eliwell
by Schneider Electric

Series EWCM EO
Series EWCM EO HFO

Controllers for compressor racks



USER GUIDE

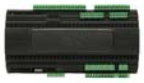
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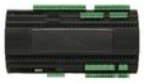
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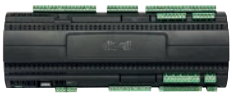
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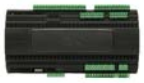


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1.1. PRODUCT RELATED INFORMATION

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ELECTRIC ARC

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the unit.
- Use only the specified voltage when operating this equipment and any associated products.

Failure to follow these instructions will result in death or serious injury.

This equipment has been designed to operate outside of any hazardous location, and exclusive of applications that generate, or have the potential to generate, hazardous atmospheres. Only install this equipment in zones known to be free, at all times, of hazardous atmospheres.

⚠ DANGER

POTENTIAL FOR EXPLOSION

- Install and use this equipment in non-hazardous locations only.
- Do not install and use this equipment in applications capable of generating hazardous atmospheres, such as those applications employing flammable refrigerants.

Failure to follow these instructions will result in death or serious injury.

For information concerning the use of control equipment in applications capable of generating hazardous materials, consult your local, regional, or national standards bureau or certification agency.

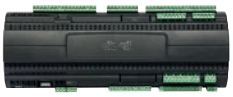
⚠ WARNING

LOSS OF CONTROL

- The control system designer must consider the potential failure modes of the control circuit and, for some critical control functions, provide a means for reaching a safe condition during and after a circuit failure. Examples of critical control functions are the emergency stop and end of travel stop, power supply cut-off and restart.
- Separate or redundant control circuits must be provided for critical control functions.
- The system control circuits can include communication connections. Keep in mind the implications of transmission delays or sudden connection failures.
- Comply with all the standards regarding accident protection and the local applicable safety directives.(1)
- Every implementation of this device must be tested individually and completely in order to verify its proper operation before putting it in service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

(1) For additional information, refer to the standards NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control" and NEMA ICS 7.1 (latest edition) "Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems" or to equivalent standards that regulate your particular location.





⚠ WARNING

INCORRECT OPERATION OF THE DEVICE

- Only use software approved by Eliwell when using this device.
- Update your application program each time the physical hardware configuration changes.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Pay attention and take all precautions when using this product as a control device to avoid unforeseen consequences deriving from the operation of the controlled machine, variations in the controller state or modification of the data memory or machine operating parameters.

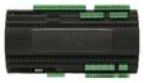
⚠ WARNING

INCORRECT OPERATION OF THE DEVICE

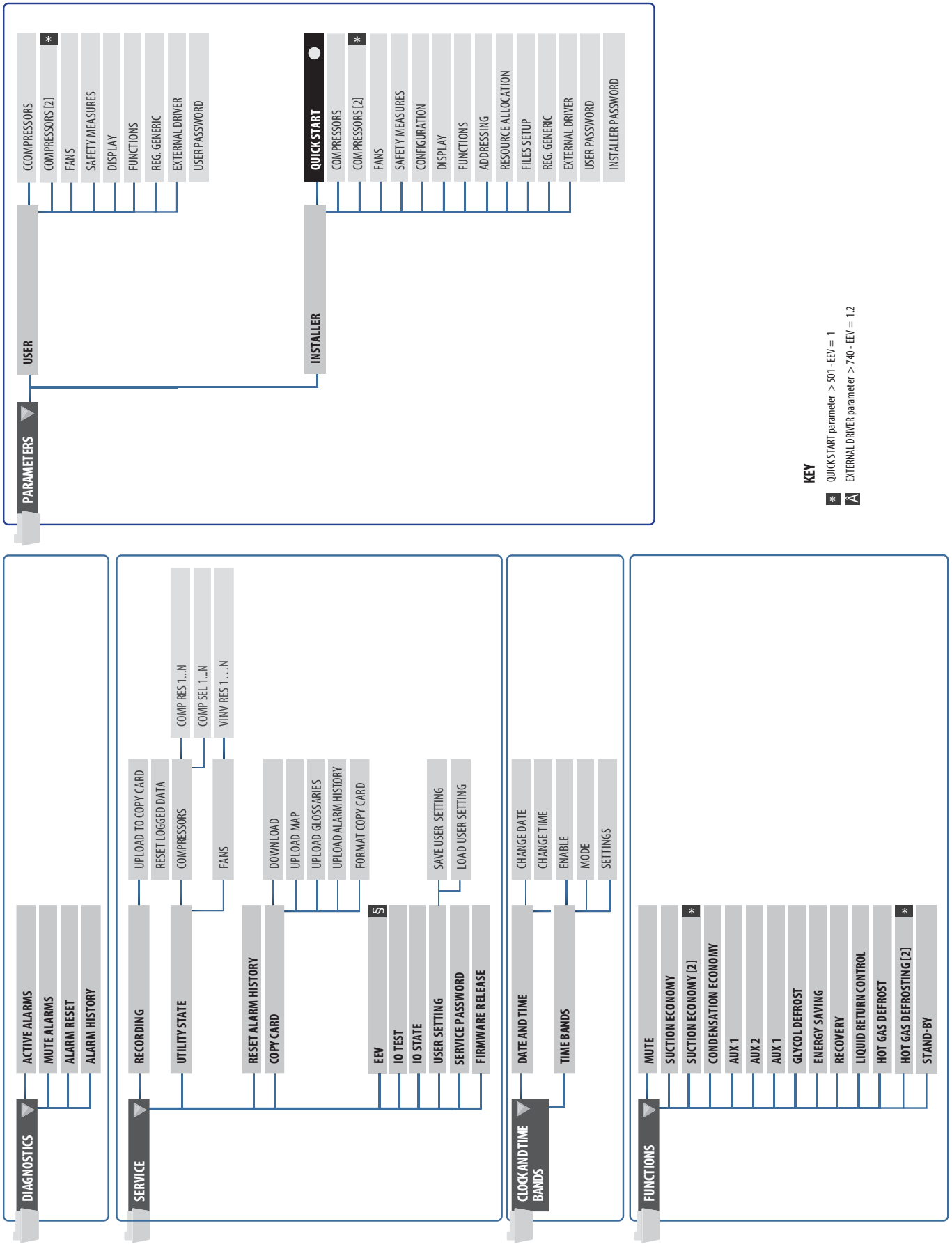
- Configure and install the mechanism enabling the remote HMI interface locally on the machine, to maintain local control over the machine whatever remote controls are sent to the application.
- Before trying to remotely control the application you must be fully familiar with the application and the machine.
- Take all precautions required to ensure the foreseen remote control of the machine, producing clear documentation for identification in the application and of the respective remote connection.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

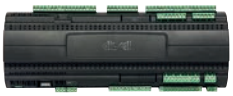




2.1. NAVIGATION MENU



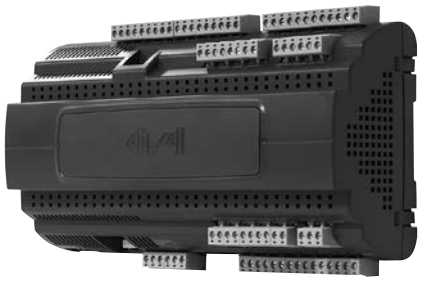
3. INTRODUCTION

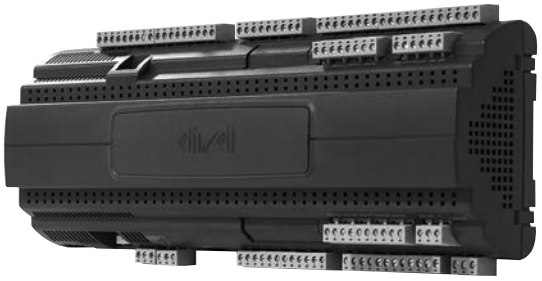




The **EWCM EO** instrument range is made up of controllers dedicated to controlling the compressor rack of a refrigeration system, with simple, multistage or variable power compressors.

3.1. MAIN FEATURES





- Assembly on DIN bar
- Energy Saving Algorithms
- Pre-defined applications available
- Direct load connection
- Easy retrofit of both Eliwell instruments and those made by others
- Compatibility of sub-critical CO_2 systems with V910 plug&play driver
- Compatibility of HFO refrigerants
- Compressor Racks managed using glycol
- Rapid configuration tool for PC DeviceManager

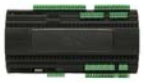
3.2. DESCRIPTION

Features
- 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 compressor INVERTERS and fan INVERTERS
- up to 3 inputs with pressure transducers for the compressor and fan sections
- 4 temperature inputs for NTC/NTC extended range /PTC probes also configurable as clean contact digital inputs
- up to 14 digital voltage inputs and up to 6 configurable clean contact digital inputs[1]
- Compatibility with a vast range of refrigerants
- Built-in clock (RTC)

Functions
- INVERTER control for compressors and fans
- Digital control in case of INVERTER error for compressors and fans, selectable by parameter
- Proportional control, PID and Dead band
- Selection of equal (homogeneous) power compressors switch-on and fan rotation policies
- Energy Saving Algorithms
- Two progammable Setpoints: 'normal' rate and 'reduced' rate.
- Dynamic setpoint on suction and discharge
- Time band management
- Management of probe alarms and minimum and maximum pressure switch alarms both for the compressor and fan sections
- Full alarm handling (self-diagnostic and alarms log)
- Operational log handling
- Upload/download parameters, alarms log, operational logs and glossaries with USB Copy Card
- Safety System that, in case of an EWCM failure, activates an alarm output to divert the control of the refrigerating unit to an emergency plant that assures minimal operations until experienced personnel step in.

1 see 'CONFIGURATION TABLE' page 117





Navigation and programming
- User-friendly LCD graphic keyboard
- Menu navigation
- Quick access menu for immediate plant status display and setting main operating parameters
- Display and setting of programmable parameters in Bar, PSI, °C or °F
- 2 levels of access to programming parameters
- Quick Start Menu for quick and easy configuration
- Activation functions from keyboard

Telecontrol
- Connections for TelevisSystem or Modbus RTU

All machine status configuration and control operations can be done with the LCD keyboard supplied. Menu navigation is user-friendly: two navigation languages (English + local language) are available as standard, defined according to the product code.

Device configuration and maintenance is protected by several password levels which hide/protect access for authorised persons only.

The Administrator Menu is for the system Administrator and allows access to the Quick Start Menu and all use and configuration parameters. The Administrator will also manage access passwords for users and expert users (installers and technicians).

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

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

Using the 'function' and navigation keys, any user can check system status, display alarms, activate functions, etc. without needing a password.
Using the Clocks and Time Frames Menu it is also possible to set date and time and, with a weekly calendar, manage correct use of the plant.





4.1. TECHNICAL SPECIFICATIONS (EN 60730-2-9)

Classification:	electronic automatic control (not safety) device for incorporation
Mounting:	on DIN Rail.
Type of action:	1.B
Pollution class:	2
Material class:	IIIa
Over-voltage category:	II
Ball test temperature:	75 °C
Nominal pulse voltage:	2500 V
Operating Temperature:	-5 … +55 °C
Storage Temperature:	30 … +85 °C
Power supply:	SMPS 100...240V~ ±10% 50/60 Hz
EWCM consumption:	20 W max
Fire resistance category:	D
Software class:	A
RTC battery life:	In a power failure, the clock battery will last 4 days.

4.2. FURTHER INFORMATION

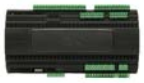
4.2.1. INPUT CHARACTERISTICS

Analogue inputs are configurable in pairs

8900 9100 9900	**8900 9100 9900**	**PB1/PB2**:	4...20 mA / 0...10 V / 0...5 V
9900	**- - 9900**	**PB3**:	4...20 mA / 0...10 V / 0...5 V
8900 9100 9900	**8900 9100 9900**	**PB5/PB6**:	NTC103AT / PTCKTY81/NTC103C1R1/DI
8900 9100 9900	**8900 9100 9900**	**PB7/PB8**:	NTC103AT / PTCKTY81/NTC103C1R1/DI

	NTC NK103AT* 10KΩ @25 °C BETA value 3435	NTC NK-103C1R1 Extended range 10KΩ @25 °C BETA value 3435	PTC KTY81* 10KΩ @25 °C BETA value 3435	DI Input Digital	4...20 mA	0...10V	0...5V
PB1 PB2	-	-	-	-	✔	✔	✔
PB3 only EWCM9900	-	-	-	✔	✔	✔	✔
PB5 PB6	✔	✔	✔	✔	-	-	-
PB7 PB8	✔	✔	✔	✔	-	-	-
Measurement range	-50.0...+110 °C	-55.0...+150 °C	-55.0...+150 °C				
Resolution	0.1 °C	0.1 °C	0.1 °C	0.1 °C	0.1 bar	0.1 bar	0.1 bar
F.S. precision	1 %	1 %	1 %	1 %	1 %	1 %	1 %
Impedence	-	-	-	-	100 Ohm	21 KOhm	110 KOhm
*** probes not included - contact the Eliwell Sales Office for accessories**							





4.2.2. OUTPUT CHARACTERISTICS

Digital Outputs

8900 9100 9900	**8900 9100 9900**	**OUT1** :	1 relay SPDT : 8(3) A max. 250 V~
	8900 9100 9900	**OUT2** :	1 relay SPST : 5(2) A max. 250 V~
	8900 9100 9900	**OUT3** :	1 relay SPST : 5(2) A max. 250 V~
	8900 9100 9900	**OUT4** :	1 relay SPST : 5(2) A max. 250 V~
	8900 9100 9900	**OUT5** :	1 relay SPST : 5(2) A max. 250 V~
	8900 9100 9900	**OUT6** :	1 relay SPST : 5(2) A max. 250 V~
	8900 9100 9900	**OUT7** :	1 relay SPST : 5(2) A max. 250 V~
	- 9100 9900	**OUT7** :	1 relay SPST : 5(2) A max. 250 V~
9100	**- 9100 -**	**OUT8** :	1 relay SPDT : 8(3) A max. 250 V~
9900	**- - 9900**	**OUT8** :	1 relay SPST : 5(2) A max. 250 V~
	- 9100 9900	**OUT9** :	1 relay SPST : 5(2) A max. 250 V~
	- 9100 9900	**OUT10** :	1 relay SPST : 5(2) A max. 250 V~
	- 9100 9900	**OUT11** :	1 relay SPST : 5(2) A max. 250 V~
	- 9100 9900	**OUT12** :	1 relay SPST : 5(2) A max. 250 V~
	- 9100 9900	**OUT13** :	1 relay SPST : 5(2) A max. 250 V~
9900	**- - 9900**	**OUT14** :	1 relay SPDT : 8(3) A max. 250 V~
	- - 9900	**OUT15** :	1 relay SPST : 5(2) A max. 250 V~
	- - 9900	**OUT16** :	1 relay SPST : 5(2) A max. 250 V~
	- - 9900	**OUT17** :	1 relay SPST : 5(2) A max. 250 V~
	- - 9900	**OUT18** :	1 relay SPST : 5(2) A max. 250 V~
	- - 9900	**OUT19** :	1 relay SPST : 5(2) A max. 250 V~

Analogue Outputs

8900 9100 9900	**8900 9100 9900**	**I1/V1**:	1 voltage/current
	8900 9100 9900	**I2/V2**:	1 voltage/current
9900	**- - 9900**	**I3/V3**:	1 voltage/current





4.2.3. MECHANICAL CHARACTERISTICS

Casing:	PC+ABS resin casing, UL94 V-0
EWCM measurements:	Model 8900 / 9100 13 DIN Rail • Model 9900 18 DIN Rail
EWCM KEYBOARD measurements:	160x96x10 mm (Lxhxd)
Terminals:	removable for cables with cross-section of 2.5 mm^2
Connectors:	removable type, pitch 5.08 for 90° insertion
EWCM KEYBOARD connector:	microfit 6-way quick connector, length 3 m max. distance base-keyboard 3 m
Humidity:	Operation / Storage: 10...90% RH (non-condensing)

NB. The technical specifications stated in this document regarding measurement (range, accuracy, resolution, etc.) refer to the instrument alone and not to any accessories provided, such as probes.
This means, for example, that the error introduced by the probe must be added to the characteristic instrument error.

4.2.4. ELECTRICAL CONNECTION PRECAUTIONS

IMPORTANT! Make sure the appliance is switched off before working on the electrical connections.
All 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.

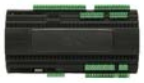
For all electrical connections, refer to the wiring diagrams provided.

The device is equipped with extractable screw terminals to connect electric cables with a cross-section of 2.5 mm2 (one wire per terminal for power connections).
The relay outputs are voltage free.
Do not exceed the maximum permitted current; for higher loads, use a contactor with sufficient power capacity.
Make certain the power supply voltage matches the rated voltage of the device.
Probes have no connection polarity and can be extended using a normal bipolar cable (note that the extension of the probes influences the instrument's EMC electromagnetic compatibility: take great care with the wiring). The pressure probes have an insertion polarity which must be observed.

SUPERVISION
• connection to TelevisSystem / Modbus RTU remote management systems ➔ through direct RS-485 assisted by an RS485/TTL-RS232 PCInterface converter and suitable software Licence.
• connection to rapid DeviceManager ➔ parameter programming software through BusAdapter and DMI
For the installation of the RS-485 network, refer to the documentation provided.

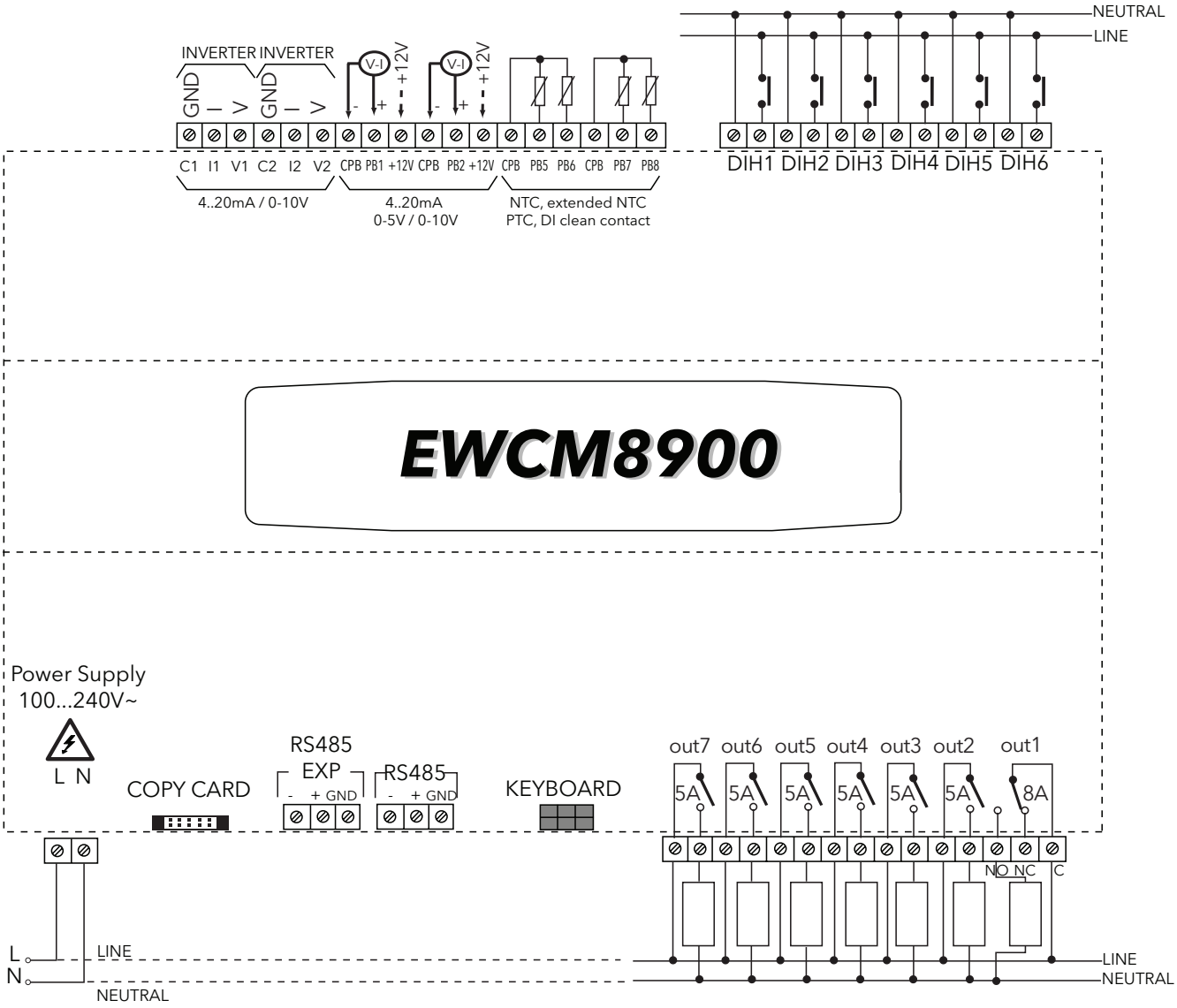
USB Copy Card
Fit the USB Copy Card TTL side into the slot and up/download the parameters as described in the specific chapter.

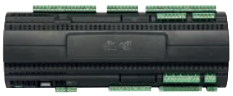




4.3. CONNECTIONS

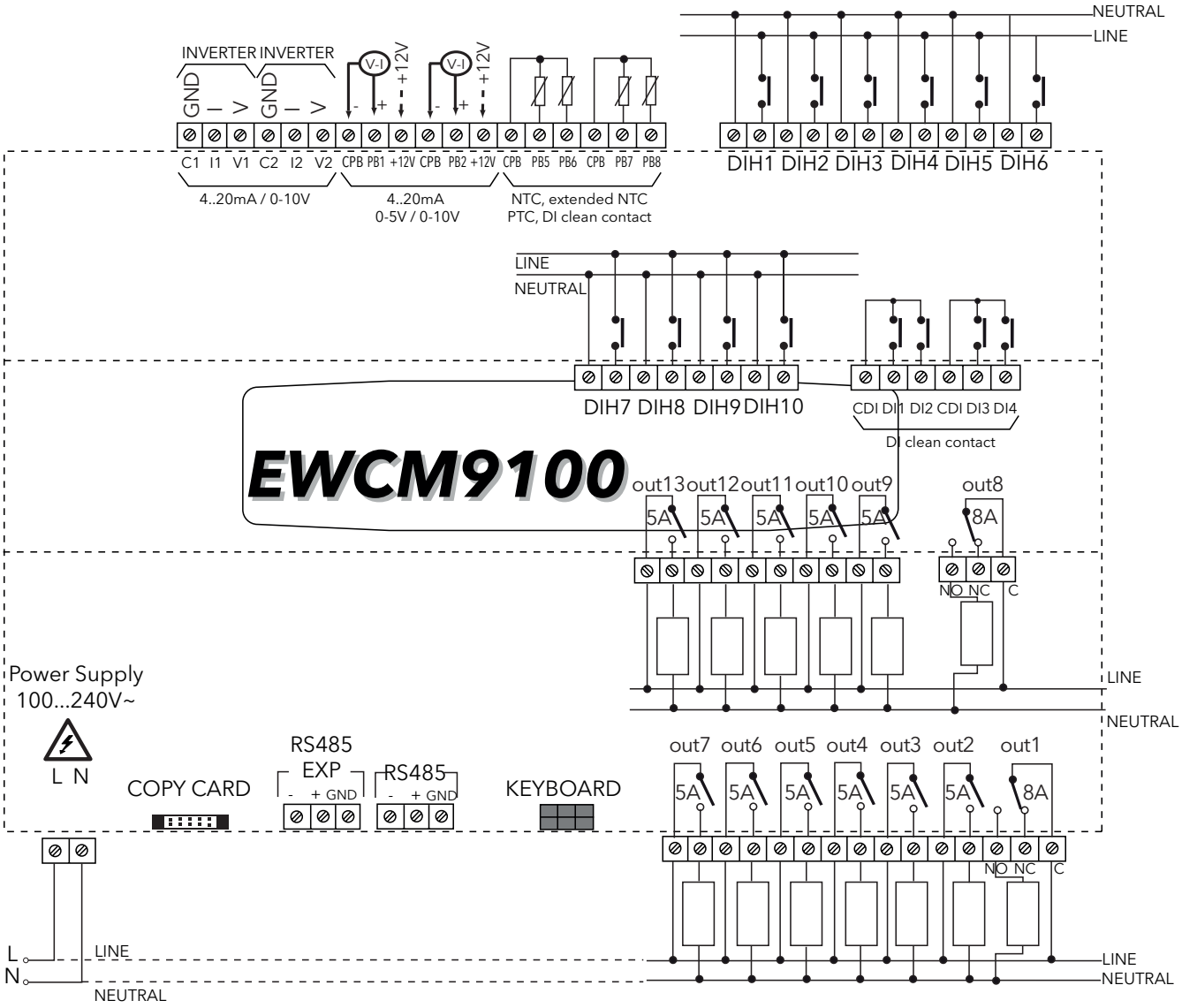
4.3.1. EWCM8900 TERMINALS



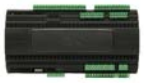




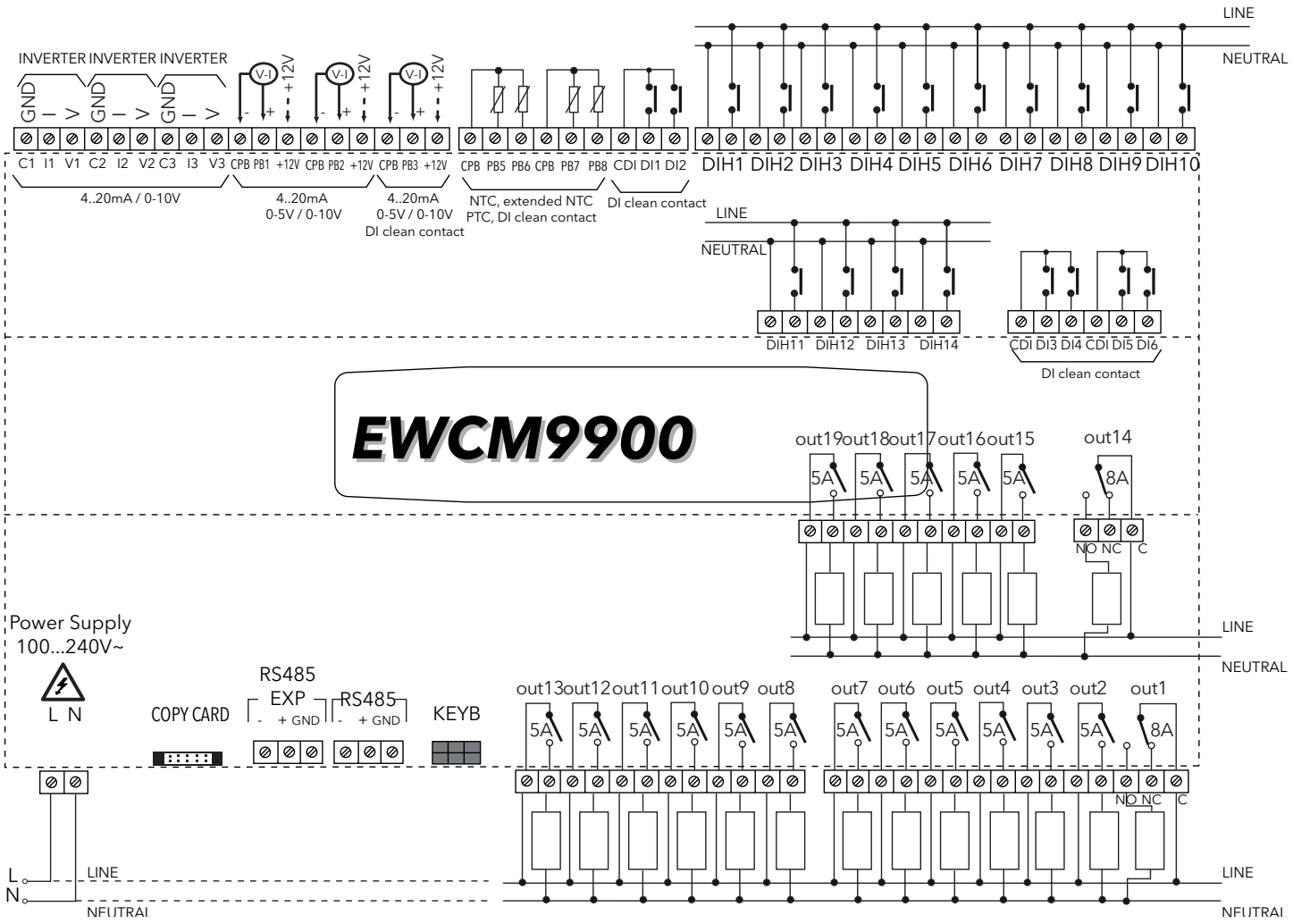
4.3.2. EWCM9100 TERMINALS

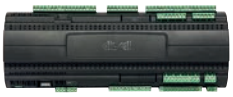






4.3.3. EWCM9900 TERMINALS

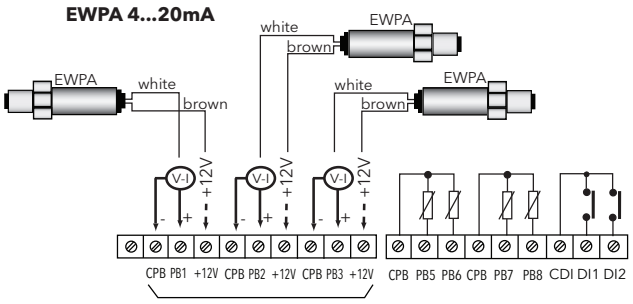


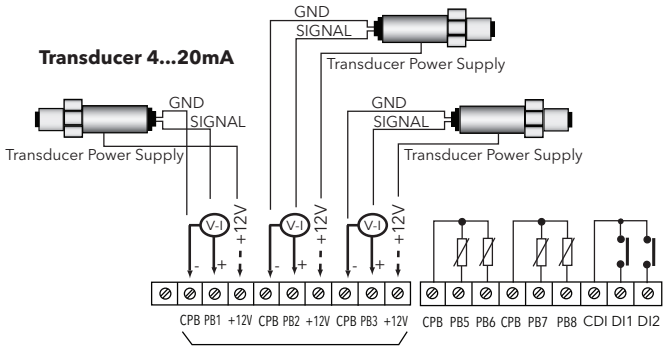




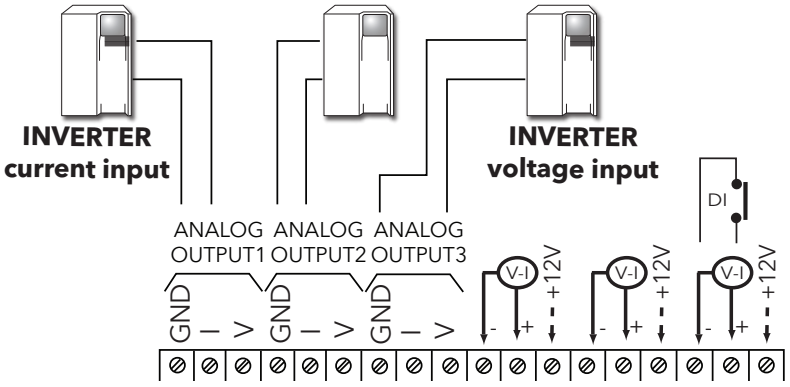
4.4. I/O AND SERIAL

ANALOGUE INPUTS

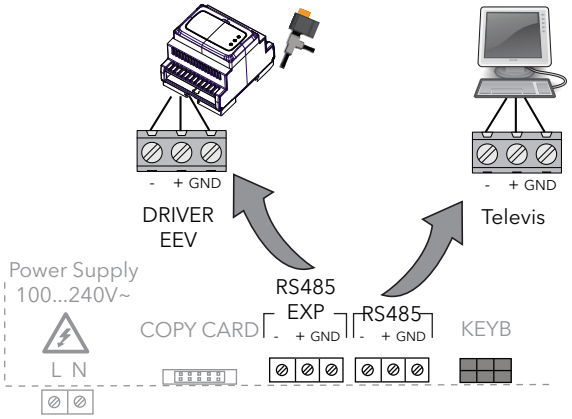




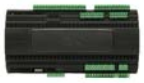
ANALOGUE OUTPUTS



RS485 SERIAL PORTS



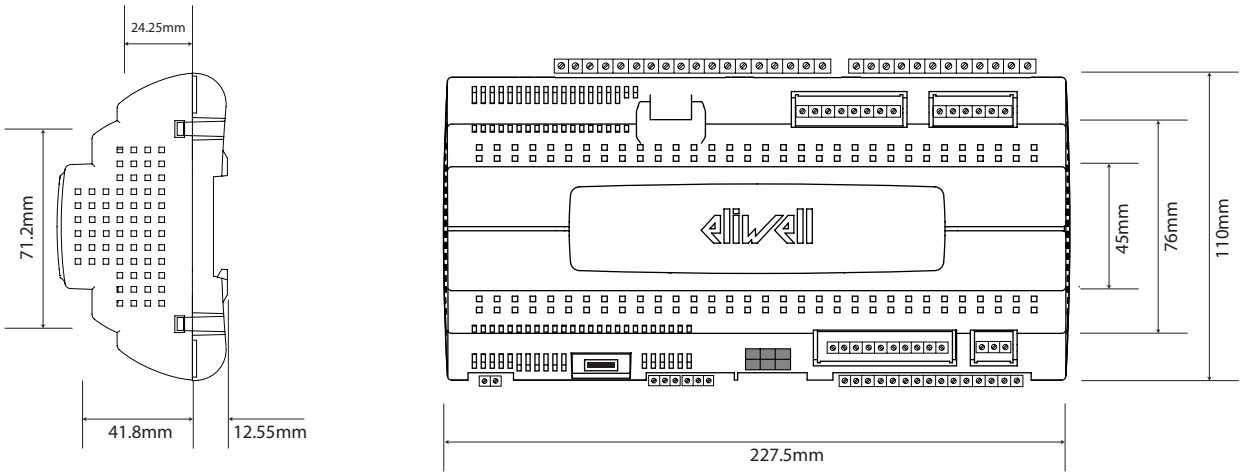




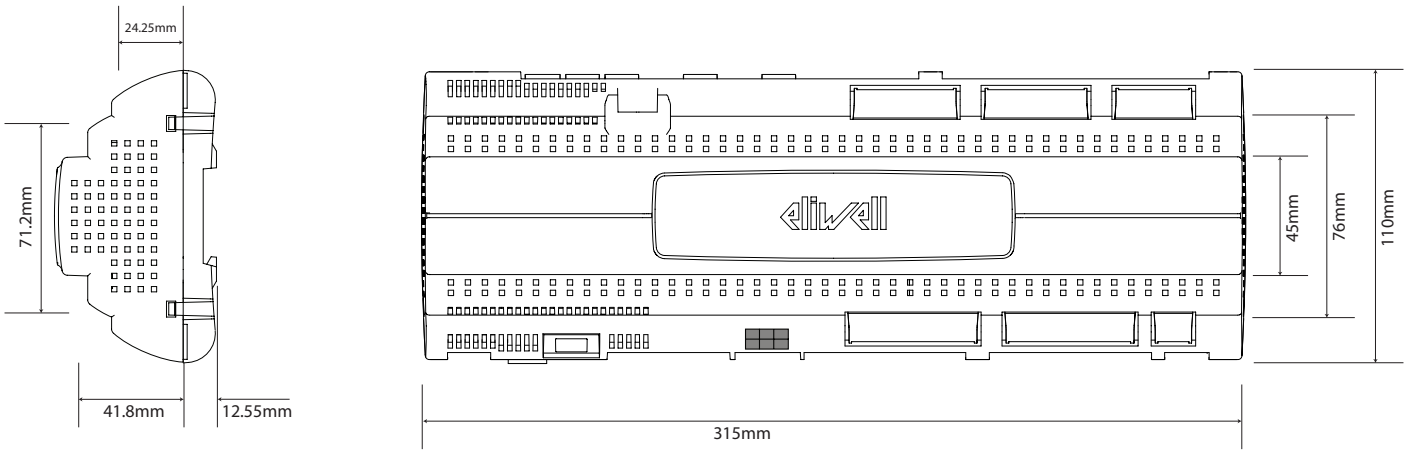
4.5. DIMENSIONS

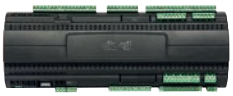
Do not install the device in places subject to high humidity and/or dirt; it is intended for use in sites with ordinary or normal levels of pollution. Keep the area around the device cooling slots adequately ventilated.

