence.
Defines the activation / deactivation sequence of the relays associated with compressor segmentation:
0 = increasing sequence;
1= single segmentation;
2 = decreasing sequence.
See section on Compressor Management

• **120 - nCPC Selection COMP Master** Selects the Master compressor: this compressor will always be the first one to be turned on and the last one to be released according to the activation policy (see 552 - PoLI).
The number identifies the compressor that will act as Master. Range 0…[number of compressors defined by parameter **523 - CPnU Num. Compr. Circuit 1**];
0 = function disabled.

Compressor Protection

• **121 - oFon COMP OFF - ON time**
Minimum time, in minutes, between turning the same compressor off and back on again.

• **122 - donF COMP ON-OFF time**
Minimum time of compressor operation before a new release!
The 'called' compressor stays on at least for the time set by this parameter.

• **123 - onon COMP ON-ON time**
Minimum time, in minutes, between turning the same compressor on and on again.

• **124 - don ON steps time**
Delay time, in seconds, between the calls of two different steps.

• **125 - doF OFF steps time**
Delay time, in seconds, between releasing two different steps.

• **126 - FdLy Enable dON 1' Ins.**
Enables operation of the delay for parameter **124 - don** even for the first step request after an equilibrium condition.
0 = No; 1 = Yes.

• **127 - FdLF Enables dOF 1' Ins.**
Enables operation of the delay for parameter **125 - doF** even for the first step off request after an equilibrium condition.
0 = No; 1 = Yes.

• 128 - InPC % var. **INVERTER**
INVERTER power percentage increment/decrement step

• 129 - Inot INV max. time a 0%
INVERTER maximum operating time at minimum power

• 130 - InLt INV time at min speed.
Time between **INVERTER** reduction to minimum and activation of a new power step

• 145 - AtdS Set dynamic amb Tp
Fluctuating control of the suction setpoint - according to the ambient temperature - used to calculate the suction setpoint correction (133 - SEt).

• 146 - dAtdS AtdS differential
Suction dynamic Set differential.
See above.
Note: the parameters 145 - AtdS and 146 - dAtdS are significant if 107 - dSS = 0

• **131 - LSE Minimum setpoint**

• **132 - HSE Maximum setpoint**
Minimum / maximum limit on programming the suction set

• **133 - SEt Suction setpoint**

• **134 - Pbd proportional band**
Proportional suction band.
Parameter has significance if 101 - CCFn = 0.1
- Case 101 - CCFn = 0: within the band the control is proportional, actuating or removing a resource (only **EVEN STEPS** or **EVEN STEPS** + **INVERTER**) according to the power request.
- Case 101 - CCFn = 1: outside the band the adjustment takes place by turning a resource on or off according to the required power.

• 135 - PbdE Extended proportional band
Extended proportional suction band
Parameter significant if 101 - CCFn = 1
(dead band)
Note: typically set to 135 - PbdE > 134 - Pbd.

• 136 - dSPo1 offset 1 for din set
Correction applied to suction setpoint (133 - SEt) if 146 - dAtdS =0 and the ambient temperature is < 145 - AtdS

• 137 - dSPo2 offset 2 for din set
Correction applied to suction setpoint (133 - SEt) during weekends if 983- Tbtyp =1.2 (se Time Bands chapter)
The parameters 136 - dSPo1, 137 - dSPo are significant if 107 - dSS = 0.
See Economy Function section

• **138 - dLAL Delta LAL**

• **139 - LAL Minimum alarm.**
Value of pressure that subtracted from the Set determines the minimum alarm limit.

• **140 - dHAL Delta HAL**

• **141 - HAL Maximum alarm**
Value of pressure that added to the Set determines the maximum alarm limit.

• 142 - Cod1 cut-off delta 1
Cutoff hysteresis **INVERTER** - temperature value to be added to 133 - SEt. If the value exceeds this sum the control passes from ON/OFF to continuous after the time set by 143 - Cod2.

• 143 - Cod2 cut-off delta 2
Cutoff differential **INVERTER** - temperature value relative to 142 - Cod1 at which modulating conrol starts.
The speed (%) is defined by the parameter 114 - InLSP

• 144 - InLPt INV min pot limit

COMPRESSOR PARAMETERS [2]
Folder with only the Quick Start **501 - tyPE** = 1 parameter displayed (plant with single delivery shared drain compressors).
The parameters displayed in the folder are*:
• 201 - CCFn COMP control type
...
• 230 - InLt INV time at min speed.
• 245 - AtdS Set dynamic amb Tp
• 246 - AtdS differential
• **231 - LSE Minimum setpoint**
...
• 244 - InLPt INV min pot limit
*Their meaning is analogous to those in the Compressor Menu (see for ref.).
The correspondence between the Compressors and Compressors [2] parameters is as follows:
1xx -> 2xx
Example: 133 - SEt suction set point corresponds to 233 - SEt suction set point

FAN PARAMETERS
• 301 - FcFn FAN control type
Selects the type of fan control:
0=Proportional; 1=Dead band; 2= PID
• 302 - FACt Activation mode
If = 0 the fans run independently of the compressors.
If = 1 at least one compressor must be on.
• 303 - CoIE Enable INV cut-off
Cutoff enable (0=No; 1=Yes)
• 304 - ItEn Full control
Use of full component PID (0=No; 1=Yes)
• 305 - It Full time
Time in seconds of the full component of PID setting
• 306 - PbEn Proportional control
Use of proportional component PID (0=No; 1=Yes)
• 307 - dtEn Derivative control
Use of derivative component PID (0=No; 1=Yes)
• 308 - dt Derivative time
Time in seconds of the proportional / derivative component of PID setting
• 309 - InLSP minimum speed
Value (%) of minimum fan speed.
• 310 - InMSP top speed
Value (%) of maximum fan speed.
• 311 - InSSP saturation speed
Value (%) of saturation fan speed.
• **312 - FPP Enable ERR-control**
Enablement of condenser power default value for delivery probe error (0=No; 1=Yes)
• **313 - FPr ERR power value**
Condenser power default value for delivry probe error. In percentage.
• 314 - dSd St Din. mode. Suc.
Selection of dynamic setpoint
0= dynamic set; 1= fixed set
• **315 - PEn High alarm. LPr times**
Number of delivery pressure switch errors which must occur within the interval defined by parameter **316 - PEI** in order to trigger the alarm.
0 = function off.
• **316 - PEn interval**
Time interval for the calculation of the number of errors of the delivery pressure switch **315-PEn**.
• 317 - byPS HPr-LPr bypass time
Delivery pressure switch high/low pressure trip bypass time. In minutes.
• 318 - HPPE Enable prev. HP

Activation of general delivery alarm prevention. (0=No; 1 = Yes)
• 319 - HPPP Red. Pow. prev. HP
Case **INVERTER.** Continuous reduction of power in the proportional band 342 - HPPd equal to the value of this power parameter activated in W1 (see chapter on Alarms, General delivery alarm prevention)
• 320 - HPPd Max duration prev. HP
General delivery alarm maximum duration. (0=disabled, time-out output). In minutes.
• 321 - HPPI Interval prev. HP
Minimum interval between two successive delivery preventions. In hours.
• **322 - rot Activation policy**
Parameter defines the rotation of fans during calls and releases to obtain the same number of hours of operation.
0 = fixed sequence; 1 = rotation.
• 323 - CIt pick-up time
Time for which the fans run at 100% when the fan battery is switched on.
• **324 - don ON steps time**
Delay time, in seconds, between the calls of two different steps.
• **325 - doF OFF steps time**
Delay time, in seconds, between releasing two different steps.
• 326 - FStt max OFF time.
Maximum time fans are off. In hours.
• **327 - SEr FAN time limit**
Maximum time fans are on. In hours.
• 328 - Inot INV max. time a 0%
Maximum time fans **INVERTER** run at minimum. In percentage.
• 329 - InPC % var. **INVERTER**
INVERTER increment/decrement step
• 330 - InoS Activ. Mode INV 0%
INVERTER minimum activation mode
• 346 - dSdo Dyn Offset. Dyn Set
Floating point condensation dynamic set offset.
• 347 - dSLdo Min. Dyn. Offset Dyn Set
Minimum floating point condensation dynamic set offset.
• 348 - dSMEt Max. Ext Temp Set dyn
Maximum external temperature for enablement of floating point condensation dynamic set.
• 349 - LdSP Min. Dynamic Set
Minimum floating point condensation dynamic set.
• 350 - SCt1 Min Subcooling
Minimum subcooling for condensation dynamic set.
• 351 - SCt2 Max Subcooling
Maximum subcooling for condensation dynamic set.
• 352 - SCd1 Delta1 subcooling
Lower proportional correction for condensation dynamic set due to subcooling.
• 353 - SCoF1 Offset1 subcooling
Lower fixed correction for condensation dynamic set due to subcooling.
• 354 - SCd2 Delta2 subcooling
Higher proportional correction for condensation dynamic set due to subcooling.
• 355 - SCoF2 Offset2 subcooling
Higher fixed correction for condensation dynamic set due to subcooling.
• 356 - EtPr TP Ext safety
Minimum value for subtemperature probe to be added to the external temperature for condensation dynamic set enablement
• **331 - LSE Minimum setpoint**

• **332 - HSE Maximum setpoint**
Minimum / maximum limit on programming the delivery set
• 333 - SEt delivery setpoint
• 334 - Pbd proportional band
Proportional delivery band
• 335 - Cod1 cut-off delta 1
Fan cutoff hysteresis
• 336 - Cod2 cut-off delta 2
Fan cutoff differential
• 337 - dHAL Delta HAL
Maximum alarm threshold differential
• 338 - HAL Maximum alarm
Value of pressure that added to the Set determines the maximum alarm limit.
• 343 - dLAL Delta LAL
Minimum alarm threshold differential
• 344 - LAL Minimum alarm.
Value of pressure that subtracted from the Set determines the minimum alarm limit.
• 345 - InLPt INV min pot limit

SAFETY PARAMETERS
• **565 - odo Output Delay Pw-On.**
Duration, in seconds, for cutting off the compressor outputs from switching on the instrument.
• **566 - PAO Al cut-off. power-on.**
Alarm exclusion at power-on. Pressure alarm exclusion time from powering on the instrument, in minutes.
• **567 - tAo HP-LP bypass time**
Delay for signaling the minimum or maximum alarm, in minutes.
• **568 - Aro Ack duration. Alarms**
Alarm acknowledgment time.
• 569 - PrSAE HPr/LPr Suct.
AlarmSuction pressure switch alarm activation for low/high pressure.
0=Disables alarm handling;
1=Enables alarm notification only;
2=Enables notification and control actions;
3=Enables notification, control actions and activates a dedicated relay for the blocking alarm;
• 570 - PSAE HP/LP Suct.
Suction probe max/min alarm control Analogous to 569 - PrSAE
• 571 - gtSAE Gas Level Alarm
Refrigerant level alarm control. Analogous to 569 - PrSAE
• 572 - gLSAE Gas leak alarm
Refrigerant leak alarm control. Analogous to 569 - PrSAE
• 573 - PrdAE HPr/LPr Man Alarm
Delivery pressure switch alarm activation for low/high pressure. Analogous to 569 - PrSAE
• 574 - PdAE HP/LP Man Alarm
Delivery probe max/min alarm control Analogous to 569 - PrSAE
• 575 - FtAE fans thermal alarm. Fans thermal alarm control. Analogous to 569 - PrSAE
• 576 - FInAE Fan Inv Prot Alarm
Probe max/min alarm control Analogous to 569 - PrSAE
• 577 - SFAE Fan Maint. Alarm
Fan/fan inverter maintenance alarm control Analogous to 569 - PrSAE
• 578 - CSAE Block comp. alarm
Compressor block alarm control Analogous to 569 - PrSAE
• 579 - CInAE Comp Inv Prot Alarm
Compressor inverter error alarm

management. Analogous to 569 - PrSAE
• 580 - SCAE Comp Maint Alarm
Compressor maintenance alarm management.
Analogous to 569 - PrSAE
• 581 - oLAE Oil Level Alarm
Lubricant oil level alarm management. Analogous
to 569 - PrSAE
• 582 - gAAE General alarm
Generic alarm management. Analogous to 569 -
PrSAE
• 583 - rtCAAE RTC Alarm
Real Time Clock alarm control (clock)
Analogous to 569 - PrSAE
• 701 - HPPAE Saf.Meas.Timeout Alarm.
Delivery maximum alarm safety timeout Alarm
Management
0=Disables alarm handling;
1=Enables alarm notification only;

CONFIGURATION PARAMETERS
• 639 - tAb TAB
Configuration index for default parameters;
cannot be modified by the User.
• 640 - rtCE RTC Enabling
Yes = RTC enabled; No = RTC disabled.
If = No the Time Bands Menu is not significant
Freon Type
• 641 FtyP Type of Gas
Type of freon used in the system.
The selection of the type of freon is necessary
for correct system operation.