EWCM EO 8900 9100 (13DIN)



EWCM EO 9900 (18DIN)





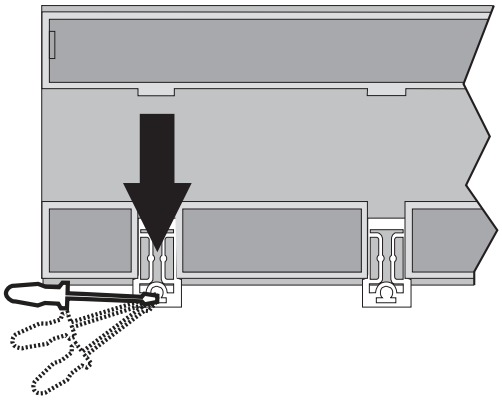


4.6. MECHANICAL ASSEMBLY

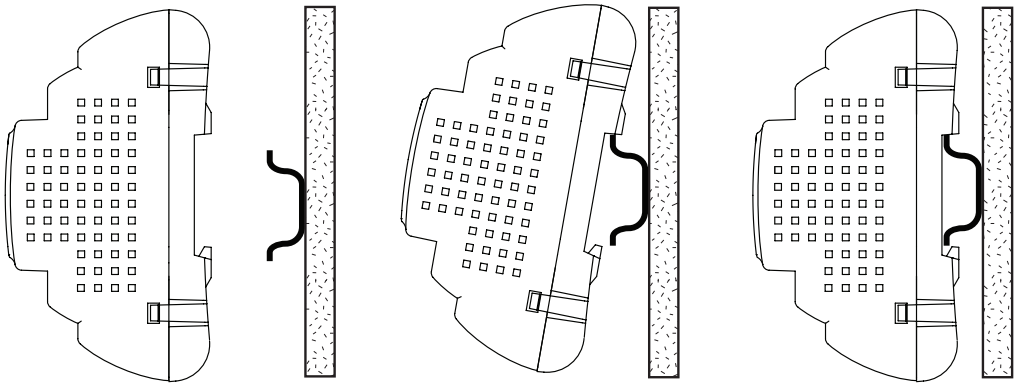
4.6.1. POWER BOARD MOUNTING

To install the BASE on DIN RAIL, proceed as follows:
Move the four spring docking devices to their standby position (use a screwdriver levering on specific spaces).
Install the 'BASE' on the DIN RAIL, then press the 'spring docking devices' which will go to the closing position.
N.B.: With the 'BASE' assembled on the DIN RAIL, the 'Spring docking devices' must be turned downwards.

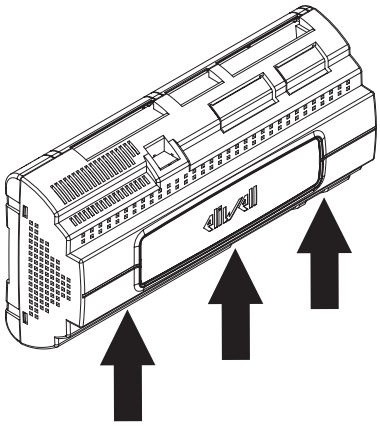
DIN RAIL



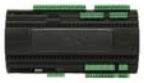
DIN RAIL



DIN RAIL



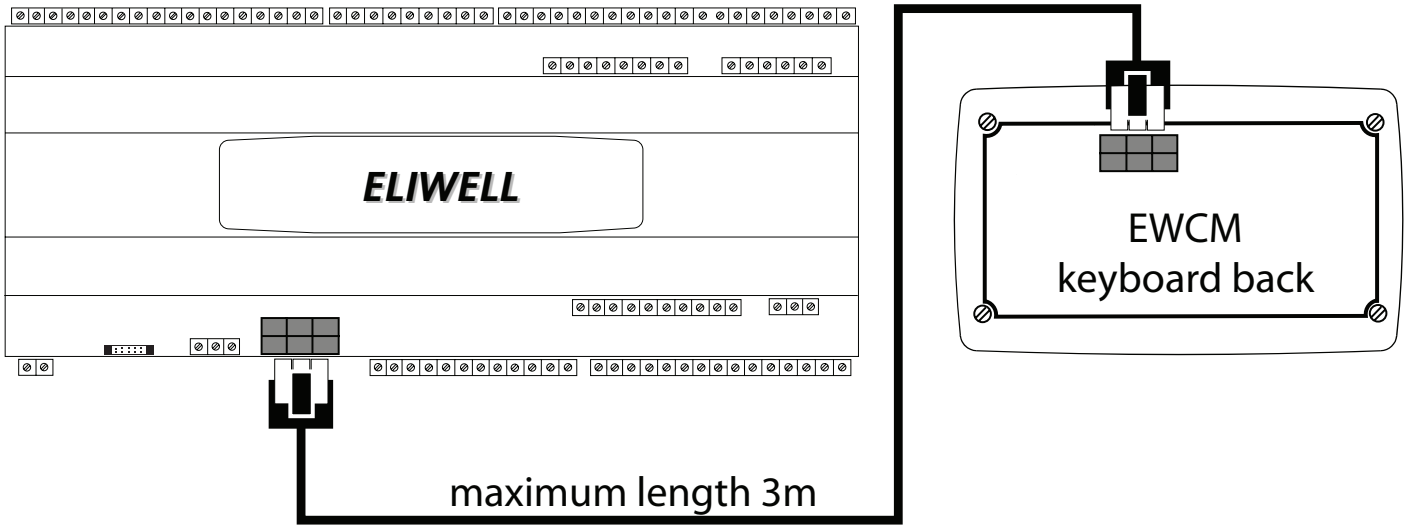




4.7. BASE-KEYBOARD CONNECTION

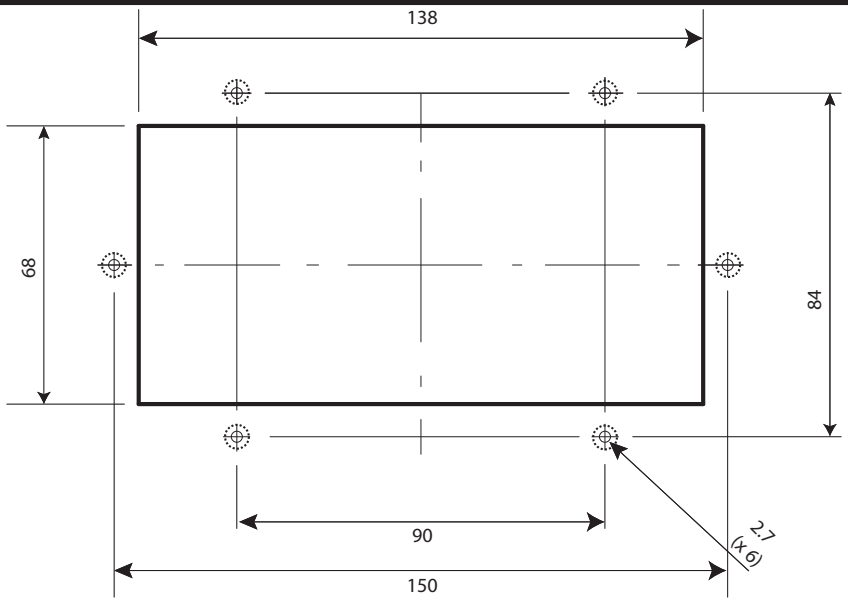
For the connection between the base and the keyboard, use the 3 m 6-wire microfit cable supplied. Only use the cable supplied, respecting the maximum distance of 3m.
The cable must be wired separately from the power cables.

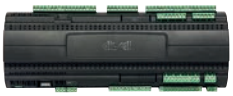
BASE- KEYBOARD



4.7.1. DIMENSIONS AND MOUNTING THE KEYBOARD

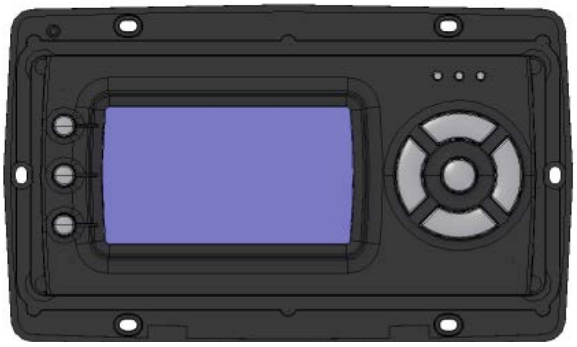
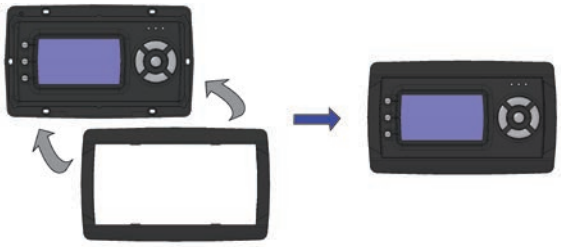
DIMENSIONS

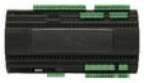






The keyboard is designed for panel-mounting.
Make a 138x68mm hole.
Remove the front panel (figure 1) and make 6 holes in the panel that will hold the panel (figure 2points A/B/C/D/E/F) of dia. 2.7 mm at the specified spacing (figure 2). Insert the device, fixing it with the screws. Then press with fingers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

FRAME REMOVAL	FRAME
	
KEYBOARD WITHOUT FRAME	**DRILLING POINTS**
	
ASSEMBLING FRAME	**PANEL MOUNTED KEYBOARD**
	

4.8. RS485 SERIAL PORTS

EWCM has two RS485 serial ports
- **RS485** for connection with the Televis/Modbus supervision system or fast programming of DeviceManager parameters
- **RS485 EXP** with connection with V910 driver for electronic expansion valve or of third parties
  RS485 EXP is set by default as **Modbus Slave**
  RS485 EXP can be set as **Modbus MASTER if 740 - EEvE> 0 and valve enabling relay is not present**

Folder	Parameter	Description	
EXTERNAL DRIVER	**740 - EEvE >0**	Enable electronic valve driver	**=1,2**
RESOURCE ALLOCATION Digital Outputs	**584-H201 ÷ 602-H219**	Control EEV activation from LP plant	**value ≠ ±98**

4.8.1. DEVICE MANAGER

Through the RS485 serial port, the Device Manager software is used to simplify and aid in installing and managing EWCM

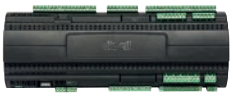
Main Device Manager characteristics
- Device parameters management.

All basic components required to use the DeviceManager with EWCM are described below.
Device Manager Software component
The software application has a graphic user interface, described in the DeviceManager manual.
The Device Manager software supports both Eliwell/Modbus protocols.
The functions available to the customer depend on which Device Manager hardware interface has been purchased.

Device Manager Interface component (DMI)
The USB/TTL hardware interface, used in association with the software package, enables:
- Use of the software itself.
- Connection to device/s to control it/them.

There can be three different types of interface, corresponding to three user levels:
- DMI 100-1 END USER.
- DMI 100-2 SERVICE.
- DMI 100-3 MANUFACTURER.

Depending on the type purchased, the client has access or not to the functions described above

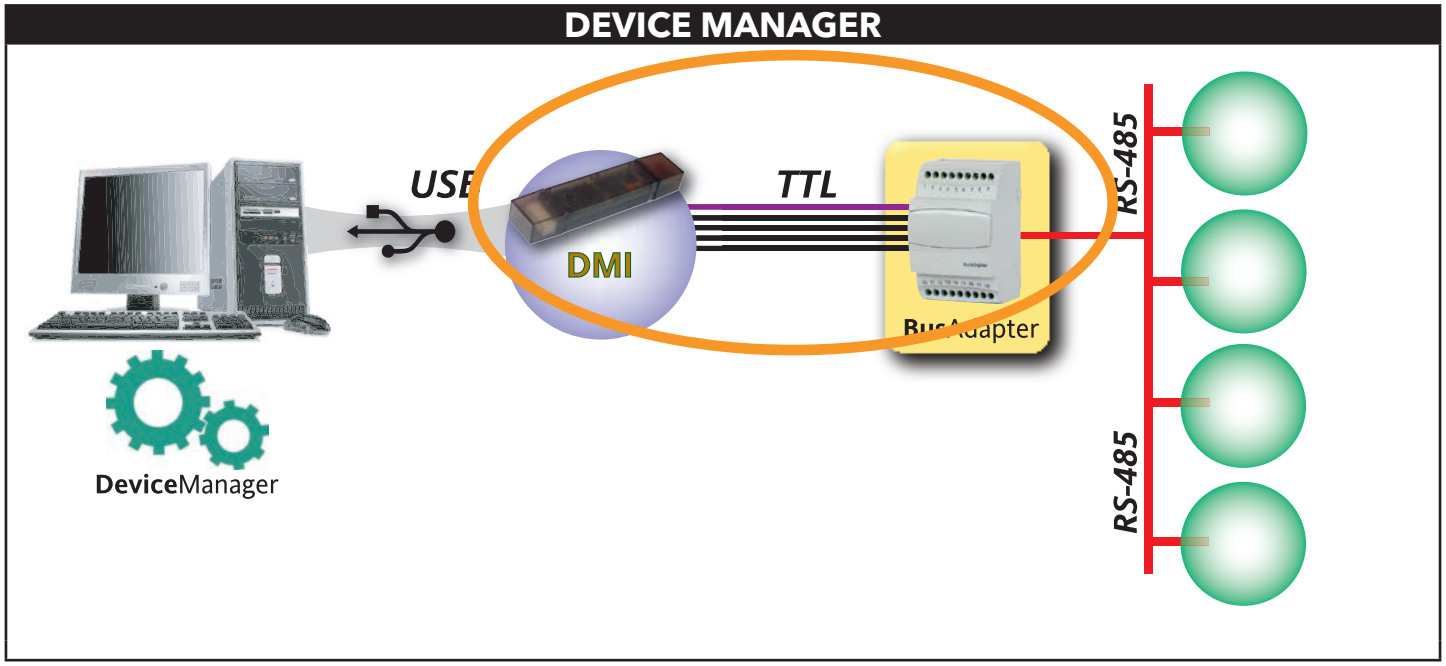




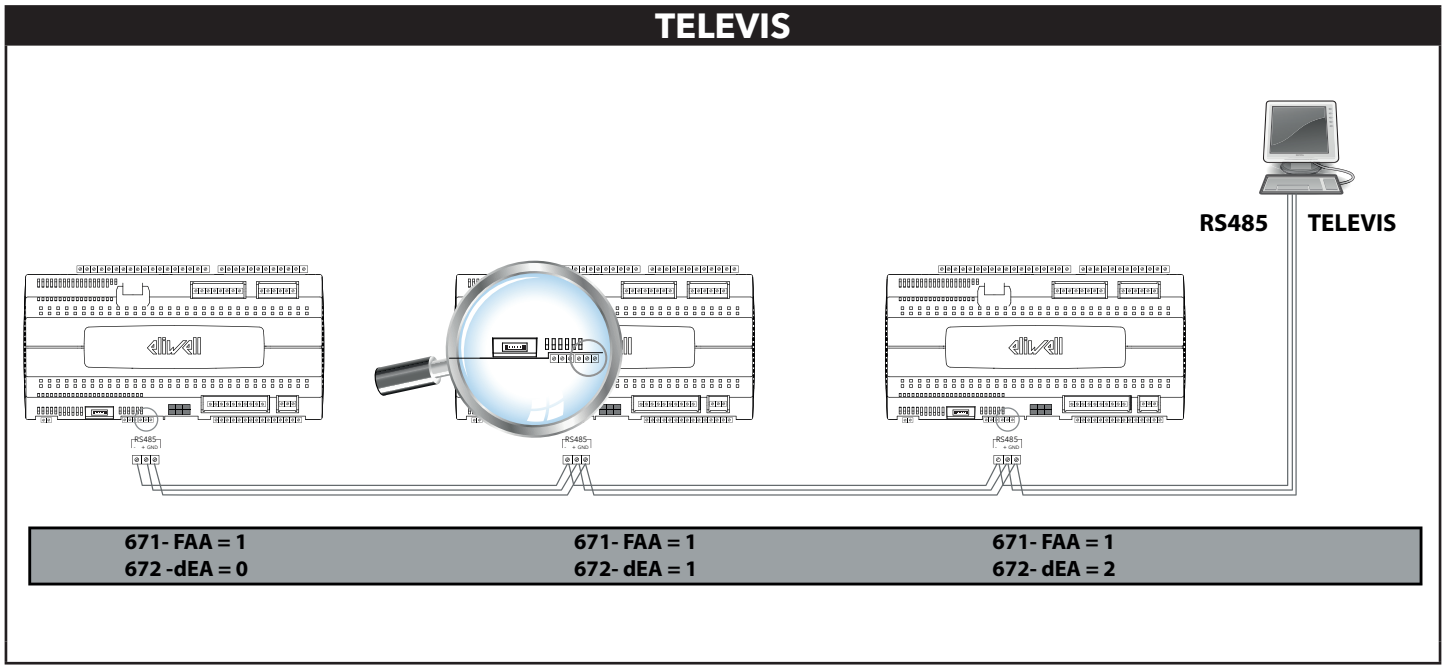
BusAdapter Component
RS485-TTL Converter
The cable must be wired separately from the power cables.

Components NEEDED: BUS ADAPTER + DMI + purple cable

USE THE TTL PURPLE CABLE >



4.8.2. SUPERVISION



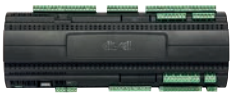




5.1. LED



	Icon	Led	Operation	Meaning
	(((•)))	**Alarm**	●	alarm active (at least one)
			☼	alarm acknowledgement
			○	no alarm
	PRG	**PRG**	●	-
			☼	Parameters menu User/Administrator Service Menu
			○	Main menu
	$	**Economy Function**	●	Economy function on
			☼	forcing setpoint
			○	Economy function off




5.2. KEYS

	Main Display		Navigation menu	Write mode (Edit Mode)
key		3sec		
F1	Menu Compressors/Fans	-	-	-
F2	Access set/band menu	-	-	-
F3	Alarm acknowledgement	• Alarms menu • Upload Glossaries (from reset)	-	-
	-	-	Scrolls through menu options	Increases value
	Display discharge value [°C → bar] → [°F → PSI]	Probes menu	Access next menu	Saves and confirms value
OK	-	Navigation Menu	• Next menu • Write mode • Activates function	Saves and confirms value
	-	-	Scrolls through menu options	Decreases value
	Display suction value [°C → bar] → [°F → PSI]	-	Goes back to previous menu	Exits write mode

5.3. KEYBOARD LOCK

When keyboard is locked the icon is displayed

EWCM foresees that keyboard operations can be disabled to prevent it being used accidentally. As soon as it is locked, the keys are disabled immediately.

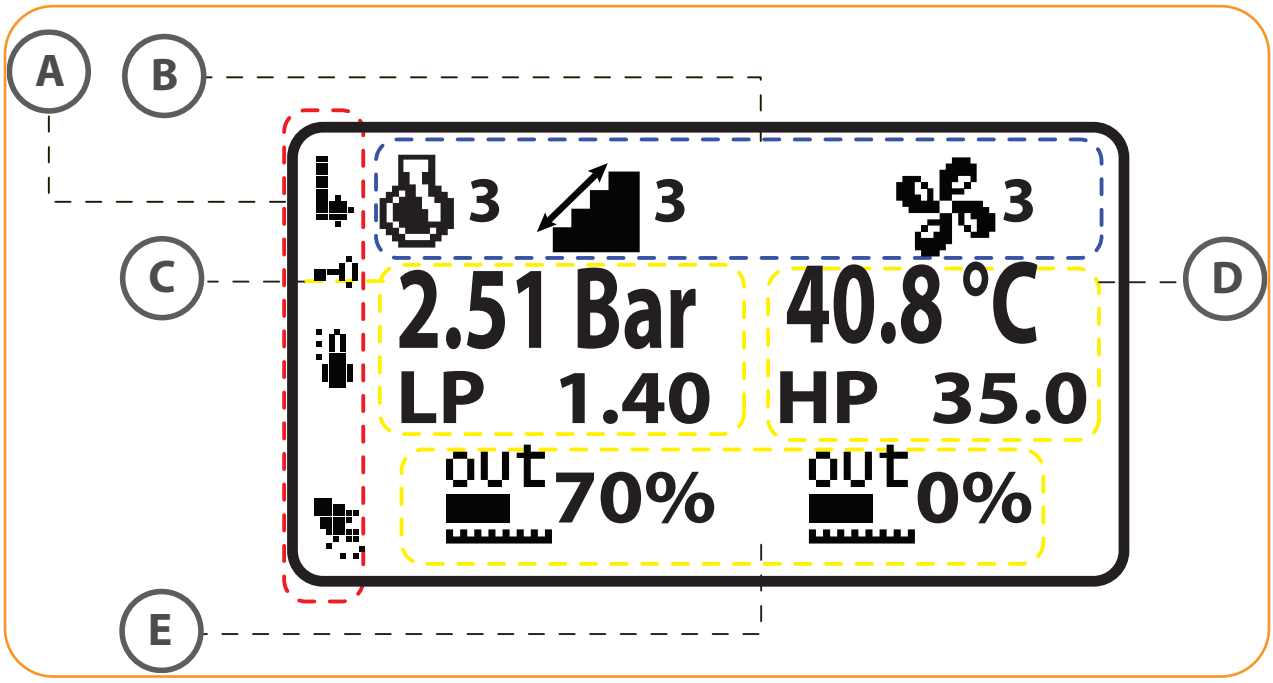
Keyboard lock: executed from parameter
DISPLAY > 549 - LoCK
Keyboard lock It locks the keyboard disabling the following functions: modify parameters, modify Setpoints, resets operating hours of the various compressors and maintenance; 0 (No); 1 (Yes).
As soon as it is locked display returns to the main display automatically

Unlock: from key, in main display
To unlock the keyboard, hold down **F2** (default).
From parameter **DISPLAY > 550-HKUnL** you can choose which key to be used to unlock the keyboard. See table:

550-HKUnL = 0	**aucune touche**		
550-HKUnL = 1	**F1**	**550-HKUnL = 7**	**F1** 3sec
550-HKUnL = 2	**F2**	**default 550-HKUnL = 8**	**F2** 3sec
550-HKUnL = 3	**F3**	**550-HKUnL = 9**	**F3** 3sec
550-HKUnL = 4		**550-HKUnL = 10**	3sec
550-HKUnL = 5		**550-HKUnL = 11**	3sec
550-HKUnL = 6	OK	**550-HKUnL = 12**	OK 3sec

5.4. MAIN DISPLAY

The icons described are only visible in the Main Display.
They are not present during Menu navigation.



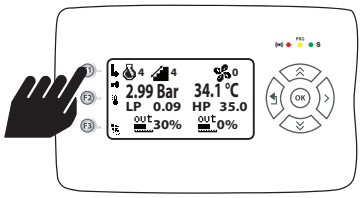
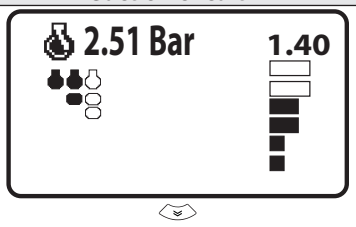
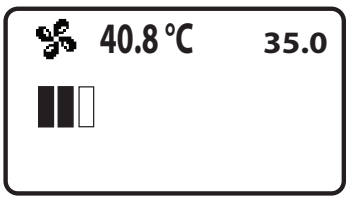
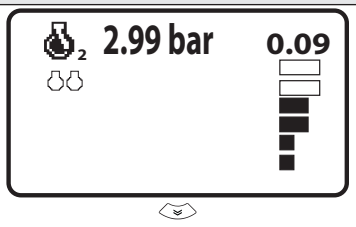
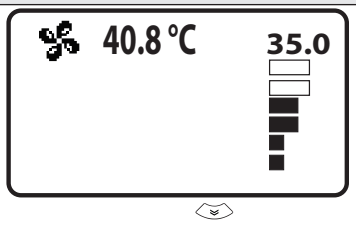
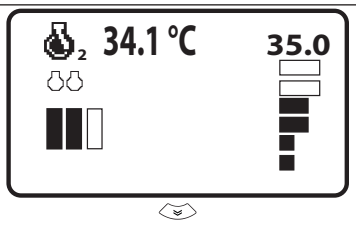
The display is used to monitor the parameters, machine status and operating modes, as well as configuring machine parameters.
The Main Menu has 5 sections

A	Access to menus		B	DIGITAL Compressors/Fans
	F1	Displays Compressors/Fans		**Compressors** and number of compressors on
	F2	if keyboard locked		**Compressor power steps on** and number of compressors on
	F3	Displays Alarms		**Digital fans** and number of digital fans on

C	Suction	D	Discharge
	• the first number indicates the value read by the suction probe • the second number indicates the value of the suction setpoint		• the first number indicates the value read by the discharge probe • the second number indicates the value of the discharge setpoint
E	**Compressor INVERTER**	**E**	**Fan INVERTER**
out	INVERTER output use percentage	out	INVERTER output use percentage
the percentage is only indicated by the number %: the icon does not identify power supplied, that is it is the same for all percentages.			



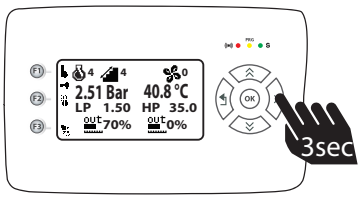

5.4.1. COMPRESSOR/FAN STATUS

<table>
<tr><th></th><th>F1</th><th>Suction circuit 1</th><th>Digital fans - discharge</th></tr>
<tr><td rowspan="2"></td><td rowspan="2">➔</td><td></td><td></td></tr>
<tr><td>Circuit 2 and mixed suction</td><td>Fan INVERTER discharge</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">compressor on compressor called compressor off stages</td></tr>
</table>

5.4.2. DISPLAYING PROBE VALUES

The Probes Menu only allows you to view the analogue input values.
For configuration see Parameters > Configuration.

You access the Probes Menu via the Main Display by pressing and holding down the RH (right-hand) function key.



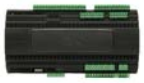
This Menu displays the values of pressure transducers and probes in the plant.

Display probe values
To scroll through probe values press the 'UP' or 'DOWN' arrow keys.

Note that each input has two separate values.

PB1 Pb2 Pb3 > Bar and PSI
PB5 Pb6 Pb7 Pb8 > °C and °F

NOTE: The value displayed is read-only and cannot be modified.

Pressure transducers

PROBE	01/05
PB1	13.4 Bar
PB1	13.4 PSI
PB2	3.61 Bar

PROBE	02/05
PB2	3.61 PSI
PB3	13.4 Bar
PB3	13.4 PSI

Temperature probes

PROBE	03/05
PB5	15.6 °C
PB5	32.4 °F
PB6	Err

PROBE	04/05
PB6	Err
PB7	Err
PB7	Err

5.4.3. MODIFY SET AND BAND

This Menu display the values of

- **suction/discharge SetPoints**
- **suction bands**
- **discharge bands.**

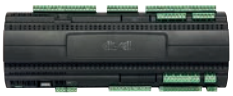
Access to the SET/BAND Menu takes place via the Main Display by pressing function key F2.

Main display→ key F2	→	
SET 01/02 Suc Set 0.09 Bar Suc Band 0.25 Bar Del Set 14.4 Bar	**or OK**	SUC SET 001/001 143 - SEt Suction setpoint 0.09 Bar
SET 01/02 Suc Set 0.09 Bar Suc Band 0.25 Bar Del Set 14.4 Bar	**or OK**	SUC BAND 001/001 144 - Pbd Proportional band 0.09 Bar
SET 01/02 Suc Set 0.09 Bar Suc Band 0.25 Bar Del Set 14.4 Bar	**or OK**	DEL SET 001/001 343 - SEt Discharge setpoint 0.09 Bar
SET 01/02 Del Band 0.25 Bar	**or OK**	DEL BAND 001/001 344 - Pbd Proportional band 0.09 Bar

Example Modify set
For example, the suction setpoint is 0.09 bar.

To modify it go to the **Set Asp** item and press the key (OK)
The relative parameter **143 - SEt** appears

NOTES:
RELATIVE PRESSURE SET > ABSOLUTE PRESSURE - 1bar. In the example, 0.09 bar = (1.09 - 1 bar)
ABSOLUTE PRESSURE SET > set via 543-rELP
MEASUREMENTÀ UNIT > depends on 548-UMFn
CENTRAL/LATERAL SET> based on 551-Stty (same for both circuits)





5.4.4. UNIT OF MEASUREMENT

Regulation
Temperature/pressure regulation is defined by the parameters

DISPLAY > 547 - UMCP → regulates suction By default: 0= °C; 1=bar;
DISPLAY > 548 - UMFn → regulates discharge By default: 0= °C; 1=bar;

There are another 2 parameters available defining regulation display range
DISPLAY > 545 - UMMin → Minimum suction measurement unit
DISPLAY > 546 - UMMax → Maximum suction measurement unit

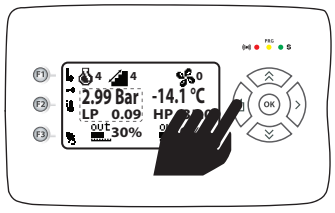
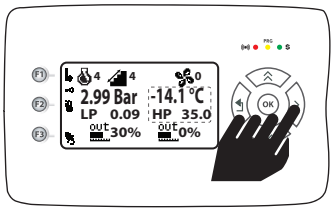
By default: **545 - UMMin = 0 and 546 - UMMax = 1 →** 0= °C; 1=bar

To consent regulation and display in °F / PSI:

if you set **545 - UMMin = 2 and 546 - UMMax = 3 →** 2= °F; 3= PSI

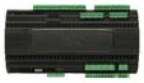
DISPLAY > 547 - UMCP → suction regulation by choice between 2= °F; 3= PSI
DISPLAY > 548 - UMFn → discharge regulation by choice between 2= °F; 3= PSI

Display
From display you can only modify display (it can only be regulated by parameter) using the UP and DOWN keys

display Suction in bar → °C	display Discharge in °C → bar
	

Please note that regulation always remains in the UM defined by parameter
On restarting EWCM display is aligned to the parameter value defined





6.1. ASSISTED CONFIGURATION

EWCM EO facilitates the setting of initial compressor rack settings using assisted configuration (Quick Start) of parameters, from choice of plant to number and type of compressors and fans, enable errors etc. and automatically 'allocating' system resources.

Resources can be configured 'manually' by the user[1] through the parameters
PARAMETERS MENU > INSTALLER > RESOURCES
PARAMETERS MENU > INSTALLER > RESOURCE ALLOCATION

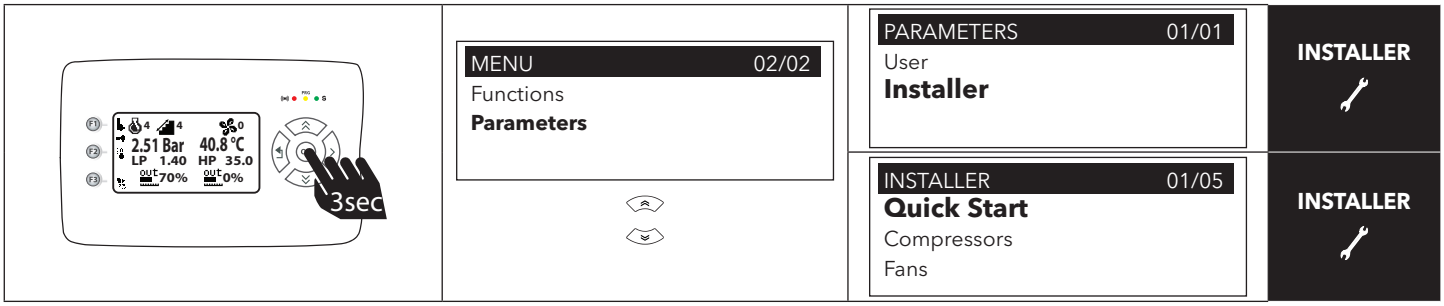
Choice of type of refrigerant must always be manual from

PARAMETER MENU > INSTALLER > RESOURCE ALLOCATION > 641 - FtyP

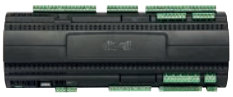
Here below you will find a description of the various stages for a correct configuration.

ACCESS TO ASSISTED CONFIGURATION QUICK START

QUICK START MENU > INSTALLER > The operation must be done by qualified personnel!
The Quick Start Menu can be used to modify the plant and define the structure of inputs/outputs.
The Quick Start Menu is visible from **PARAMETERS MENU > INSTALLER**



1 See section '7. START-UP' page 41



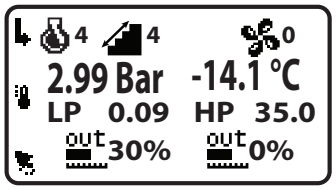
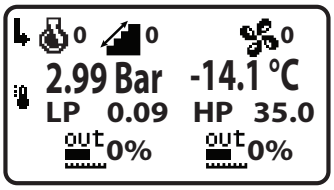


Enabling
The Quick Start parameters should be 'enabled' for writing to be able to be modified[2]:
Position yourself on the 'UP' and 'DOWN' keys of the folder **Enable** and press 'OK' to enable modification.
To disable parameter modification, repeat the procedure.

Enable =No > With this setting access to the Quick Start Parameters folder is read-only (parameters visible but not modifiable)

Enable=Yes > EWCM EO will behave as follows:
- all the outputs are deactivated (that is the machine doesn't adjust)
- the Functions Menu is disabled (only display)
- Manual resource assignment is disabled

From Main display note that with **Enable=Yes** the machine stops

Enable = No	Enable = Yes
	

Once you have exited the Quick Start menu, you must confirm the changed settings to make them operational

Save new settings
Entering Quick Start to allow setting modification **Enable=No→ Yes**
Exiting Quick Start to confirm the modification **Enable=Yes→ No**

Save new settings > Enable=Yes → No

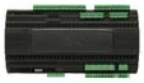
Manual assignment of I/O resources
If the user wants to work on parameters and configure I/O manually it can access the relative folders
PARAMETERS MENU > INSTALLER > RESOURCES
PARAMETERS MENU > INSTALLER > RESOURCE ALLOCATION

On the contrary, it can use the function 'Manual':

Manual=Yes > leave this default setting if you do not want the and automatic I/O allocation

Manual=No > this setting **modifies the I/O allocation automatically**
On exiting the menu with **Save new settings > Enable=Yes → No** EWCM EO assigns inputs and outputs automatically associating settings just modified with physical resources.

2 by default Quick Start parameters are NOT enabled for writing to prevent any unwanted configuration

Quick Start parameters
Place yourself on the Parameters menu with 'UP' and 'DOWN' and press OK to display the Quick Start parameters themselves. Parameters are modified as described in the **Parameters** section

CHOICE OF TYPE OF • COMPRESSORS • FANS PLANT

PLANT • 501-TyPE

SUCTION

CIRCUITS

1 CIRCUIT > **501-TyPE = 0 or 501-TyPE = 2**

2 CIRCUITS > **501-TyPE = 1**

NUMBER OF COMPRESSORS

No. number of compressors circuit 1 > **523-CPnU**
No. number of compressors circuit 2 > **525-CPnU2**

No. of compressor circuits + 523+525 less than 12
No. of compressor circuits or circuit = 0 only in mixed case

☑ DISCHARGE PRESENCE • 520- Fnty ≠ 0

NUMBER OF FANS

No. number of fans > **521-nFn**

CHOICE OF PLANT TYPE SUCTION 522- CtyP • 524- CtyP2

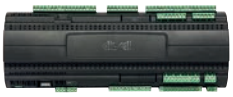
CIRCUIT 1 > **522- CtyP**

CIRCUIT 2 > **524- CtyP2**

0	HOMOGENEOUS	HOMOGENEOUS DIGITAL COMPRESSORS	
1	NON HOMOGENEOUS	NON-HOMOGENEOUS DIGITAL COMPRESSORS	
2	HOMOGENEOUS + INVERTER	- DIGITAL COMPRESSORS + INVERTER - just INVERTER →523-CPnU = 0	If 523-CPnU = 0 then the section is just INVERTER without digital
3	HOM+INV+ BACKUP	DIGITAL COMPRESSORS + INVERTER with backup relay	See '18.1. SERVICE MENU' page 160

CHOICE OF PLANT TYPE DISCHARGE 520- Fnty ≠ 0

0	DISABLED	discharge control disabled	
1	INVERTER	INVERTER	
2	DIGITAL	DIGITAL FANS	
3	INVERTER + BACKUP	INVERTER with backup relay	
4	DIGITAL + INVERTER	DIGITAL FANS + INVERTER	
5	DIG + INV + BACKUP	DIGITAL FANS + INVERTER with backup relay	See '18.1. SERVICE MENU' page 160



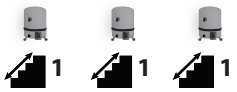


COMPRESSOR STEPS AND POWER 502- PC1 • 513 - PC12

STEPS o POWER COMPRESSORS	**502-PC1**	Compressor 1 power or number of compressor 1 steps	1 ... 255	1	num
	503-PC2	Compressor 2 power or number of compressor 2 steps	1 ... 255	1	num
	504-PC3	Compressor 3 power or number of compressor 3 steps	1 ... 255	1	num
	505-PC4	Compressor 4 power or number of compressor 4 steps	1 ... 255	1	num
	506-PC5	Compressor 5 power or number of compressor 5 steps	1 ... 255	1	num
	507-PC6	Compressor 6 power or number of compressor 6 steps	1 ... 255	1	num
	508-PC7	Compressor 7 power or number of compressor 7 steps	1 ... 255	1	num
	509-PC8	Compressor 8 power or number of compressor 8 steps	1 ... 255	1	num
	510-PC9	Compressor 9 power or number of compressor 9 steps	1 ... 255	1	num
	511-PC10	Compressor 10 power or number of compressor 10 steps	1 ... 255	1	num
	512-PC11	Compressor 11 power or number of compressor 11 steps	1 ... 255	1	num
	513-PC12	Compressor 12 power or number of compressor 12 steps	1 ... 255	1	num

EWCM EO Definitions:
Step equals use of a relay.
Step = Stages + 1
1 step → no stages (whole compressor)
2 steps → 1 stage
5 steps → 4 stages
If 522 - CtyP = 0 or 2 **502- PC1 • 513 - PC12** must be less than 6
Up to 12 compressors allowed in a plant.

Parameters **502- PC1 • 513 - PC12 Compressor power or number of compressor steps** establish:
for HOMOGENEOUS compressors: number of compressor steps
for NON HOMOGENEOUS compressors: value proportional to power

HOMOGENEOUS	HOMOGENEOUS	NON HOMOGENEOUS
		
502 - PC1 = 1	**502 - PC1 = 1**	**502 - PC1 = 50 (e.g 50% of power)**
503 - PC2 = 2	**503 - PC2 = 1**	**503 - PC2 = 30 (e.g 30% of power)**
504 - PC3 = 3	**504 - PC3 = 1**	**504 - PC3 = 20 (e.g 20% of power)**
522-CtyP = 0 homogeneous	**522-CtyP = 0 homogeneous**	**522-CtyP = 1 NON homogeneous**
523-CPnU = 3	**523-CPnU = 3**	**523-CPnU = 3**

sum steps/compressor power→ ∑ 502-PC1 + 503-PC2 + 504-PC3

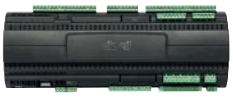
ENABLING ALARMS

By default the cumulative alarm relay output is enabled
The generic alarm digital input is optional

Digital output Cumulative Alarm 514-EAAL	Digital input Generic alarm 519-EAgA optional
digital output: ±09	**digital input: ±01**




	PAR.	DESCRIPTION	RANGE	DE-FAULT	M.U.
		QUICKSTART			
PLANT	**501-tyPE**	Type of plant **0 =** compressor rack of standard type **1 =** common discharge single discharge compressor racks **2 =** chiller. The same as case 0. In this case regulation is in temperature (referred to water) N.B.: If **501 - tyPE = 1** the parameters of the folder **Compressors [2]** will be visible	0 ... 2	0	num
STEPS o POWER COMPRESSORS	**502-PC1** **503-PC2** **504-PC3** **505-PC4** **506-PC5** **507-PC6** **508-PC7** **509-PC8** **510-PC9** **511-PC10** **512-PC11** **513-PC12**	Compressor 1 power or number of compressor 1 steps Compressor 2 power or number of compressor 2 steps Compressor 3 power or number of compressor 3 steps Compressor 4 power or number of compressor 4 steps Compressor 5 power or number of compressor 5 steps Compressor 6 power or number of compressor 6 steps Compressor 7 power or number of compressor 7 steps Compressor 8 power or number of compressor 8 steps Compressor 9 power or number of compressor 9 steps Compressor 10 power or number of compressor 10 steps Compressor 11 power or number of compressor 11 steps Compressor 12 power or number of compressor 12 steps	1 ... 255 1 ... 255 1 ... 255 1 ... 255 1 ... 255 1 ... 255 1 ... 255 1 ... 255 1 ... 255 1 ... 255 1 ... 255 1 ... 255	1 1 1 1 1 1 1 1 1 1 1 1	num num num num num num num num num num num num
ALARM RELAY	**514-EAAL**	Enable cumulative alarms digital output It defines whether to assign the cumulative alarm automatically to a digital output on relay. **0=** No; **1=** Yes	0 ... 1	1	flag
optional	**515-EACI**	Compressor INVERTER enabling digital output. Defines whether to automatically assign the compressor INVERTER 1 and 2 to the analogue outputs **0=** No; **1=** Yes	0 ... 1	0	flag
optional	**516-EAFI**	Fan INVERTER enabling digital output. Defines whether to assign the fan INVERTER automatically to an analogue output. **0=** No; **1=** Yes	0 ... 1	0	flag
optional	**517-EACIE**	Compressor INVERTER 1 and 2 error digital input Defines whether to automatically assign the compressor INVERTER 1 and 2 error to the digital inputs. **0=** No; **1=** Yes	0 ... 1	0	flag
optional	**518-EAFIE**	Fan INVERTER error digital input. Defines whether to automatically assign the fan INVERTER error to a digital input. **0=** No; **1=** Yes	0 ... 1	0	flag
optional	**519-EAgA**	Enable generic alarm digital input. Defines whether to assign the generic alarm automatically to a digital input. **0=** No; **1=** Yes	0 ... 1	0	flag
PLANT DISCHARGE	**520-Fnty**	Fan mode 0 = **disabled** condensation control disabled 1= **inverter** control through INVERTER (only analogue) 2= **digital** control through relay 3= **inverter+backup** control with INVERTER (only analogue) with backup relay 4= **digital+inverter** control by relay + INVERTER 5= **dig+inv+backup** control by relay + INVERTER with backup relay	0 ... 5	2	num
NUMBER FANS	**521-nFn**	Number of fans	1 ... 8	3 **9900** 3 **9100** 1 **8900**	num
PLANT SUCTION circuit 1	**522-CtyP**	Circuit 1 type 0= **homogeneous** digital control by relay (HOMOGENEOUS STEPS) 1= **non-homogeneous** digital control by relay (NON-HOMOGENEOUS STEPS) 2 = **homogeneous + inverter** control by relay (HOMOGENEOUS STEPS) + INVERTER 3= **hom+inv+backup** control by relay (HOMOGENEOUS STEPS) + INVERTER with backup relay	0 ... 3	2	num




	PAR.	DESCRIPTION	RANGE	DE-FAULT	M.U.
		QUICKSTART			
NUMBER COMPRESSORS circuit 1	**523-CPnU**	Number of compressors circuit 1 N.B: 0 value is only allowed if **522-CtyP = 2**. (only INVERTER)	0 ... 12	3 **9900** 3 **9100** 2 **8900**	num
PLANT SUCTION circuit 2	**524-CtyP2**	Circuit 2 type. See **522-CtyP**	0 ... 3	0	num
NUMBER COMPRESSORS circuit 2	**525-CPnU2**	Number of compressors circuit 2 N.B: 0 value is only allowed if **524-CtyP2 = 2**. (only INVERTER)	0 ... 12	0	num

ENABLING optional

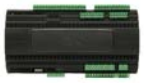
AUTOMATIC I/O ENABLING SUCTION

Enabling digital Output INVERTER 515- EACI= 1		Enabling Digital Error Input 517- EACIE = 1	
Digital output INVERTER	**Digital output INVERTER**	**Digital Input Error INVERTER**	**Digital input Error INVERTER**
±31	**±32**	**±64**	**±65**

AUTOMATIC I/O ENABLING DISCHARGE

Enabling Digital output INVERTER 516- EAFI = 1	Enabling Digital Input Error 518- EAFIE = 1
Digital output INVERTER	**Digital Input Error INVERTER**
±18	**±66**





AUTOMATIC I/O ASSIGNMENT RULES
As described above on exiting the menu with **Save new settings > Enable=Yes → No** EWCM EO assigns inputs and outputs **automatically** associating the modified settings with physical resources based on certain rules.
Assign automatically modifes parameters in the folder **RESOURCE ALLOCATION**

They will be assigned automatically in the order

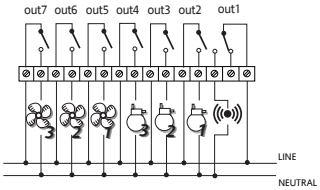
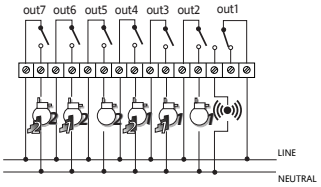
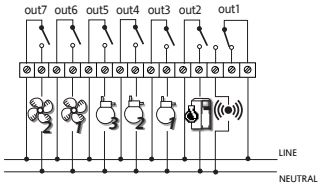
RESOURCE ALLOCATION > Digital outputs→ for Suction
514-EAAL = 1 > OUT1 ALARM → 584 - H201 = 9: cumulative alarms digital output

case 515-EACI = 0 > relays are associated to digital compressors
• **OUT2** Compressor 1 Switch on (in general OUT**n+1,** Compressor Switch-on **n)**

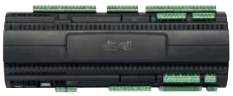
in the case of FULL COMPRESSORS:
• **OUT3** Compressor 2 Switch-on (in general OUT**n+1,** Compressor Switch-on **n)**
• **OUT4** Compressor 3 Switch-on (in general OUT**n+2,** Compressor Switch-on **n+1)**
etc

in the case of STAGED COMPRESSORS
• **OUT3** Switch on Stage 1 Compressor 1 (Switch on Compressor Stage 1 **n**)
• **OUT4** Switch on Stage 2 Compressor 1 (Switch on Compressor Stage 2 **n**)
etc

Examples: alarm relay + 3 full compressors (default EWCM9100) or 3 compressors with 3 steps or homogeneous + inverter

	FULL	**STAGES**	**HOMOGENEOUS + INVERTER**
			
OUT1	**584 - H201 = 9**	**584 - H201 = 9**	**584 - H201 = 9**
OUT2	**585 - H202 = 19**	**585 - H202 = 19**	**585 - H202 = 31**
OUT3	**586 - H203 = 20**	**586 - H203 = 33**	**586 - H203 = 19**
OUT4	**587 - H204 = 21**	**587 - H204 = 34**	**587 - H204 = 20**
OUT5	**Discharge**	**588 - H205 = 20**	**588 - H205 = 21**
OUT6		**589 - H206 = 38**	**Discharge**
OUT7		**590 - H207 = 39**	

case 515-EACI = 1 > OUT2 COMPRESSOR INVERTER→ 585 - H202 = 31: Enable compressor INVERTER
In the homogeneous + inverter case resources are translated by a relay





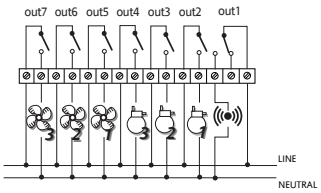
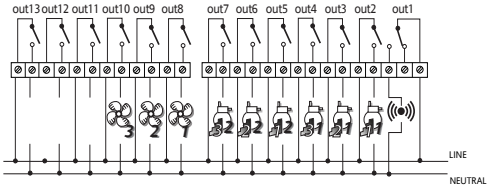
RESOURCE ALLOCATION > Digital outputs→ for Discharge

case 516-EAFI = 0 > relays are associated to digital fans

- **OUT4** Switch on Fan 1 (in general OUT**k,** Switch on Fan **k)**
- **OUT5** Switch on Fan 2 (in general OUT**k+1,** Switch on Fan **k+1)**
- **OUT6** Switch on Fan 3 (in general OUT**k+2,** Switch on Fan **k+2)**

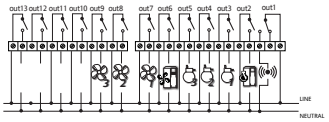
etc

Examples: 3 full fans with full or staged compressors

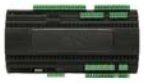
		
OUT4	**Suction**	**Suction**
OUT5	**588 - H205 = 10**	**Suction**
OUT6	**589 - H206 = 11**	**Suction**
OUT7	**590 - H207 = 12**	**Suction**
OUT8		**591 - H208 = 10**
OUT9		**592 - H209 = 11**
OUT10		**593 - H210 = 12**

case 516-EAFI = 1 > OUT... FAN INVERTER Enable fan INVERTER

Examples: 3 full fans with fan INVERTER with full compressors and compressor INVERTER

EWCM 9100	
OUT5	**Suction**
OUT6	**589 - H206 = 18**
OUT7	**590 - H207 = 10**
OUT8	**591 - H208 = 11**
OUT9	**592 - H209 = 12**



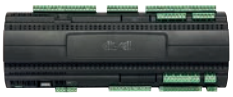


RESOURCE ALLOCATION > Digital Inputs
The digital inputs are:
> in high voltage
• DIH1 Compressor INVERTER shut-down
• DIH2 Compressor 1 shut-down (in general compressor shut-down **n,** compressor shut-down **n)**
• DIH3 Compressor 2 shut-down (in general compressor shut-down **n+1,** compressor shut-down **n+1)**
etc
• DIH... Fan INVERTER shut-down
• DIH... Digital fan thermal switch 1
• DIH... Digital fan thermal switch 2
etc
• DIH... suction pressure switch
• DIH... Discharge pressure switch

> clean contact
517-EACIE =1 > DI... ERROR compressor INVERTER
518-EAFIE =1 > DI... ERROR fan INVERTER
519-EAFIE =1 > DI... GENERIC ALARM

RESOURCE ALLOCATION > Analogue Outputs
They are assigned automatically in the order:
• Switch-on **compressor** INVERTER
• Switch on **fan** INVERTER

ANALOGUE INPUTS ARE NOT ASSIGNED AUTOMATICALLY.
See '7.3. I/O configuration' page 41





CONFIGURATION ERROR

If there is a configuration error the alarm **Err Conf.** appears **IO**

Errors resettable manually
• number of **digital outputs**: outputs set exceed those available
• number of **analogue outputs**: outputs set exceed those available
• number of **digital inputs** (in high voltage or clean contact): inputs set exceed those available
In these cases the Quick Start configuration can be **reset manually** with the command **Reset Alarms** in the Alarms Menu. Resetting means the I/O can be assigned manually.

Errors not resettable manually
Further errors where the Quick Start configuration cannot be reset manually
So the I/O has to be re-assigned.

SUCTION

• case HOMOGENEOUS STEPS or NON HOMOGENEOUS STEPS at least one compressor must be present (at least one compressor per circuit)
• case HOMOGENEOUS STEPS or HOMOGENEOUS STEPS + compressor INVERTERS, the number of steps per compressor must be less than 6

The 'homogeneous + inverter' system is always with digital compressors **homogeneous** + INVERTER

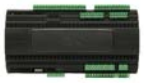
HOMOGENEOUS	NON HOMOGENEOUS	HOMOGENEOUS + INVERTER	INVERTER
522- CtyP = 0 **524 -CtyP2 = 0** ↓ **MAX 12**	**522- CtyP = 1** **524 -CtyP2 = 1** ↓ **MAX 12**	**522- CtyP = 2** **524 -CtyP2 = 2** ↓ **MAX 10** **+2 INVERTER**	**522- CtyP = 2** **524 -CtyP2 = 2** ↓ **MAX 2**
523- CPnU ≠ 0 **525- CPnU2 ≠ 0**	**523- CPnU ≠ 0** **525- CPnU2 ≠ 0**	**6**	

SUCTION INVERTER BACKUP

522- CtyP = 3 **524 -CtyP2 = 3**
DIGITAL COMPRESSORS + INVERTER **+BACKUP**
Digital Input Error **517- EACIE**

• case **hom+inv+backup** the compressor INVERTER thermal switch must be assigned to a digital input **(517 - EACIE = Yes)**





DISCHARGE

DIGITAL FANS	DIGITAL FANS + INVERTER	INVERTER
520- Fnty = 2	520- Fnty = 4	520- Fnty = 1
↓ MAX 8	↓ MAX 7 +1 INVERTER	↓ MAX 1

DISCHARGE BACKUP INVERTER

520- Fnty = 3 520- Fnty = 5
FAN INVERTER or (DIGITAL + INVERTER) +BACKUP
Digital Input Error 518- EAFIE

• case **digital+backup dig+inv+backup** Control switches to digital fans so the fan INVERTER thermal switch must be assigned to a digital input **(518 - EAFIE = Yes)**

N.B
DROP IN VOLTAGE
If there is a drop in voltage during modification of the Quick Start parameters, when the device is restarted the new settings will be applied even if they were not completed and saved using the appropriate procedure

Pay special attention when modifying parameters

N.B
The operations described modify the type of plant and assignment of resources.

The modification affects the Resource Allocation parameters described in the Administrator Parameters section (parameters 584 - H201...633 - H503)

Check that the parameters have been correctly configured before proceeding. If in doubt contact Eliwell Technical Support

Please note that if no changes have been made to the QuickStart parameters the device will NOT assign resources automatically that is does NOT change the default I/O status of the EWCM





7.1. REFRIGERANT SELECTION

CONFIGURATION > 641 - FtyP

Type of refrigerant used in the system.
The selection of the type of refrigerant is necessary for correct system operations.

N.B 641 – FtyP must only be modified by qualified personnel!
The operation must be performed on first installation, when verifying and configuring the type of application and selecting the probes and pressure transducers

NOTE: **641 - FtyP= 3 DEFAULT**

EWCM EO MODELS

641 - FtyP		641 - FtyP			641 - FtyP	
0	R22	**5**	R507		**10**	R407A
1	R134a	**6**	R717	**AMMONIA**	**11**	R407F
2	R502	**7**	R410A		**12**	Reserved
3*	R404A	**8**	R417a		**13**	R427A
4	R407C	**9**	R744	**CARBON DIOXIDE**	**14**	Reserved
					15	R23

EWCM EO - HFO MODELS

641 - FtyP		641 - FtyP			641 - FtyP	
0	R434A	**5**	R427A		**10**	R449A
1	R134a	**6**	R717	**AMMONIA**	**11**	R450
2	R448A	**7**	R410A		**12**	R407A
3*	R404A	**8**	R452A		**13**	R513A
4	R407C	**9**	R744	**CARBON DIOXIDE**	**14**	R407F
					15	R442A

* Factory settings

7.2. TYPE OF DISPLAY: ABSOLUTE OR RELATIVE PRESSURE

DISPLAY > 543- rELP
Relative pressure. Selects display in absolute or relative pressure.
- **0 = absolute;**
- **1 = relative.**

7.3. I/O CONFIGURATION

7.3.1. CONFIGURATION OF TRANSDUCERS PB1 PB2 PB3

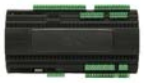
Configurable in pairs

ALL MODELS	**PB1 PB2**	**CONFIGURATION > 646-Pb12**
EWCM 9900	**PB3**	**CONFIGURATION > 647-Pb34**

646-Pb12		647-Pb34	EWCM9900
0	4-20mA	**0**	4-20mA
1	0-5V	**1**	0-5V
2	0-10V	**2**	0-10V
-	-	**3**	D.I. Digital input

7.3.1.1 Resolution of pressure transducers PB1 PB2

650-HPb1		651-HPb2	
0	No	**0**	No
1	Yes HIGH PRECISION	**1**	Yes HIGH PRECISION
HIGH PRECISION → SUCTION hundredths of bar / tenths PSI **HIGH PRECISION → DISCHARGE hundredths of bar / tenths PSI**			

7.3.1.2 Analogue inputs calibration

PB1 AND PB2 CALIBRATION IS ALWAYS IN ABSOLUTE VALUES (ABSOLUTE BAR)

Analogue inputs calibration can be set from parameters in the table

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.
In the parameters table, the parameter is repeated 4 times on 4 separate lines.

transducers			temperature probes			
PB1	**PB2**	**EWCM9900 PB3**	**PB5**	**PB6**	**PB7**	**PB8**
655-CALb1	**656-CALb2**	**657-CALb3**	**660-CALPb5**	**661-CALPb6**	**661-CALPb7**	**660-CALPb8**
bar	**bar**	**-**	**-**	**-**	**-**	**-**
PSI	**PSI**	**-**	-	-	-	-
°C	**°C**	**°C**	**°C**	**°C**	**°C**	**°C**
°F	**°F**	**°F**	**°F**	**°F**	**°F**	**°F**

7.3.2. CONFIGURATION OF TEMPERATURE PROBES PB5 PB6 PB7 PB8

CONFIGURATION > 648-Pb56
CONFIGURATION > 649-Pb78
Configurable in pairs

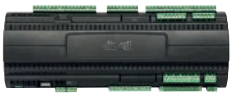
648-Pb56		649-Pb78	
3	D.I. Digital input	**3**	D.I. Digital input
4	NTC 103 AT	**4**	NTC 103 AT
5	PTC KTY81	**5**	PTC KTY81
6	NTC NK103 C1R1	**6**	NTC NK103 C1R1

7.3.3. CONFIGURATION OF ANALOGUE OUTPUTS

ALL MODELS **CONFIGURATION > 652-AoS1**
ALL MODELS **CONFIGURATION > 653-AoS2**

EWCM 9900 **CONFIGURATION > 654-AoS3**

652-AoS1 653-AoS2 654-AoS3	**0**	voltage
	1	current





8.1. USB COPY CARD

The USB Copy Card is an accessory enabling
- fast parameter programming
- Instrument upgrading
- updating glossaries from LCD keyboard[1]
- management of alarms history files, recordings, etc.

The USB Copy Card is equipped with a TTL connector to be connected to the TTL serial port of the EWCM and a USB connector which connects to the USB port of a PC
A LED on the USB Copy Card comes on to indicate status of the various operations

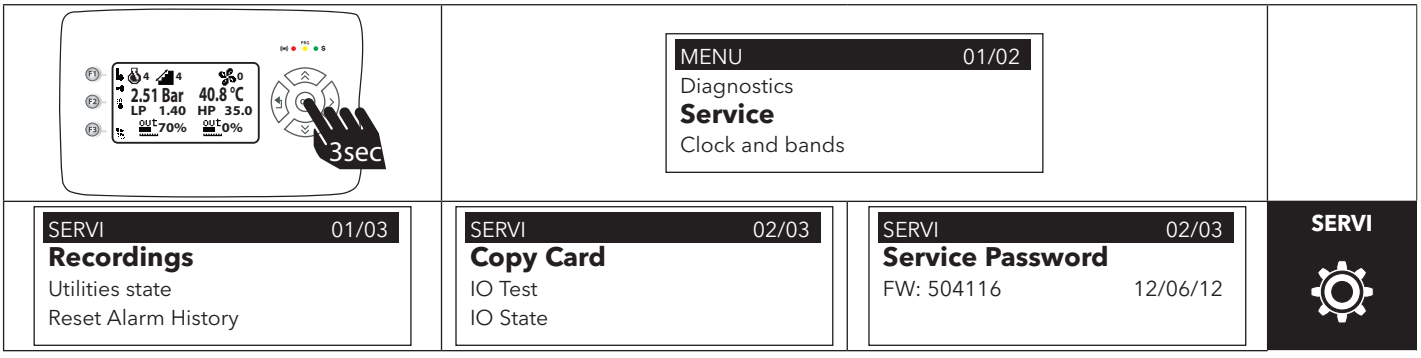
Check you have inserted the USB Copy Card in the right slot correctly!

Note. Once the map has been downloaded from the USB Copy Card to EWCM EO, when the USB Copy Card is extracted EWCM EO resets automatically



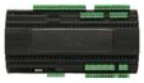
8.1.1. COPY CARD MENU

SERVICE> Copy Card
The Copy Card Menu is accessible from the Service Menu[2].
Access to the Service Menu requires a Password.



1 the keyboard has a bilingual, updatable glossary (English - local language)
2 The Service Menu is described in detail in '18. APPENDIX' page 160





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

SERVI 02/03
Copy Card
IO Test
IO State

COPY 01/02
Download
Upload Map
Upload Glossaries

COPY 02/02
Upload Alarm History
Format CopyCard

The Copy Card Menu has 5 items; access to each folder is as described above:
- **Download**: permits 'download' of varied information on EWCM EO
- **Upload**: permits 'upload' of varied information to USB Copy Card

There are 4 file types available to be uploaded/downloaded via USB Copy Card
File names are defined by 4 parameters:

PARAMETERS > FILES SETUP

		parameter	file name (depending on model)	extension
PARAMETERS > FILES SETUP	parameter map	461 - dAtF	8900-01 9100-01 9900-01	.DAT
PARAMETERS > FILES SETUP	glossary	462 - dgLoF		.GLO
PARAMETERS > FILES SETUP	alarms history	460 - HISF		.HIS
PARAMETERS > FILES SETUP	recordings	459 -rECF		.REC

File names must contain maximum 8 uppercase CHARACTERS
If the name of the file or parameter contains just spaces, EWCM EO assigns an 8 UPPERCASE character name automatically as per table:

FILES SETUP NAMES ASSIGNED AUTOMATICALLY

parameter	file name default (depending on model)	file name assigned by user space = ☐	file name assigned by EWCM
461 - dAtF	8900-01 9100-01 9900-01	☐☐☐☐☐☐☐☐	PARAM.DAT
462 - dgLoF		☐☐☐☐☐☐☐☐	GLOSSARY.GLO
460 - HISF		☐☐☐☐☐☐☐☐	HISTORY.HIS
459 -rECF		☐☐☐☐☐☐☐☐	RECORD.REC

8.1.1.1 Format CopyCard

Enables 'formatting' that is cancelling all USB CopyCard contents.
We advise performing this operation every time before an Upload[3].

FORMAT 01/01
Operation:
< Operation state >
Format

To format the USB key, press Format. 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 appears:

3 if you do not format the USB Copy Card in Download files with name and extension errors could appear





Error Messages
• Err [No CopyCard] -> the USB CopyCard is not present

8.1.1.2 Upload

The following 3 file types are available to upload on the USB Copy Card from Copy Card Menu[4]

UPLOAD MAP 01/01
Operation state:
< Operation state >
Upload

UPLOAD GLOSS. 01/01
Operation state:
< Operation state >
Upload

UPLOAD HISTORY 01/01
Operation state:
< Operation state >
Upload

To upload the file select **Upload** and press OK.

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 appears:

Error Messages
• Err [No CopyCard] - > the USB CopyCard is not present*
• Err [Write File]

8.1.1.3 Upload Recordings

The Recordings Menu allows uploading of operating log records to the instrument.

The Recordings Menu is accessible via the Service Menu (see). Access to the Service Menu requires a Password.
The Service Menu folder 01/03 is indicated above; move to the Recordings folder with UP and DOWN and enter the desired folder with OK. Move onto the Upload folder On Copy Card with the UP and DOWN keys and enter with OK

SERVICE 01/03
Recordings
Utilities state
Reset Alarm History

RECORDINGS 01/01
Upload to Copy Card
Recordings

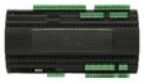
UPLOAD REGIST. 01/01
Upload Status:
<Upload Status>
Upload

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 appears:

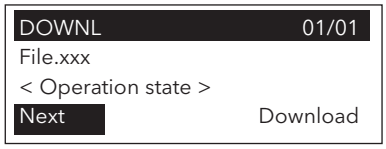
Error Messages
• Err [No Copy Card] - > the USB Copy Card is not present*
• Err [Write File]
• Err [No File]

4 The Recordings file is kept in the Recordings Menu. Also see Service Menu described in detail in '13. APPENDIX 131' on page 40





8.1.1.4 Download



The Download allows you to 'download' varied file types - selecting Next and using the DX (right) key you scroll through the various files to be downloaded[5]

- FILE.DAT → parameters map or predefined programme[6]
- FILE.X8M → applications and menu descriptors

Once selected, to download the desired file use the UP and DOWN keys to move onto <Download> and press OK. At this stage, download starts:

<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 appears:
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 Incompat.]	Err [File Incompat.]
	Err [Write Data]	Err [Write Data]

N.B
- File names **.DAT** must contain maximum 8 uppercase CHARACTERS
- When the application and parameters map downloads is completed, the device reboots automatically.
- When the glossary download is completed
  - remove the USB Copy Card
  - remove EWCM EO keyboard cable
  - keep pressed F3 key on EWCM EO keyboard while connecting keyboard cable again.

Glossaries (available on base board) will be uploaded now also on EWCM EO keyboard automatically:
Following messages will appear:

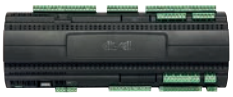
```
Upload Glossary Req
Upload Glossary Run
Upload Glossary...
```

Operation will take a while. Please keep waiting until glossaries have been uploaded

- Navigation is not possible while the glossaries are downloading.
- files with **.DAT** extension are compatible with the **.DAT** format of Device Manager.
- If the USB CopyCard is already connected when the device boots, you can still download the application + menu descriptors (**.X8M**) from the USB Copy Card.

This must be a single file, present in the USB Copy Card main directory.
If the USB Copy Card contains two **.X8M** files (or no **.X8M** file) when the device boots, no download will be executed in the USB Copy Card.
For map files **.DAT** import can be done at boot time even in case of normal startup, under the same rules described above.

5 names given are by default - see description to modify them **PARAMETERS > FILES SETUP**
6 for predefined programmes supplied by Eliwell see **APPENDIX APPLICATION BOOK**





EXPORTING OPERATING LOGS TO THE USB COPY CARD

Exporting operating logs to the USB Copy Card can be done from the keyboard via the 'Service' Menu.

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.