Value	Description	
0	R22	
1	R134a	
2	R502	
3	R404 A	
4	R407 C	default
5	R 507	
6	R717	
7	R410A	
8	R417a	
9	R744	
10	R-402A	
11	R-402B	
12...15	not used	

Analog inputs type
• 646 - Sig12 Probe Type SIG1/2
Configurable in pairs 0-10V / 0-5V / 4-20mA
• 648 - Pb12 Probe Type PB1/2
• 649 - Pb34 Probe Type PB3/4
Configurable in pairs NTC / PTC / Digital input:
3 = D.I. Digital Input
4 = NTC103AT
5 = PTC KTY81
6 = NTC NK103C1R1
Pressure transducers resolution
• 650 - HSig1 SIG1 High Precision
• 651 - HSig2 SIG2 High Precision

The default is in hundredths of a bar / tenths of
PSI or high precision.
Analogue outputs type
• 652 - AoS1 Selection V1 or I1
• 653 - AoS2 Selection V2 or I2
Selectable as voltage (V) or current (I)
Analog inputs calibration
• 655 - CALSIg1 Calibration SIG1 bar
• 655 - CALSIg1 Calibration SIG1 PSI
• 656 - CALSIg2 Calibration SIG2 bar
• 656 - CALSIg2 Calibration SIG2 PSI
• 659 - CALPb1 Calibration PB1 °C
• 659 - CALPb1 Calibration PB1 °F
...
• 662 - CALPb4 Calibration PB4 °C
• 662 - CALPb4 Calibration PB4 °F
Calibrations are always indicated in double units
of measurement.
Setting full scale values
• 663 - LtSIg1 Lower limit SIG1 bar
• 663 - LtSIg1 Lower limit SIG1 PSI
• 664 - UtSIg1 Upper limit SIG1 bar
• 664 - UtSIg1 Upper limit SIG1 PSI
• 665 - LtSIg2 Lower limit SIG2 bar
• 665 - LtSIg2 Lower limit SIG2 PSI
• 666 - UtSIg2 Upper limit SIG2 bar
• 666 - UtSIg2 Upper limit SIG2 PSI
Fullscale values (upper and lower limits) of the
SIG1/2 analogue inputs settable as bar/PSI

DISPLAY PARAMETERS • 541 - LAng Language
selection
0 = local language (ITA, GER, SPA, FRE according
to the product code)
1= English
Note: Check product code and availability of
languages with Sales department.
• 542 - tout Time out menu.
Time after which the system quits the current
menu and returns to the previous one.
In seconds. Default 300 sec.
• 543 - rELP Relative pressure
Selects display in absolute or relative pressure.
0 = absolute; 1 = relative.
• 544 - AbS Relative alarms
Defines if the alarms are to be considered in a
relative way (Yes) or absolute way (No)
• 547 - UMCP UM Suction
• 548 - UMCP UM delivery
Measurement Unit suction / delivery section
0=°C; 1=°F; 2= bar; 3= PSI
If the setting is in temperature and the suction
input is a transducer the read value will
automatically be converted into pressure
according to the refrigerant (641 - FtyP).
The unit of measure shown on the display may
differ from the control unit. The display depends
on the LH (suction) and RH (delivery) buttons.
• 549 - LoCK Keypad lock
Locks the keyboard disabling the following
functions: modifies parameters, modifies the
Sets, resets the hours of work of the various
compressors and maintenance; the parameter
579 - LoCK in any case can be modified.

Value	Description	
0	no key	
1	F1 single press	
2	F2 single press	
3	F3 single press	
4	LH single press	
5	RH single press	
6	OK single press	
7	F1 press and hold	
8	F2 press and hold	
9	F3 press and hold	
10	LH press and hold	
11	RH press and hold	
12	OK press and hold	

• 550 - HKUnL Unlock Keypad Hotkey.
It defines the function key for unlocking the
keyboard: pressing the set function key accesses
the 'reduced Menu' to unlock the keyboard.

FUNCTION PARAMETERS
• 554 - drEn Record Data
Enable data logging
• 555 - HIEn Record history
Enable alarm history
ENERGY SAVING
• 556 - ESFn Energy Saving Type
Energy Saving activation mode.
See Functions / Energy Saving chapter

556 - ESFn	Economy Suction C1	Economy Suction C2	Economy Discharge
0	disabled	disabled	disabled
1	//	//	✔
2	//	✔	//
3	//	✔	✔
4	✔	//	//
5	✔	//	✔
6	✔	✔	//
7	✔	✔	✔
✔	Economy function active		
//	no changes		

Heat Recovery
• 557 - Hrto Max Tp OUT Recovery
SetPoint Maximum outlet water temperature for
heat recovery
• 558 - Hrdt Delta Tp Recovery
Outlet water delta (differential) temperature in
heat recovery
Liquid Return Test
Significant parameters for compressors of the
same circuit switched off.
• 559 - LrCd Liq Ret Ctrl Delay
Liquid return control activation delay
• 560 - Lron d.c. ON time. Liq Ret
• 561 - LroF d.c. OFF time. Liq Ret
Duty cycle liquid return control ON/OFF time
ADDRESSING PARAMETERS • 671 - FAA
Family address
Selects the family in the Televis**System** network.
• 672 - dEA Device Address
Selects the address in the Televis**System**
network.
• 673 - PtStLV Protocol selection
Selects the Micronet (Televis) or Modbus RTU
comms protocol.
If selecting the Modbus RTU protocol it is wise

to configure the parameters:
• 674 - bdrttLV Baud rate
Values that can be set: 9600 /19200 / 38400 b/s
• 675 - PtytLV Parity Bit
If selecting the Televis protocol, parameters 674-675 are not significant.

RESOURCE ALLOCATION PARAMETERS
Relay outputs
Note: OUT1,8 SPDT; OUT2...7, OUT9...13 SPST)
• 584 - H201 Relay OUT1
• 585 - H202 Relay OUT2
...
• 596 - H213 Relay OUT13
Configuration of outputs on relays
OUT1...OUT13: positive values indicate direct polarity, negative indicate reverse polarity.
0= Disabled
±1=Digital output AUX1
±2=Digital output AUX2
±3=Digital output AUX3
±4=Digital output AUX4
±5=Digital output central gas expulsion (gas leak)
±6=Liquid return control digital output C1
±7=Liquid return control digital output C2
±8=Safety relay digital output
±9=Cumulative alarm digital output
±10=Power-on digital fan 1
±11=Power-on digital fan 2
±12=Power-on digital fan 3
±11=Power-on digital fan 4
±12=Power-on digital fan 5
±15=Power-on digital fan 6
±16=Power-on digital fan 7
±17=Power-on digital fan 8
±18=Enable **INVERTER** fan
±19=Power-on compressor 1
±20=Power-on compressor 2
±21=Power-on compressor 3
±22=Power-on compressor 4
±23=Power-on compressor 5
±24=Power-on compressor 6
±25=Power-on compressor 7
±26=Power-on compressor 8
±27=Power-on compressor 9
±28=Power-on compressor 10
±29=Power-on compressor 11
±30=Power-on compressor 12
±31=Enable **INVERTER** compressor C1
±32=Enable **INVERTER** compressor C2
±33=Segmentation 1 compressor 1
±34=Segmentation 2 compressor 1
±35=Segmentation 3 compressor 1
±36=Segmentation 4 compressor 1
±37=Segmentation 5 compressor 1
±38=Segmentation 1 compressor 2
±39=Segmentation 2 compressor 2
±40=Segmentation 3 compressor 2
±41=Segmentation 4 compressor 2
±42=Segmentation 5 compressor 2
±43=Segmentation 1 compressor 3
±44=Segmentation 2 compressor 3
±45=Segmentation 3 compressor 3
±46=Segmentation 4 compressor 3
±47=Segmentation 5 compressor 3
±48=Segmentation 1 compressor 4
±49=Segmentation 2 compressor 4
±50=Segmentation 3 compressor 4
±51=Segmentation 4 compressor 4
±52=Segmentation 5 compressor 4
±53=Segmentation 1 compressor 5
±54=Segmentation 2 compressor 5

±55=Segmentation 3 compressor 5
±56=Segmentation 4 compressor 5
±57=Segmentation 5 compressor 5
±58=Segmentation 1 compressor 6
±59=Segmentation 2 compressor 6
±60=Segmentation 3 compressor 6
±61=Segmentation 4 compressor 6
±62=Segmentation 5 compressor 6
±63=Segmentation 1 compressor 7
±64=Segmentation 2 compressor 7
±65=Segmentation 3 compressor 7
±66=Segmentation 4 compressor 7
±67=Segmentation 5 compressor 7
±68=Segmentation 1 compressor 8
±69=Segmentation 2 compressor 8
±70=Segmentation 3 compressor 8
±71=Segmentation 4 compressor 8
±72=Segmentation 5 compressor 8
±73=Segmentation 1 compressor 9
±74=Segmentation 2 compressor 9
±75=Segmentation 3 compressor 9
±76=Segmentation 4 compressor 9
±77=Segmentation 5 compressor 9
±78=Segmentation 1 compressor 10
±79=Segmentation 2 compressor 10
±80=Segmentation 3 compressor 10
±81=Segmentation 4 compressor 10
±82=Segmentation 5 compressor 10
±83=Segmentation 1 compressor 11
±84=Segmentation 2 compressor 11
±85=Segmentation 3 compressor 11
±86=Segmentation 4 compressor 11
±87=Segmentation 5 compressor 11
±88=Segmentation 1 compressor 12
±89=Segmentation 2 compressor 12
±90=Segmentation 3 compressor 12
±91=Segmentation 4 compressor 12
±92=Segmentation 5 compressor 12
±93=Blocking alarm digital output
Digital Inputs
 - High voltage
• 603 - H101 IN Digital HV DIH1
...
• 612 - H114 IN Digital HV DIH10 **- Voltage free**
• 617 - H301 IN Digital LV DI1
...
• 620 - H304 IN Digital LV DI4 Configuration of digital inputs on high voltage DIH1...DIH10 and low voltage DI1...DI4: positive values indicate direct polarity, negative indicate reverse polarity.
0=Disabled
Settings for voltage-free digital inputs
±1=Generic alarm
±2=Digital input AUX1
±3=Digital input AUX2
±4=Digital input AUX3
±5=Digital input AUX4
±6=Suction economy digital input C1
±7=Suction economy digital input C2
±8=Delivery economy digital input
±9=Energy saving digital input
±10=Refrigerant level
±11=Refrigerant leak
±12=Hot gas defrosting request C1
±13=Hot gas defrosting request C2
±14=Circuit lubricating oil level C1
±15=Circuit lubricating oil level C2
±16=Compressor differential pressure switch C1
±17=Compressor differential pressure switch C2
±18=HP Compressor C1
±19=HP Compressor C2
±20=LP Compressor C1

±21=LP Compressor C2
±22=Compressor thermal switch C1
±23=Compressor thermal switch C2
±24=Error **INVERTER** compressor circuit C1
±25=Error **INVERTER** compressor circuit C2
Settings for high voltage digital inputs
±26=Enable **INVERTER** fan
±27=Circuit suction gas pressure switch C1
±28=Circuit suction gas pressure switch C2
±29=Delivery gas pressure switch
±30=Digital fan thermal cut-out 1
±31=Digital fan thermal cut-out 2
±32=Digital fan thermal cut-out 3
±33=Digital fan thermal cut-out 4
±34=Digital fan thermal cut-out 5
±35=Digital fan thermal cut-out 6
±36=Digital fan thermal cut-out 7
±37=Digital fan thermal cut-out 8
±38=Fan thermal switch regulated continuously
±39=Compressor block 1
±40=Compressor block 2
±41=Compressor block 3
±42=Compressor block 4
±43=Compressor block 5
±44=Compressor block 6
±45=Compressor block 7
±46=Compressor block 8
±47=Compressor block 9
±48=Compressor block 10
±49=Compressor block 11
±50=Compressor block 12
±51=Compressor block regulated continuously C1
±52=Compressor block regulated continuously C2
±53=Power limit NU
Analogue inputs
Pressure transducers
• 623 - H401 IN Analog SIG1 • 624 - H402 IN Analog SIG2 Configuration of analogue inputs (transducers) SIG1/SIG2
0=Disabled
±1=Circuit suction gas pressure switch C1
±2=Circuit suction gas pressure switch C2
±3=Delivery gas pressure
• 627 - H405 IN Analog PB1
• 630 - H408 IN Analog PB4 Configuration of analogue inputs (probes) PB1...PB4
These inputs can be configured as low voltage digital inputs: in this case positive values indicate direct polarity, negative ones the contrary.
0=Disabled
±1=Suction gas temperature C1
±2=Suction gas temperature C2
±3=Delivery gas temperature
±4=Internal ambient temperature
±5=External ambient temperature
±6=Subtemperature sensor
±7=Recovery water temperature
±8=Generic alarm
±9=Digital input AUX1
±10=Digital input AUX2
±11=Digital input AUX3
±12=Digital input AUX4
±13=Suction economy digital input C1
±14=Suction economy digital input C2
±15=Delivery economy digital input
±16=Energy saving digital input
±17=Refrigerant level
±18=Refrigerant leak
±19=Hot gas defrosting request C1
±20=Hot gas defrosting request C2
±21=Circuit lubricating oil level C1