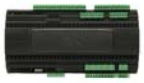
NOTE: Data is stored daily and/or weekly at a preset time (time 23:00)

Example of export

```
REC-REPORT
DD/MM/YY-HH:MM
MB_USERID1
MB_USERID2
-----------------------------------------------------
                            DD/MM/YY-HH:MM          DD/MM/YY-HH:MM
Desc    UM     Avg    Min   dd/mm/yy hh:mm Max     dd/mm/yy hh:mm
HP      [Bar]  xxx.x  xxx.x  DD/MM/YY HH:MM xxx.x   DD/MM/YY HH
HP      [C]    xxx.x  xxx.x  DD/MM/YY HH:MM xxx.x   DD/MM/YY HH
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
TINT    [C]    xxx.x  xxx.x  DD/MM/YY HH:MM xxx.x   DD/MM/YY HH
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
```

Key
The field DD/MM7YY-HH:MM reported in the header indicates file upload date

MB_USERID1 and MB_USERID2 are 2 20 character strings set by the user through relative parameters
PARAMETERS > FILES SETUP > 452 - USId1
PARAMETERS > FILES SETUP > 453 - USId2
- HP indicates the refrigerant discharge pressure
- HT indicates the refrigerant discharge temperature
- LP1/2 indicates the circuit 1/2 refrigerant suction pressure
- LT1/2 indicates the circuit 1/2 refrigerant suction temperature
- HP indicates the power of the fans as a percentage
- TEXT indicates the external ambient temperature
- TINT indicates the internal ambient temperature
- LTSET1/2 indicates the circuit 1/2 suction temperature [°C]
- HTSET indicates the discharge circuit temperature [°C]
- LPSET1/2 indicates the circuit 1/2 suction pressure [bar]
- HPSET indicates the discharge circuit pressure [bar]

• LP1/2 indicates the power of the circuit 1/2 compressors as a percentage
• *HPR indicates possible discharge pressure switch activation
• *LPR1/2 indicates possible circuit 1/2 discharge pressure switch activation
• *HPE indicates possible fan INVERTER error
• *LPE1/2 indicates possible circuit 1/2 compressor INVERTER error
• *AL indicates possible machine shut-down alarm
Note:
Temperature values are in tenths of °C
Discharge pressure values are in tenths of a bar
Suction pressure values are in hundredths of a bar

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.
* The sum of the number of activations is reported (e.g. discharge pressure switch)
Note:
• in weekly recordings the two fields 'DD/MM/YY-HH:MM'
represent the dates for the start and end of a week.
• daily recordings have only one date.
• To import the **.REC** text into Excel, we advise using the 'delimited' option with fields separated by 'Space'.
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 HISTORY
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

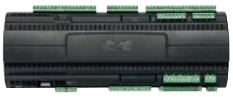
If the log contains no alarms the format will be as follows:

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

Key
DD/MM/YY HH:MM is the upload date
USER ID 1 and USER ID 2 are two 20 character strings set by the user in parameters

PARAMETERS > FILES SETUP > 452 - USId1
PARAMETERS > FILES SETUP > 453 - USId2

Note that alarms notified during upload to USB Copy Card export are ignored.





8.2. SERIAL PORTS

8.2.1. PROTOCOL SELECTION

ADDRESSING > 673-PtStLV
ADDRESSING > 676 - PtSEXP

Protocol selection **RS485**

RS485	RS485 EXP		Notes
673-PtStLV = 2	676 - PtSEXP = 2	Micronet (Televis)	
673-PtStLV = 3	676 - PtSEXP = 3	Modbus RTU	

8.2.2. TELEVIS NETWORK

ADDRESSING > 671-FAA Family address.
Permits family selection within the TelevisSystem network.
For example: 00 01 00=**671-FAA**; **672-dEA**

ADDRESSING > 672-dEA Device address.
Permits address selection within the TelevisSystem network.must be pre-set being careful that each pair is univocal (they do not have to be adjacent).
Addresses **671-FAA**; **672-dEA** are valid for the Televis

N.B.: we suggest assigning the same value as **671-FAA** to all devices in a sub-network to identify them more easily.

8.2.3. MODBUS NETWORK

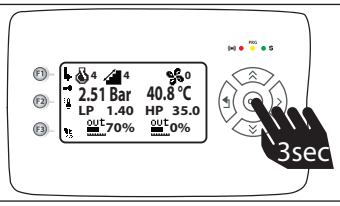
RS485	RS485 EXP		
674-bdrttLV	676 - PtSEXP		Notes
674-bdrttLV = 0	676 - PtSEXP = 0	9600 baud	
674-bdrttLV = 1	676 - PtSEXP= 1	19200 baud	
674-bdrttLV = 2	676 - PtSEXP = 2	38400 baud	
675-PtytLV = 0	678 - PtyEXP = 0	NONE	679 - datEXP RS485 EXP data bit. 0=7 data bit; 1=8 data bit;
675-PtytLV = 1	678 - PtyEXP = 1	ODD	
675-PtytLV = 2	678 - PtyEXP = 2	EVEN	





9.1. FUNCTIONS

This chapter describes the various function available with EWCM EO
Functions can be enabled in several modes (key, dedicated digital input[1], etc.)
There is also a dedicated **FUNCTION MENU** where you enable/disable the function chosen manually on display[2].
All functions can be enabled from **FUNCTION MENU**



MENU 01/02
Diagnostics
Service
Clock and bands

MENU 02/02
Functions
Parameters

FUNCT 01/04	
Mute	No
Suc. Eco	No
Cond. Eco.	No

FUNCT 02/04	
Aux1	No
Aux2	No
Aux3	No

FUNCT 03/04	
Glyc.Defr.	No
En.Saving	No
Recovery	No

FUNCT 01/04	
CtRitLq	No
SbGasCa	No
Stand-by	No

9.1.1. 'ENERGY SAVING' FUNCTION

The Energy Saving function manages all Economy functions in Suction (circuit 1 and 2) and Discharge.

Enabling
As the following table shows and based on parameter settings

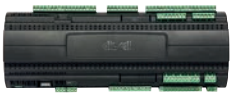
FUNCTIONS > 556-ESFn

Energy saving type.
✓ economy function enabled;
black background: no variation

	Economy Discharge	Suction Economy circuit 1	Suction Economy circuit 2
0	disabled	disabled	disabled
1		✓	
2			✓
3		✓	✓
4	✓		
5	✓	✓	
6	✓		✓
7	✓	✓	✓

1 If the request originates from a digital input, the Energy Saving function will be enabled/disabled by changing digital input status (active with contact open).

2 Enabled in '**toggle**' mode:
indicates that the function is enabled if disabled and vice versa by using the same sequence of keys.
Keystroke, Functions menu and remote requests enable/disable toggle the function.




The activation request may come from:
FUNCTION MENU
TIME BANDS
DIGITAL INPUT > configure a digital input ±09
KEY
SUPERVISION

N.B. If the heat recovery function is enabled and enabling the Energy Saving function results in a change in the state of the discharge Economy function, the recovery function is disabled.

Disabling occurs as per the exclusion table for disabling via time bands (°)
Energy Saving will be disabled also in the case in which the state is modified (for instance by key) of a function indicated in the table with 'economy function enabled' (✓).
Example: If Economy is disabled in discharge and **556-ESFn = 5** the Energy Saving function will be disabled in Circuit 1 Suction (besides Economy in discharge, naturally). Circuit 2 suction Economy will undergo no change.
N.B. The Energy saving LED will go out.

(°) 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 come in from keystrokes, the function menu or remote controls, these are considered by the system.
• If disabled by time bands, the discharge and suction economy functions are determined by the time band settings
Eg. if at 6.30 p.m. I access band 2 where the Energy Saving function is disabled, the discharge and suction Economy modes are determined by the respective settings in the band.

9.1.2. ECONOMY FUNCTION • SUCTION SET POINT

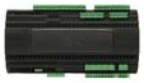
The Economy function manages the control of the regulation SetPoint
The function allows control to be obtained on the suction regulation SetPoint depending on the ambient temperature (for instance the temperature of the display area of the supermarket)

The activation request may come from:
FUNCTION MENU
TIME BANDS
DIGITAL INPUT > configure a digital input ±06 (CIRCUIT 1) / ±07 (CIRCUIT 2)
KEY
SUPERVISION
ENERGY SAVING FUNCTION

Parameters

Folder	[1]	[2]	Description
COMPRESSORS Regulation/Alarms	107-dSS	207-dSS	Dynamic Suction Set Mode
COMPRESSORS Regulation Limits	146-dSPo1	246-dSPo1	Offset 1 for dynamic set Value to be summed to the Setpoint when the economy function in suction is activatedby time bands just for weekdays and for all other modes (digital / key / menu / remote / energy saving)
COMPRESSORS Regulation Limits	147-dSPo2	247-dSPo2	Offset 2 for dynamic set Value to be summed to Setpoint when economy functionin suction is activated by time bands just for holidays.
COMPRESSORS Regulation Limits	155 - AtdS	255 - AtdS	Ambient temperature dynamic set
COMPRESSORS Regulation Limits	156 - dAtdS	256 - dAtdS	AtdS differential





The Set can be fixed or variable (function of a differential) defined by:

COMPRESSORS > Regulation/Alarms > 107 - dSS = 0
→ suction SetPoint will be **dynamic** or function of a differential.

COMPRESSORS > Regulation/Alarms > 107 - dSS = 1
→ suction SetPoint **fixed**

Case **COMPRESSORS > Regulation/Alarms > 107 - dSS = 0→ Dynamic Suction SetPoint**

Enabling
107 - dSS = 0
• 145 - AtdS Set dynamic Amb Tp
• 146 - dAtdS AtdS differential
If 146-dAtdS=0 the correction is equal to 136-dSPo1 (137 - dSPo2) for ambient temperature values < SET, for higher values there is no correction.

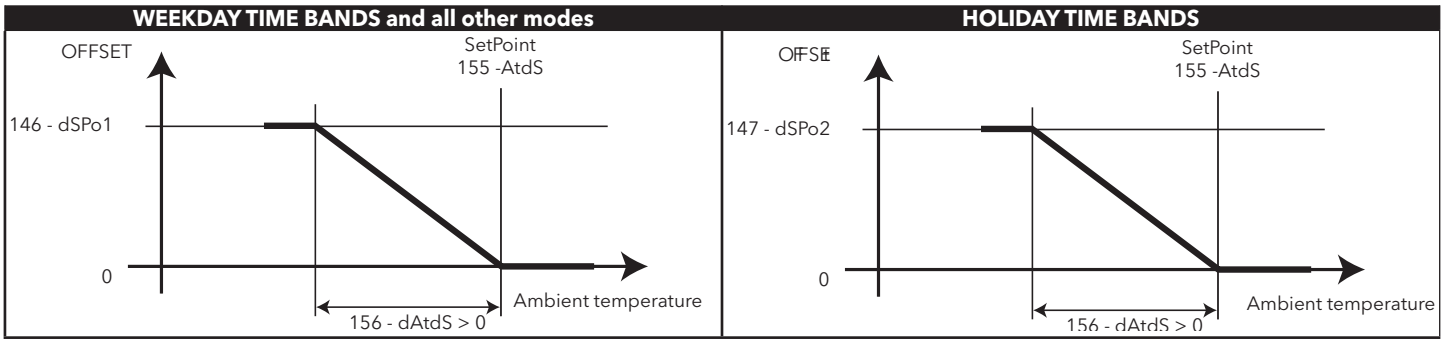
If the internal ambient temperature probe is in error or not configured, the function is not enabled and the correction is always =0

Case **COMPRESSORS > Regulation/Alarms > 107 - dSS = 1→ Fixed Suction 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 Set dyn (24h /Mon-Fri / Mon-Sat) **WEEKDAYS**
  • 137 - dSPo2 Offset 2 for Set dyn (Sat-Sun/ Sun) **HOLIDAYS**
  according to the settings of the Time Band Mode
• In all other cases the correction (fixed offset) will be summed to the:
  136 - dSPo1.

• If the request originates from the Energy Saving function, economy will be enabled/disabled by changing the status of the Energy Saving function. It will be enabled if the Energy saving function requires it, and disabled otherwise.

(°) 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 come in from keystrokes, the function menu or remote controls, these are considered by the system







9.1.3. ECONOMY FUNCTION • DISCHARGE SET POINT

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

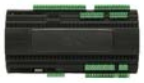
The activation request may come from:
FUNCTION MENU
TIME BANDS
DIGITAL INPUT > configure a digital input ±08
KEY
SUPERVISION
ENERGY SAVING FUNCTION

Parameters

Folder	Parameter	Description
FANS Regulation/Alarms	**314-dSd**	Discharge economy function mode
FANS Regulation Limits	**349-dSFo**	This parameter has two meanings depending on **314-dSd:** • If 314-dSd=1 (fixed set) → Fixed offset for economy discharge function (value to be subtracted from discharge set point) • If 314-dSd=0 (dynamic set) → Upper limit of dynamic set economy discharge (floating condensation) based on the sum **343-SEt + 349-dSFo**
FANS Regulation Limits	**356-dSdo**	Dynamic offset dynamic set economy discharge*
FANS Regulation Limits	**357-dSLdo**	Minimum economy discharge dynamic set offset (floating condensation)*
FANS Regulation Limits	**358-dSMEt**	Maximum external temp. to enable discharge economy dynamic set (floating condensation)*
FANS Regulation Limits	**359-LdSP**	Minimum economy discharge dynamic set (floating condensation)*
FANS Regulation Limits	**360-SCt1**	Minimum Sub-cooling (floating condensation dynamic set)*
FANS Regulation Limits	**361-SCt2**	Maximum Sub-cooling (floating condensation dynamic set)*
FANS Regulation Limits	**362-SCd1**	Sub-cooling* Delta 1
FANS Regulation Limits	**363-SCoF1**	Sub-cooling* Offset 1
FANS Regulation Limits	**364-SCd2**	Sub-cooling* Delta 2
FANS Regulation Limits	**365-SCoF2**	Sub-cooling* Offset 2
FANS Regulation Limits	**366-EtPr**	Disables dynamic setpoint if temperature measured by the sub-temperature probe is greater than the ext. ambient probe temperature + 366-EtPr. Note. If 366-EtPr = 0 function not enabled

The Set can be fixed or variable (function of a differential) defined by:

FANS > Regulation/Alarms > 314 - dSd = 0
→ discharge SetPoint will be **dynamic** (floating condensation) or function of a differential.
FANS > Regulation/Alarms > 314 - dSd = 1
→ discharge SetPoint **fixed**

Case **FANS > Regulation/Alarms > 314 - dSd = 0→ Dynamic Discharge Set mode**

Operating conditions
External temperature is less than parameter **FANS > Regulation Limits > 358-dSMEt**

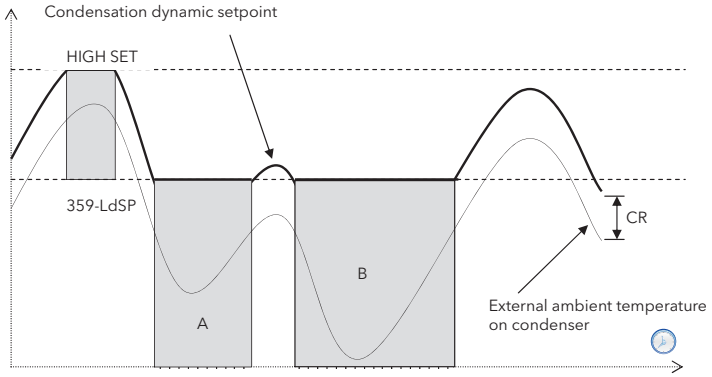
The condensation Setpoint is derived by summing the external temperature to the 'CR' factor, where:
356-dSdo →Value to be summed to external temperature in proportion to plant power.

CR=356-dSdo * power % delivered by the system/100

Notes
• The CR factor is limited below by the parameter **357-dSLdo** (minimum offset)

FLOATING DISCHARGE CONDENSATION

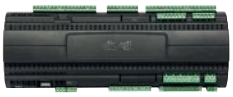
'CR' FACTOR



Sub-cooling
Sub-cooling is used to prevent liquid return to the condenser and prevent gas sub-cooling.
Operating conditions
Presence of sub-cooling probe

Sub-cooling UCtemp (see diagram) is calculated using the sub-temperature probe value, positioned upstream of the liquid receiver, and that of the discharge probe:

temperature regulation **UCtemp = discharge gas temperature - sub-cooling probe**
pressure regulation **UCtemp = value converted in temperature (Discharge gas pressure) - sub-cooling probe**

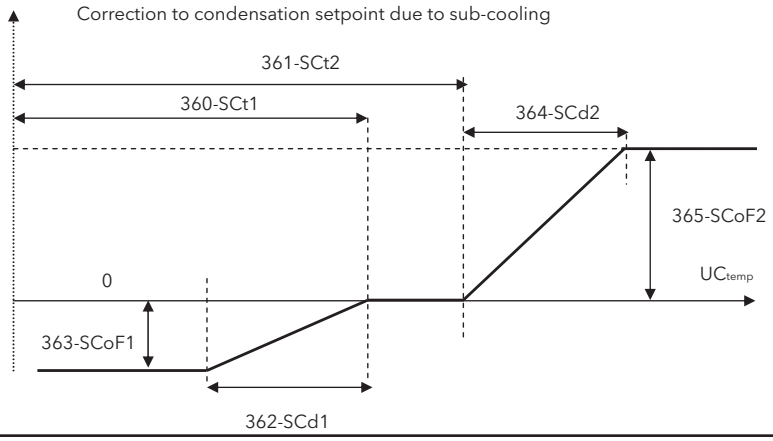




In accordance with the second diagram, a further correction is applied to the fluctuating setpoint (summed to the current setpoint).

FLOATING DISCHARGE CONDENSATION

SUB-COOLING



Note:
- **360-SCt1** minimum sub-cooling (floating condensation dynamic set).
- **361-SCt1** maximum sub-cooling (floating condensation dynamic set)

- If **360-SCt1<UCtemp<361-SCt2** → no correction
- For external values →

correction **proportional** → with divergences< **362-SCd1 or 364-SCd2.**
correction **fixed** → with divergences greater and equal to **363-SCoF1 or 365-SCoF2**

After running the sub-cooling function following limitations will be applied (see chart on previous page):
- The **effective** value of the floating setpoint will be limited below by **359-LdSP** (areas A and B - see chart on previous page)
- The **effective** value of the floating setpoint is limited above so that it cannot take on higher values than the HIGH SET value (Area C - see chart on previous page):

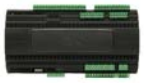
Upper limit of dynamic set economy discharge
HIGH SET = 343-SEt + 349-dSFo

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 temperature measured by the sub-cooling probe is higher than the external temperature probe on the condenser + **366-EtPr (366-EtPr≠0**);

In these cases the set point set by paremeter is used

Case **FANS > Regulation/Alarms > 314 - dSd = 1→ Fixed Discharge Set mode**
The following with be subtracted from set point value **349 - dSFo** that is Fixed offset for discharge economy function

- If the request originates from the Energy Saving function, economy will be enabled/disabled by changing the status of the Energy Saving function. It will be enabled if the Energy saving function requires it, and disabled otherwise.

9.1.4. LIQUID RETURN

Liquid return control is needed to check the quantity of refrigerant present in the system.
The liquid return function enables in duty cycle the solenoid valves in the relative refrigeration counters belonging to the same circuit

Operating conditions
Safety Measures > 565-odo→ time set expired
QUICKSTART→Enable= No

Activate
Activation with delay in relation to turning off the compressors defined by
circuit 1 FUNCTIONS > 559-LrCd
circuit 2 FUNCTIONS > 562-LrCd

Parameters

Folder	①	②	Description
FUNCTIONS	**559-LrCd**		Circuit 1 control liquid return activation delay
FUNCTIONS	**560-Lron**		Circuit 1 control liquid return ON time duty cycle
FUNCTIONS	**561-LroF**		Circuit 1 control liquid return OFF time duty cycle
FUNCTIONS		**562-LrCd2**	Circuit 2 control liquid return activation delay
FUNCTIONS		**563-Lron2**	Circuit 2 control liquid return ON time duty cycle
FUNCTIONS		**564-LroF2**	Circuit 2 control liquid return OFF time duty cycle

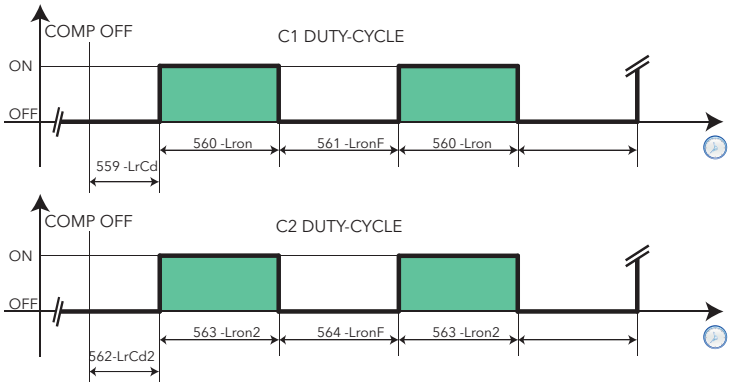
The liquid return relay control is determined by 584 - H201 Relay OUT1, ..., 596 - H213 Relay OUT13 if at least one of these = 6

DUTY CYCLE circuit 1
ON FUNCTIONS > 560-Lron
OFF FUNCTIONS > 561-LroF

DUTY CYCLE circuit 2
ON FUNCTIONS > 562-Lron2
OFF FUNCTIONS > 564-LroF2

Function not active
If at least one of the compressors of the circuit where the function is on switches on, control will be deactivated.

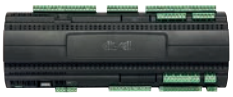
LIQUID RETURN



output always ACTIVE > circuit 1 >560-Lron non 0 & 561-LroF = 0
output always ACTIVE > circuit 2 > 562-Lron2 non 0 & 564-LroF2 = 0

output always NOT ACTIVE > circuit 1 > 560-Lron =0 & 561-LroF non 0
output always NOT ACTIVE > circuit 2 > 562-Lron2 =0 & 564-LroF2 non 0
output always NOT ACTIVE > circuit 1 > 560-Lron =0 & 561-LroF = 0
output always NOT ACTIVE > circuit 2 > 562-Lron2 =0 & 564-LroF2 = 0

①			②		
560-Lron	**561-LroF**	**OUTPUT**	**562-Lron2**	**564-LroF2**	**OUTPUT**
non-zero	**0**	ACTIVE	**non-zero**	**0**	ACTIVE
0	**non-zero**	NOT ACTIVE	**0**	**non-zero**	NOT ACTIVE
0	**0**	NOT ACTIVE	**0**	**0**	NOT ACTIVE




9.1.5. HEAT RECOVERY

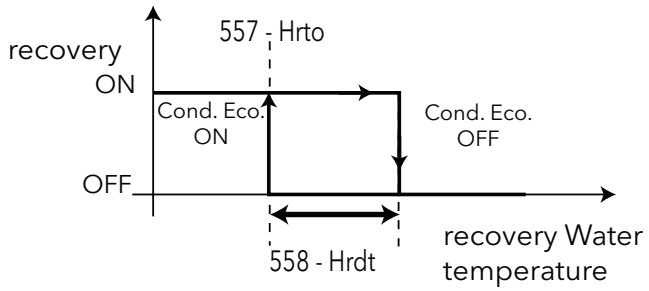
Heat recovery control is determined by parameters
627 - H405... 630 - H408 if at least one of these = 7 (recovery water temperature).

Operating conditions
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-Hrto+558-Hrdt**

Parameters

Folder		Description
FUNCTIONS	**557-Hrto**	Max heat recovery outlet water temperature
FUNCTIONS	**558-Hrdt**	Delta heat recovery outlet water temperature

HEAT RECOVERY ONLY FROM TIME BANDS



Function not active
- with a recovery probe failure.
- disabled when the discharge economy function status is modified.

9.1.6. AUXILIARY OUTPUT

Controls directly up to 3 digital auxiliary outputs.
The (AUX) activation request may come from:
FUNCTION MENU
TIME BANDS
DIGITAL INPUT > configure a digital input ±94
KEY
FUNCTIONS MENU
SUPERVISION

Keystroke, Functions menu and remote requests toggle[3] (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.

Operating conditions
At device switch on

3 Enabled in '**toggle**' mode:
indicates that the function is enabled if disabled and vice versa by using the same sequence of keys.
Keystroke, Functions menu and remote requests enable/disable toggle the function.




9.1.7. HOT GAS DEFROST

Operating conditions
Safety Measures > 565-odo→ time set expired

Parameters
The parameters that control this regulator are:

Folder	①	②	Description
SAFETY MEASURES	**565-odo**		Regulation delay from power-on.
COMPRESSORS Regulation/Alarms	**109-PoPr**	**209-PoPr**	Power default for suction probe error or minimum power required in subcritical C02 systems in cascade

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 production 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 NON HOMOGENEOUS 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.

9.1.8. GLYCOL SYSTEMS

Operating conditions
SAFETY MEASURES > 565-odo→ time set expired
QUICKSTART→Enable= No

Activate
Activation with delay in relation to turning off the compressors defined by
FUNCTION MENU
TIME BANDS
DIGITAL INPUT > configure a digital input ±94

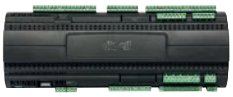
Parameters
The parameters that control this regulator are:

Folder	Parameter	Description
SAFETY MEASURES	**565-odo**	
FUNCTIONS	**750-toUtgLy**	Glycol system defrost time out

During defrosts, the power requested of compressors will be forced at 0%.
All other regulators will suffer no limits.
When defrost is over, regulation goes back to normal.

Start defrost events, with defrosting on cycle, are cancelled

Defrosting ends for time-out **SAFETY MEASURES > 750-toUtgLy** minumum value 1 minute.



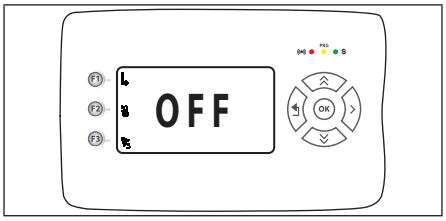

9.1.9. STAND BY

Stand by foresees that all regulators are switched off and alarms de-activated

Operating conditions
At device switch on

Activate
Activation with delay in relation to turning off the compressors defined by
FUNCTION MENU
DIGITAL INPUT > configure a digital input ±97
SUPERVISION

On stand by the display displays **OFF**



9.1.10. ALARM MUTE

Stand by foresees that all regulators are switched off and alarms de-activated

Operating conditions
At device switch on

Activate

FUNCTION MENU
KEY > F3 (default)
SUPERVISION

Alarms can be muted in the Main Display by pressing key F3 once (press and release) (see Keys and Components section)[4]. The alarm LED flashes.
The relay configured as an alarm relay will be deactivated.

Mute duration
parameter **SAFETY MEASURES > 568-Aro.**
If **SAFETY MEASURES > 568-Aro=0** mute is not enabled.

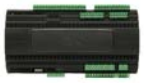
9.1.11. FORCING THE SUCTION AND DISCHARGE SETPOINT FROM DI

1. A suitably configured digital input can be used to force the discharge setpoint to the value **FANS > Regulation Limits >342-HSE**. Forcing takes priority over all the functions that change the setpoint, and remains active as long as the digital input is active. If the function is active, the Economy LED blinks.
2. A suitably configured digital input can be used to force the suction setpoint to the value **COMPRESSORS > Regulation Limits >141-LSE for circuit 1 and 241-LSE for circuit 2**. Forcing takes priority over all the functions that change the setpoint, and remains active as long as the digital input is active. If the function is active, the Economy LED blinks.

Operating conditions
At device switch on

Activate
DIGITAL INPUT > configure a digital input ±98 (suction); ±99 (discharge)
ANALOGUE INPUT configured as DIGITAL > configure PB3 ±101 (suction); ±102 (discharge)
ANALOGUE INPUT configured as DIGITAL > configure PB5...8 ±108 (suction); ±109 (discharge)

4 operation in this case is not toggle. Mute cannot be 'de-activated' from the functions menu.

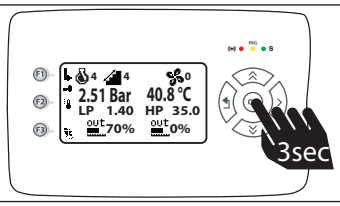
9.2. TIME BANDS

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

Operating Condition

CONFIGURATION > 640 - rtCE = 'YES' (RTC present)
On the contrary the correct display and the change of the date/time will not be guaranteed.

Date and Time Menu

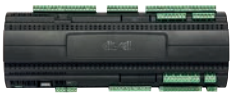
<table>
<tr>
<td>
</td>
<td>➔</td>
<td>MENU 01/02
Diagnostics
Service
Clock and bands</td>
<td>MENU 02/02
Functions
Parameters</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DATE/ 01/01
Date and Time
Time Bands</td>
<td></td>
</tr>
<tr>
<td>Change Date
N.B.: The year is displayed as a two digit integer (2012 is displayed as 12, 2013 as 13)</td>
<td></td>
<td>DATE/ 01/01
09/07/12 09:04
Change Date
Change Time</td>
<td>CHANG 01/01
DD 9
MM July
YY 12</td>
</tr>
<tr>
<td>Change Time</td>
<td></td>
<td>DATE/ 01/01
09/07/12 09:04
Change Date
Change Time</td>
<td>CHANG 01/01
HH 9 hours
MM 6 min</td>
</tr>
</table>

Time is in the format HH:0...23: MM:0...59.
Resolution is to the minute.
Leap years > are considered. For example: February 2012 will have 29 days.
CHANGE TIME > solar to legal and vice versa **NOT managed**

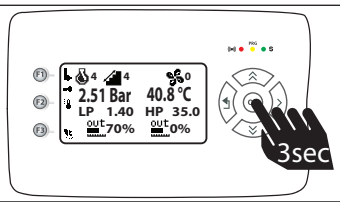
Parameters
The parameters concerned are:

Folder		Parameter	Description
COMPRESSORS Regulation Limits	**146-dSPo1**	**246-dSPo1**	Offset 1 for dynamic set Value to be summed to the Setpoint when the economy function in suction is activated by time bands just for weekdays and for all other modes (digital / key / menu / remote / energy saving)
COMPRESSORS Regulation Limits	**147-dSPo2**	**247-dSPo2**	Offset 2 for dynamic set Value to be summed to Setpoint when economy functionin suction is activated by time bands just for holidays.
CONFIGURATION	**640-rtCE**	**640-rtCE**	Enable RTC. Yes (1) = RTC enabled; No (0)= RTC disabled. If 640-rtCE = No the Time Band Menu is NOT important
SAFETY MEASURES	**583-rtCAE**	**583-rtCAE**	RTC alarm

Time Bands Menu
each week can be divided into 6 periods in which controls can be set, such as dynamic suction Setpoint, energy saving, and so on.
Calendar > WEEKLY: the week can also be divided into two periods (weekdays and holidays) with dedicated settings.





	→	MENU 01/02 Diagnostics Service **Clock and bands**	MENU 02/02 Functions Parameters
		DATE/ 01/01 Date and Time **Time Bands**	
Time Bands		TIME 01/01 Enable No Mode weekly Settings	MODE 001/001 Time Band mode weekly

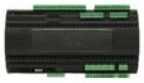
Enabling
Enter the Clock Menu and Bands and choose Time Bands
Enable appears. Enter in Edit Mode with OK or DX (right): change the value from No to Yes with UP. Confirm with OK; to exit press SX (left).

TIME BAND MODE
Menu for selecting the method of using Time Bands
To enter and modify Mode, do as is described above.
The values are:
= 0 (weekly). The weekly mode (**24 H**) indicates that every day will have the same settings
= 1 (Monday→ Friday and Saturday->Sunday) mode 1 indicates that Monday to Friday will have one setting and the weekend another
= 2 (Monday→ Saturday and Sunday) Mode 2 requires Sunday to have a different setting to the rest of the week.

You can check the mode set from the Settings menu
Settings
Menu for changing the parameters of each single band. To access and change the Time bands mode (Time Bands) proceed likewise as described above. The display is determined by what is set in the Mode Menu.
In the example, the Time bands mode is set to 1.
For each group of days it is possible to set 6 independent and separately enabled time bands.
For each band it is possible to enable or disable a function.

BANDS > 6 BANDS MAX - 4H EACH
FUNCTIONS > 9 FUNCTIONS available

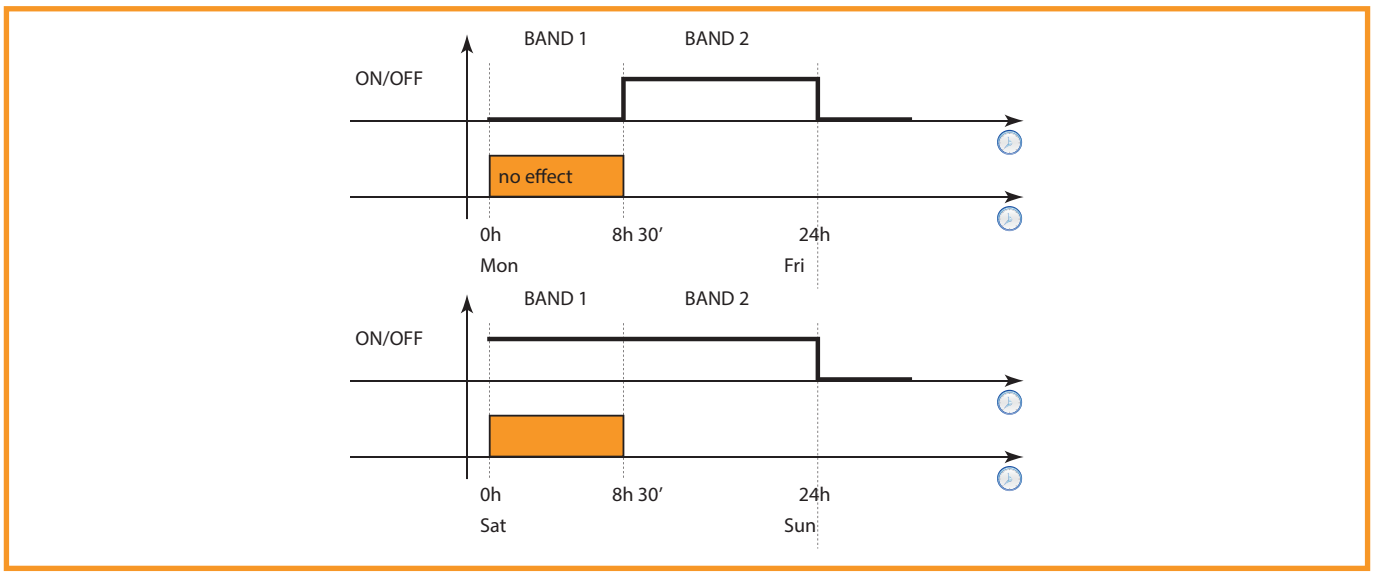
Time	BAND 1	BAND 2	BAND 3	BAND 4	BAND 5	BAND 6
hours	0 hours	4 hours	8 hours	12 hours	16 hours	18 hours
minutes	0 min	0 min	0 min	0 min	0 min	0 min
FUNCTIONS	**BAND 1**	**BAND 2**	**BAND 3**	**BAND 4**	**BAND 5**	**BAND 6**
Suc. Dynamic Set 1	✓	✓	✓	✓	✓	✓
Suc. Dynamic Set 2	✓	✓	✓	✓	✓	✓
Discharge Dynamic Set	✓	✓	✓	✓	✓	✓
Auxiliary 1	✓	✓	✓	✓	✓	✓
Auxiliary 2	✓	✓	✓	✓	✓	✓
Auxiliary 3	✓	✓	✓	✓	✓	✓
Glycol defrosts	✓	✓	✓	✓	✓	✓
Energy Saving	✓	✓	✓	✓	✓	✓
Heat Recovery	✓	✓	✓	✓	✓	✓

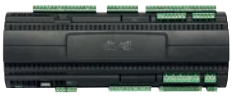



Clock not active
If the clock is not active (parameter 640 - rtCE =No) the date and time indicated will not be accurate.
Whenever the machine is switched off and on again, the time will display as 00/00/00 00:00.
Re-setting the parameter 640 - rtCE=Yes will return to the correct display.
The clock has 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.

Example
Mode = 1 (Monday→Friday and Saturday→Sunday)

We have selected mode 1 that is the division of the week into Monday->Friday and Saturday->Sunday
In the Settings menu, we access Mon-Fri
Days Mon-Fri
• If you consider the first band NOT active that is '**Band 1 →No**'.
  - the start time is nonetheless determined by 'Band 1 hours' and 'Band 1 minutes' (default 0:00 i.e. midnight)
• If you consider the second band active that is '**Band 2 →Yes**'.
• With 'Band 2 hours' we set the starting time in hours of time band 2 (e.g 8 hours)
• 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
• If you consider the first band active that is '**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.
Note:
• Time band duration goes 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 weekdays 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 condensation setpoint offsets will be ignored







10.1. COMPRESSORS

Parameters regulating compressors are visible in the folder and sub-folders
PARAMETERS > COMPRESSOR

10.2. TYPE SYSTEM SUCTION

With assisted configuration, in the Quick Start Menu, the suction section type must have been set through parameters
QUICK START > 522- CtyP for circuit 1
QUICK START > 524- CtyP2 for circuit 2

The three regulations can be selected from parameter **COMPRESSORS > Regulation/Alarms > 101-CCFn**

	Quick Start parameter 522- CtyP 524- CtyP2	Suction System Type	Regulation parameter 101-CCFn
0	HOMOGENEOUS	HOMOGENEOUS DIGITAL COMPRESSORS	PID DEAD BAND PROPORTIONAL BAND
1	NON HOMOGENEOUS	NON-HOMOGENEOUS DIGITAL COMPRESSORS	DEAD BAND
2	HOMOGENEOUS + INVERTER	DIGITAL COMPRESSORS + INVERTER or just INVERTER (no. digital compressors circuit 1 or circuit 2 = 0)	PID DEAD BAND
3	HOM+INV+ BACKUP	DIGITAL COMPRESSORS + INVERTER with backup relay	

10.3. ACTIVATE

- Regulation is activated after the time **SAFETY MEASURES > 565 - odo**
- the **QUICK START** parameters must be set **> 522-CtyP • 524- CtyP2**
- temperature probe or pressure sensor[1] must be configured to regulate suction (LP suction control probe)

RESOURCE ALLOCATION > Analogue Inputs > 623-H401 ÷ 630-H408 → 1 circuit 1
RESOURCE ALLOCATION > Analogue Inputs > 623-H401 ÷ 630-H408 → 2 circuit 2

10.4. TYPE OF CONTROL

Compressor control is a function of the Suction control probe.

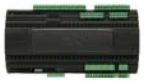
DISPLAY > 547-UMCP

547-UMCP	TEMPERATURE	547-UMCP	PRESSURE
547-UMCP = 0	°C	547-UMCP = 1	bar
547-UMCP = 2	°F	547-UMCP = 3	PSI

Please note that, if using temperature control and the Suction control probe is a pressure transducer, suction control is a function of the value converted into temperature, based on gas selected, of the Suction control probe.
Behaviour is the same if the Suction control probe is a temperature probe and the control selected from **547-UMCP** is under pressure.

Parameter **547-UMCP** can be modified during normal system operations.
The default suction control is pressure (bar)
N.B.: The unit of measurement shown on the display may differ from that of the control unit.

1 pressure: PB1 PB2 PB3; temperature PB5 ÷ PB8

10.5. REGULATION

COMPRESSORS > Regulation/Alarms

Three regulation modes can be selected from

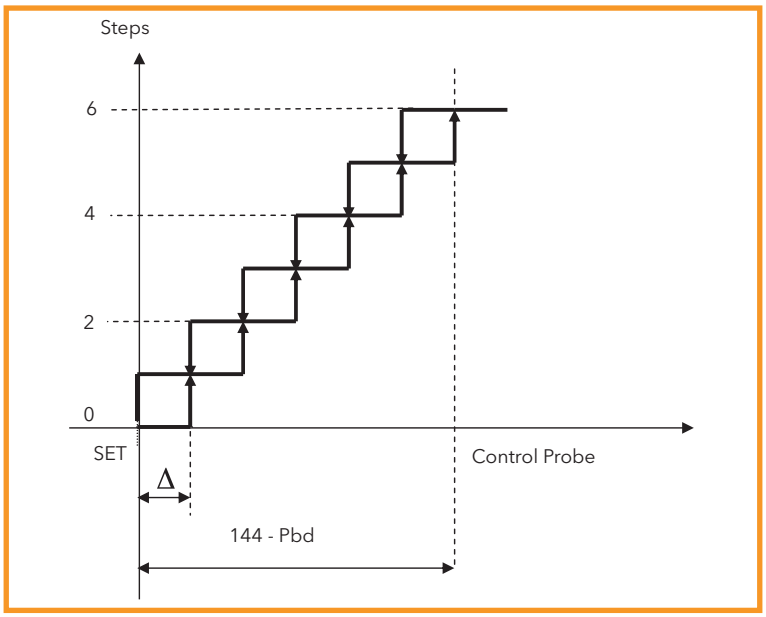
101-CCFn	Compressors control type	Notes
101-CCFn = 0	Proportional band control (BP)	**COMPRESSORS Regulation/Alarms 551-Stty** controls lateral and central set setpoint of regulation band
101-CCFn = 1	Dead band control (ZN)	
101-CCFn = 2	PID regulation	

10.5.1. PROPORTIONAL BAND CONTROL

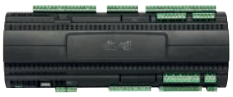
Plant
HOMOGENEOUS DIGITAL COMPRESSORS

Enabling
COMPRESSORS > Regulation/Alarms > 101 - CCFn=0
The power request from the suction regulator is proportional to the difference between the setpoint and the Suction control probe.

Proportional band: Homogeneous digital compressors
The regulator activates a number of power steps to reach the Set Point given in parameter **143-SEt**. The number of resources needed is linked to the difference between the value measured by the Suction control probe and the Set Point. Naturally, the greater the difference, the more resources needed to reach the Set Point.
The temperature or pressure interval between power steps is a function of the proportional band **144-Pbd** and the number of resources present.



e.g. lateral SEt (551 -Stty = 0)
e.g. 3 compressors x 2 steps each
SET POINT → COMPRESSORS > Regulation Limits > 143 - SEt
BAND → COMPRESSORS > Regulation Limits > 144 - Sbd
sum of compressor steps → QUICK START > ∑ 502-PC1 + 503-PC2 + 504-PC3 + 505-PC4
Δ → 144 - Pbd / ∑ 502-PC1 + 503-PC2 + 504-PC3 + 505-PC4





10.5.2. DEAD ZONE CONTROL

Plant
HOMOGENEOUS DIGITAL COMPRESSORS or NON-HOMOGENEOUS DIGITAL COMPRESSORS

Enabling
COMPRESSORS > Regulation/Alarms > 101 - CCFn=1
The suction regulator power request is proportional to the time the Suction control probe (LP) stays outside the proportional band.
The proportional band is symmetrical to the setpoint value.

There are two proportional bands, one real and one 'extended'.
The extended band generally has greater values than the first one, indicates the region outside which power increase/ decrease can be faster.

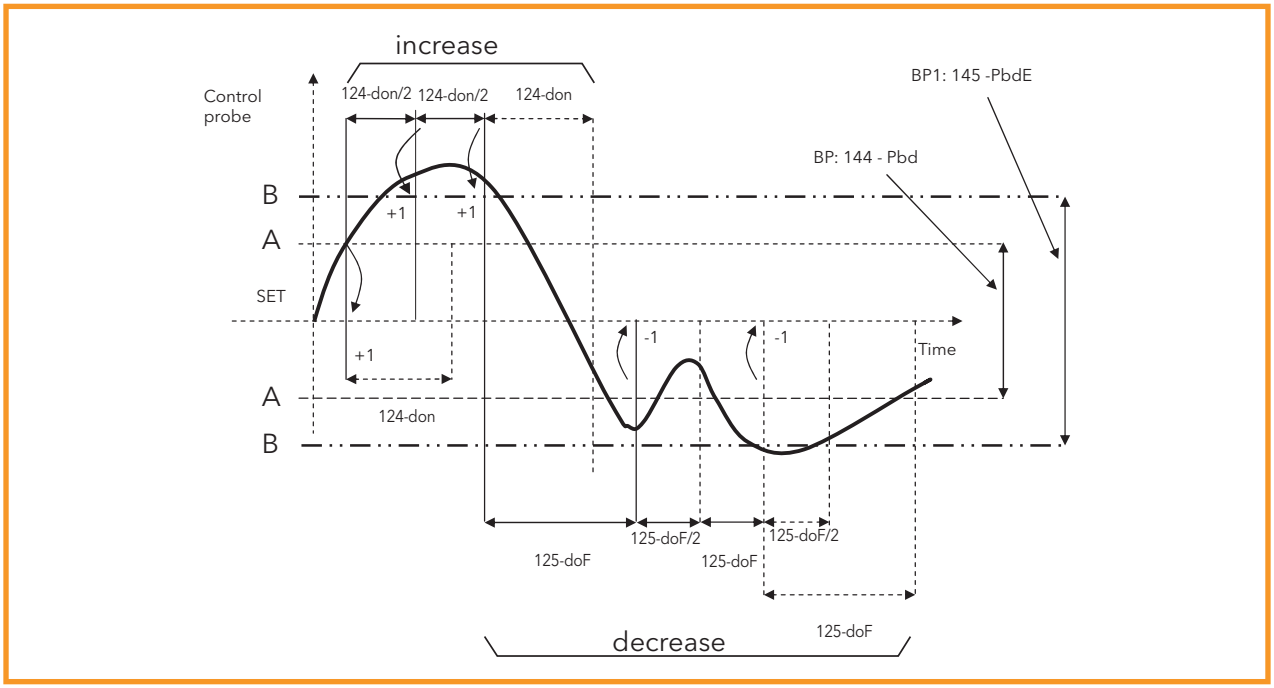
Parameters

	①	②		Notes
COMPRESSORS Regulation Limits	**144 - Pbd**	**244 - Pbd**	Proportional band	
COMPRESSORS Regulation Limits	**145 - PbdE**	**245 - PbdE**	Extended proportional band	

The parameters that control times are:

Folder	①	②	Description
COMPRESSORS Safety times	**124-don**	**224-don**	ON steps time
	125-doF	**225-doF**	OFF steps time
COMPRESSORS Safety times	**126-FdLy**	**226-FdLy**	Enable dOn 1' step up (start up). Enables operation of the delay of parameter 124 - don / 224 - don also upon the request to enter steps for the first time after a condition of equilibrium. 0 = no; 1 = yes.
	126-FdLy	**227-FdLF**	Enable dOF 1' step down. Enables operation of the delay for the parameter 125 - doF/225 - doF also upon the request to deactivate the steps for the first time after a condition of equilibrium. 0= No, 1=Yes.

Dead band: Homogeneous digital compressors



limit A → SET+BP/2
limit B → SET+BP1/2



If the value read by the LP control probe exceeds **limit A** but is below **limit B** and if step ON time **124-don** has expired a step is actuated straight away[2] and step time is recounted.
If the value read by the LP control probe stays in this band, a further power step is actuated every **124-don** seconds.
If the value read by the LP control probe exceeds the **limit A** value and if step ON time has already expired, a step is actuated straight away[3] and time recounted **124-don/2**.
As long as the value read by the LP control probe stays above this last limit power steps will be increased every **124-don/2.**

The same applies for switch off, with times settable from parameter **125-doF**.

Power variations are not requested inside the proportional band.

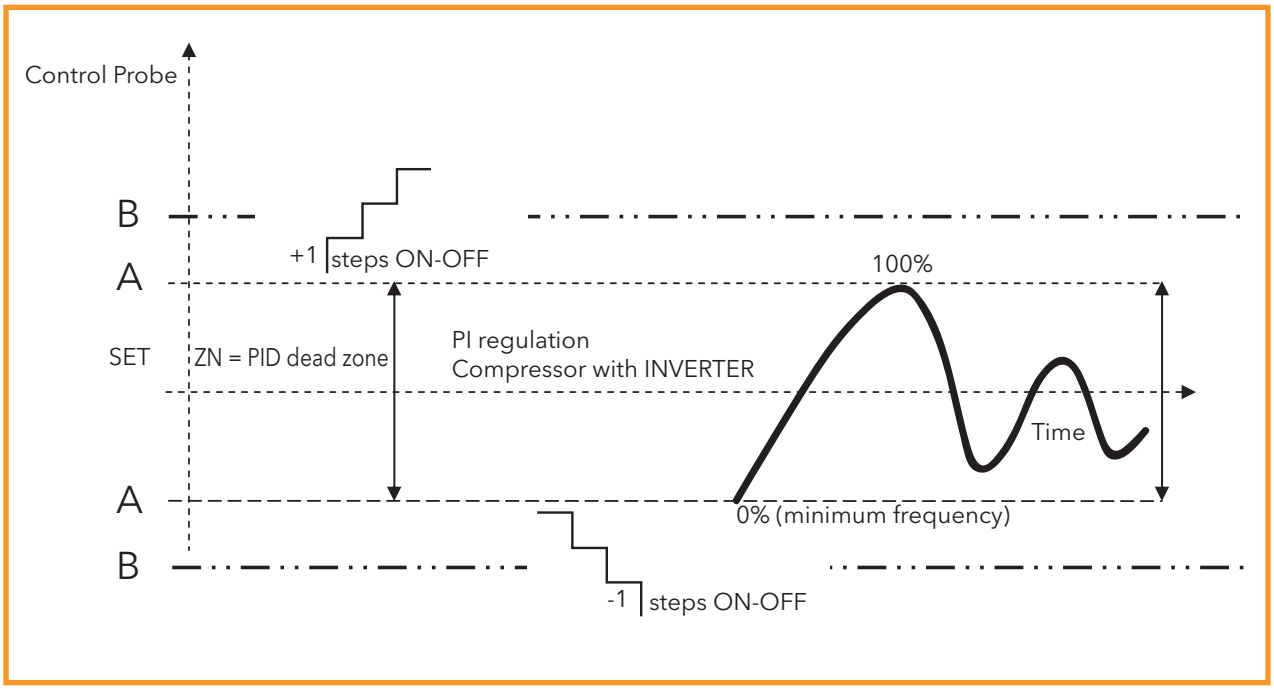
All interstep times are re-synchronized when a new step is activated/de-activated.
The step to be entered/deactivated based on parameter **552-PoLI.**

Dead band: Non-homogeneous digital compressors

Same as **Homogeneous digital compressors**
The increase **+1** indicates the request for power increase, while **–1** indicates the request for a power decrease.

The power increase/decrease that can be implemented is illustrated in paragraph '10.7. RESOURCE SELECTION POLICIES' page 77

Dead band: Homogeneous + INVERTER digital compressors (mixed system)



Note. The setpoint is always central, regardless of the parameter COMPRESSORS> Regulation/Alarms > 551-Stty which controls the lateral and central setpoint in relation to the regulation band

2 see parameters for times, in particular 126-FdLy and 127-FdLF
3 see parameters for times, in particular 126-FdLy and 127-FdLF



10.5.3. PID CONTROL

Plant
HOMOGENEOUS or HOMOGENEOUS + INVERTER DIGITAL COMPRESSORS

Enabling
COMPRESSORS > Regulation/Alarms > 101 - CCFn=2

The power requested by the suction regulator is a function of the difference between the LP control probe - Setpoint and is equal to the sum of three terms:

P proportional to the error: considers the difference between value read by the LP control probe and the Set Point, entering an action that is directly proportional to it; the proportional component action decreases as the error approaches zero;
I proportional to the error integral: integrates the error detected over time, reducing the final difference from the Set Point; this function tracks previous control values, providing a corrective action able to add or remove power gradually to get closer to the Set Point value.
D proportional to the error derivative: considers the speed with which the control value varies in the process; this provides a faster response in system control, inasmuch as the correction is greater the greater the rate of change of the error;

You can set the following with parameters:

	Folder		Parameter	Description
Enabling	**COMPRESSORS Regulation/Alarms**	**102 - ItEn**	**202 - ItEn**	enabling integral control =1
	COMPRESSORS Regulation/Alarms	**104 - PbEn**	**204 - PbEn**	enabling proportional control =1
	COMPRESSORS Regulation/Alarms	**105 - dtEn**	**205 - dtEn**	enabling derivative control =1
Values	**COMPRESSORS Regulation/Alarms**	**106 - It**	**206 - It**	integrative time constant value **Ti**
	COMPRESSORS Regulation Limits	**144 - Pbd**	**244 - Pbd**	proportional band value **Bp**
	COMPRESSORS Regulation/Alarms	**106 - dt**	**206 - dt**	derivative time constant value **Td**

PID: Homogeneous digital compressors
The control signal results in the activation of a number of resources (power steps) proportional to the signal itself. After the last power step has been activated and for values above the proportional band, please refer to the diagram of the previous example with the following warning: modulation in the step has no hysteresis.




PID: Homogeneous + INVERTER digital compressors (mixed system)
The number of power steps implemented is proportional to the signal while the power the INVERTER is controlled at aries in a linear way between two discrete power increases/decreases of step compressors.

With an INVERTER Error with **522 - CtyP / 523 - CTyP2 = 3** the continuous control compressor will be controlled as in **PID: Homogeneous digital compressors**

Example 2 HOMOGENEOUS DIGITAL COMPRESSORS + COMPRESSOR INVERTER
Rated power at mains frequency > the same as compressors ON-OFF

		INVERTER POWER	
Minimum frequency	25Hz	minimum	50%
Switch-on frequency	40Hz	start	80%
Maximum frequency	85Hz	maximum	170%
Rated power	Rated power (Ptarga)		
Line frequency	50Hz		

COMPRESSOR INVERTER POWER (referred to rated power) with mains frequency 50Hz:
Pinv_min = (**114-InLFr / 50Hz**) * **117-InRP** (Ptarga) = 50% Ptarga;
Pinv_start = (**116-InSFr/ 50Hz**) * **117-InRP** (Ptarga) = 80% Ptarga;
Pinv_max = (**115-InMFr/ 50Hz**) * **117-InRP** (Ptarga) = 170% Ptarga;

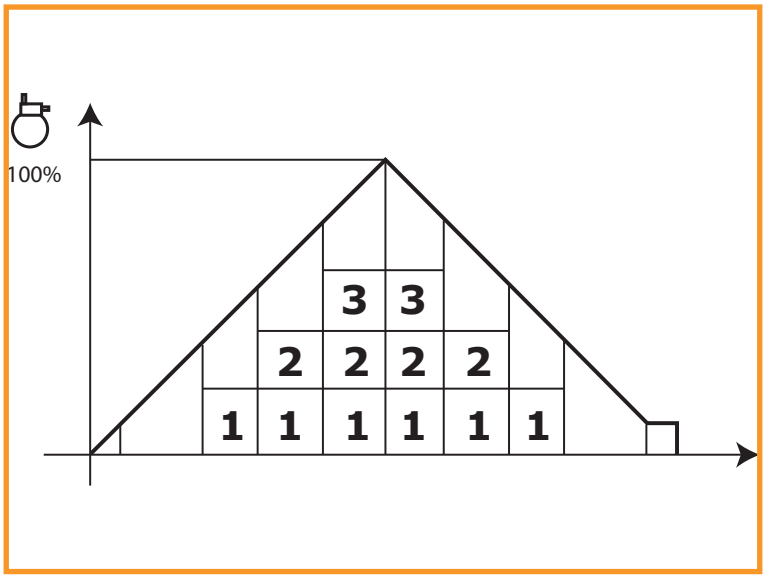
TOTAL PLANT POWER =
COMPRESSOR ON/OFF RATED POWER + MAXIMUM INVERTER POWER = 3.7 * RATED POWER

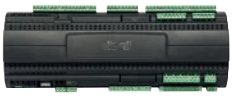
Normalised 'weights' of single compressors will be:
Compressor ON-OFF power: Ptarga / Ptot → PERon_off = 27%;
Inverter power:
- PERinv_min = Pinv_min / Ptot = 13.5%;
- PERinv_start = Pinv_start / Ptot = 21.6%;
- PERinv_max = Pinv_max / Ptot = 46%

To sum up, the example shows us the following situations

Compressors on			POWER
		Inverter	13.5÷46% (21.6 ÷ 46% con inverter OFF)
	Compressor 1	Inverter	40.5 ÷ 73%
Compressor 2	Compressor 1	Inverter	67.5 ÷ 100%

As the table shows, the three situations overlap, so there will be continuous control, and the greater the overlapped area the lower the number of compressor start-ups ON-OFF.



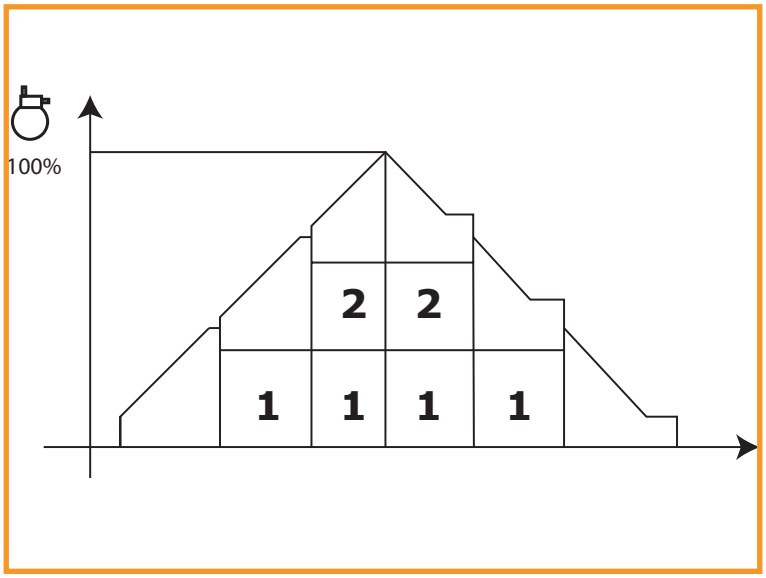



FREQUENCY > 25...87Hz POWER > 50..174% (100%)
Let's consider cases where the working areas do not overlap, like in the following example:

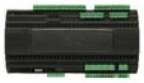
To sum up, the example shows us the following situation

Compressors on			POWER
		Inverter	13.5÷40% (21.6 ÷ 40% con inverter OFF)
	Compressor 1	Inverter	43 ÷ 73%
Compressor 2	Compressor 1	Inverter	73.5 ÷ 100%

The regulator algorithm will only activate the compressors if the power requested complies with one of the work areas; otherwise the previous situation will be maintained.







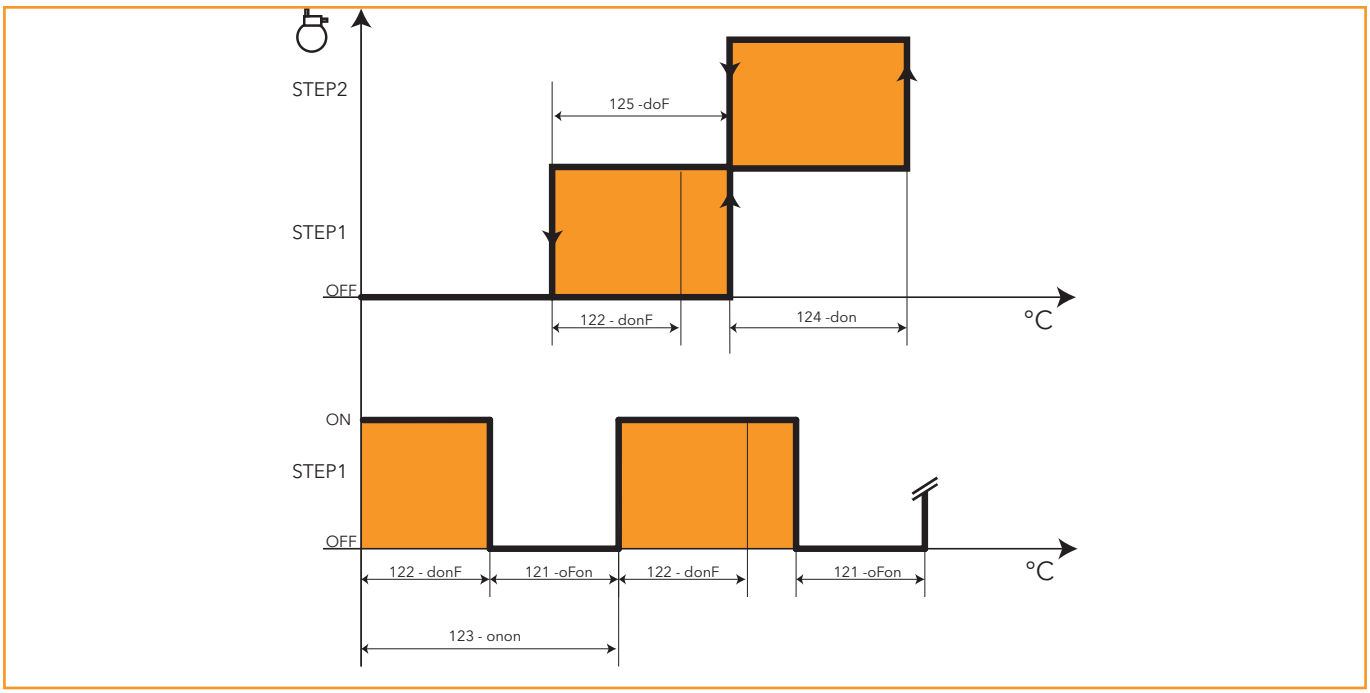
10.6. COMPRESSOR SAFETY TIMES

10.6.1. SAFETY TIMES DIGITAL COMPRESSORS

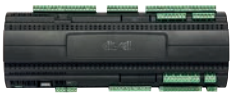
Parameters
The parameters that control times are:

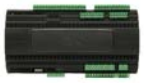
Folder	[1]	[2]	Description
COMPRESSORS Safety times	**121-oFon**	**221-oFon**	Compressor OFF - ON time
	122-donF	**222-donF**	Compressor ON - OFF time
	123-onon	**223-onon**	Compressor ON - ON time
	124-don	**224-don**	ON steps time
	125-doF	**225-doF**	OFF steps time
COMPRESSORS Safety times	**126-FdLy**	**226-FdLy**	Enable dOn 1' step up (start up). Enables operation of the delay of parameter 124 - don / 224 - don also upon the request to enter steps for the first time after a condition of equilibrium. 0 = no; 1 = yes.
	126-FdLy	**227-FdLF**	Enable dOF 1' step down. Enables operation of the delay for the parameter 125 - doF/225 - doF also upon the request to deactivate the steps for the first time after a condition of equilibrium. 0= No, 1=Yes.

Switch on-off



Enter and deactivate steps
Entering and deactivating power steps must respect the activation and release times between resources **124-don and 125-doF** and is also a function, besides of compressor type (homogeneous or non-homogeneous), of parameters **126-FdLy and 127-FdLF.**





Enter and deactivate steps

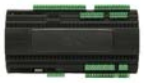
Enter HOMOGENEOUS steps
126-FdLy=0
it is enough to comply with the increment interstep time **124-don** which is started when each resource is entered;
126-FdLy=1
- If the increment interstep time count was already under way due to a previous step being activated, then this delay must expire before another 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 regulator;

Enter NON HOMOGENEOUS steps
126-FdLy=0
it is enough to comply with the increment interstep time **124-don** which is started when each resource is entered;
126-FdLy=1
the increment interstep time is reloaded when a resource is called by the regulator only if the activation would result in exiting the dead zone;

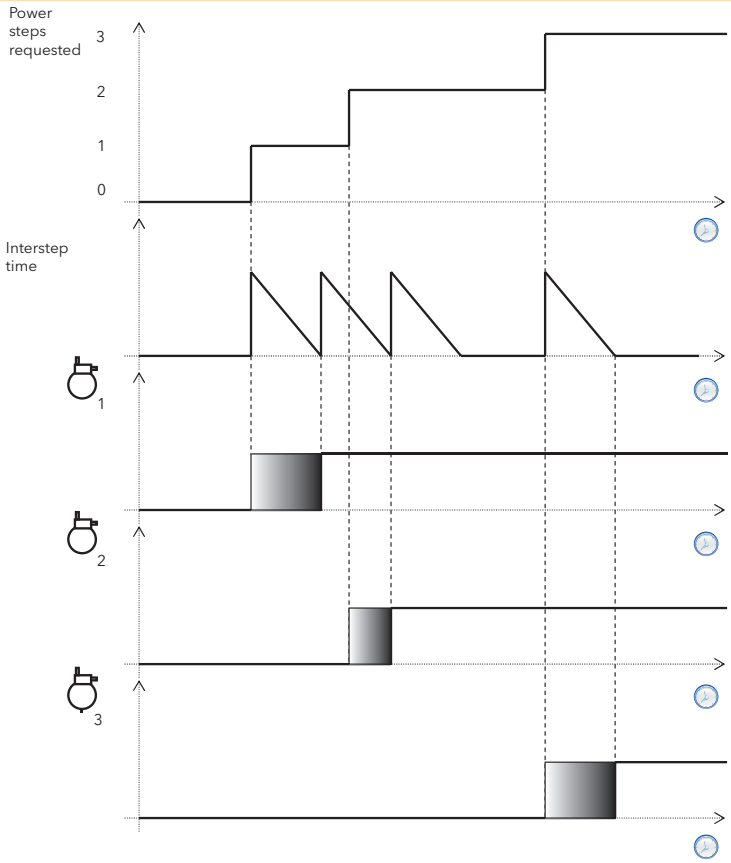
Deactivate HOMOGENEOUS steps
127-FdLF=0
it is enough to comply with the decrement interstep time **125-doF** which is started when each resource is deactivated;
127-FdLF=1
- If the decrement interstep time count was already under way due to a previous step being deactivated, then this delay must expire before another resource can be deactivated;
- If the decrement interstep time has already expired, then it is reloaded when the regulator calls for another resource to be deactivated;

Deactivate NON HOMOGENEOUS steps
126-FdLy=0
it is enough to comply with the decrement interstep time **125-doF** started when each resource is deactivated
126-FdLy=1 the decrement interstep time is reloaded when the regulator calls for another resource to be deactivated, only if this would result in exiting the dead zone.

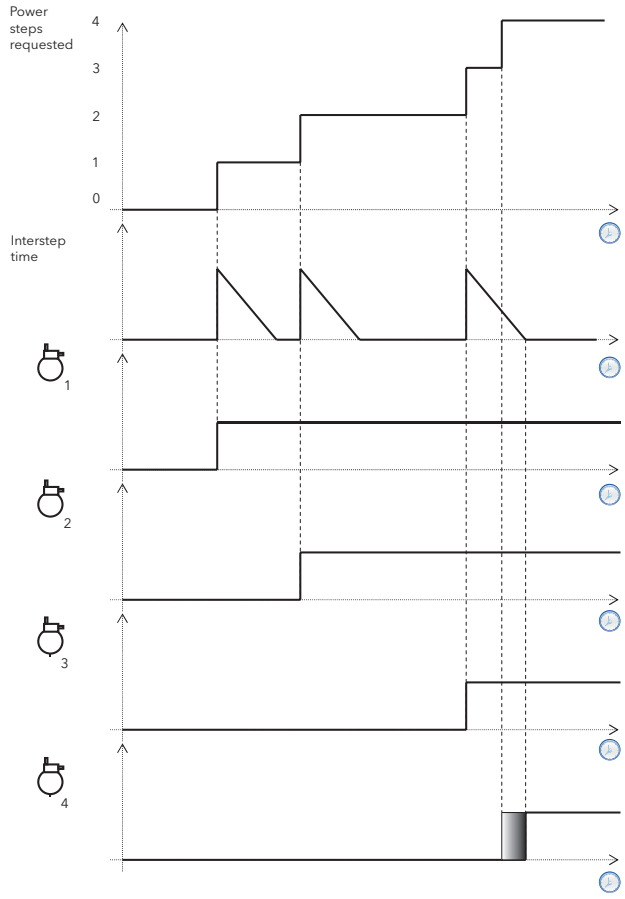


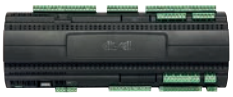


Example of steps entered with three homogeneous compressors with 126-FdLy =1



Example of steps entered with four homogeneous compressors with 126-FdLy =0






10.6.1.1 STAGES OF HOMOGENEOUS STEP COMPRESSORS

Quick Start parameters
Configuration of a circuit with staged compressors is through Quick Start parameters

STEPS o POWER COMPRESSORS	**502-PC1**	Compressor 1 power or number of compressor 1 steps
	503-PC2	Compressor 2 power or number of compressor 2 steps
	504-PC3	Compressor 3 power or number of compressor 3 steps
	505-PC4	Compressor 4 power or number of compressor 4 steps
	506-PC5	Compressor 5 power or number of compressor 5 steps
	507-PC6	Compressor 6 power or number of compressor 6 steps
	508-PC7	Compressor 7 power or number of compressor 7 steps
	509-PC8	Compressor 8 power or number of compressor 8 steps
	510-PC9	Compressor 9 power or number of compressor 9 steps
	511-PC10	Compressor 10 power or number of compressor 10 steps
	512-PC11	Compressor 11 power or number of compressor 11 steps
	513-PC12	Compressor 12 power or number of compressor 12 steps

Step = Stages + 1
1 step → no stages (whole compressor)
2 steps → 1 stage
5 steps → 4 stages
502-PC1 ÷513-PC12 = 1→ whole compressors and can supply 0% or 100% of their power.