±22=Circuit lubricating oil level C2
±23=Compressor differential pressure switch C1
±24=Compressor differential pressure switch C2
±25=HP Compressor C1
±26=HP Compressor C2
±27=LP Compressor C1
±28=LP Compressor C2
±29=Compressor thermal cut-out C1
±30=Compressor thermal cut-out C2
±31=Error **INVERTER** compressor circuit C1
±32=Error **INVERTER** compressor circuit C2
±33=Error **INVERTER** fan
±34=Circuit suction gas pressure switch C1
±35=Circuit suction gas pressure switch C2
±36=Delivery gas pressure switch
±37=Digital fan thermal cut-out 1
±38=Digital fan thermal cut-out 2
±39=Digital fan thermal cut-out 3
±40=Digital fan thermal cut-out 4
±41=Digital fan thermal cut-out 5
±42=Digital fan thermal cut-out 6
±43=Digital fan thermal cut-out 7
±44=Digital fan thermal cut-out 8
±45=Fan thermal switch regulated continuously
±46=Compressor block 1
±47=Compressor block 2
±48=Compressor block 3
±49=Compressor block 4
±50=Compressor block 5
±51=Compressor block 6
±52=Compressor block 7
±53=Compressor block 8
±54=Compressor block 9
±55=Compressor block 10
±56=Compressor block 11
±57=Compressor block 12
±58=Compressor block regulated continuously C1
±59=Compressor block regulated continuously C2
±60=Power limit NU
• 631 - H501 OUT Analog V1/I1 • 632 – H502 OUT Analog V2/I2 • 633 – H503 OUT Analog V3/I3 Configuration of analogue inputs (for **INVERTER**) AO1...AO3:
0=Disabled
±1=Switch on **INVERTER** fan
2=Switch on **INVERTER** compressor circuit C1
3=Switch on **INVERTER** compressor circuit C2
SETUP FILES PARAMETERS
• 452 - USId1 User string 1
• 453 - USId2 User string 2
String composed of 20 alphanumeric characters (max. length).
• 459 - rECF File name REC
• 459 - HISF File name HIS
• 459 - dAtF File name DAT
• 459 - gLoF File name GLO
Names that will be assigned to the various log files on operation/alarms log/parameters/glossary

PASSWORD
Operating passwords
• 634 - PSW1 Password 1
Sets the Operational Parameters Menu password
The password is composed of 5 alphanumeric digits.
The default password is '*****'.
Note: The default password set to '*****' provides direct access to the Menu.
Visible from Operational Parameters Menu and Administrator Parameters Menu.

Configuration Password
• 635 - PSW2 Password 2
Sets the Configuration Parameters Menu password.
Visible from Configuration Parameters Menu and Administrator Parameters Menu.
See also parameter 634. **Administrator Password**
• 636 - PSW3 Password 3
Sets the Menu password.
Administrator parameters Visible from Administrator Parameters Menu.
See also parameter 634.
Visible parameters from other Menus / Param Manager
Service Password
• 637 - PSW4 Password 4
Sets the Service Menu password.Visible from the Service Menu.
See also parameter 634.
Password 5
• 637 - PSW5 Password 5
Not used
See also parameter 634.

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PARAMETERS TABLE

Parameter	Range	Default	U.o.M.	Notes
QUICKSTART folder		**DEFAULT [501 - tYPE] = 0**		
501 - tyPE Type of plant	0 ... 2	0	number	0=Standard compressor plant
502 - PC1 - Power COMP 1	1 ... 255	3	number	
503 - PC2 - Power COMP 2	1 ... 255	3	number	
504 - PC3 - Power COMP 3	1 ... 255	3	number	
505 - PC4 - Power COMP 4	1 ... 255	3	number	
506 - PC5 - Power COMP 5	1 ... 255	1	number	3 steps / 2 capacity steps
507 - PC6 - Power COMP 6	1 ... 255	1	number	max 12 compressors in a system
508 - PC7 - Power COMP 7	1 ... 255	1	number	
509 - PC8 - Power COMP 8	1 ... 255	1	number	
510 - PC9 - Power COMP 9	1 ... 255	1	number	
511 - PC10 - Power COMP 10	1 ... 255	1	number	
512 - PC11 - Power COMP 11	1 ... 255	1	number	
513 - PC12 - Power COMP 12	1 ... 255	1	number	
514 - EAAL - Enable DO Alarms	0 ... 1	1	flag	0=No; 1=Yes
515 - EACI - Enable COMP INV	0 ... 1	0	flag	0=No; 1=Yes
516 - EAFI - Enable FANS INV	0 ... 1	0	flag	0=No; 1=Yes
517 - EACIE - Enable ERR COMP INV	0 ... 1	0	flag	0=No; 1=Yes
518 - EAFIE - Enable ERR FANS INV	0 ... 1	0	flag	0=No; 1=Yes
519 - EAgA - Enable DI Alarm	0 ... 1	0	flag	0=No; 1=Yes
520 - Fnty - Fan mode	0 ... 2	1	number	1=continuous fan (analogue)
521 - nFn - Fan number	1 ... 8	5	number	max. 8 digital fans Significant if 520 - Fnty = 2
522 - CtyP - Type Circuit 1	0 ... 2	0	number	0= HOMOGENEOUS STEPS 1= NON-HOMOGENEOUS STEPS 2=HOMOGENEOUS STEPS + INVERTER
523 - CPnU - Num. COMP circuit 1	0 ... 12	4	number	0 only permitted if 522 - CtyP = 2 The sum (523 - CPnU) + (525 - CPnU2) <=12
524 - CtyP2 - Type Circuit 2	0 ... 2	0	number	0= HOMOGENEOUS STEPS 1= NON-HOMOGENEOUS STEPS 2=HOMOGENEOUS STEPS + INVERTER
525 - CPnU2 - Num. COMP circuit 2	0 ... 12	4	number	0 only permitted if 524 - CtyP2 = 2 The sum (523 - CPnU) + (525 - CPnU2) <=12
COMPRESSORS folder				
551 - Stty - Central Set	0...1	1	flag	1=Central Set
552 - PoLI - Activation Policy	0...3	2	number	
553 - SEr - COMP time limit	0...32000	32000	hours	
101 - CCFn - COMP control type	0...2	0	number	
102 - ItEn - Full control	0...1	0	flag	0=No; 1=Yes
103 - It - Full time	0,1...90	60	secs	
104 - PbEn - Prop. control	0...1	0	flag	0=No; 1=Yes
105 - dtEn - Derivative control	0...1	0	flag	0=No; 1=Yes
106 - dt - Derivative time	0,1...90	60	secs	
107 - dSS - Suction Dyn. set mode.	0...1	1	number	
108 - CPP - Enable ERR-control	0...1	0	flag	0=No; 1=Yes
109 - PoPr - ERR power value	0...100	50	%	
111 - PEn - Max. time LPr alarm	0...20	3	number	
112 - PEI - PEn interval	1...15	15	mins	
113 - byPS - HPr-LPr bypass time	0...999	2	mins	
114 - InLSP - Minimum speed	0...100	20	%	
115 - InMSP - Top speed	0...100	80	%	
116 - InSSP - Saturation speed	0...100	90	%	
117 - CoIE - Enable INV cut-off	0...1	1	flag	0=No; 1=Yes
118 - PtSE - Part. sequence.	0...2	0	number	
120 - nCPC - Select Master COMP	0...[523 - CPnU]	0	number	**See QUICKSTART folder**
121 - oFon - COMP OFF - ON time	0...999	5	mins	
122 - donF - COMP ON-OFF time	0...999	15	secs	
123 - onon - COMP ON-ON time	0...999	5	mins	
124 - don - ON steps time	0...999	15	secs	
125 - doF - OFF steps time	0...999	5	secs	
126 - FdLy - Enable dON 1' On.	0...1	1	flag	0=No; 1=Yes
127 - FdLF - Enables dOF 1' Off.	0...1	1	flag	0=No; 1=Yes
128 - InPC - % inverter. variation	1...100	10	%	
129 - Inot - Max. time INV a 0%	0...999	999	mins	
130 - InLt - INV time at min speed	0...999	0	secs	
131 - LSE - Minimum setpoint	-100...600 -150...999,9 -1...68 -14,5...999,9	0,37	°C °F bar PSI	bar
132 - HSE - Maximum setpoint	-100...600 -150...999,9 -1...68 -14,5...999,9	4,6	°C °F bar PSI	bar
133 - SEt - Suction setpoint	131 - LSE...132 - HSE	1,09	°C °F bar PSI	bar
134 - Pbd - Proportional Band	-100...600 -150...999,9 -1...68 -14,5...999,9	0,25	°C °F bar PSI	bar
135 - PbdE - Extended proportional band	-100...600 -150...999,9 -1...68 -14,5...999,9	0,51	°C °F bar PSI	bar
136 - dSPo1 - Offset 1 for dyn set	-100...600 -150...999,9 -1...68 -14,5...999,9	0,1	°C °F bar PSI	bar
137 - dSPo2 - Offset 2 for dyn set	-100...600 -150...999,9 -1...68 -14,5...999,9	0,1	°C °F bar PSI	bar

Parameter	Range	Default	U.o.M.	Notes
138 - dLAL - Delta LAL	-100...600 -150...999,9 -1...68 -14,5...999,9	0,1	°C °F bar PSI	bar
139 - LAL - Minimum alarm	-100...600 -150...999,9 -1...68 -14,5...999,9	5,47	°C °F bar PSI	bar
140 - dHAL - Delta HAL	-100...600 -150...999,9 -1...68 -14,5...999,9	0,1	°C °F bar PSI	bar
141 - HAL - Maximum alarm	-100...600 -150...999,9 -1...68 -14,5...999,9	5,47	°C °F bar PSI	bar
142 - Cod1 - Cut-off delta 1	-100...600 -150...999,9 -1...68 -14,5...999,9	0,1	°C °F bar PSI	bar
143 - Cod2 - Cut-off delta 2	-100...600 -150...999,9 -1...68 -14,5...999,9	0	°C °F bar PSI	bar
144 - InLPt - INV min pot limit	-100...600 -150...999,9 -1...68 -14,5...999,9	0,99	°C °F bar PSI	bar
145 - AtdS - Set dynamic amb Tp	-100...600 -150...999,9	15	°C °F	°C
146 - dAtdS - AtdS differential	-100...600 -150...999,9	2	°C °F	°C
COMPRESSORS folder [2] **cartella visibile solo se 501 - tyPE = 1**				
201 - CCFn - COMP control type	0...2	0	number	
202 - ItEn - Full control	0...1	0	flag	
203 - It - Full time	0,1...90	60	secs	
204 - PbEn - Prop. control	0...1	0	flag	
205 - dtEn - Derivative control	0...1	0	flag	
206 - dt - Derivative time	0,1...90	60	secs	
207 - dSS - Suction Dyn. set mode.	0...1	1	number	
208 - CPP - Enable ERR-control	0...1	0	flag	
209 - PoPr - ERR power value	0...100	50	%	
211 - PEn - Max. time LPr alarm	0...20	3	number	
212 - PEI - PEn interval	1...15	15	mins	
213 - byPS - HPr-LPr bypass time	0...999	2	mins	
214 - InLSP - Minimum speed	0...100	20	%	
215 - InMSP - Top speed	0...100	80	%	
216 - InSSP - Saturation speed	0...100	90	%	
217 - CoIE - Enable INV cut-off	0...1	1	flag	
218 - PtSE - Part. sequence.	0...2	0	number	
220 - nCPC - Select Master COMP	0...[525 - CPnU2]	0	number	**See QUICKSTART folder**
221 - oFon - COMP OFF - ON time	0...999	5	mins	
222 - donF - COMP ON-OFF time	0...999	15	secs	
223 - onon - COMP ON-ON time	0...999	5	mins	
224 - don - ON steps time	0...999	15	secs	
225 - doF - OFF steps time	0...999	50	secs	
226 - FdLy - Enable dON 1' On.	0...1	1	flag	
227 - FdLF - Enables dOF 1' Off.	0...1	1	flag	
228 - InPC - % inverter. variation	1...100	10	%	
229 - Inot - Max. time INV a 0%	0...999	999	mins	
230 - InLt - INV time at min speed	0...999	0	secs	
231 - LSE - Minimum setpoint	-100...600 -150...999,9 -1...68 -14,5...999,9	0,37	°C °F bar PSI	bar
232 - HSE - Maximum setpoint	-100...600 -150...999,9 -1...68 -14,5...999,9	4,6	°C °F bar PSI	bar
233 - SEt - Suction setpoint	231 - LSE...232 - HSE	3,44	°C °F bar PSI	bar
234 - Pbd - Proportional Band	-100...600 -150...999,9 -1...68 -14,5...999,9	0,7	°C °F bar PSI	bar
235 - PbdE - Extended proportional band	-100...600 -150...999,9 -1...68 -14,5...999,9	1,41	°C °F bar PSI	bar
236 - dSPo1 - Offset 1 for dyn set	-100...600 -150...999,9 -1...68 -14,5...999,9	0,28	°C °F bar PSI	bar
237 - dSPo2 - Offset 2 for dyn set	-100...600 -150...999,9 -1...68 -14,5...999,9	0,28	°C °F bar PSI	bar
238 - dLAL - Delta LAL	-100...600 -150...999,9 -1...68 -14,5...999,9	0,28	°C °F bar PSI	bar
239 - LAL - Minimum alarm	-100...600 -150...999,9 -1...68 -14,5...999,9	5,47	°C °F bar PSI	bar
240 - dHAL - Delta HAL	-100...600 -150...999,9 -1...68 -14,5...999,9	0,28	°C °F bar PSI	bar