502-PC1 ÷513-PC12 = 4 → (4 steps): 3 stages established
The compressors can supply 0%, 25%, 50%, 75% or 100% of their power.

Up to 5 stages relays can be handled

Parameters **502- PC1 • 513 - PC12 Compressor power or number of compressor steps** establish:
for HOMOGENEOUS compressors: number of compressor steps
for NON HOMOGENEOUS compressors value proportional to power

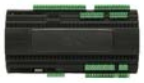
Parameters
Parameters controlling the stages sequence are:

Folder	[1]	[2]	Description
COMPRESSORS Regulation/Alarms	**118-PtSE**	**218-PtSE**	Compressor steps sequence. This parameter depends on the compressor model being used. Depending on the mode set in the compressor to manage the power stages, the following options are available : **0=** Activation of power stage (solenoid valve)→ Power decrease **1=**Simple power stage → each power stage will enable a specific power **2=** Activation of power stage (solenoid valve) → Power increase

E.g. **4 steps → 3 stages**

Power	118-PtSE =0				118-PtSE =1				118-PtSE =2			
	Step				Step				Step			
	Compressor ON	Stage			Compressor ON	Stage			Compressor ON	Stage		
		1	2	3		1	2	3		1	2	3
100%	**ON**				**ON**				**ON**	**ON**	**ON**	**ON**
75%	**ON**			**ON**	**ON**			**ON**	**ON**	**ON**	**ON**	
50%	**ON**		**ON**	**ON**	**ON**		**ON**		**ON**	**ON**		
25%	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**			**ON**			
0%												

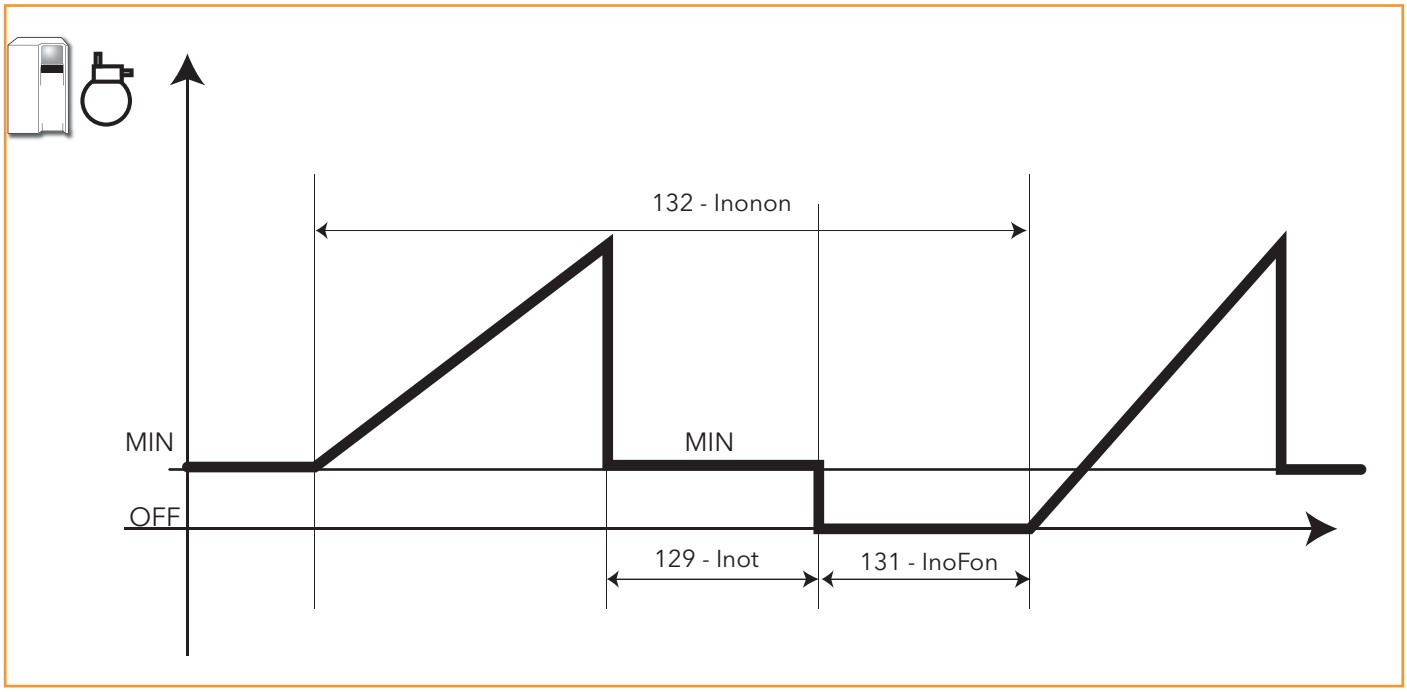




COMPRESSOR INVERTER > Safety time and operating modes

Parameters controlling times and operating modes are:

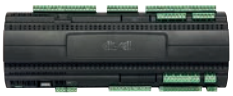
Folder	1	2	Description
COMPRESSORS Regulation/Alarms	**110 - InMode**	**210 - InMode**	Inverter mode. **0=** inverter sequence 'First In Last Out', **1=** standard
COMPRESSORS Inverter	**129-Inot**	**229-Inot**	Max time INVERTER at minimum power
	130-InLt	**230-InLt**	Interval between inverter minimum and new power step activation
	131-InoFon	**231-InoFon**	Inverter OFF - ON time
	132-Inonon	**232-Inonon**	Inverter ON - ON time
	133-InSwt	**233-InSwt**	Minimum inverter switch on time
COMPRESSORS Regulation limits	**154-InLPt**	**254-InLPt**	Threshold for INVERTER operation at minimum power



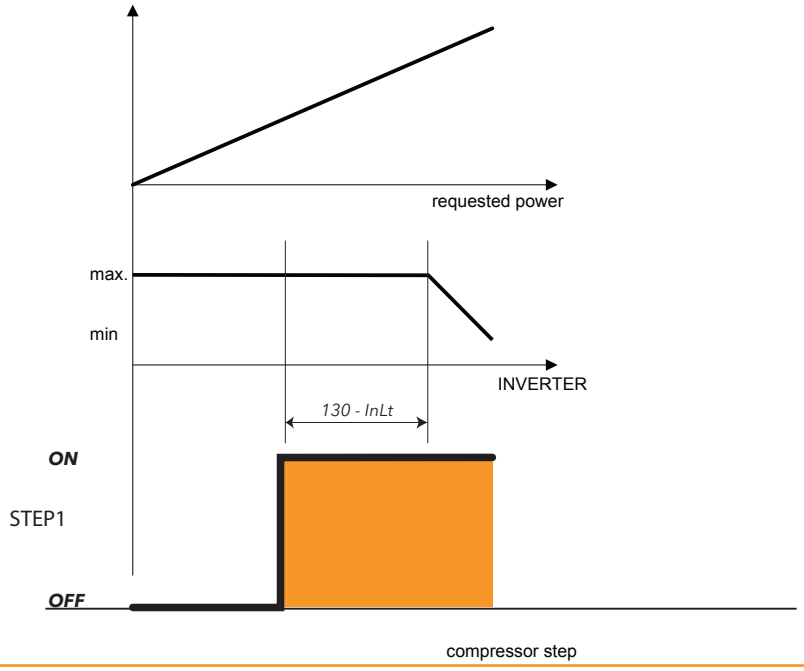
COMPRESSOR INVERTER MODE > 110-InMode: inverter sequence
110-InMode = 0 the inverter compressor is always the first to switch on and the last to switch off (sequence 'First In Last Out') compared to digital compressors in the circuit, unless there is an alarm.

110-InMode = 1 switch on and switch off of digital compressors and the inverter only take place based on their availability (safety times and alarms).

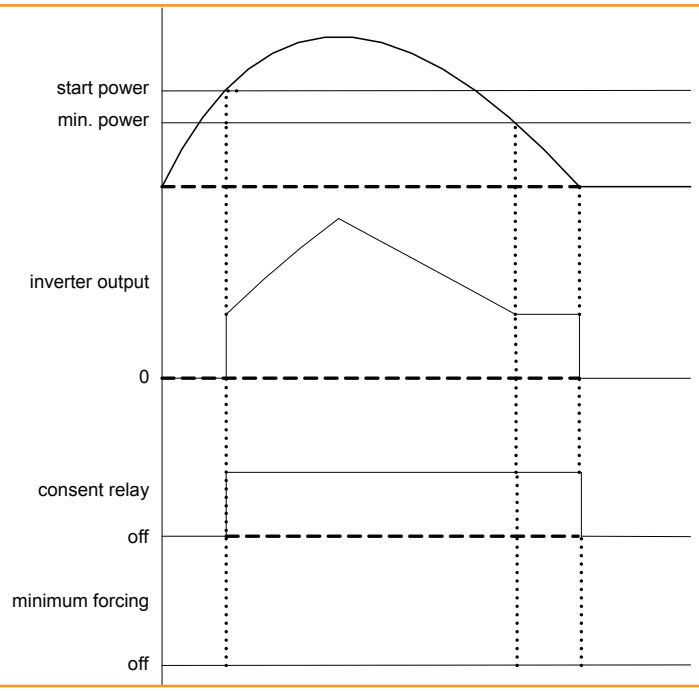
COMPRESSOR INVERTER > 130-InLt: only with increasing power.
When the gear changes, first the digital step is activated and then INVERTER power is reduced.
At switch off there are no delays between step deactivation and control of INVERTER

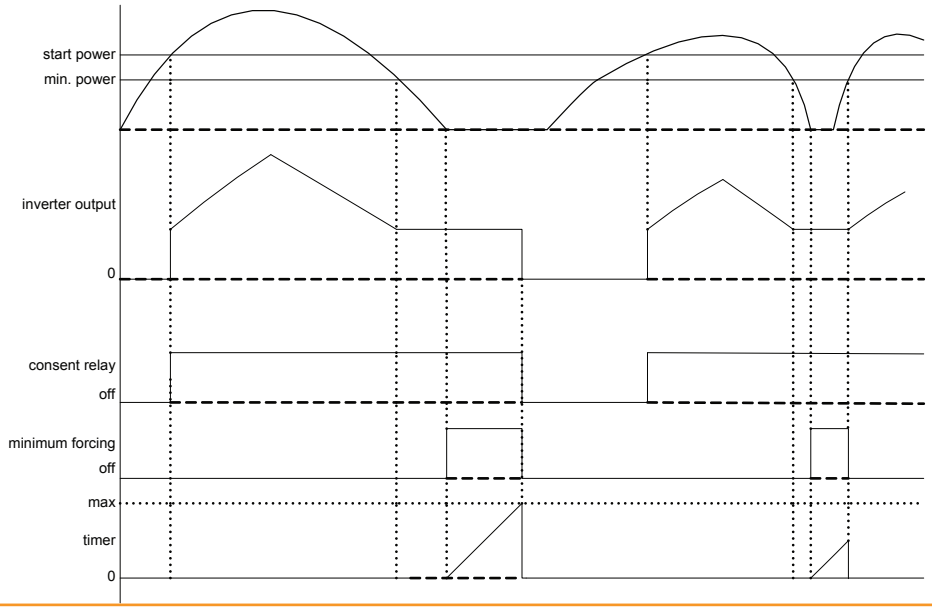




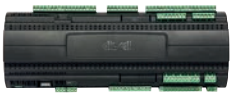


COMPRESSOR INVERTER > 129-Inot = 0





During minimum forcing if temperature or pressure drops below the limit **154-InLPt** inverter output, relay consent, timer and minimum forcing will be forced to zero.




10.7. RESOURCE SELECTION POLICIES

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

Compressor activation policy
Selection policies come into play when the regulator requests step activation/deactivation. This request is distributed to the most 'suitable' compressor based on policy selected.
The selection policies are mainly based on compressor hours of operation. Using the parameter

COMPRESSORS > Regulation/Alarms > 552-PoLI

you can select one of the following policies:

552-PoLI		
552-PoLI **= 0**	fixed sequence;	
552-PoLI **= 1**	rotation of compressors (balancing);	
552-PoLI **= 2**	saturation 1; distribution of resources on smallest number of compressors possible to obtain highest number of compressors turned off.	
552-PoLI **= 3**	saturation 2; same as saturation 1, except that all compressors must reach minimum power level (one step) before starting switch-off.	

MASTER COMPRESSOR
For all systems with step compressors, independent of type of control and policy, one of the step compressors may be defined as the 'Master' compressor.
It is selected with parameter

COMPRESSORS > Regulation/Alarms > 120-nCPC

The master compressor is the one which turns on first and switches off last. In the case of staged compressors, in response to power step increment requests the master compressor will always be augmented before the other compressors on the circuit are made available.

10.7.1. HOMOGENEOUS STEPS AND HOMOGENOUS STEPS + INVERTER

FIXED SEQUENCE → COMPRESSORS > Regulation/Alarms > 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 requirement limits, such as compressor safety times. The resulting allocation is such as to obtain, at any given time, maximum supply levels from compressors with lower indexes.
Note that:
• on request for a step increment, components which may increment are considered and the one with the lowest index is selected;
• on request for a step decrement, components which may decrement are considered and the one with the highest index is selected;

MASTER COMPRESSOR FIXED SEQUENCE
At switch on, the master is always turned on first and taken to saturation, after which the other compressors are turned on and saturated in fixed sequence without reference to the master. At switch off, all compressors excluding the master are switched off based on fixed sequence policy (as per saturation policy) and the master is the last to be switched off.




BALANCING → **COMPRESSORS > Regulation/Alarms > 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 times. The resulting allocation is such as to have the greatest possible equalisation of compressor supply levels at any one time.
Note that:
• on request for a step increment, components which may increment are considered and the one with the smallest distance from the minimum number of deliverable steps at that time is selected.
At the same distance, the one with the lowest hours of operation is chosen;
• on request for a step decrement, components which may decrement are considered and the one with the largest distance from its minimum number of deliverable steps at that time is selected.
At equal distance, the component with the highest hours of use is selected.

MASTER COMPRESSOR BALANCING
The master is switched on first then the others in balancing mode, master included. At switch off, all compressors including the master are switched off in balancing mode, but the master is the last to be turned off.

SATURATION 1 → **COMPRESSORS > Regulation/Alarms > 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 times. The resulting allocation is intended to have the largest possible number of compressors switched off at any one time.

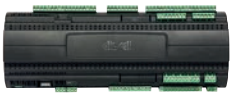
Note that:
• on request for a step increment, components which may increment are considered and the one with the smallest distance from the maximum number of deliverable steps at that time is selected.
At the same distance, the one with the lowest hours of operation is chosen;
• on request for a step decrement, components which may decrement are considered and the one with the smallest distance from the minimum number of deliverable steps at that time is selected.
At equal distance, the component with the highest hours of use is selected;

MASTER COMPRESSOR SATURATION 1
At switch on, the master is turned on first and taken to saturation, then the others are turned on. At switch off, all compressors are switched off in saturation mode, except for the master which is the last to be turned off.

SATURATION 2 → **COMPRESSORS > Regulation/Alarms > 552-PoLI =3**
Like saturation 1, with the following exceptions
• tries to avoid restarting a compressor which has just been switched off
• when a decrement request occurs, before switching off the last active step of a compressor it is advisable to switch off a step of another compressor, to avoid requests to switch the same compressor back on

Example
3 compressors x 3 steps
At first they are all on. The switch off sequence will be:

	1	2	3
1	100%	100%	100%
2	100%	100%	66%
3	100%	100%	33%
4	100%	66%	33%
5	100%	66%	33%
6	100%	33%	33%
7	66%	33%	0%
8	33%	0%	0%
9	0%	0%	0%





MASTER COMPRESSOR SATURATION 2

In switch off where 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.

10.7.2. NON-HOMOGENEOUS STEPS

When the power supply is varied, selection criteria for the new active compressor configuration are as follows:

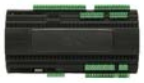
- In the case of increased power, the configuration which results in the smallest increase has priority;
- In the case of decreased power, the configuration which results in the smallest decrease has priority;
- For a given power supply, the configuration which requires switching on the smallest number of compressors has priority; if more than one configuration meets this requirement, the one with the smallest number of compressors is chosen, and after that, the configuration which has operated less.
- If the power supplied 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.

In the new situation, the power actuated is considered to be stable.

MASTER COMPRESSOR NON NOMINAL CASES

- If the master compressor has an alarm or is deselected when 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 the master compressor belongs to is switched off and the master compressor is in alarm or deselected, then if the regulator for the circuit in question requests power, available compressors are activated according to the policy selected. Basically, if the master compressor cannot be used due to alarm or de-selection, this does not make it impossible to enter resources.
- If the circuit the master compressor belongs to is switched off and the master compressor is not in alarm and is selected but its safety time is counting down, then, if the regulator for the circuit in question requests power the master compressor is switched on first, as soon as its safety time has expired. In the meantime, the other compressors are kept switched off.
- If the master compressor exits an alarm condition when some of the compressors on its circuit are already active, it 'loses its privileges' when the regulator requests power steps. If the regulator requests step deactivation, the master compressor 'gets its privileges back'.





10.8. INVERTER

Compressors controlled by inverter, can only operate above a pre-set speed (which depends on compressor type)

ANALOG OUT

The INVERTER uses a 0-10V output with which to modulate compressor speed, in the range between minimum and maximum speed allowed (**FMIN →FMAX)**

Minimum speed

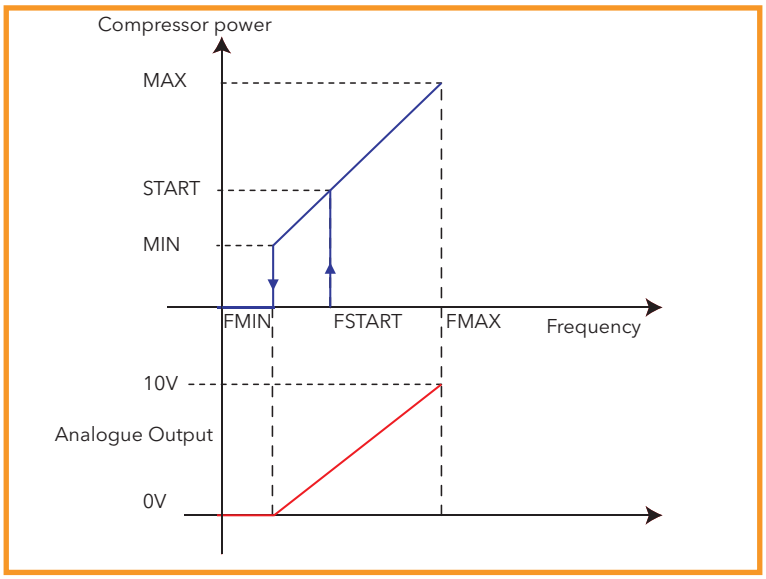
FMSTART → Minimum speed such that the compressor has the pair needed to be able to switch-on

Parameters

ANALOGUE OUTPUTS > set = 2 or 3

	Analogue Outputs
631-H501	V1/I1 analogue OUT **0=**Disabled; **1=**FAN INVERTER switch-on; **2=**compressor inverter circuit C1 switch on **3=**Compressor inverter circuit C2 switch on; **4=** analogue output regulator configurable step 1
632-H502	V2/I2 analogue OUT. See **631-H501**
633-H503	V3/I3 analogue OUT see **631-H501**

Frequency plate data is found in the technical sheet attached to the INVERTER, or on the compressor plate



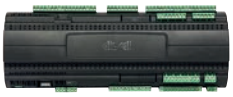
FMIN → **COMPRESSORS > Inverter > 114 - InLFr**
FMAX → **COMPRESSORS > Inverter > 115 - InMFr**
FSTART → **COMPRESSORS > Inverter > 116 - InSFr**

INVERTER error

circuit 1 QUICK START > 522 - CtyP = 3
circuit 2 QUICK START > 523 - CTyP2 = 3

the continuous control compressor will be controlled by activation/deactivation of a power step.

For compressor control we must consider both homogeneous compressor power and that of compressor inverters.





The compressor inverter has the following parameters:

COMPRESSOR INVERTERS

	Folder	1	2	
Minimum frequency	COMPRESSORS Inverter	114-InLFr	214-InLFr	Inverter minimum frequency
Maximum frequency		115-InMFr	215-InMFr	Inverter maximum frequency
Switch-on frequency		116-InSFr	216-InSFr	Switch Inverter frequency
Rated power		117-InRP	217-InRP	Inverter rated power at network frequency
Line frequency	COMPRESSORS Regulation/Alarms	698-SUPFr		Line frequency 0=50Hz; 1=60Hz

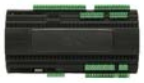
DIGITAL COMPRESSORS

The rated power of digital compressors is characterised by:

	Folder	1	2	
Rated power	COMPRESSORS Regulation/Alarms	128-CRP	228-CRP	Digital compressor rated power at network frequency

Note. Inverter plant control requires all ON-OFF compressors to be **HOMOGENEOUS** and that they have the same rated power.





11.1. FANS

Parameters controlling fans are visible in the folder and sub-folders
PARAMETERS > FANS

11.1.1. DISCHARGE TYPE

With assisted configuration, in the Quick Start Menu, the discharge section must be set with the parameter
QUICK START > 520- Fnty
The discharge section can be present or not but the suction one is always present

Controls can be selected from parameter **FANS > Regulation/Alarms > 301 - FCFn**

	Quick Start parameter 520- Fnty		Regulation parameter 301 - FCFn
0	DISABLED	discharge control disabled	-
1	INVERTER	INVERTER	PROPORTIONAL BAND DEAD BAND PID
2	DIGITAL	DIGITAL FANS	
3	INVERTER + BACKUP	INVERTER with backup relay	
4	DIGITAL + INVERTER	DIGITAL FANS + INVERTER	
5	DIG + INV + BACKUP	DIGITAL FANS + INVERTER with backup relay	

11.1.2. ACTIVATE

- Regulation is activated after the time **SAFETY MEASURES > 565 - odo**
- **QUICK START > 520-Fnty ≠ 0 (discharge section present)**
- a temperature probe or a pressure sensor must be configured to control discharge (HP control probe)

RESOURCE ALLOCATION > Analogue Inputs > 623-H401 ÷ 630-H408 → 3

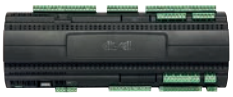
11.1.3. TYPE OF CONTROL

- Digital fans **QUICK START > 520-Fnty = 2** (max 8 fans).
- Fan INVERTERS **QUICK START > 520-Fnty = 1** (the fan battery will be controlled by a single analogue output)

Fan control is a function of the HP control probe.
The parameter **DISPLAY > 548-UMFn Discharge UM** selects control under pressure (bar/PSI) or temperature (°C/°F)[1].
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 mutual if the HP control probe is a temperature probe and control selected from **548-UMFn** is under pressure.

Parameter **548-UMFn** can be modified during normal plant operations.
The default discharge control is pressure (bar).
N.B.: The unit of measurement shown on the display may differ from that of the control unit.

1 based on [545-UMmIn, 546-UMMax]. See section '5.4.4. UNIT OF MEASUREMENT' page 29





11.1.4. DIGITAL FANS

Fans are controlled by digital outputs with Quick Start

QUICK START > 520-Fnty = 2 (max 8 fans).

Any error conditions are signalled by digital inputs (digital fan thermal switch).

11.1.4.1 Times

Safety times can be configured with parameters in the folder
FANS > Safety times

Delays
• **FANS > Safety times > 324-don** defines the delay, in seconds, between the calls for two different steps (activation of different fans).
• **FANS > Safety times > 325-doF** defines the delay, in seconds, between the release of two different steps (switch off of different fans).

Fan stop
FANS > Safety times > 326-FStt
This parameter defines the maximum fans off time
Once that time is over fans are forced on for a 'pick-up' time
FANS > Safety times > 331-FPkUP

Pick-up[2]
Once off time is over fans are forced at maximum speed for the pick-up time
FANS > Safety times > 323-Clt

• **326-FStt = 0** → fans can remain off indefinitely
• **326-FStt >1** & **331-FPkUP = 0** → fans remain off until **331-FPkUP** is placed on a non 0 value.

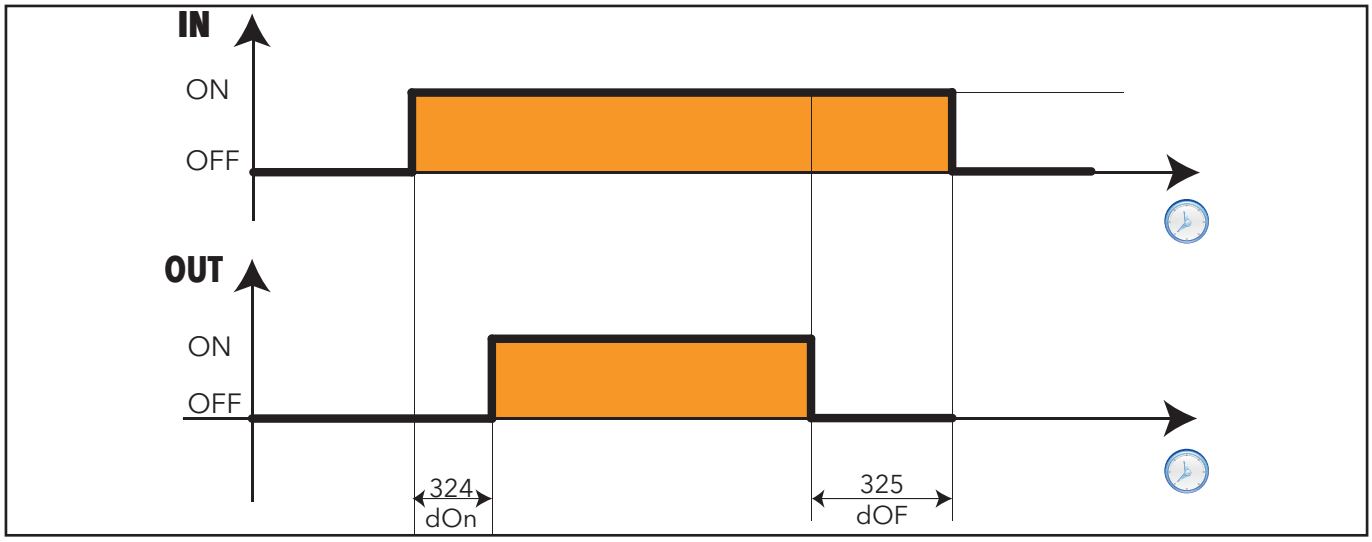
If **323 - Clt = 0** there is no pick-up.

Fans can be used for a maximum number of hours defined by
FANS > Safety times > 327-SEr (hours)

Safety time parameters

Folder	Parameter	Description
FANS Safety Times	**323-Clt**	Pick-up time Time for which the fans run at 100% when the fan battery is switched on
FANS Safety Times	**324-don**	ON steps time Delay time between the calls of two different steps.
FANS Safety Times	**325-doF**	OFF steps time Delay time between switching off two different steps.
FANS Safety Times	**326-FStt**	Max OFF time Maximum fans off time.
FANS Safety Times	**327-SEr**	Fan max usage time
FANS Safety Times	**331-FPkUP**	Pick-up time after maximum OFF time

2 see section '11.1.7. FAN PICKUP' page 86



11.1.5. ROTATION

FANS - Regulation/Alarms

FANS > Regulation/Alarms 322-rot defines fan rotation when called and released to obtain the same number of hours of operation.

	322-rot	Activation policy	Notes
FANS Regulation/Alarms	**322-rot = 0**	**fixed sequence**: in the switch on phase the activation sequence is fan 1, 2, 3... for switch off the phase is inverted.	
FANS Regulation/Alarms	**322-rot = 1**	**rotation**: in the switch on phase the fan with the least hours will be chosen; during switch off, the fan with the most hours of operation.	balancing number of hours of operation.

11.1.6. FAN INVERTER

The fan INVERTER is controlled through analogue output by Quick Start parameter

QUICK START > 520-Fnty = 1 (the fan battery will be controlled by a single analogue output)

Configuration options are:
- Digital output to activate INVERTER is optional
- Digital output for INVERTER error is optional

Any error conditions are signalled by digital inputs (fan thermal switch with continuous control).

N.B.: Parameter **QUICK START > 521-nFn** (number of fans) is NOT important in this case as the INVERTER analogue output is used.

INVERTER parameters are configurable in the folders
FANS >Inverter
FANS >Regulation/Alarms





Speed

		Speed
FANS Regulation/Alarms	**309-InLSP**	minimum fan speed %.
FANS Regulation/Alarms	**310-InMSP**	maximum fan speed %.
FANS Regulation/Alarms	**311-InSSP**	fan saturation speed %.

Fan INVERTER – max. speed
If the discharge regulator requires a power greater than **311-InSSP**, the INVERTER will be controlled at speed **311-InSSP**.

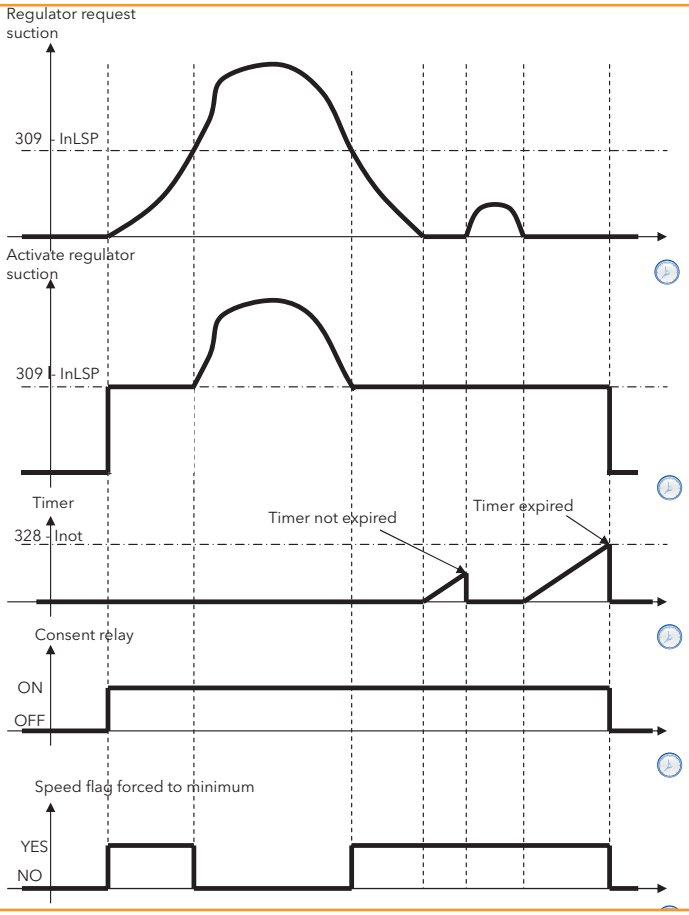
Fan INVERTER – min. speed
- If **309-InLSP = 0** the INVERTER is controlled at the speed defined by the discharge regulator;
- If **309-InLSP ≠ 0** there are 2 cases:

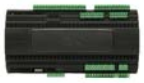
the discharge regulator request is less than **309-InLSP** but ≠ 0: the INVERTER will be forced at minimum speed defined by **309-InLSP.** In this case if the HP control probe < 345-InLPt and time 565-odo (alarm de-activation at switch on) has expired, the INVERTER switches off and the enabling digital output is de-activated.

1. the discharge regulator request = 0 INVERTER behaviour is defined by **330 - InoS:**

Based on value of **330-InoS** there are 2 sub-cases

	330-InoS	Activation policy
FANS Inverter	**330-InoS = 0**	INVERTER continues to be controlled at the minimum speed defined by 309-InLSP for the time 328-Inot after which the INVERTER is switched off and the enabling digital output is de-activated.
FANS Inverter	**330-InoS = 1**	INVERTER continues to be controlled at the minimum speed defined by 309-InLSP
FANS Inverter	**328 - Inot**	Maxi time INVERTER at minimum power



11.1.7. FAN PICKUP

FANS > Safety times

Operating conditions

When first switched on fans are forced to **maximum** power for the time defined by the parameter

FANS > Safety times> 323-Clt

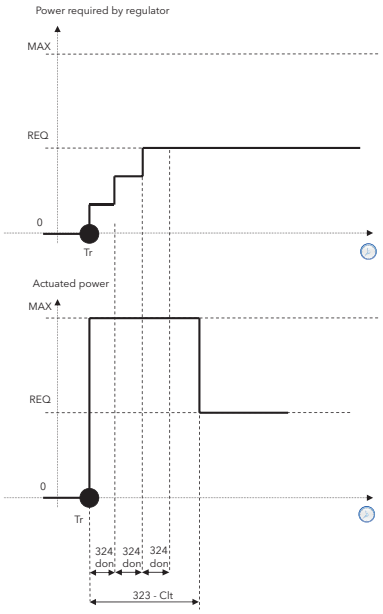
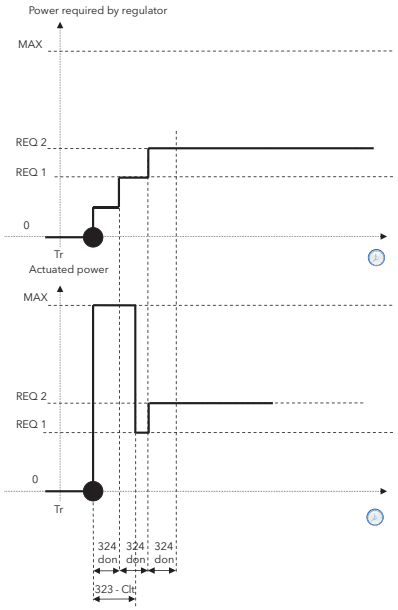
maximum power **DIGITAL FANS → 100%**
maximum power **FAN INVERTER** → parameter **FANS > Regulation/Alarms > 311 - InSSP**

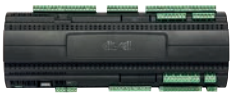
If **323 - Clt = 0** there is no pick-up.