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Parameter	Range	Default	U.o.M.	Notes
241 - HAL - Maximum alarm	-100...600 -150...999,9 -1...68 -14.5...999,9	5,47	°C °F bar PSI	bar
242 - Cod1 - Cut-off delta 1	-100...600 -150...999,9 -1...68 -14.5...999,9	0,28	°C °F bar PSI	bar
243 - Cod2 - Cut-off delta 2	-100...600 -150...999,9 -1...68 -14.5...999,9	0	°C °F bar PSI	bar
244 - InLPt - INV min pot limit	-100...600 -150...999,9 -1...68 -14.5...999,9	3,19	°C °F bar PSI	bar
245 - AtdS - Set dynamic amb Tp	-100...600 -150...999,9	15	°C °F	°C
246 - dAtdS - AtdS differential	-100...600 -150...999,9	2	°C °F	°C
FANS folder				
301 - FcFn - FAN control type	0...2	0	number	
302 - FACt - Activation mode	0...1	0	flag	0 = fans independent from the compressors
303 - CoIE - Enable INV cut-off	0...1	0	flag	0=No; 1=Yes
304 - ItEn - Full control	0...1	0	flag	0=No; 1=Yes
305 - It - Full time	0,1...90	60	secs	
306 - PbEn - Prop. control	0...1	0	flag	0=No; 1=Yes
307 - dtEn - Derivative control	0...1	0	flag	0=No; 1=Yes
308 - dt - Derivative time	0,1...90	60	secs	
309 - InLSP - Minimum speed	0...100	20	%	
310 - InMSP - Top speed	0...100	80	%	
311 - InSSP - Saturation speed	0...100	90	%	
312 - FPP - Enable ERR-control	0...1	0	flag	0=No; 1=Yes
313 - FPr - ERR power value	0...100	50	%	
314 - dSd - Del. Dyn. Set. Mode	0...1	1	number	
315 - PEn - Max. time LPr alarm	0...20	3	number	
316 - PEI - PEn interval	1...15	15	mins	
317 - byPS - HPr-LPr bypass time	0...999	2	mins	
318 - HPPE - Enable HP. saf.	0...1	0	flag	0=No; 1=Yes
319 - HPPP - Red. Pow. HP. Saf.	1...100	30	%	
320 - HPPd - Max duration HP. Saf	0...999	15	mins	
321 - HPPI - Interval HP. Saf	0...999	10	hours	
322 - rot - Activation policy	0...1	0	flag	1=Rotation
323 - CIt - Pick-up time	0...120	30	secs	
324 - don - ON steps time	0...999	015	secs	
325 - doF - OFF steps time	0...999	5	secs	
326 - FStt - Max OFF time	0...999	24	hours	
327 - SEr - FAN time limit	0...32000	32000	hours	
328 - Inot - Max. time INV a 0%	0...999	15	mins	
329 - InPC - % inverter. variation	1...100	20	%	
330 - InoS - INV. activation. mode 0%	0...1	1	number	
346 - dSdo - Dyn Offset. Dyn Set	-100...600 -150...999,9	5	°C °F	°C
347 - dSLdo - Min Offs.Dyn.Set dyn	-100...600 -150...999,9	3	°C °F	°C
348 - dSMEt - Max Ext Temp Set dyn	-100...600 -150...999,9	30	°C °F	°C
349 - LdSP - Min. Dynamic Set	-100...600 -150...999,9	30	°C °F	°C
350 - SCt1 - Min Subcooling	-100...600 -150...999,9	3	°C °F	°C
351 - SCt2 - Max Subcooling	-100...600 -150...999,9	5	°C °F	°C
352 - SCd1 - Subcooling Delta1	-100...600 -150...999,9	6	°C °F	°C
353 - SCoF1 - Subcooling Offset1	-100...600 -150...999,9	1	°C °F	°C
354 - SCd2 - Subcooling Delta2	-100...600 -150...999,9	1	°C °F	°C
355 - SCoF2 - Subcooling Offset2	-100...600 -150...999,9	1	°C °F	°C
356 - EtPr - TP Ext safety	-100...600 -150...999,9	0	°C °F	°C
331 - LSE - Minimum setpoint	-100...600 -150...999,9 -1...68 -14.5...999,9	5,6	°C °F bar PSI	bar
332 - HSE - Maximum setpoint	-100...600 -150...999,9 -1...68 -14.5...999,9	19,7	°C °F bar PSI	bar
333 - SEt - Delivery set	331 - LSE...332 - HSE	15,4	°C °F bar PSI	bar
334 - Pbd - Proportional Band	-100...600 -150...999,9 -1...68 -14.5...999,9	3,2	°C °F bar PSI	bar
335 - Cod1 - Cut-off delta 1	-100...600 -150...999,9 -1...68 -14.5...999,9	0,4	°C °F bar PSI	bar
336 - Cod2 - Cut-off delta 2	-100...600 -150...999,9 -1...68 -14.5...999,9	0,4	°C °F bar PSI	bar
337 - dHAL - Delta HAL	-100...600 -150...999,9 -1...68 -14.5...999,9	0,8	°C °F bar PSI	bar
338 - HAL - Maximum alarm	-100...600 -150...999,9 -1...68 -14.5...999,9	6,6	°C °F bar PSI	bar

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Parameter	Range	Default	U.o.M.	Notes
339 - dSFo - Dyn Set Fixed Offset	-100...600 -150...999,9 -1...68 -14,5...999,9	0,8	°C °F bar PSI	bar
340 - HPP1 - HP Saf. Limit 1	-100...600 -150...999,9 -1...68 -14,5...999,9	6,2	°C °F bar PSI	bar
341 - HPP2 - HP Saf. Limit 2	-100...600 -150...999,9 -1...68 -14,5...999,9	6,4	°C °F bar PSI	bar
342 - HPPb - HP Safety. alarm band	-100...600 -150...999,9 -1...68 -14,5...999,9	0,4	°C °F bar PSI	bar
343 - dLAL - Delta LAL	-100...600 -150...999,9 -1...68 -14,5...999,9	0,8	°C °F bar PSI	bar
344 - LAL - Minimum alarm	-100...600 -150...999,9 -1...68 -14,5...999,9	6,6	°C °F bar PSI	bar
345 - InLPt - INV min pot limit	-100...600 -150...999,9 -1...68 -14,5...999,9	15	°C °F bar PSI	bar
SAFETIES folder				
565 - odo - Output Delay Pw-On.	0...999	1	secs	
566 - PAO - Pw-On Al. Exclusion	0...999	15	mins	
567 - tAo - HP-LP bypass time	0...999	0	mins	
568 - Aro - Alarm sil. duration	0...9999	15	mins	
569 - PrSAE - HPr/LPr Suct. Alarm	0...3	2	number	
570 - PSAE - HP/LP Suct. Alarm	0...3	2	number	
571 - gtSAE - Gas Level Alarm	0...3	3	number	
572 - gLSAE - Gas leak alarm	0...3	1	number	
573 - PrdAE - HPr/LPr Man Alarm	0...3	2	number	
574 - PdAE - HP/LP Man Alarm	0...3	2	number	
575 - FtAE - Fans thermal alarm	0...3	2	number	
576 - FInAE - Fan Inv Prot Alarm	0...3	2	number	
577 - SFAE - Fan Maint. Alarm	0...3	1	number	
578 - CSAE - Comp shutdown alarm	0...3	2	number	
579 - ClnAE - Comp Inv Prot Alarm	0...3	2	number	
580 - SCAE - Comp Maint Alarm	0...3	1	number	
581 - oLAE - Oil Level Alarm	0...3	1	number	
582 - gAAE - General alarm	0...3	2	number	
583 - rtCAE - RTC Alarm	0...3	1	number	
701 - HPPAE - Saf.Meas.Timout Alarm.	0...1	1	number	
CONFIGURATION folder				
639 - tAb - TAB	0...32767	1	number	
640 - rtCE - RTC Enabling	0...1	1	flag	0=No; 1=Yes
641 - FtyP - Type of Gas	0...15	4	number	
646 - SIg12 - Probe Type SIG 1/2	0...2	0	number	4-20mA
647 - SIg34 - Probe Type SIG 3/4	0...3	0	number	4-20mA
648 - Pb12 - Probe Type PB 1/2	3...6	4	number	NTC 103AT
649 - Pb34 - Probe Type PB 3/4	3...6	4	number	NTC 103AT
650 - HSIg1 - SIG1 High Precision	0...1	1	flag	1=High Precision
651 - HSIg2 - SIG2 High Precision	0...1	1	flag	1=High Precision
652 - AoS1 - Selection V1 or I1	0...1	1	number	Current
653 - AoS2 - Selection V2 or I2	0...1	1	number	Current
654 - AoS3 - Selection V3 or I3	0...1	1	number	Current
655 - CALSIg1 - Calibration SIG1	-10...10	0	bar	
655 - CALSIg1 - Calibration SIG1	-145...145	0	PSI	always displayed as an absolute value Not dependent on parameter 543 - rELP
656 - CALSIg2 - Calibration SIG2	-10...10	0	bar	
656 - CALSIg2 - Calibration SIG2	-145...145	0	PSI	
657 - CALSIg3 - Calibration SIG3	-10...10	0	bar	
657 - CALSIg3 - Calibration SIG3	-145...145	0	PSI	
659 - CALPb1 - Calibration PB1	-10...10	0	°C	
659 - CALPb1 - Calibration PB1	-18...18	0	°F	
660 - CALPb2 - Calibration PB2	-10...10	0	°C	
660 - CALPb2 - Calibration PB2	-18...18	0	°F	
661 - CALPb3 - Calibration PB3	-10...10	0	°C	
661 - CALPb3 - Calibration PB3	-18...18	0	°F	
662 - CALPb4 - Calibration PB4	-10...10	0	°C	
662 - CALPb4 - Calibration PB4	-18...18	0	°F	
663 - LtSIg1 - Lower Limit SIG1	-1...1	0,5	bar	
663 - LtSIg1 - Lower Limit SIG1	-14,5...14,5	-7,2	PSI	
664 - UtSIg1 - Upper Limit SIG1	1...10	8	bar	
664 - UtSIg1 - Upper Limit SIG1	-14,5...14,5	116	PSI	
665 - LtSIg2 - Lower Limit SIG2	-1...1	0,5	bar	always displayed as an absolute value Not dependent on parameter 543 - rELP
665 - LtSIg2 - Lower Limit SIG2	-14,5...14,5	-7,2	PSI	
666 - UtSIg2 - Upper Limit SIG2	1...10	8	bar	
666 - UtSIg2 - Upper Limit SIG2	-14,5...14,5	116	PSI	
667 - LtSIg3 - Lower Limit SIG3	-1...1	1	bar	
668 - UtSIg3 - Upper Limit SIG3	-14...14	14	PSI	
668 - UtSIg3 - Upper Limit SIG3	1...100	31	bar	
667 - LtSIg3 - Lower Limit SIG3	14...1450	449	PSI	
DISPLAY folder				
541 - LAng - Language Selection	0...1	0	flag	0=First language 1= Second language
542 - toUt - Time out menu	10...1000	300	secs	
543 - rELP - Relative pressure	0...1	1	flag	0=No; 1=Yes
544 - AbS - Relative alarms	0...1	1	flag	0=No; 1=Yes
547 - UMCP - UM Suction	0...3	2	number	
548 - UMFn - UM delivery	0...3	2	number	
549 - LoCK - Keypad lock	0...1	0	flag	0=No; 1=Yes
550 - HKUnL - Unlock Keypad Hotkey.	0...12	8	number	
FUNCTIONS folder				