After pickup, the fans are run as required by the discharge regulator.
In an alarm locking out the fan battery, fans are switched off in any case.

Digital fans Pick-up

Digital fans pick-up with discharge regulator request
1. stable at end of pick-up time
2. in increment at end of pick-up time

Pick-up digital fans 1	Pick-up digital fans 2
	
tr: fan request	
REQ number of steps requested	
MAX max. number of available steps	



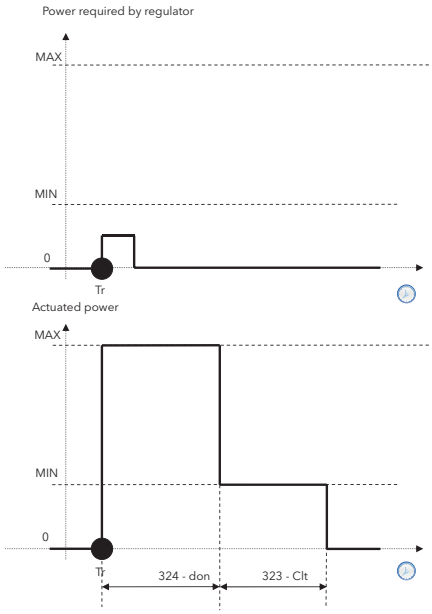
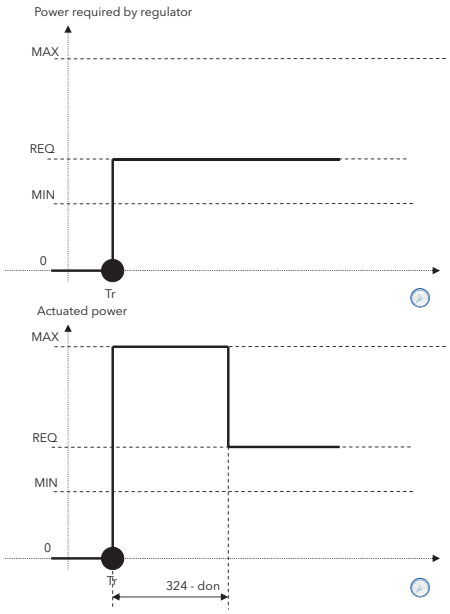


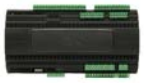
Fan INVERTER Pick-up

• Fan INVERTER pick-up with discharge regulator request zero during pick-up.
After pick-up time fans will be forced at minimum for the **328 - Inot** time to then switch off

• Pick-up with regulator request constant and greater than **309-InLSP.**
After pick-up time fans will be forced at **REQ**:

FANS Regulation/Alarms	**309-InLSP**	Minimum speed.
FANS Inverter	**328-Inot**	Max time INVERTER at minimum power

Pick-up INVERTER fan 1	**Pick-up INVERTER fan 2**
	
tr: fan request	
REQ number of steps requested	
MAX max. number of available steps	

11.1.8. REGULATION

FANS - Regulation/Alarms

Three regulation modes can be selected from

301 - FCFn	Fan control type	Notes
301 - FCFn = 0	Proportional band control (BP)	If proportional the parameter **COMPRESSORS > Regulation/Alarms 551-Stty** controls lateral and central set setpoint of regulation band
301 - FCFn = 1	Dead band control (ZN)	
301 - FCFn = 2	PID regulation	

302 - FACt	Activation mode	Notes
302 - FACt = 0	independent of compressor status	
302 - FACt = 1	if at least 1 compressor is on.	

11.1.8.1 PROPORTIONAL BAND FAN REGULATION

Enabling

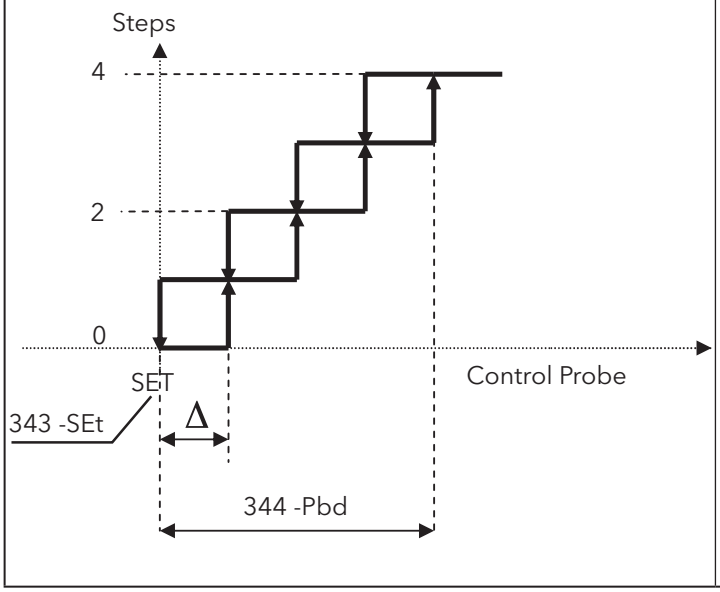
301 - FCFn = 0

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

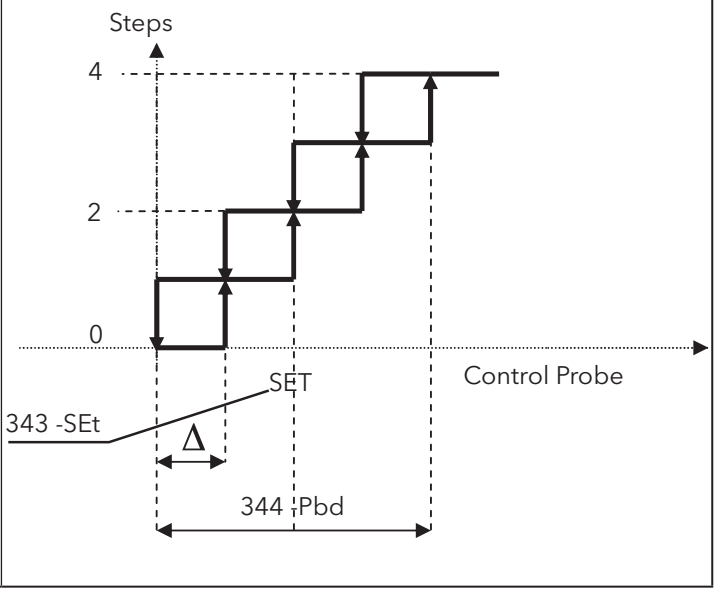
Proportional band: Digital fans

The regulator activates a number of power steps to reach the Set Point set at parameter **343-SEt**.
The number of resources needed is linked to the difference between the value measured by the HP control probe and the Set Point. Naturally, the greater the difference, the more resources needed to reach the Set Point.
The temperature or pressure interval between one step and another is the functional value of the proportional band **344 - Pbd** and number of resources present.

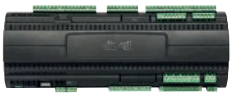
Example: with 551 – Stty = 0 (lateral setpoint)



Example: with 551 – Stty = 1 (central setpoint)



Δ = 344 - Pbd / 521 - nFn (number of fans)





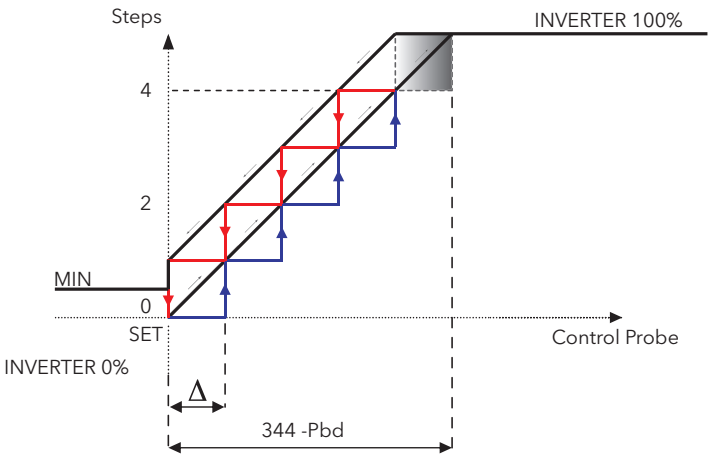
Parameters

			Notes
FANS Regulation Limits	**343-SEt**	Discharge setpoint	
FANS Regulation Limits	**344 - Pbd**	Proportional discharge band	

Proportional band: Digital Fans + INVERTER
The number of power steps is actuated on the basis of the difference between the value detected by the HP control probe and the Set Point, the power at which the continuously controlled fans is driven varies from 0% to 100% between the activation/deactivation of a power step.

After activating the last power step, the INVERTER continues to modulate between 0% and 100% in the section highlighted in the diagram before remaining ON outside the proportional band.
For HP control probe < Set Point, INVERTER at minimum.

Example 4 digital fans + INVERTER



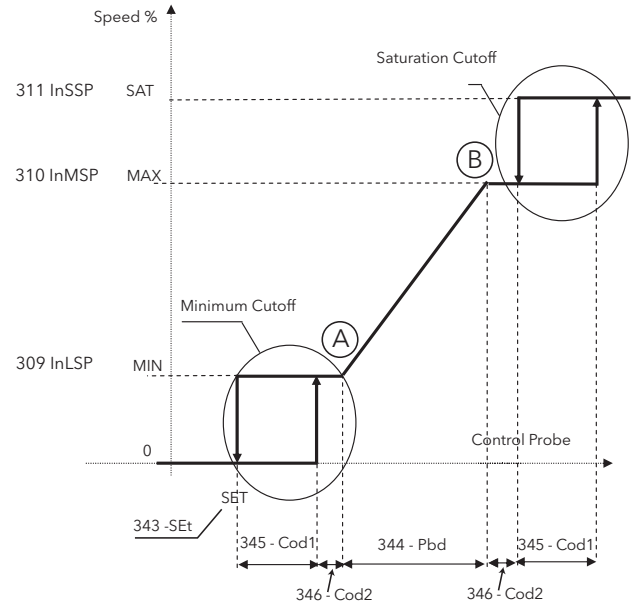
Δ = 344 - Pbd / 521 - nFn (number of fans)

In an INVERTER Error with the Quick Start parameter **520 - Fnty = 3** the continuous control fan will be driven by the activation/deactivation of a power step.

Proportional band: INVERTER fan

NB: this applies in the case of a continuously controlled fan (or multiple fans connected in parallel)

Example with 551 – Stty = 0 (lateral setpoint) and 303 - CoIE = 1 (enable cut-off)



Parameters

Folder	Parameter	Description
FANS Regulation Limits	**343-SEt**	Discharge setpoint
FANS Regulation Limits	**344 - Pbd**	Proportional discharge band
FANS Regulation/Alarms	**309-InLSP**	minimum fan speed %.
FANS Regulation/Alarms	**310-InMSP**	maximum fan speed %.
FANS Regulation/Alarms	**311-InSSP**	fan saturation speed %.
FANS Regulation/Alarms	**303 – CoIE**	Enable cut-off INVERTER
FANS Regulation Limits	**345 – Cod1**	Delta 1 cut-off
FANS Regulation Limits	**346 – Cod2**	Delta 2 cut-off

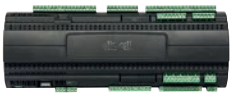
minimum cut-off

fan speed goes from 0 to MIN when the HP control probe reaches 'A' from below;
If the HP control probe reaches 'A' 'from above', the speed changes from MIN to 0.

saturation cut-off

fan speed goes from continuous control to MAX when the HP control probe reaches 'B'.
If the HP control probe reaches 'B' 'from above', we have continuous control between MAX to MIN.

N.B.: with no cutoff by setting the **303 – CoIE = 0** parameter the graph is transformed losing the cutoff hysteresis





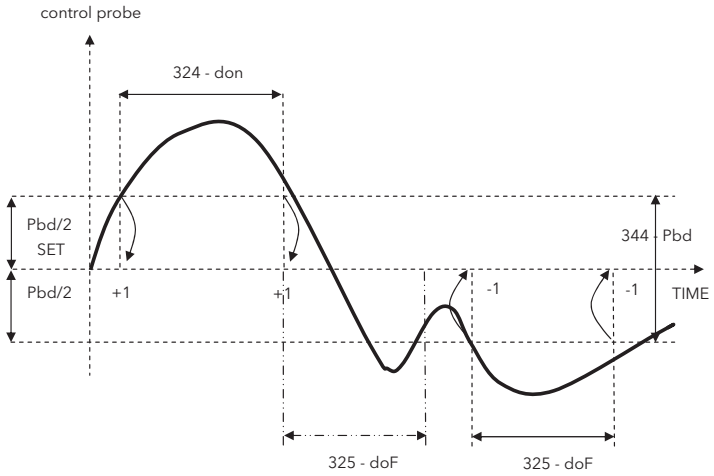
11.1.8.2 DEAD ZONE FAN REGULATION

Enabling

301 - FCFn = 1

Power requested by the discharge regulator is proportional to how long the HP control probe remains outside the proportional band.
The proportional band is symmetrical to the setpoint value.

DEAD ZONE FAN REGULATION



Dead Zone Fan Parameters

Folder	Parameter	Description
FANS Regulation Limits	**343-SEt**	Discharge setpoint
FANS Regulation Limits	**344 - Pbd**	Proportional discharge band
FANS Safety Times	**324-don**	ON steps time Delay time between the calls of two different steps.
FANS Safety Times	**325-doF**	OFF steps time Delay time between switching off two different steps.

Dead band: Digital fans

The main function of the regulator consists in activating a number of power steps in proportion to the time passing from when the HP control probe has exceeded the limit SET + BP/2.
The proportional band is symmetrical to the SET value.
When the HP control probe has exceeded the limit a new resource will be activated every **324 - don** seconds till the HP control probe returns into the semi-band. The same holds for resource deactivation every **325 - doF** seconds.

Dead band: Digital Fans + INVERTER

Activation of a number of digital power steps is the same as the digital case, while continuous fan regulation is driven from 0% (SET – BP/2) and 100% (SET+BP/2) within the band.

With an INVERTER Error with the Quick Start parameter **520 - Fnty = 3** the continuous control regulator is driven by an additional digital step.





Dead band: INVERTER

Operations are the same as that of digital fans: in this case you do not activate number of steps but discrete increments / decrements defined by 329-InPC.

With an INVERTER Error with 520 - Fnty = 3, regulation switches from continuous to digital as described in the section Digital Fans - Dead Band.

11.1.8.3 PID FAN REGULATION

Enabling

301 - FCFn = 2

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

P proportional to error: considers the difference between value read by the LP control probe and the Set Point, entering an action that is directly proportional to it; the proportional component action decreases as the error approaches zero;
I proportional to the integral error: integrates the error detected over time, reducing the final difference from the Set Point; this function tracks previous control values, providing a corrective action able to add or remove power gradually to get closer to the Set Point value.
D proportional to the error derivative: considers the speed with which the control value varies in the process; 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*(error) + Ki*(error integral) + Kd*(error derivative)

Kp = 1000/Bp
Ki = Kp•Tc/Ti
Kd = Kp•Td/Tc

Tc Application cycle time (1.0 sec)

You can set the following with parameters:

	Folder	Parameter	Description
Enabling	**FANS Regulation/Alarms**	**304 - ItEn**	enabling integral control =1
	FANS Regulation/Alarms	**306 - PbEn**	enabling proportional control =1
	FANS Regulation/Alarms	**307 - dtEn**	enabling derivative control =1
Values	**FANS Regulation/Alarms**	**305 - It**	integrative time constant value **Ti**
	FANS Regulation Limits	**344 - Pbd**	proportional band value **Bp**
	FANS Regulation/Alarms	**308 - dt**	derivative time constant value **Td**

The discrete control signal applied to the actuator is thus

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

PID: INVERTER fan
The control signal u(t) represents the power actuated directly on the INVERTER.

With an INVERTER Error with **520 - Fnty = 5** the continuously controlled fan will be driven as described in the previous case





12.1. CONFIGURABLE REGULATOR AND CONFIGURABLE ALARM REGULATOR

EWCM EO manages a 'general purpose' regulator for heating and cooling of the ON/OFF or analogue type.
An alarm regulator called alarm 'configurable regulator independent of the configurable regulator, that is it is not necessary to enable the latter for alarm operations.

The regulator controls 2 steps (heating/cooling), one step plus an analogue output or a step and a serial command through EEV Eliwell driver. Just the first step controls all options:

	step 1	step 2
HEAT/COOL mode (heating/cooling)	✔	✔
digital output	✔	✔
analogue output	✔	-
V800/V910 driver	✔	-

The regulator, with two independent intervention points, works on the basis of probe in temperature or on the difference between the discharge probe value (converted in temperature) and the value of a probe selected.

Typical examples
ON/OFF
- oil heating and cooling, using a probe immersed in the oil; possible cold gas injection on heads;
- oil heating (first step) + cooling (second step) for cold climates;
- cooling of low temperature compressor head (first step);
- cooling of ambients and/or control panels (using panel temperature probe);
- control of modulated pump for glycol plants

control of discharge gas sub-cooling (with fixed or floating set). Regulation by:
a) fixed set: on gas temperature output from sub-cooling exchanger or
b) floating set: on difference between discharge temperature and gas temperature output from sub-cooling exchanger.

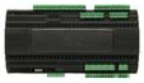
Analogue
• fan activation

Electronic expansion valve
Activation of an electronic expansion valve
- Activation of the solenoid valve powering the thermostatic valve, through relay output;
- Activation of EEV driver (impulse or stepper) through relay output (using third party drivers) or via serial port '**RS485 EXP' (using an Eliwell V910 or V800 driver**);

Parameters
The menu contains a folder with configurable regulator parameters and for the configurable alarm regulator

		GENERAL REGULATOR
REGULATOR CONFIGURABLE	**710-MPCFR**	Configurable regulator probe mode **0=**disabled; **1=**probe selected; **2=**difference between probe selected and discharge probe;
	711-MCFr1	Configurable regulator mode step 1 **0=**Cooling; **1=**Heating;
	712-MCFr2	Configurable regulator mode step 2 **0=**Cooling; **1=**Heating;
	713-SEtCFR1	Configurable regulator setpoint step 1
	714-SEtCFR2	Configurable regulator setpoint step 2
	715-dCFr1	Configurable regulator delta step 1
	716-dCFr2	Configurable regulator delta step 2
	717-PbdCFr1	Proportional band step 1
	718-CodCFR1	Delta cut-off step 1
	719-CFr1dly	Configurable regulator delay step 1
	720-CFr2dly	Configurable regulator delay step 2
	721-CFrL1	% minimum step 1
	722-CFrM1	% maximum step 1
	723-CFrS1	% saturation step 1
ALARM REGULATOR CONFIGURABLE	**724-ECFAw**	Enable warning **0=**Disabled; **1=**Enabled;
	725-CFAty	Configurable alarm mode **0=**Minimum; **1=**Maximum;
	726-SEtwCFA	Configurable alarm warning threshold
	727-SEtCFA	Configurable alarm setpoint
	728-dCFA	Configurable alarm differential





Enabling
PARAMETERS > GENERAL REGULATOR > 710-MPCFR ≠ 0

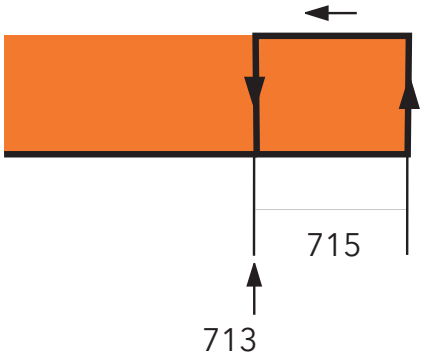
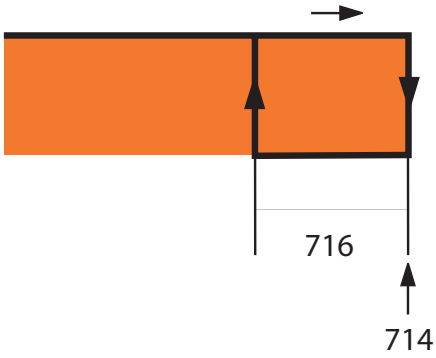
Configuration of parameters to control mode and outputs:

	step 1		step 2	
HEAT/COOL mode (heating/cooling)	✓	**711-MCFr1 = 0 COOL 711-MCFr1 = 1 HEAT**	✓	**712-MCFr2 = 0 COOL 712-MCFr2 = 1 HEAT**
digital output	✓	**±94 digital output configurable regulator step 1**	✓	**±95 digital output configurable regulator step 2**
analogue output	✓	**631-H501=4 or 632-H502=4 or (only 9990) 633-H503=4 or**	-	-
V800/V910 driver	✓	**EXTERNAL DRIVER >740 - EEvE=2 (CO2)**	-	-

Based on configuration of parameters the regulator can control all ON/OFF modes in parallel, band or EEV driver

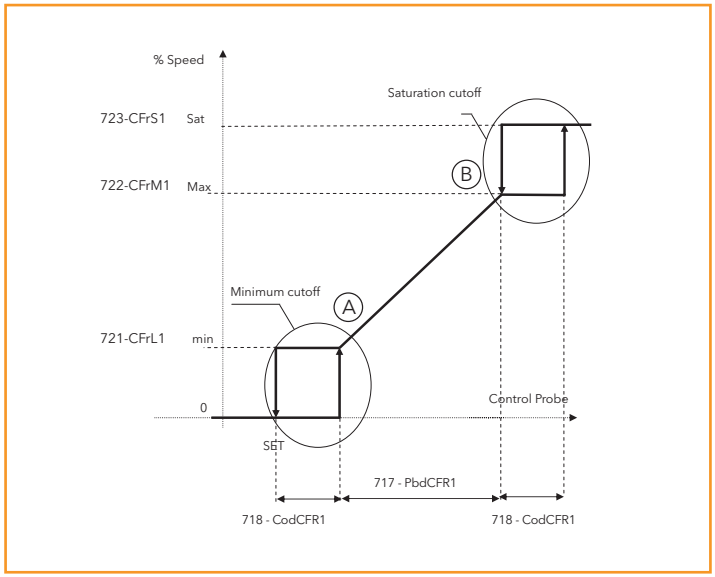
12.1.1. CONFIGURABLE REGULATOR ON/OFF

For each of the steps, COOL or HEAT can be selected with the parameters
711-MCFr1 and **712-MCFr2**
Each step has its own fixed and differential set

step 1 example COOL mode 711-MCFr1= 0	**step 2 example HEAT mode 712-MCFr2= 1**
	
713-SEtCFR1 Configurable regulator setpoint step 1	**714-SEtCFR2** Configurable regulator setpoint step 2
715-dCFr1 Configurable regulator delta step 1	**716-dCFr2** Configurable regulator delta step 2

12.1.2. PROPORTIONAL BAND REGULATION

Band regulation is only with step 1



With an analogue output you can set the proportional band **717-PbdCFr1** and minimum actuation percentages **721-CFrL1** maximum **722-CFrM1** and saturation **723-CFrS1**.
The differential (return hysteresis) will be **718-CodCFR1**. Setting the differential to zero the step is disabled.
A minimum stay time can be set for each step (regulator on) with delay parameters:
719-CFr1dly regulator 1
720-CFr2dly regulator 2 (just digital output)
before activating the function associated to the step.
Return occurs immediately, as soon as the regulator is deactivated.

If the control probe is in error, regulation is disabled.

12.1.3. CONFIGURABLE REGULATOR ALARM

The configurable regulator alarm uses a temperature probe that can be selected from amongst those listed below

Probes
Analogue inputs to be configured are one or more amongst **PB5 PB6 PB7 PB8**
If the control probe is in error, regulation is disabled.

CONFIGURABLE REGULATOR ALARM
ANALOGUE INPUT > configure an analogue input =10

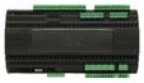
CONFIGURABLE ALARM REGULATOR + CONFIGURABLE REGULATOR
ANALOGUE INPUT > configure an analogue input =9
In this case, regulators are correlated: the same probe is configured for both alarm and configurable regulator

N.B.:
If you want to use two separate probes, configure as follows:

CONFIGURABLE REGULATOR
ANALOGUE INPUT > configure an analogue input =8

CONFIGURABLE REGULATOR ALARM
ANALOGUE INPUT > configure an analogue input =10

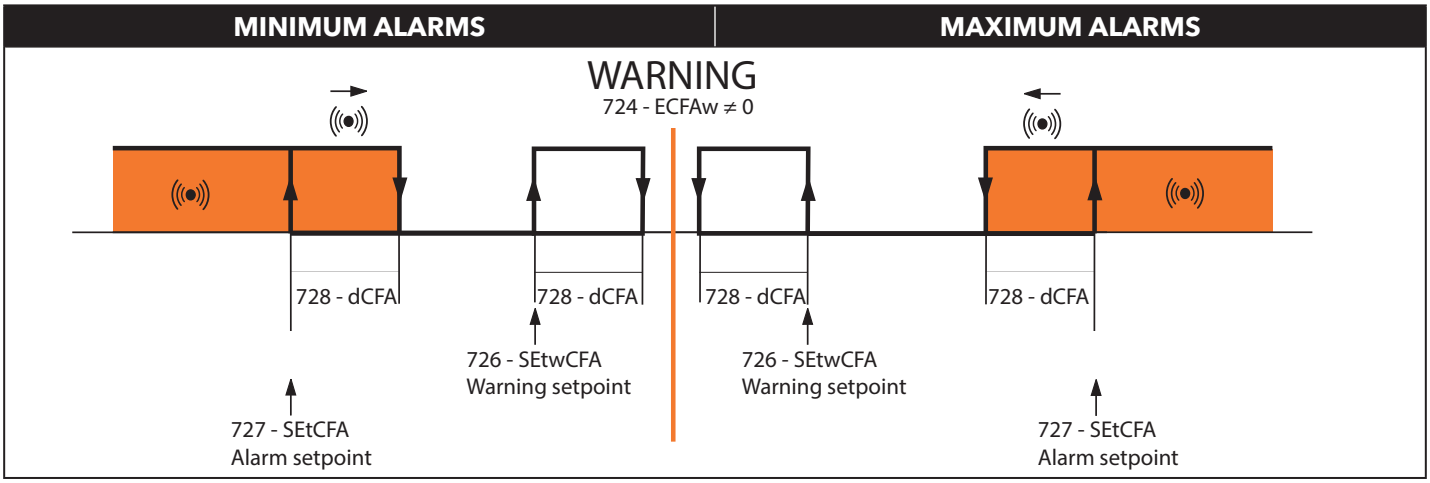


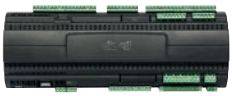


To summarise:

	probe configuration	Notes
Configurable REGULATOR	**8**	**separate probes**
Configurable regulator alarm	**10**	
Configurable regulator alarm + Configurable REGULATOR	**9**	**single probe**

Alarms have two intervention limits, a 'warning' (signal) and the alarm itself both configurable
The warning can be enabled or not through **724-ECFAw** (0=Disabled; 1=Enabled)
The minimum or maximum alarm is configurable through **725-CFAty 0**=Minimum; **1**=Maximum



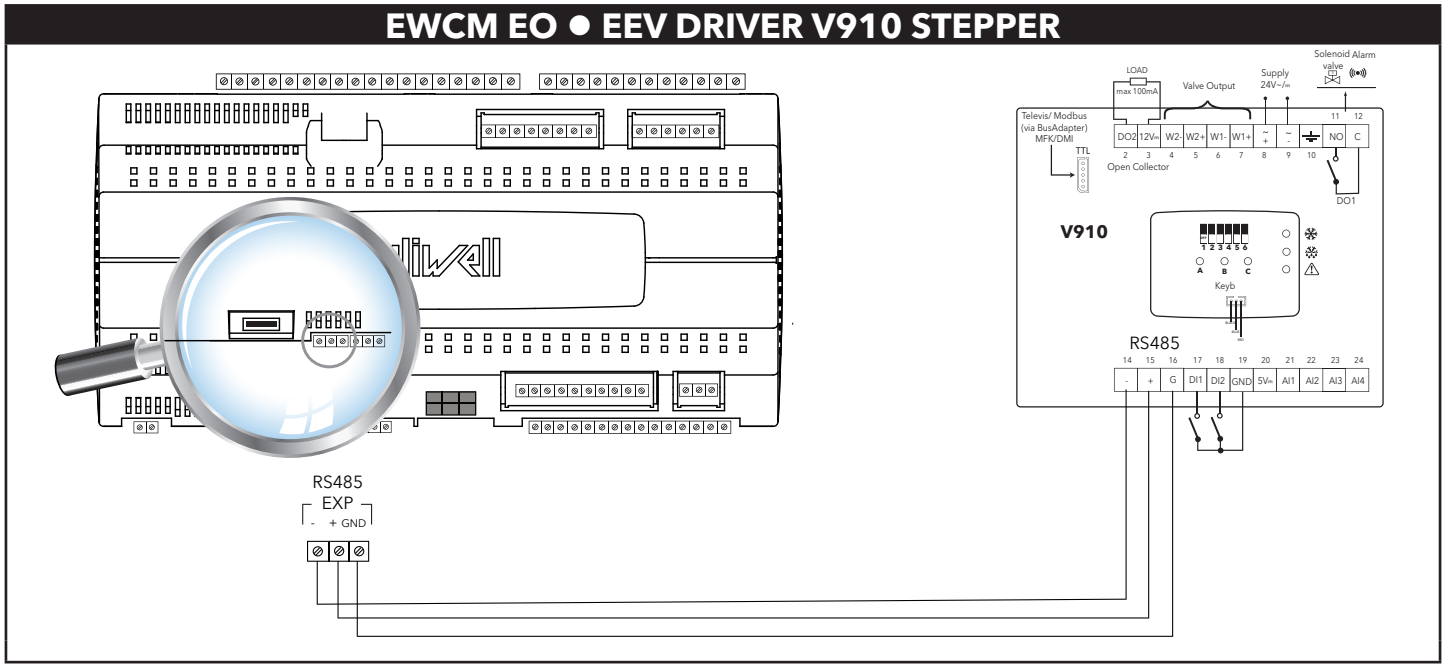




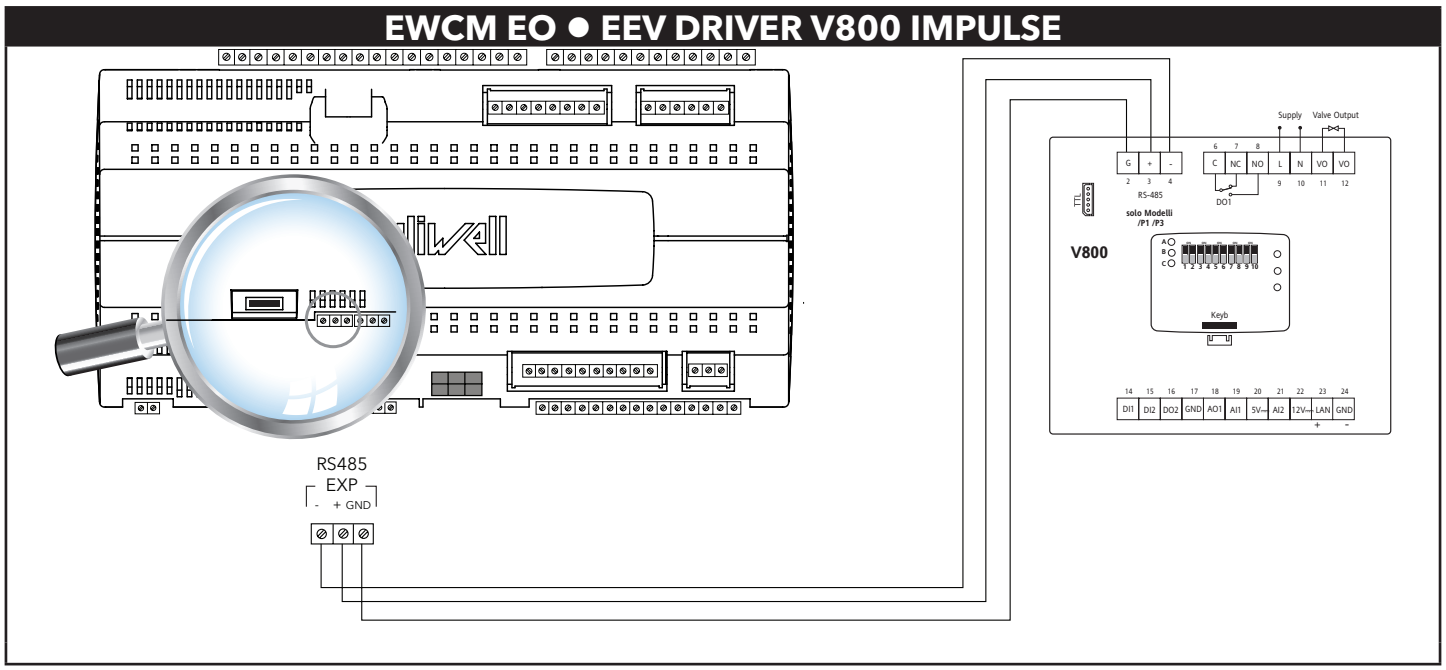
12.2. EEV DRIVER V910/ V800

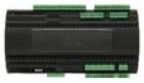
EWCM EO manages an electronic expansion valve (EEV) using the serial **RS485 EXP**

Here below is a connection diagram between EWCM EO and driver V910 for stepper valves



Here below is a connection diagram between EWCM EO and driver V800 for impulse valves



The parameters for configuring serial communication are:

Folder	Parameter	Description	Values
ADDRESSING	**676 - PtSEXP**	Protocol selection RS485 EXP	**3= Modbus RTU**
ADDRESSING	**677 - bdrtEXP**	Baud rate RS485 EXP.	**1=**19200
ADDRESSING	**678 - PtyEXP**	Parity bit RS485 EXP	**2=**EVEN (parity)
ADDRESSING	**679 - datEXP**	RS485 EXP data bit.	**0=**7 data bit; **1=**8 data bit;

NOTE.
Factory settings to manage **RS485 EXP** serial with **EEV V910/V800 driver shall NOT be changed**

Parameters
The menu contains a dedicated folder with parameters and for the external driver