Parameter	Range	Default	U.o.M.	Notes	
554 - drEn - Record Data	0...1	0	flag	0=No; 1=Yes	
555 - HIEn - Record history	0...1	0	flag	0=No; 1=Yes	
556 - ESFn - Energy Saving Type	0...7	0	number		
557 - Hrto - Max Tp OUT Recovery	-100...600 -150...999,9	40	°C °F	°C	
558 - Hrdt - Delta Tp Recovery	-100...600 -150...999,9	10	°C °F	°C	
559 - LrCd - Liq Ret Ctrl Delay	0...999	15	mins		
560 - Lron - Liquid Return d.c. ON time	0...999	60	secs		
561 - LroF - Liquid Return d.c. OFF time	0...999	60	secs		
562 - LrCd2 - Liq Ret Ctrl Delay	0...999	15	mins		
563 - Lron2 - Liquid Return d.c. ON time	0...999	60	secs		
564 - LroF - Liquid Return d.c. OFF time	0...999	60	secs		
ADDRESSING folder					
671 - FAA - Family Address	0...14	0	number		
672 - dEA - Device Address	0...14	0	number		
673 - PtStLV - Protocol selection	2...3	2	number	Micronet	
674 - bdrttLV - Baud rate	0...2	0	number	9600 b/s	
675 - PtytLV - Parity Bit	0...2	1	number	Odd numbers	
RESOURCE ALLOCATION folder				**DEFAULT [501 - tYPE] = 0**	**DEFAULT [501 - tYPE] = 1**
584 - H201 - Relay OUT1	-93...93	9	number	9=ALARM	9=ALARM
585 - H202 - Relay OUT2	-93...93	19	number	19=COMP1 STEP1	19=COMP1 STEP1
586 - H203 - Relay OUT3	-93...93	33	number	33=COMP1 STEP2	33=COMP1 STEP2
587 - H204 - Relay OUT4	-93...93	34	number	34=COMP1 STEP3	34=COMP1 STEP3
588 - H205 - Relay OUT5	-93...93	20	number	20=COMP2 STEP1	20=COMP2 STEP1
589 - H206 - Relay OUT6	-93...93	38	number	38=COMP2 STEP2	38=COMP2 STEP2
590 - H207 - Relay OUT7	-93...93	39	number	39=COMP2 STEP3	39=COMP2 STEP3
591 - H208 - Relay OUT8	-93...93	21	number	21=COMP3 STEP1	21=COMP3 STEP1
592 - H209 - Relay OUT9	-93...93	43	number	43=COMP3 STEP2	43=COMP3 STEP2
593 - H210 - Relay OUT10	-93...93	44	number	44=COMP3 STEP3	44=COMP3 STEP3
594 - H211 - Relay OUT11	-93...93	22	number	22=COMP4 STEP1	22=COMP4 STEP1
595 - H212 - Relay OUT12	-93...93	48	number	48=COMP4 STEP2	48=COMP4 STEP2
596 - H213 - Relay OUT13	-93...93	49	number	49=COMP4 STEP3	49=COMP4 STEP3
597 - H214 - Relay OUT14	-93...93	93	number	93=ALARM REFRIGERANT LEVEL	23=COMP5
598 - H215 - Relay OUT15	-93...93	0	number	0=CNF	24=COMP6
599 - H216 - Relay OUT16	-93...93	0	number	0=CNF	25=COMP7
600 - H217 - Relay OUT17	-93...93	0	number	0=CNF	26=COMP8
601 - H218 - Relay OUT18	-93...93	0	number	0=CNF	0=CNF
602 - H219 - Relay OUT19	-93...93	0	number	0=CNF	0=CNF
603 - H101 - IN Digital HV DIH1	-53...53	39	number	39	39
604 - H102 - IN Digital HV DIH2	-53...53	40	number	40	40
605 - H103 - IN Digital HV DIH3	-53...53	41	number	41	41
606 - H104 - IN Digital HV DIH4	-53...53	42	number	42	42
607 - H105 - IN Digital HV DIH5	-53...53	38	number	38	43
608 - H106 - IN Digital HV DIH6	-53...53	0	number	0	44
609 - H107 - IN Digital HV DIH7	-53...53	0	number	0	45
610 - H108 - IN Digital HV DIH8	-53...53	0	number	0	46
611 - H109 - IN Digital HV DIH9	-53...53	0	number	0	38
612 - H110 - IN Digital HV DIH10	-53...53	0	number	0	27
613 - H111 - IN Digital HV DIH11	-53...53	0	number	0	28
614 - H112 - IN Digital HV DIH12	-53...53	0	number	0	29
615 - H113 - IN Digital HV DIH13	-53...53	27	number	27	0
616 - H114 - IN Digital HV DIH14	-53...53	29	number	29	0
617 - H301 - IN Digital LV DI1	-53...53	0	number	0	0
618 - H302 - IN Digital LV DI2	-53...53	0	number	0	0
619 - H303 - IN Digital LV DI3	-53...53	0	number	0	0
620 - H304 - IN Digital LV DI4	-53...53	10	number	10	0
621 - H305 - IN Digital LV DI5	-53...53	8	number	8	0
622 - H306 - IN Digital LV DI6	-53...53	6	number	6	0
623 - H401 - IN Analog SIG1	0...3	1	number	1	1
624 - H402 - IN Analog SIG2	0...3	0	number	0	0 (set = 2 for circuit 2 suction)
625 - H403 - IN Analog SIG3	-56...56	3	number	3	3
627 - H405 - IN Analog PB1	-60...60	5	number	5	5
628 - H406 - IN Analog PB2	-60...60	6	number	6	6
629 - H407 - IN Analog PB3	-60...60	0	number	0	0
630 - H408 - IN Analog PB4	-60...60	4	number	4	4
631 - H501 - Analog OUT V1/I1	0...3	1	number	1	1
632 - H502 - Analog OUT V2/I2	0...3	0	number	0	0
633 - H503 - Analog OUT V3/I3	0...3	0	number	0	0
FILES SETUP folder					
452 - USId1 - User string 1	0...20	' '	string	max 20 characters	
453 - USId2 - User string 2	0...20	' '	string		
459 - rECF - File name REC	0...10	' '	string	max 8 characters ALL CAPITALS	
460 - HISF - File name HIS	0...10	' '	string		
461 - dAtF - File name DAT	0...10	' '	string		
462 - gLoF - File name GLO	0...10	' '	string		
PASSWORD					
634 - PSW1 - Password 1	0...5	'*****'	string	max 5 characters '*****' indicates Password not present	
635 - PSW2 - Password 2	0...5	'*****'	string		
636 - PSW3 - Password 3	0...5	'*****'	string		
637 - PSW4 - Password 4	0...5	'*****'	string	visible from Service Menu	
638 - PSW5 - Password 5	0...5	'*****'	string	max 5 characters	

NOTE: ALL the values in bar / PSI are expressed in Absolute Pressure and are dependent on parameter 543 - rELP where not expressly indicated

eliwell

ALARMS

The EWCM device is able to perform complete diagnostics of the system signalling any operating trouble with specific alarms, both to signal on LCD and via LED particular events, defined by the user to have greater control over the system.

Alarm are always indicated with the red Alarm LED on the keyboard. The alarm is also indicated by the activation of the corresponding alarm relay if so configured.

The alarms can be of 3 types:

Automatic alarm
Alarm active if the cause of the alarm is present, otherwise not.

Manual alarm
Alarm active if the cause of the alarm is present, otherwise resettable in the alarms menu.

Semi-automatic alarm (timed/event)
Behaves like an automatic alarm so long as the number of events in the unit of time is less than a number set in a parameter, otherwise like a manual alarm.

Probe Errors / Generic Errors
The probe errors / generic errors are all automatic.

ALARM ACKNOWLEDGEMENT
Alarms can be acknowledged in the main display by pressing key F3 once (see Keys and Components section). The alarm LED flashes.
The relay configured as an alarm relay will be deactivated.
The duration of the acknowledgement is defined by parameter 568-Aro.
if 568-Aro=0, acknowledgement is not enabled.

In case of new alarms/probe errors, the LED changes from flashing to steady on and the alarm relay is reactivated.

If during the acknowledgement period all alarms automatically reset, the LED turns off and the alarm relay is deactivated.
If at the end of the acknowledgement period there is at least one active alarm, the alarm relay is re-activated and the alarm LED turns back on.

ENABLING ALARMS

In general all alarms and probe errors are immediately controlled from when the machine is switched on, if enabled. The LP/HP control probe maximum and minimum alarms are distinguished inasmuch as they are controlled, if enabled, after the delay 566-Pao after the device is switched on.
The handling of each alarm can be configured (see parameters 569-PrSAE to 701-HPPAE) so as to:
Values attributable to alarm parameters 569-PrSAE...701-HPPAE
0=Disables alarm handling;
1=Enables alarm notification only;
2=Enables notification and control actions;
3=Enables notification, control actions and activates a dedicated relay for the blocking alarm;

This does not apply to probe errors and compressor alarms which are in the always enabled matrix.

Access to the Alarms Menu takes place via the Main Display by pressing and holding down the function key F3.
if there are no active alarms/probe errors, the display will read EMPTY.

SAFETY RELAY
The safety relay digital output is activated when the board is powered up. It is deactivated when the board is powered down.
The actuation of the safety relay depends on the correct allocation of the output itself.

BLOCKING ALARM RELAY
This relay is activated if at least one of 569-PrSAE...701-HPPAE is set to 3 and the corresponding alarm is active.
The actuation of the relay depends on the correct allocation of the output itself.

COMPRESSOR ALARMS IN MATRIX
Each compressor is equipped with a blocking digital input.
The activation of this input, depending on parameter 578-CSAE, results on an alarm signal and, potentially, the immediate stopping of the compressor.

The following digital inputs may also be present as options, which are common to all compressors on the same circuit:
• differential pressure switch digital input;
• HP digital input;
• LP digital input;
• thermal switch digital input;

Note
• If a compressor block actuates, the activation of one or more of these inputs allows us to easily identify the cause. The compressor block input may also stop the compressor, while the matrix inputs can only give an alarm notification.
• If more than one compressor is blocked at the same time, the cause of the block will not unequivocal.

ALARMS LOG
The alarms log is enabled by 555-HIEn (= 1).
The log contains a maximum of 50 alarms. A new alarm, after this limit is reached, will result in the loss of the oldest alarm.
When a new alarm is activated, it is immediately entered in the alarms history. This does not apply to automatic pressure switch alarms which are only notified on the display.
If the alarm is already present in the history and it has occurred within the same hour, the hourly frequency of the alarm is incremented. The maximum value of the hourly frequency is 99.
Each alarm is represented as follows:
- nn Exyzw-hh-mm-dd/mm/yy-ff
• -nn Nr. Alarm [1...50]
• Exyzw: 'E' followed by alarm code (xy) and system index (zw)
• hh: hour of activation
• dd/mm/yy: date of activation
• ff: hourly frequency - the number of times the alarm has occurred in an hour (max. 99)

Example: E0102-13-12/06/08-02
Alarm 0102 at 13h on 12 June 2008; 2 activations in the hour
See table ALARMS LOG AND CODES LIST

UPLOADING THE ALARMS LOG
See USB Copy Card chapter

DISCHARGE HIGH ALARM PREVENTION

The discharge high alarm is prevented by limiting the number of resources the suction controller would normally ask for when the HP control probe approaches the alarm activation threshold. This function is activated by parameter 318-HPPE.
This prevention algorithm is based on the definition of two thresholds W1 and W2 relative to the HP control probe, which can be defined absolutely or relatively depending on parameter 544-AbS:
• Se 544-AbS=0 (absolute):
  - W1 = (340-HPP1)
  - W2 = (341-HPP2)
• Se 544-AbS=1 (relative):
  - W1 = (333-Set)+(340-HPP1)
  - W2 = (333-Set)+(341-HPP2)

When the value of the HP control probe exceeds W1 resources can no longer be actuated by the suction controller. In this phase, compressors on call wait for equalisation of the discharge pressure/temperature value.

If W2 is also exceeded, resources will be deactivated progressively in proportion to the divergence between the HP probe value and the threshold W2 itself.

Note that once the HP probe value drops to between W1 and W2, the subtracted power is restored in observance of the compressor safety timings.

For values below W1, the suction controller returns to normal control.

Releasing resources

HOMOGENEOUS STEPS AND HOMOGENOUS STEPS + INVERTER

A number of power steps will be released in the proportional band 342-HPPb equal to the percentage 319-HPPP of steps actuated in W1. If the **INVERTER** compressor is present, its power is forced to 0.

Example: 6 steps
Δ = 124-Pbd / Σ Compressor power
Σ = 502-PC1 + ...+ 506-PC6
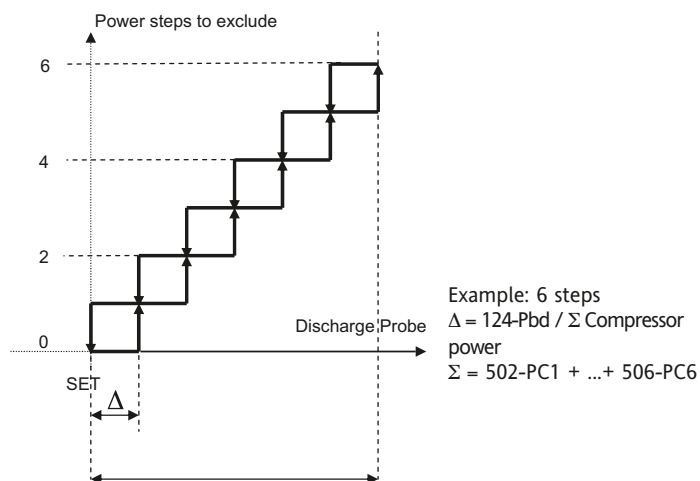
INVERTER

There will be a continuous decrease in power in the proportional band 342-HPPb equal to the percentage 319-HPPP of power actuated in W1.

NON-HOMOGENEOUS STEPS

There will be a request for a continuous decrease in power in the proportional band 342-HPPb equal to the percentage 319-HPPP of power actuated in W1. There is thus no hysteresis inasmuch as it is not determinable in systems with compressors of different powers. The only hysteresis will be temporal, due to the increase/decrease timing parameters.

The system will attempt to guarantee a power as close as possible in excess relative to that requested, in line with the available resources at the time of the decision.

Parameter 320-HPPd, if not equal to 0, defines the maximum duration of the prevention algorithm. When the algorithm remains active for longer than 320-HPPd (counted from when W1 is exceeded) the algorithm is disabled for the time set in parameter 321-HPPI.

If enabled by parameter 701-HPPAE the alarm message 'Discharge prevention timeout' will display.

Once delay 321-HPPI has expired and if the conditions obtain, maximum discharge alarm prevention can be re-enabled.

The alarm automatically resets when the HP control probe value drops below W1 and the algorithm was active.

The control of the algorithm timeout output is not active if 320-HPPd=0.

If the HP control probe is in error, this algorithm is not enabled.

ALARMS LOG AND CODES LIST

Alarms list	Alarm code (xy)	System index (zw)	Notes
LP suction pressure switch trip alarm (manual)	00	01...02	01 circuit 1 02 circuit 2
HP suction pressure switch trip alarm (manual)	01	01...02	
Maximum suction probe alarm	02	01...02	
Minimum suction probe alarm	03	01...02	
Refrigerant level alarm	04	00	
Refrigerant leak alarm	05	00	
LP delivery pressure switch trip alarm (manual)	06	00	
HP delivery pressure switch trip alarm (manual)	07	00	
Delivery probe maximum alarm	08	00	
Delivery probe minimum alarm	09	00	
Digital fan thermal switch alarm	10	01...08	01 digital fan 1 ... 08 digital fan 8
Continuous control fan thermal switch alarm	11	00	
Fan inverter error alarm	12	00	
Digital fan 1 maintenance alarm	13	01...08	01 digital fan 1 ... 08 digital fan 8
Continuous control fan maintenance alarm	14	00	
Compressor oil differential pressure alarm	15	01...02	01 circuit 1 02 circuit 2
Compressor HP alarm	16	01...02	
Compressor LP alarm	17	01...02	
Compressor thermal switch alarm	18	01...02	
Compressor maintenance alarm	19	01	
...			
Compressor maintenance alarm	19	12	
Compressor inverter shutdown alarm	20	01...02	01 circuit 1 02 circuit 2
Inverter compressor maintenance alarm	21	01...02	
Compressor shutdown alarm	22	01	01 compressor 1 ... 12 compressor 12
Compressor inverter error alarm	23	01...02	01 circuit 1 02 circuit 2
Compressor lubricating oil level alarm	24	01...02	
General plant alarm	25	00	
Internal ambient temperature alarm	26	00	
Suction gas probe error alarm	27	01...02	01 circuit 1 02 circuit 2
Delivery gas probe error alarm	28	00	
External ambient temperature alarm	29	00	
Recovery water temperature alarm	30	00	
Subcooling temperature alarm	31	00	
Error opening logged data file	32	00	
Error writing logged data file	33	00	
Error closing logged data file	34	00	
Logged data memory full error	35	00	
IO Configuration Error	36	00	
EEPROM Bios error	37	00	
EEPROM User error	38	00	
RTC batt exhausted	39	00	
RTC connection error	40	00	
RTC Value Error	41	00	
Delivery HP alarm prevention timeout	42	00	

EWCM9900

Display	Description	Type	Parameter.	Compressor shutdown	Fan shutdown	Notes
System refrigerant level	Refrigerant Level	Manual	571 - gtSAE	x	x	Plant shutdown
Refrigerant Leak Plant	Refrigerant Leak	Manual	572 - gLSAE			Activates central gas expulsion digital output
Thermal switch Fan 1	Digital fan 1 thermal switch	Automatic	575 - FtAE	x if all the digital fans are in thermal switch mode	(°) fan 1	
...					...	Plant shutdown if all the digital fans are in thermal switch mode
Thermal switch Fan 8	Digital fan 8 thermal switch	Automatic	575 - FtAE		(°) fan 8	
Cont Fan Thermal switch Delivery	Continuous control fan thermal switch	Automatic	575 - FtAE	x	x	Plant shutdown
Delivery inverter error	Fan inverter error	Automatic	576 - FInAE	x	x	Plant shutdown
Maintenance Fan 1	Maintenance digital fan 1	Manual	577 - SFAE	x if all the digital fans are in mainte- nance	(°) fan 1	Plant shutdown if all the digital fans are in maintenance
...					...	
Maintenance Fan 8	Maintenance digital fan 8	Manual	577 - SFAE		(°) fan 8	
Cont. delivery fan maintenance	Maintenance Continuous control fan	Manual	577 - SFAE		x	Plant shutdown
Suction Comp.Oil. Press.Diff.	Compressor oil pressure differential circuit 1	Automatic				Alarm display in matrix only
Suction [2] Comp.Oil.Press.Diff. (*)	Compressor oil pressure differential circuit 2	Automatic				Alarm display in matrix only
HP suction compressor	HP circuit 1 compressor	Automatic				Alarm display in matrix only
HP suction compressor (*)	HP circuit 2 compressor	Automatic				Alarm display in matrix only
LP suction compressor	LP circuit 1 compressor	Automatic				Alarm display in matrix only
LP suction compressor (*)	LP circuit 2 compressor	Automatic				Alarm display in matrix only
Cont. suction comp. thermal switch	Circuit 1 compressor thermal switch	Automatic				Alarm display in matrix only
Cont. suction comp. thermal switch (*)	Circuit 2 compressor thermal switch	Automatic				Alarm display in matrix only
Maintenance compressor 1	Maintenance compressor 1	Manual	580 - SCAE	(°) compressor 1		
...						
Maintenance compressor 12	Maintenance compressor 12	Manual	580 - SCAE	(°) compressor 12		
Shutdown Comp. Cont.	Circuit C2 compressor inverter shutdown	Automatic	578 - CSAE			
Cont. suction comp. shutdown (*)	Circuit C2 compressor inverter shutdown	Automatic	578 - CSAE			
Cont. suction comp. maintenance	Circuit 1 inverter compres- sor maintenance	Manual	580 - SCAE	(°) Cont. suction compressor		
Cont. suction comp. maintenance (*)	Circuit C2 inverter com- pressor maintenance	Manual	580 - SCAE	(°) Cont. suction [2] compressor		

UTILITIES ALARMS TABLE 2/2

Display	Description	Type	Parameter.	Compressor shutdown	Fan shutdown	Notes
Shutdown	Compressor 1 shutdown	Automatic	578 - CSAE	(°) compressor 1	x if all the system compressors are in maintenance + parameter 302 - FACt = Yes + alarm **LP suction pressure switch** or **Maximum suction probe** on circuit C1 or C2 but not on both	see table **Analogue alarms**
Shutdown	Compressor 12 shutdown	Automatic	578 - CSAE	(°) compressor 12		
Suction inverter error	Circuit C1 compressor inverter error	Automatic	579 - CInAE	(°) inverter compressor C1		
Inverter Error Suction (*)	Circuit C2 compressor inverter error	Automatic	579 - CInAE	(°) inverter compressor C2		
Oil level	Circuit C1 lubricating oil level	Manual	581 - oLAE	compressors C1	x if all the system compressors are in oil level alarm mode + parameter 302 - FACt = Yes + alarm **LP suction pressure switch** or **Maximum suction probe** on circuit C1 or C2 but not on both	see table **Analogue alarms**
Oil level	Circuit C2 lubricating oil level	Manual	581 - oLAE	compressors C2		
Timeout Prevention	Output for general delivery alarm timeout prevention	Automatic	701 - HPPAE			display only
(°) Simultaneous tripping of the thermal switches of all digital fans results in a shutdown alarm						

ANALOGUE ALARMS TABLE 1/3

Display	Description	Type	Parameter.	(Set) activation	Hysteresis	Compressor shutdown	Fan shutdown	Bypass	Reset / No. interventions in time window	Notes
LP suction pressure switch	LP suction pressure switch trip	Events	569 - PrSAE	LP control probe <= (133-Set)		x circuit 1 if manual	x if manual case of standard machine, otherwise if shared drain only in presence of **LP suction pressure switch [2]** or **Minimum suction probe [2]**	113 - byPS	112 - PEI (no. events) 111 - PEn (time window) Automatic if No. interventions in time window <= PEn (indicator only), if >PEn manual. If Pen=0 always automatic	The bypass is loaded at every power variation applied to the plant not due to the alarm itself. In case of suction probe error, a minimum alarm is always notified
HP suction pressure switch	HP suction pressure switch trip	Events	569 - PrSAE	LP control probe > (133-Set)		x circuit 1 if manual	fans at 100% if manual case of standard machine, otherwise if shared drain only in presence of **HP suction pressure switch [2]** or **Maximum suction probe [2]**	113 - byPS	112 - PEI (no. events) 111 - PEn (time window) Automatic if No. interventions in time window <= PEn (indicator only), if >PEn manual. If Pen=0 always automatic	The bypass is loaded at every power variation applied to the plant not due to the alarm itself. In case of suction probe error, a minimum alarm is always notified
LP suction pressure switch [2] (*)	Suction pressure switch triggered due to low pressure in circuit 2	Events	569 - PrSAE	LP control probe <= [233-Set]		x circuit 2 if manual	x if manual only in presence of **LP suction pressure switch** or **Minimum suction probe**	213 - byPS	212 - PEI (no. events) 211 - PEn (time window) Automatic if No. interventions in time window <= PEn (indicator only), if >PEn manual. If Pen=0 always automatic	
HP suction pressure switch [2] (*)	Suction pressure switch triggered due to high pressure in circuit 2	Events	569 - PrSAE	LP control proble > [233-Set]		x circuit 2 if manual	fans at 100% if manual only in presence of **HP suction pressure switch [2]** or **Maximum suction probe [2]**	213 - byPS	212 - PEI (no. events) 211 - PEn (time window) Automatic if No. interventions in time window <= PEn (indicator only), if >PEn manual. If PEn=0 always automatic	

ANALOGUE ALARMS TABLE 2/3

Display	Description	Type	Parameter.	(Set) activation	Hysteresis	Compressor shutdown	Fan shutdown	Bypass	Reset / No. interventions in time window	Notes
Minimum suction probe	Minimum suction probe	AUTO	570 - PSAE	139 - LAL	138 - dLAL	x circuit 1	x case of standard machine, otherwise if shared drain only in presence of **LP suction pressure switch [2]** or **Minimum suction probe [2]**	[566 - PAO] + [567 - tAo]		Alarm bypassed at power-on for time 566 - Pao. Alarm disabled in case of suction probe error Bypass 567 - tAo loaded when activation threshold exceeded Activation setpoint relative to setpoint if 544 - AbS=1 (139 - LAL is subtracted from setpoint)
Maximum suction probe	Maximum suction probe	AUTO	570 - PSAE	141 - HAL	140 - dHAL	x circuit 1	fans at 100% case of standard machine, otherwise if shared drain only in presence of **HP suction pressure switch [2]** or **Maximum suction probe [2]**	[566 - PAO] + [567 - tAo]		Alarm bypassed at power-on for time 566 - Pao. Alarm disabled in case of suction probe error Bypass 567 - tAo loaded when activation threshold exceeded Activation setpoint relative to setpoint if 544 - AbS=1 (setpoint is added to 141 - HAL)
Minimum suction probe [2] (*)	Minimum suction probe circuit 2	AUTO	570 - PSAE	239 - LAL	238 - dLAL	x circuit 2	x only in presence of **LP suction pressure switch** or **Minimum suction probe**	[566 - PAO] + [567 - tAo]		
Maximum suction probe [2] (*)	Maximum suction probe circuit 2	AUTO	570 - PSAE	241 - HAL	240 - dHAL	x circuit 2	fans at 100% only in presence of **HP suction probe** or **Maximum suction probe**	[566 - PAO] + [567 - tAo]		
LP delivery pressure switch	LP delivery pressure switch trip	Events	573 - PrdAE			x if manual	x if manual	317 -byPS	315 - Pen.(no. events) 316 - PEI (time window) Automatic if No. interventions in time window <= PEn (indicator only), If >PEn manual. If Pen=0 always manual	The bypass is loaded at every power variation applied to the plant not due to the alarm itself. In case of delivery probe error, a minimum alarm is always notified

ANALOGUE ALARMS TABLE 3/3

Display	Description	Type	Parameter.	(Set) activation	Hysteresis	Compressor shutdown	Fan shutdown	Bypass	Reset / No. interventions in time window	Notes
HP delivery pressure switch	HP delivery pressure switch trip	Events	573 - PrdAE			x if manual	fans at 100% if manual	317 - byPS	315 - Pen.(no. events) 316 - PEI (time window) Automatic if No. interventions in time window <= PEn (indicator only), If >PEn manual. If Pen=0 always manual	The bypass is loaded at every power variation applied to the plant not due to the alarm itself. In case of delivery probe error, a minimum alarm is always notified
Delivery probe minimum	Delivery probe minimum	AUTO	574 - PdAE	344 - LAL	343 - dLAL	x	x	[566 - PAO] + [567 - tAo]		Alarm bypassed at power-on for time 566 - Pao. Alarm disabled in case of delivery probe error Bypass 567 - tAo loaded when activation threshold exceeded Activation setpoint relative to setpoint if 544 - AbS=1 (344 - LAL is subtracted from setpoint)
Maximum Delivery Probe	Delivery probe maximum	AUTO	574 - PdAE	338 - LAL	337 - dLAL	x	100%	567 - tAo [566 - PAO] + [567 - tAo]		Alarm bypassed at power-on for time 566 - Pao. Alarm disabled in case of delivery probe error Bypass 567 - tAo loaded when activation threshold exceeded Activation setpoint relative to setpoint if 544 - AbS=1 (setpoint is added to 338 - HAL)

x = compressor / fan shutdown

(*) If Circuit 2 present [501 - TyPE =1]

PROBE ERRORS TABLE 1/3

Display	Description	Parameter.	Cause	Effect (°)	Notes / Troubleshooting
General plant alarm	General	582 - gAAE	general alarm digital input activation	from par. 582	
Plant ambient temp. error	Internal ambient temperature	none	measured values are outside the nominal range • probe faulty	Suction dynamic set point disabled	check wiring • replace probe • wait for the read temperature value to come back
Suction Regulat. Probe Err.	Circuit C1 suction gas probe	none	measured values are outside the nominal range • probe faulty	Maximum/minimum suction alarm management disabled • Suction pressure switch alarm management minimum alarm always announced	check wiring • replace probe • wait for the read temperature value to come back • if 108 - CPP = Yes resources activated according to 109 - PoPr, if 108 - CPP = No active resources at time of fault kept active • check wiring • replace probe
Suction [2] Regulat. Probe Err. (*)	Circuit C2 suction gas probe	none	measured values are outside the nominal range • probe faulty	Maximum/minimum suction alarm management disabled • Suction pressure switch alarm management minimum alarm always announced	check wiring • replace probe • wait for the read temperature value to come back • if 208 - CPP = Yes resources activated according to 209 - PoPr, if 208 - CPP = No active resources at time of fault kept active • replace probe

PROBE ERRORS TABLE 2/3

Display	Description	Parameter.	Cause	Effect (°)	Notes / Troubleshooting
Delivery Regulat. Probe Err.	Delivery gas probe	none	measured values are outside the nominal range • probe faulty	Maximum/minimum delivery alarm management disabled • In case of delivery pressure switch error, a minimum alarm is always notified • Delivery dynamic set point disabled • Maximum delivery alarm prevention disabled	check wiring • replace probe • wait for the read temperature value to come back • If 312 - FPP = Yes resources activated on the basis of 313 - FPr, if 312 - FPP = No resources kept active at the time of failure
Plant Ext. temp. error	External ambient temperature	none	measured values are outside the nominal range • probe faulty	Delivery dynamic set point disabled	check wiring • replace probe • wait for the read temperature value to come back
Plant H20 recov. probe err.	Recovery water temperature	none	measured values are outside the nominal range • probe faulty	Heat recovery function disabled	check wiring • replace probe • wait for the read temperature value to come back
Plant Subcooling Probe Err.	Subcooling temperature	none	measured values are outside the nominal range • probe faulty	Delivery dynamic set point disabled	check wiring • replace probe • wait for the read temperature value to come back
Error Opening File	Error opening logged data file	none		***	
Error Writing File	Error writing logged data file	none		***	
Error Closing File	Error closing logged data file	none		***	
No Space Error	Logged data memory full error	none		***	

PROBE ERRORS TABLE 3/3

Display	Description	Parameter.	Cause	Effect (°)	Notes / Troubleshooting
IO Config. Err	IO Configuration Error	none	QuickStart Parameters wrong setting	QuickStart enabled	Configure the Quickstart parameters and quit Configuration mode
EEPROM Bios error	EEPROM Bios error	none		Plant shutdown	
EEPROM User error	EEPROM User error	none		Plant shutdown	
RTC Batt Exhausted	RTC batt exhausted	583 - rtCAE	RTC batt exhausted	Time Bands disabled if blocked	Set date/time
RTC Communication. Err	RTC connection error	583 - rtCAE	RTC does not respond	Time Bands/data logging disabled	
RTC Value Error	RTC Value Error	583 - rtCAE	RTC batt exhausted	Time Bands if blocked	Set date/time

(°) if parameter so configured

(*) if Circuit 2 present [501 - TyPE =1]

EWCM9900

USB COPY CARD

The USB CopyCard is an accessory which enables quick parameter programming, glossary updates and alarms log, records etc. management.
the USB CopyCard is equipped with a TTL connector for connection to the TTL serial port of the EWCM and a USB connector which connects to the USB port of a PC.
During use the LED on the CopyCard will start flashing.

TTL Side		**USB side**
to connect to the EWCM		to connect to a PC
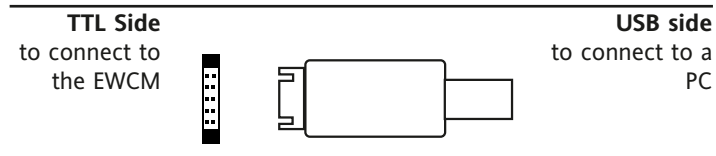
The Copy Card menu is accessible via the Service Menu.
Access to the Service Menu requires a password.

Service Menu folder 02/03 is shown here; move onto the Copy Card folder with the UP and DOWN keys and enter the desired folder with the OK key.

Copy Card Menu
Menu composed of 5 folders; access to each folder is analogous to what is described above:
• **Download** to EWCM: it allows 'downloading' on EWCM information of various types
• **Upload** to Copy Card: it allows 'uploading' to Copy Card information of various types

```
SERVICE              02/03
Copy Card
IO Test
IO State
```

```
COPY CARD            01/02
Download
Upload Map
Upload Glossaries
```

```
COPY CARD            02/02
Upload Alarm History
Format CopyCard
```

Format
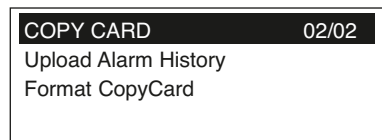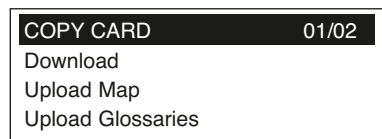
```
FORMAT CCARD         01/01
Operation State:
 <Operation State>
 Format
```
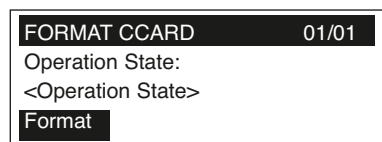
The Format menu formats (cancels all information from) the USB CopyCard.
You are recommended to perform this operation every time before making an Upload.
To format the key, press the OK key. The message that will appear will be:
Operation State
The state of the operation can be:
• No operation
• Operation in progress (°)
• Operation terminated - Operation terminated successfully.
(°) N.B! wait: it can take a few minutes.
If the operation is not finished successfully an error message is displayed:
Error Messages
• Err [No CopyCard] -> the Copy Card is not connected*

Upload Map

```
UPLOAD MAP           01/01
            State:
        <Operation State>
 Upload
```
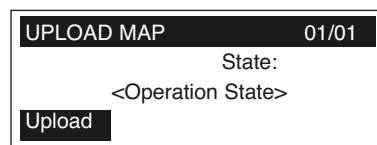
Menu that allows uploading the whole parameters map to the USB Copy Card.
The name of the exported file is set in parameter 461 - dAtF(°) (see parameters description). The file extension is .DAT
Upload Glossaries
Menu that allows uploading the whole glossary to the USB Copy Card.
The name of the exported file is set in parameter 462 - dgLoF (°) (see parameters description). The file extension is .GLO
Alarm Upload History
Menu that allows uploading the whole alarm log to the USB Copy Card.
The name of the exported file is set in parameter 460 - HISF (°) (see parameters description). The file extension is .HIS

To upload the file, select <Upload> and press OK. The message that will appear will be:
Operation status - see Format
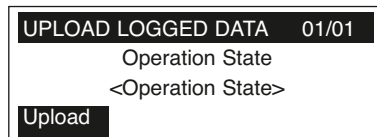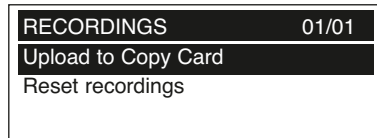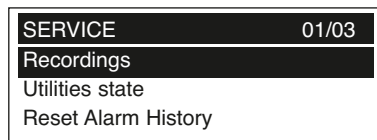or an error message can appear:
Error Messages
• Err [No Copy Card] -> the CopyCard is not connected*
• Err [Write File]

*check you have correctly inserted the CopyCard into the slot

Service Menu
Upload Logged Data

```
SERVICE              01/03
Recordings
Utilities state
Reset Alarm History
```

```
RECORDINGS           01/01
Upload to Copy Card
Reset recordings
```

```
UPLOAD LOGGED DATA   01/01
          Operation State
        <Operation State>
 Upload
```

The Copy Card menu is accessible via the Service Menu (see).
Access to the Service Menu requires a password.
Service Menu folder 01/03 is shown above; move onto the Recordings folder with the UP and DOWN keys and enter the desired folder with the OK key. Move onto the folder Upload On Copy Card with the UP and DOWN keys and enter with the OK key
The Recordings Menu uploads the operating log into the device.
The name of the exported file is set in parameter 459 - rECF (°) (see parameters description). The file extension is .rec
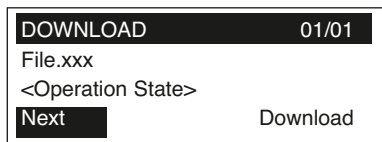**Operation status** - see Format
Error Messages
• Err [No Copy Card] -> the CopyCard is not connected*
• Err [Write file]
• Err [No File]

Copy Card Menu
Download

```
DOWNLOAD              01/01
File.xxx
<Operation State>
Next                  Download
```

The Download menu allows 'downloading' various types of file onto the instrument - moving onto the Next item and pressing the RH (right) key scrolls through the various types of file to download (the indicated names are the default ones - to modify them see description of parameters Folder Files setup).

NOTE: Filenames are at most 8 UPPERCASE characters.
• FILE.X8M —>   applications + menu descriptors
• PARAM.DAT —>   parameters map file
• GLOSSARY.GLO —> glossaries file
once selected, to download the file use the UP and DOWN keys to select <Download> and press OK. At this stage, the download starts:
Operation status - see Format
or an error message can appear:

Error Messages

X8M	DAT	GLO
Err [Read file]	Err [Read file]	Err [Read file]
Err [No CopyCard]	Err [No CopyCard]	Err [No CopyCard]
	Err [File NoCompat.]	Err [File NoCompat.]
	Err [WriteData]	Err [WriteData]

NOTE
• When the application and parameters map downloads have completed, the device automatically reboots.
• After glossaries download: switch off and turn on the device, by pressing hold F3 key in order to save new glossaries in LCD keyboard.
• Navigation is not possible while the glossaries are downloading.
• Files with extension .DAT are compatible with the Param Manager .dat format.
• **If the USB CopyCard is already connected when the device boots, you can still download the application/menu descriptors (.X8M) from the Copy Card.**
This must be a single file, present in the USB CopyCard main directory. If the USB CopyCard contains two .X8M files (or no .XM8 file) when the device boots, no download will be executed from the USB CopyCard.
For map files (.DAT) the download can be done at boot time even in case of normal startup, under the same rules described above.

EXPORTING OPERATING LOGS TO THE USB COPY CARD

Exporting operating logs to the USB Copy Card can be done from the keypad via the Service Menu.
This is possible only if the parameter 640-rtCE Enable RTC = 1 and there is no RTC Communications Error.
All data will be saved to a single text file with extension .REC in the following order:
• weekly records from the oldest to the most recent
• daily records.
The data is formatted as follows:

```
REC-REPORT
DD/MM/YY-HH:MM
MB_USERID1
MB_USERID2
```

Desc	UM	Avg	Min	DD/MM/YY-HH:MM dd/mm/yy hh:mm	Max	DD/MM/YY-HH:MM dd/mm/yy hh:mm
HP	[Bar]	xxx.x	xxx.x	DD/MM/YY HH:MM	xxx.x	DD/MM/YY HH:MM
HP	[C]	xxx.x	xxx.x	DD/MM/YY HH:MM	xxx.x	DD/MM/YY HH:MM
LP1	[Bar]	xxx.x	xxx.xx	DD/MM/YY HH:MM	xxx.xx	DD/MM/YY HH:MM
LT1	[C]	xxx.x	xxx.x	DD/MM/YY HH:MM	xxx.x	DD/MM/YY HH:MM
LP2	[Bar]	xxx.x	xxx.xx	DD/MM/YY HH:MM	xxx.xx	DD/MM/YY HH:MM
LT2	[C]	xxx.x	xxx.x	DD/MM/YY HH:MM	xxx.x	DD/MM/YY HH:MM
TEXT	[C]	xxx.x	xxx.x	DD/MM/YY HH:MM	xxx.x	DD/MM/YY HH:MM
TINT	[C]	xxx.x	xxx.x	DD/MM/YY HH:MM	xxx.x	DD/MM/YY HH:MM
HPSET	[Bar]	xxx.x				
HTSET	[C]	xxx.x				
LPSET1	[Bar]	xx.xx				
LTSET1	[C]	xxx.x				
LPSET2	[Bar]	xx.xx				
LTSET2	[C]	xxx.x				
HP	[%]	xxx	xxx	DD/MM/YY HH:MM xxx		DD/MM/YY HH:MM
LP1	[%]	xxx	xxx	DD/MM/YY HH:MM xxx		DD/MM/YY HH:MM
LP2	[%]	xxx	xxx	DD/MM/YY HH:MM xxx		DD/MM/YY HH:MM
HPR	[Num]	xxxxx				
LPR1	[Num]	xxxxx				
LPR2	[Num]	xxxxx				
HPE	[Num]	xxxxx				
LPE1	[Num]	xxxxx				
LPE2	[Num]	xxxxx				
ALL	[Num]	xxxxx				

The field DD/MM/YY-HH:MM in the header indicates the export date, while MB_USERID1 and MB_USERID2 represent 2 20 character strings which can be set with parameters.
The column Avg contains the average value of the daily or weekly values. the Min and Max columns contain the minimum and maximum values respectively.
Notes:
• In weekly registrations, the two fields 'DD/MM/YY-HH:MM' represent the week start and end dates.
• daily registrations have only one date field.
• To import the .REC file into EXCEL, use the 'Delimited' option with fields separated by spaces.
Use the point as decimal separator and set the 2 'HH:MM' columns to text format.
The log can be cancelled in the Service Menu.

UPLOADING THE ALARMS LOG
All data will be saved to a single text file with extension .HIS in the following order:

```
HIS REPORT
DD/MM/YY HH:MM
USER ID 1
USER ID 2
————————————————
- 01 E0102-13-12/04/05-01
- 02 E0101-13-14/04/05-01
```

If the log contains no alarms the format will be as follows:

```
HIS REPORT
DD/MM/YY HH:MM
MB_USERID1
MB_USERID2
————————————————
EMPTY
```

Legend
• DD/MM/YY HH:MM is the export date.
• USER ID 1 and USER ID 2 are two 20 character strings set by the user in parameters 452-USId1 and 453-USId2.
The file extension is .HIS and the name corresponds to the first 8 characters of the string set with parameter 460-HISF.
if 460-HISF contains only spaces, the file is given the default name HISTORY.HIS.

Note that alarms notified during the export are ignored.

(°) NOTE
if the parameter contains only spaces, the file is given the default name:
• RECORD.REC for operating logs
• HISTORY.HIS for the alarms log file
• PARAM.DAT for the parameters map file
• GLOSSARY.GLO for the glossaries file

EWCM9900

KEYBOARD TECHNICAL DATA

Housing	PC+ABS plastic resin casing, UL94 V-0, polycarbonate window, thermoplastic resin keys
Insulation class	II (the device must NOT be accessible in normal conditions)
Dimensions	160x96x10mm (Lxhxd)
Mounting	panel mounting with 138x68mm template, See INSTALLATION
Operating temperature	-5...55 °C
Storage temperature	-20...85 °C
Ambient humidity in use and in storage	10...90% RH (non-condensing)
Display	LCD graphic display 128x64 pixels backlit with LEDs
Keys	8
LEDs	3
Power supply	from the power board
Connector for base-keyboard connection	microfit 6-way quick connector, length 3m
max. distance base-keyboard	3m

TECHNICAL DATA BASE BOARD 9900

|	
Housing	PC+ABS plastic resin casing, UL94 V-0, polycarbonate window, thermoplastic resin keys
Insulation class	II (the device must NOT be accessible in normal conditions)
Dimensions	315x110x60mm (Lxhxp)
Mounting	on DIN 18 rail
Operating temperature	–5...55 °C
Storage temperature	–20...85 °C
Ambient humidity in use and in storage	10...90% RH (non-condensing)
Analogue inputs	7 • 4 NTC/PTC/voltage free digital inputs, configurable by parameter • 3 0-5V/0-10V/4-20 mA input configurable by parameter

Digital inputs
  • voltage free
 	
  • high voltage
	20 (+4 analogue inputs configurable as digital)
	• 6 voltage free inputs
	• (+4) voltage free inputs (analogue if configured as digital) (contact current referred to ground 0.5mA)
	• 14 high voltage inputs 100-240 V~

Analogue output	3 • voltage: 0-10 V⎓ with 500Ohm minimum load • current: 4...20mA with max. load (max. load resistance) 500Ohm with 2% precision and max. resolution (f.s.).
Digital outputs	19 relay outputs • 2 SPDT 8(3)A 250V~ • 17 SPST 5(2)A 250V~
Serial	• RS-485 connection to Televis**System** - Modbus RTU • TTL for connection to USB Copy Card
Power	20W
Power supply	100-240V~ ±10% 50/60 Hz
Terminals and connectors	extractable, pitch 5.08 insertion 90°
Connector for base-keyboard connection	microfit 6-way quick connector, length 3m
max. distance base-keyboard	3m

PARAM MANAGER

Special Param Manager **release 5.2 functions for EWCM 18DIN rail models**
Version 5.2 has a section named Special Functions composed of two keys:
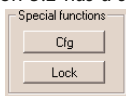
• **CFG:** this key enters the EWCM Configuration mode, thus enabling Quick Start parameter editing.
To modify the Quick Start parameters, the EWCM 13/18DIN must be in configuration mode, Enable = Yes:
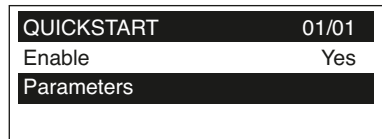
If the modification is not done correctly, the above error message will display

• **Lock:** This key enables lock mode to allow for modification of parameters which have various units of measurement.
Some EWCM 18DIN parameters are duplicated/quadruplicated depending on the unit of measurement shown on the display.
For example, the parameter for the 131 - LSE Compressors minimum setpoint folder is quadrupled as:
• 131 - LSE minimum setpoint °C
• 131 - LSE minimum setpoint °F
• 131 - LSE minimum setpoint bar
• 131 - LSE minimum setpoint PSI
In the **Param**Manager parameters table, the parameter is repeated 4 times on 4 separate lines. If you edit and select one (or more) lines or just edit one or more measurement units of the same parameter and you want to update the parameter map, the following occurs:

Case A Lock disabled
On the instrument, for example, the value 131-LSE in °C will be edited; the instrument will automatically recalculate all the measurement units on the basis of the current type of setting.
Despite the fact that the parameter specified in °C has been modified, the device, which is controlling the system with another unit of measurement, will recalculate all four parameters on the basis of its current type of control, thus modifying both the °C and °F values (highlighted in red), independently of the operator's setting:
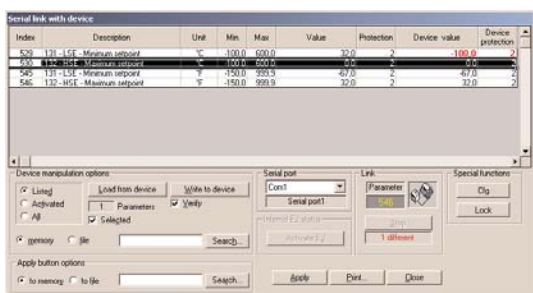

Case B Lock enabled
On the instrument, for example, the value in °C of parameter 131-LSE will be edited and the instrument will NOT recalculate the other measurement units, i.e. it will save the changes made by the operator.
If the device is setting in °C, the setting will be edited on the basis of the changes.
If the device is setting in another measurement unit, the setting will be independent and will not take into account the changes unless the setting is changed manually on the device.
Note: usually, the operator prepares the map that he/she intends to load into the device, inclusive of the doubled/quadrupled parameters that involve the assigning of different default values on the basis of the different measurement units.
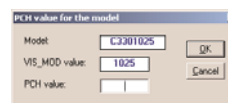With the Lock function, therefore, it is guaranteed that the values assigned in this session will be written accurately.
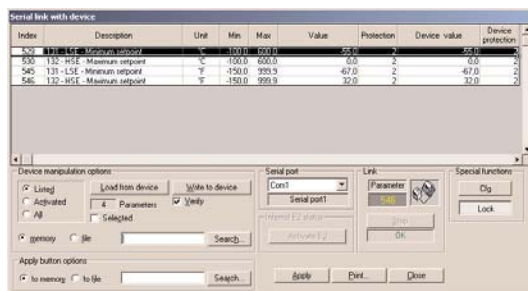
Consult the 8MA0006 ParamManager release 2/08 or later manual for further details.
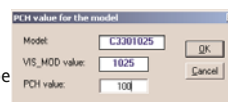
Saving .DAT files
To save the .DAT file the program will display this window:
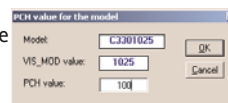

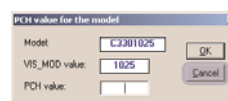|	PCH value	Message
Enter value 100 N.B.: If you enter a value other than 100 the .DAT file will be saved in any case **but the USB key will not be recognised by the EWCM 18DIN.**		No message
If no value is entered the corresponding message appears		
In case of cancellation, no .DAT file is saved		

WEBADAPTER

The controller can be connected to the internet with the **Web**Adapter module, to display the controller's resources via an internet browser without the need for any further software on the pc.
With the **Web**Adapter, depending on permissions, the operator is able to:
• Display the controller parameter values;
• Modify the controller parameter values;
• Display the controller state;
• Display the controller alarms;
• Modify the controller date and time.

EWCM9900

ACCESSORIES

	Description	code
Temperature probes	• Probe NTC 103AT, 1.5m (plastic cap, 2-wire cable); • Probe NTC 6x40, 1.5m (metal cap, silicon or PVC cable); • Probe NTC 6x50, IP68, 1,5m (cap in TPE Steel, PVC cable);	SN691150 SN8S0A1500 SN8T6N1502 other items available contact Sales Department
Pressure transducers	• EWPA030, Pressure transducer 4..20mA/0..30bar; • EWPA007, Pressure transducer 4..20mA/-0.5..7bar;	connection male female TD200130 TD200030 TD200107 TD300008 other items available contact Sales Department
Fan modules	• CFS: single phase speed regulators for currents from 2A to 9A • CFS05 TANDEM: TRIAC 5A+5A/230V~ • DRV 300: 3 phase 12...20A/420V~ (IP22 or IP55)	various codes available other items available

USB COPY CARD	• **USB CopyCard** programming key for:
	    • up/downloading parameters
	    • up/downloading glossaries
	    • downloading alarms log
		CCA0BUI02N000

Interface modules	• PC**Interface** USB • PC**Interface** RS232	PCI6A3000000 PCI5A3000000 other items available contact Sales Department
Software Tools	• **Param**Manager • **Web**Adapter	SLP05XX000100 WA0ET00X700

EWCM9900

PROPER AND IMPROPER USE - RESIDUAL RISKS AND RESPONSIBILITIES

CONDITIONS OF USE - Proper use

For safety reasons, the device must be installed and used according to the instructions provided. In particular, parts carrying dangerous voltages must not be accessible in normal conditions. The device must be adequately protected from water and dust with regard to the application, and must only be accessible using a tool (except the front panel).

It is classified:

- according to construction, as an electronic automatic command device for temperature control, to be incorporated;
- according to the characteristics of automatic operation, as a type 1 B controller;
- according to the software class and structure, as a class A device.
- as a device with class D fire resistance
- device made with class IIIa material
- device with pollution grade 2
- overvoltage category grade II
- ball test temperature: 75°C

Improper uses

Any use other than that expressly permitted is prohibited. The relay contacts provided are of a functional type and subject to failure: any protection devices provided for by the product standards or suggested by common sense for obvious safety requirements must be installed externally to the device.

RESPONSIBILITY AND RESIDUAL RISKS

Eliwell Controls srl declines any liability for damage due to:

- installation/uses other than those expressly specified and, in particular, failure to comply with the safety requirements of established standards and/or specified in this document;
- use on panels that do not provide adequate protection against electric shock, water or dust when assembled;
- use on panels allowing access to dangerous parts without having to use tools;
- tampering with and/or modification of the product;
- installation/use on panels not complying with the current standards and regulations.

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