	EXTERNAL DRIVER
740 - EEvE	Enable EEV. Enable electronic valve driver **0=**disabled; **1=**step 1; **2=**CO2;
741 - drMMT	Delay activation high temperature central (MT) at minimum power
742 - dCOnLT	Delay activation compressor after high temperature central (MT) consent

Enabling
Electronic valve is enabled through parameter **740 - EEvE ≠ 0**

Driver present if **740 - EEvE = 1.2**

EXTERNAL DRIVER > 740 - EEvE = 1 → step. We advise using driver V800 (for impulse valve)[1]
The driver is associated to the 'general purpose' regulator for sub-cooling
The configurable regulator controls a step and a serial command by driver for EEV Eliwell.
Just the first step controls this option

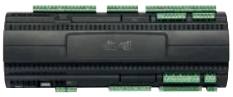
EXTERNAL DRIVER > 740 - EEvE = 1 →step1 / 740 - EEvE = 2 CO2. We advise using driver V910 (for stepper valve)
The driver controls exchangers for systems in cascade

	step 1	**CO2**
digital output	✔	
analogue output	✔	
EEV driver	**V 800** **V910**	**V910**

Case **740 - EEvE = 1,2** the Service Menu displays the EEV folder[2]

Through the RS485 EWCM EO serial port it will carry out
- EEV driver activation/deactivation
- read alarm status

1 driver V910 can also be used for stepper valves
2 see EEV Service Menu Appendix




12.2.1. SUB-CRITICAL CO2 SYSTEMS

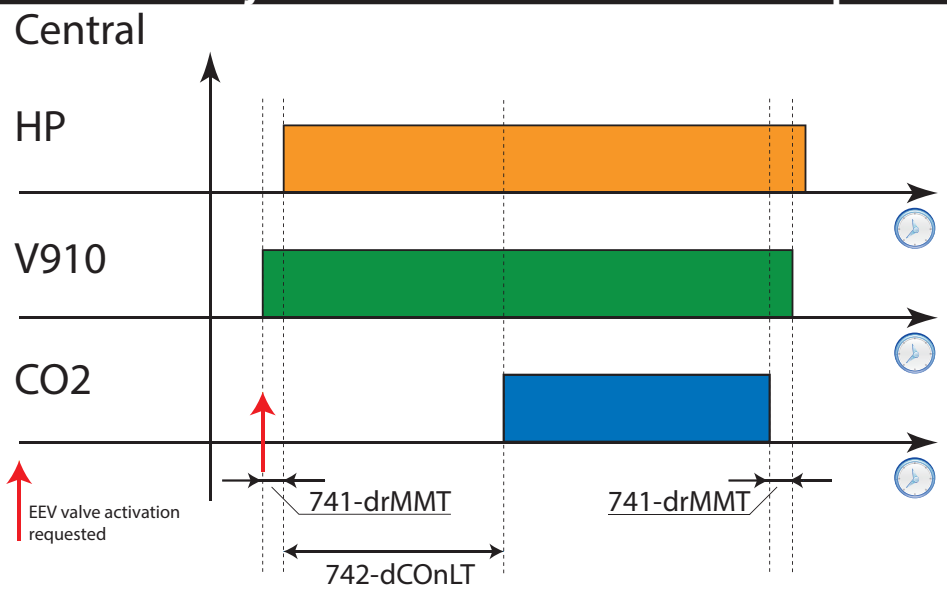
Operation
Request to activate the CO2 system (low)

- the V910 exchanger valve is enabled
- after a delay **741 - drMMT** the HP plant (high) operates at minimum power
- on confirmation that the HP plant has been activated, after a further delay **742 - drCOnLT** the CO2 system (low) activates its compressors

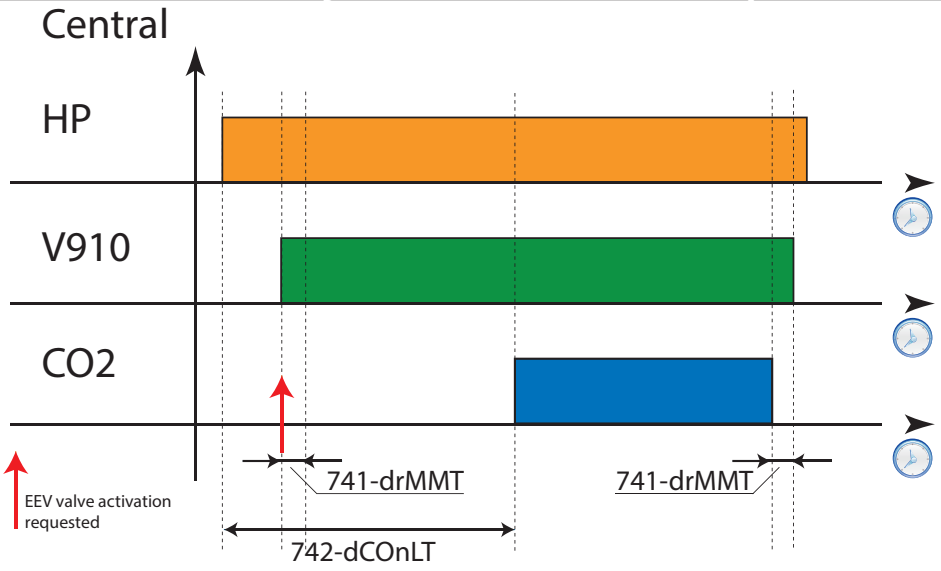
The V910 driver will be switched off after a delay **741 - drMMT** from the CO2 system (low) being switched off

There are 3 cases based on activation of the HP system

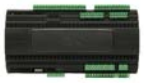
case 1 • HP system switched off at activation request



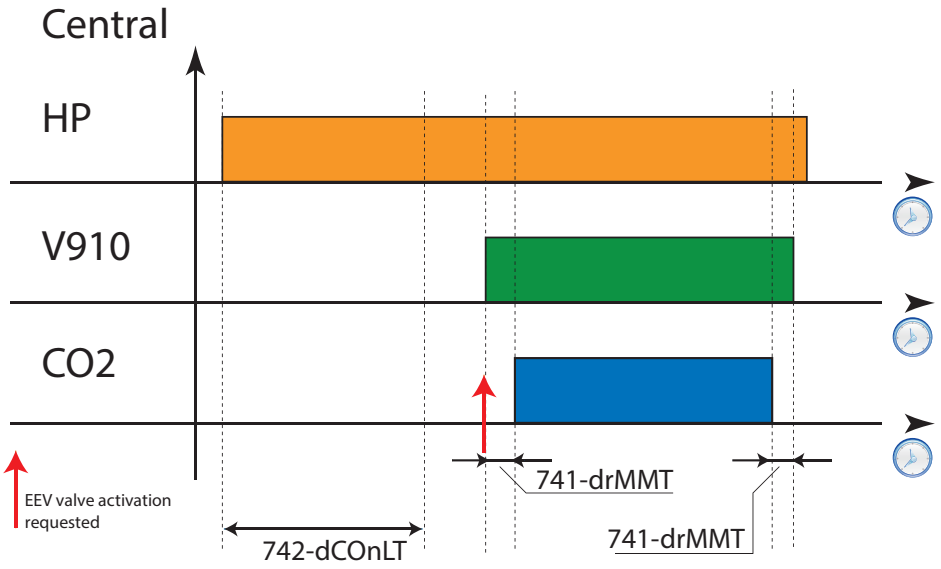
case 2 • HP system on at activation request







case 3 • HP system on at activation request
HP system activation delay already expired

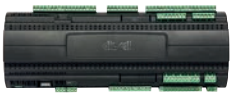


The two systems can be managed by serial port or suitable configuration of digital inputs and outputs

system	serial	digital inputs	digital output
high HP	input: receives command to activate at minimum	±95 minimum activation high system (MT)	±96 power state > 0% high system (MT)
low CO2	input: receives operation status HP system	±96 reception of power state > 0% high system (MT)	±97 command for minimum activation for high plant (MT)

The low system (CO2) will block, or will not start, its compressors if:
- The high system is not supplying power (system OFF, plant blocked, etc);
- The V910 driver is blocked (alarm)
- There is no communication between EWCM EO and V910 with serial connection

The low system (CO2) block must occur immediately deactivating all resources without respecting safety times.





Applications[3]

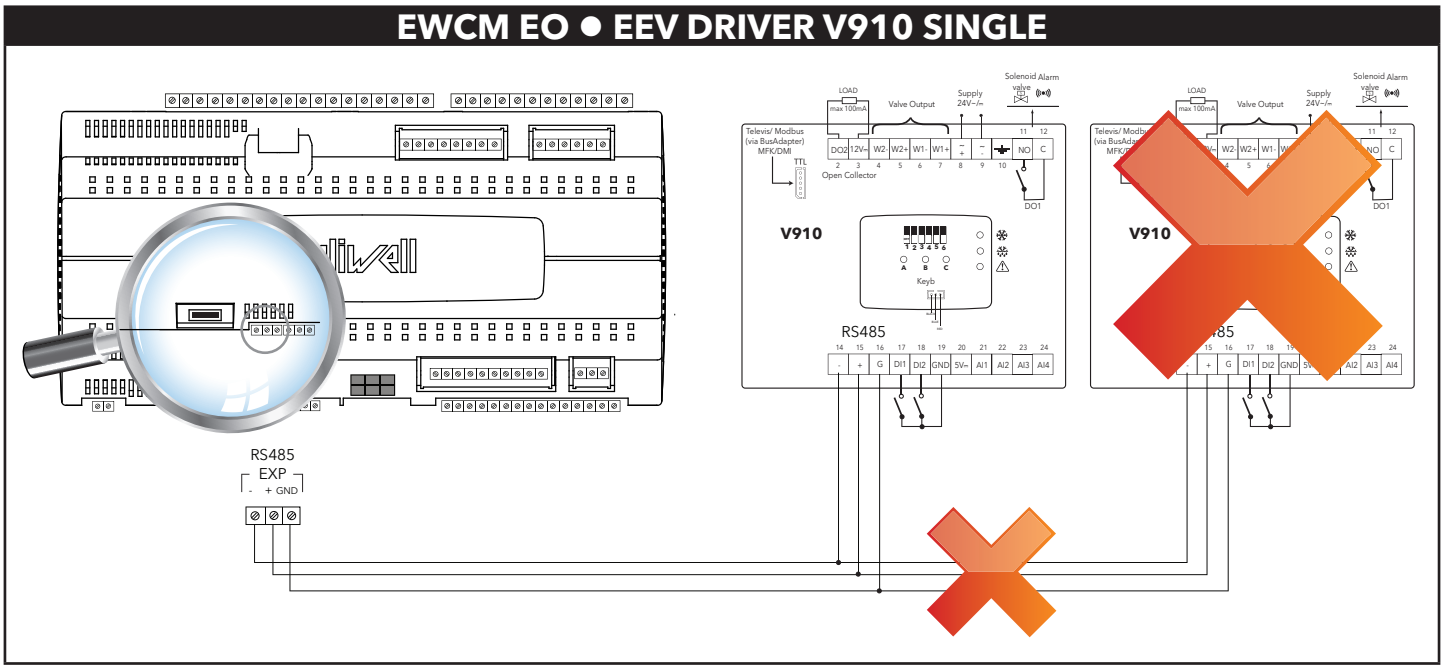
The valve driver can also be controlled by a suitably configured relay.

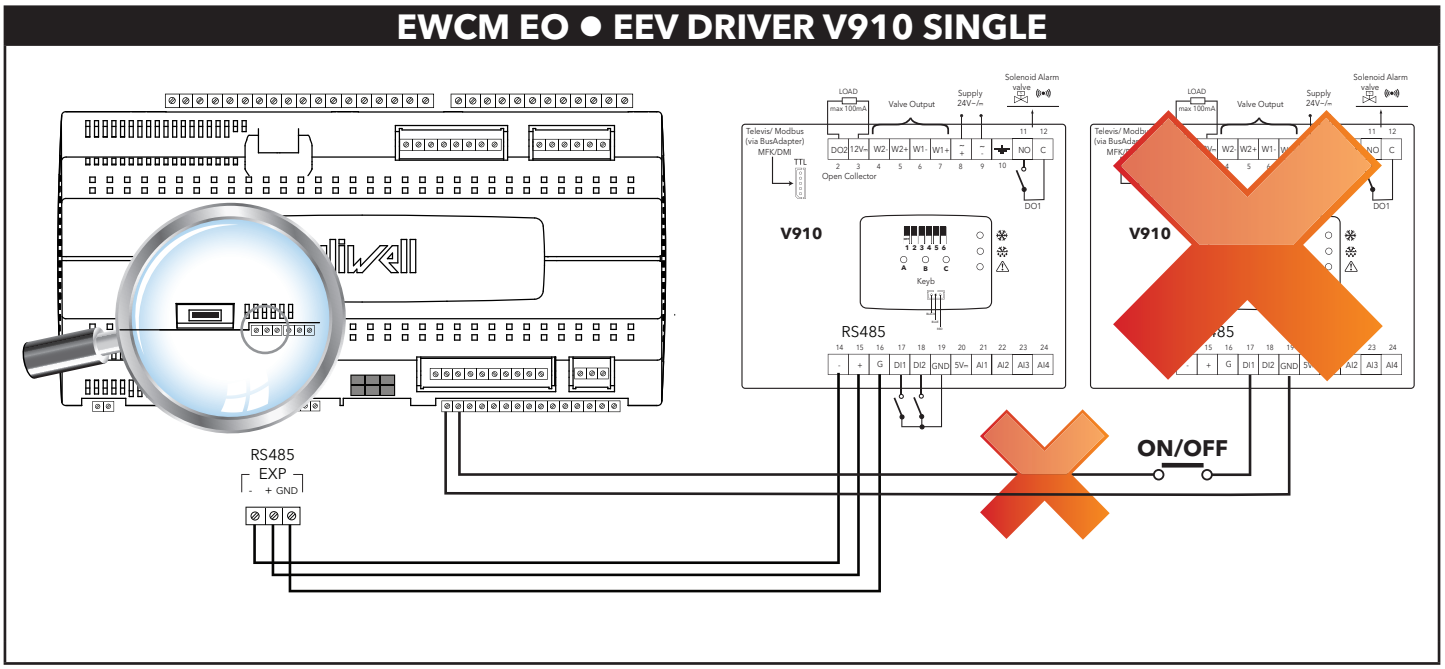
There are 2 cases

1. 1 driver commanded by serial
2. 1 or 2 drivers commanded by relay

2 drivers commanded by serial or 1 driver commanded by serial + 1 by relay (mixed) is not allowed.

EWCM EO manages a single V910 driver connected via serial





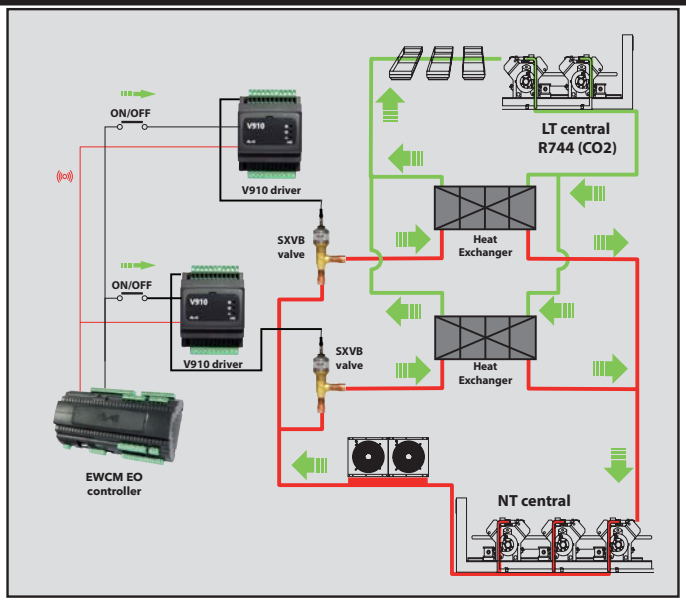
see Appendix - Application Book for predefined CO2 applications supplied by Eliwell





The use of 2 V910 drivers is foreseen exploiting digital inputs

EWCM EO ● 2 x EEV DRIVER V910 with DIGITAL



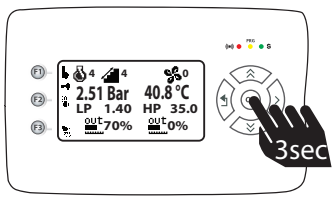
An application example is illustrated above where 2 exchangers are used in parallel.
EWCM EO manages commands via digital for:

- enabling
- feedback
- external alarm





ACCESS TO PARAMETERS



MENU 02/02
Functions
Parameters

PARAM 01/01
User
Installer

USER

PARAM 01/01
User
Installer

USER INSTALLER

PASSWORD
The password is composed of 5 alphanumeric characters.

DEFAULT PASSWORD > *** > direct access to parameters**
ACCESS PASSWORD > the label **PASSWORD** appears

PASSWORD

*****

press the 'OK' key and set the password with the 'UP' and 'DOWN' keys.
If the password is correct, pressing 'OK' opens the parameters Menu.

ACCESS AND STRUCTURE OF THE PARAMETERS[1]

PARAM 01/01
User
Installer

INSTA 01/05
Quick Start
Compressors
Fans

COMPR 01/05
Regulation Limits
Safety Times
Inverter

USER INSTALLER

INSTA 02/05
Safety Measures
Configuration
Display

DISPLAY 01/10
541 - LAng
Language selection
0

USER INSTALLER

Select the Quick Start folder with 'UP' and 'DOWN' and press 'OK'
- display sub-folders (Compressors case): with 'UP' and 'DOWN' keys and press 'OK' to access the parameters display itself
- display of parameters themselves.

After entering the selected folder (example Display folder) EWCM EO will show in the heading the name of the folder in lower case followed by two numbers that identify the number of the parameter / total number of the parameters in the folder (example 001/010 indicates the first parameter of 10 parameters in the Display folder).
This will be followed by the parameter acronym preceded by an univocal number identifying the parameter itself (e.g. 541 - LAng, the first in the list)

Display and modification of parameters
To scroll parameters press 'UP' or 'DOWN' arrow keys; to modify the value press 'OK'; to modify the value press 'UP' or 'DOWN' again; to confirm the parameter value press 'OK' again.
Press the 'SX' key to exit parameter editing.

1 Access and use of Quick Start parameters is described in section '6. assisted configuration' page 30





PARAMETERS TABLE KEY

EWCM EO foresees a group of parameters representing the same variable in different units of measurement
Parameters are duplicated / quadrupled depending on the Unit of Measurement shown on the display.

Pressure/Temperature Parameters
Parameters quadrupled [°C, bar; °F, PSI] based on Unit of Measurement displayed
For example the parameter of folder **Compressors >Regulation Limits > 141 – LSE** is displayed as:

DESCRIPTION	RANGE	DEFAULT	M.U.
141 – LSE minimum setpoint °C.	-100...600	**-55.0**	**°C**
141 – LSE minimum setpoint °F.	-150...999.9	-67	°F
141 – LSE minimum setpoint bar.	-1...68	0.62	bar
141 – LSE minimum setpoint PSI.	-14.5...999.9	8.9	PSI

In the table the parameter is indicated once only (single line) with range, default, and UM in °C with the symbol **§**

Temperature Parameters
Parameters duplicated [°C; °F,] based on Unit of Measurement displayed
For example the parameter of folder **Compressors > Regulation Limits > 155 – AtdS** is displayed as:

DESCRIPTION	RANGE	DEFAULT	M.U.
155 – AtdS Ambient temperature dynamic set °C	-100...600	**15.0**	**°C**
155 – AtdS Ambient temperature dynamic set °F	-150...999.9	59	°F

In the table the parameter is indicated once only (single line) with range, default, and UM in °C with the symbol **°**

To display range in other UM see '5.4.4. UNIT OF MEASUREMENT' page 29
or use Device Manager

Values read by probe or pressure transducers
NOTE: ALL values in **bar / PSI** are expressed in **ABSOLUTE PRESSURE** and depend on parameter
DISPLAY > 543- rELP.

Except for Calibrations and Limits:

CALIBRATIONS > PB1 and PB2 ALWAYS AN ABSOLUTE VALUE (ABSOLUTE BAR)

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.

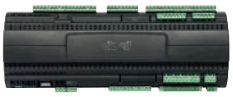
Parameters quadrupled [°C, bar; °F, PSI] based on Unit of Measurement displayed
In the table the parameter is indicated once only (single line)

transducers			temperature probes			
PB1	**PB2**	**EWCM9900 PB3**	**PB5**	**PB6**	**PB7**	**PB8**
655-CALb1	**656-CALb2**	**657-CALb3**	**660-CALPb5**	**661-CALPb6**	**661-CALPb7**	**660-CALPb8**
bar/PSI	**bar/PSI**	**bar/PSI**	**-**	**-**	**-**	**-**
-	**-**	**-**	**°C/°F**	**°C/°F**	**°C/°F**	**°C/°F**

LIMITS > ALWAYS IN ABSOLUTE VALUES (ABSOLUTE BAR)

Parameters duplicated [bar; PSI] based on Unit of Measurement displayed
In the table the parameter is indicated on 2 separate lines:

transducers					
lower threshold PB1	**upper threshold PB1.**	**lower threshold PB2**	**upper threshold PB2.**	**EWCM9900 lower threshold PB3**	**EWCM9900 upper threshold PB3.**
663-LtPb1	**664-UtPb1**	**665-LtPb2**	**666-UtPb2**	**667-LtPb3**	**668-UtPb3**
bar	**bar**	**bar**	**bar**	**bar**	**bar**
PSI	**PSI**	**PSI**	**PSI**	**PSI**	**PSI**



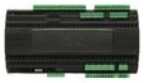

14.1. PARAMETER TABLES

14.1.1. QUICK START PARAMETERS TABLE

Access and use of Quick Start parameters is described in section '6. assisted configuration' page 30

PAR.	DESCRIPTION	RANGE	DEFAULT	M.U.	8900	9100	9900
	QUICKSTART						
501-tyPE	Type of plant **0 =** compressor rack of standard type **1 =** common discharge single discharge compressor racks **2 =** chiller. The same as case 0. In this case regulation is in temperature (referred to water) N.B.: If **501 - tyPE = 1** the parameters if the folder **Compressors [2]** will be visible	0 ... 2	0	num	●	●	●
502-PC1 **503-PC2** **504-PC3** **505-PC4** **506-PC5** **507-PC6** **508-PC7** **509-PC8** **510-PC9** **511-PC10** **512-PC11** **513-PC12**	Compressor 1 power or number of compressor 1 steps Compressor 2 power or number of compressor 2 steps Compressor 3 power or number of compressor 3 steps Compressor 4 power or number of compressor 4 steps Compressor 5 power or number of compressor 5 steps Compressor 6 power or number of compressor 6 steps Compressor 7 power or number of compressor 7 steps Compressor 8 power or number of compressor 8 steps Compressor 9 power or number of compressor 9 steps Compressor 10 power or number of compressor 10 steps Compressor 11 power or number of compressor 11 steps Compressor 12 power or number of compressor 12 steps	1 ... 255 1 ... 255 1 ... 255 1 ... 255 1 ... 255 1 ... 255 1 ... 255 1 ... 255 1 ... 255 1 ... 255 1 ... 255 1 ... 255	1 1 1 1 1 1 1 1 1 1 1 1	num num num num num num num num num num num num	●	●	●
514-EAAL	Enable cumulative alarms digital output It defines whether to assign the cumulative alarm automatically to a digital output on relay. **0=** No; **1=** Yes	0 ... 1	1	flag	●	●	●
515-EACI	Compressor INVERTER enabling digital output. Defines whether to automatically assign the compressor INVERTER 1 and 2 to the analogue outputs **0=** No; **1=** Yes	0 ... 1	0	flag	●	●	●
516-EAFI	Fan INVERTER enabling digital output. Defines whether to assign the fan INVERTER automatically to an analogue output **0=** No; **1=** Yes	0 ... 1	0	flag	●	●	●
517-EACIE	Compressor INVERTER 1 and 2 error digital input Defines whether to automatically assign the compressor INVERTER 1 and 2 error to the digital inputs. **0=** No; **1=** Yes	0 ... 1	0	flag	●	●	●
518-EAFIE	Fan INVERTER error digital input. Defines whether to automatically assign the fan INVERTER error to a digital input. **0=** No; **1=** Yes	0 ... 1	0	flag	●	●	●
519-EAgA	Enable generic alarm digital input. Defines whether to assign the generic alarm automatically to a digital input. **0=** No; **1=** Yes	0 ... 1	0	flag	●	●	●
520-Fnty	Fan mode 0 = **disabled** condensation control disabled 1= **inverter** control through INVERTER (only analogue) 2= **digital** control through relay 3= **inverter+backup** control with INVERTER (only analogue) with backup relay 4= **digital+inverter** control by relay + INVERTER 5= **dig+inv+backup** control by relay + INVERTER with backup relay	0 ... 5	2	num	●	●	●
521-nFn	Number of fans	1 ... 8	3 **9900** 3 **9100** 1 **8900**	num	●	●	●





PAR.	DESCRIPTION	RANGE	DEFAULT	M.U.	8900	9100	9900
522-CtyP	Circuit type 1 - suction section 0= **homogeneous** digital control by relay (HOMOGENEOUS STEPS) 1= **non-homogeneous** digital control by relay (NON-HOMOGENEOUS STEPS) 2 = **homogeneous+inverter** control by relay (HOMOGENEOUS STEPS) + INVERTER 3= **hom+inv+backup** control by relay (HOMOGENEOUS STEPS) + INVERTER with backup relay	0 ... 3	2	num	●	●	●
523-CPnU	Number of compressors circuit 1 N.B: 0 value is only allowed if **522-CtyP = 2**. (only INVERTER)	0 ... 12	3 **9900** 3 **9100** 2 **8900**	num	●	●	●
524-CtyP2	Circuit type 2-. See **522-CtyP**	0 ... 3	0	num	●	●	●
525-CPnU2	Number of compressors circuit 2 N.B: 0 value is only allowed if **524-CtyP2 = 2**. (only INVERTER)	0 ... 12	0	num	●	●	●




14.1.2. INSTALLER/USER PARAMETERS TABLE

PAR.		DESCRIPTION	RANGE	DEFAULT	M.U.	8900	9100	9900
		[1] COMPRESSORS • [2] COMPRESSORS [2] visible if Se 501 - tyPE = 1						
[1]	[2]	**Regulation Limits**						
141-LSE	**241-LSE**	Minimum setpoint	-100...600§	**-55.0**	°C	●	●	●
142-HSE	**242-HSE**	Maximum setpoint	-100...600§	**0.0**	°C	●	●	●
143-SEt	**243-SEt**	Suction setpoint	**141-LSE... 142-HSE§** **241-LSE... 242-HSE§**	**-35.0**	°C	●	●	●
144-Pbd	**244-Pbd**	Proportional band	-100...600§	**6.0**	°C	●	●	●
145-PbdE	**245-PbdE**	Extended proportional band. Significant parameter if: **101 - FCFn = 1 (Dead Band)** **201 - FCFn = 1 (Dead Band)**	-100...600§	**10.0**	°C	●	●	●
146-dSPo1	**246-dSPo1**	Offset 1 for dynamic set. Value to be summed to the Setpoint when the economy function in suction is activatedby time bands just for weekdays and for all other modes (digital / key / menu / remote / energy saving)	-100...600§	**2.0**	°C	●	●	●
147-dSPo2	**247-dSPo2**	Offset 2 for dyn set. Value to be summed to Setpoint when economy functionin suction is activated by time bands just for holidays.	-100...600§	**2.0**	°C	●	●	●
148-dLAL	**248-dLAL**	Hysteresis returning from minimum	-100...600§	**5.0**	°C	●	●	●
149-LAL	**249-LAL**	Absolute or relative minimum alarm limit	-100...600§	**20.0**	°C	●	●	●
150-dHAL	**250-dHAL**	Hysteresis returning from maximum	-100...600§	**5.0**	°C	●	●	●
151-HAL	**251-HAL**	Absolute or relative maximum alarm limit	-100...600§	**20.0**	°C	●	●	●
154-InLPt	**254-InLPt**	Threshold for INVERTER operation at minimum power	-100...600§	**-40.0**	°C	●	●	●
155 - AtdS	**255 - AtdS**	Ambient temperature dynamic set	-100...600°	**15.0**	°C	●	●	●
156 - dAtdS	**256 - dAtdS**	AtdS differential	-100...600°	**2.0**	°C	●	●	●
[1]	[2]	**Safety times**						
121-oFon	**221-oFon**	Compressor OFF - ON time. Minimum time, in minutes, between turning the same compressor off and back on again	0 ... 999	5	min	●	●	●
122-donF	**222-donF**	Compressor ON - OFF time. Minimum compressor operating time before being turned off. The 'called' compressor stays on at least for the time set by this parameter.	0 ... 999	15	sec	●	●	●
123-onon	**223-onon**	Compressor ON - ON time. Minimum time, in minutes, between turning the same compressor on twice.	0 ... 999	5	min	●	●	●
124-don	**224-don**	ON steps time. Delay time between the calls of two different steps.	0 ... 999	15	sec	●	●	●
125-doF	**225-doF**	OFF steps time. Delay time between switching off two different steps.	0 ... 999	5	sec	●	●	●
126-FdLy	**226-FdLy**	Enable dOn 1' step up (start up). Enables delay of parameter **124 - don / 224 - don** also upon the request to turn on steps for the first time after a condition of equilibrium.**0 =** no; **1 =** yes.	0 ... 1	1	flag	●	●	●
127-FdLF	**227-FdLF**	Enable dOF 1' step down. Enables for the parameter also **125 - doF** / **225 - doF** upon the request to turn off the steps for the first time after a condition of equilibrium. **0 =** No; **1 =** Yes.	0 ... 1	1	flag	●	●	●
[1]	[2]	**INVERTER**						
114-InLFr	**214-InLFr**	Inverter minimum frequency	0 ... 100	25	(Hz)	●	●	●
115-InMFr	**215-InMFr**	Inverter maximum frequency	0 ... 100	85	(Hz)	●	●	●
116-InSFr	**216-InSFr**	Switch Inverter frequency	0 ... 100	40	(Hz)	●	●	●
117-InRP	**217-InRP**	Inverter rated power at line frequency	0 ... 255	100	num	●	●	●
129-Inot	**229-Inot**	Max time INVERTER at minimum power	0 ... 999	999	min	●	●	●
130-InLt	**230-InLt**	Interval between INVERTER minimum and new power step activation	0 ...999	0	sec	●	●	●
131-InoFon	**231-InoFon**	Inverter OFF - ON time. Minimum time between switch off and the next switch on	0 ... 999	0	sec	●	●	●
132-Inonon	**232-Inonon**	Inverter ON - ON time. Minimum interval between two consecutive switch ons	0 ...999	0	sec	●	●	●
133-InSwt	**233-InSwt**	Minimum inverter switch on time	0 ...999	10	sec	●	●	●





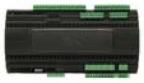
PAR.		DESCRIPTION	RANGE	DEFAULT	M.U.	8900	9100	9900
①	②	**Regulation/Alarms**						
The parameters 551-Stty, 552-PoLI, 553-SEr, 698-SUPFr are only displayed in the Regulation/Alarms folder and in common for the two circuits								
551-Stty		Regulation enabling suction/discharge with set central to the regulation band **0 (No)=** Side set; **1 (Yes)=** Central set.	0 ... 1	1	flag	●	●	●
552-PoLI		Compressor activation policy **0 =** fixed sequence; **1 =** rotation of compressors (balancing); **2 =** saturation 1; distribution of resources on smallest number of compressors possible to obtain highest number of compressors turned off. **3 =** saturation 2; same as saturation 1, except that all compressors must reach minimum power level (one step) before starting switch-off**..**	0 ... 3	2	flag	●	●	●
553-SEr		Compressor max usage time.	0 ... 32000	32000	hours	●	●	●
698-SUPFr		Line frequency. **0=**50Hz; **1=**60Hz	0 ... 1	0	flag	●	●	●
101-CCFn	**201-CCFn**	Compressors control type. Selection of type of compressor control **0=**Proportional; **1=**Dead band; **2=** PID	0 ... 2	2	num	●	●	●
102-ItEn	**202-ItEn**	Enabling full control. **0=**No; **1=**Yes	0 ... 1	1	flag	●	●	●
103-It	**203-It**	Integral time	0.1...90.0	90.0	sec	●	●	●
104-PbEn	**204-PbEn**	Enabling proportional control **0=**No; **1=**Yes	0 ... 1	1	flag	●	●	●
105-dtEn	**205-dtEn**	Enabling derivative control **0=**No; **1=**Yes	0 ... 1	0	flag	●	●	●
106-dt	**206-dt**	Derivative time	0.1...90.0	0.1	sec	●	●	●
107-dSS	**207-dSS**	Dynamic suction set mode. **0=** dynamic set; **1=** fixed set.	0 ... 1	1	flag	●	●	●
108-CPP	**208-CPP**	Enable default power control in case of suction probe error. **0 =** No; **1 =** Yes	0 ... 1	0	flag	●	●	●
109-PoPr	**209-PoPr**	Default power value in case of suction probe error or minimum power required in sub-critical C02 systems in cascade	0 ... 100	50	%	●	●	●
110 - InMode	**210 - InMode**	INV mode. **0=** inverter sequence 'First In Last Out', **1=** standard	0 ... 1	1	flag	●	●	●
111-PEn	**211-PEn**	Number of suction pressure switch trips which must occur in the time interval set by the parameter **112-PEI / 212-PEI**. If**= 0** the alarm is always automatic. If **= 33** the alarm is always manual.	0 ... 33	0	num	●	●	●
112-PEI	**212-PEI**	Time interval for the counting of **111-PEn** / **211-PEn**	1 ... 15	15	min	●	●	●
113-byPS	**213-byPS**	Bypass time suction pressure switch trip for high and low pressure	0 ... 999	0	min	●	●	●
118-PtSE	**218-PtSE**	This parameter depends on the compressor model being used. Depending on the mode set in the compressor to manage the power stages, the following options are available : **0=** Activation of power stage (solenoid valve)→ Power decrease **1=**Simple power stage → each power stage will enable a specific power **2=** Activation of power stage (solenoid valve) → Power increase	0 ... 2	0	num	●	●	●
120-nCPC	**220-nCPC**	Selection 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**). **0 =** function disabled.	**0** ... **523 - CPnU** **0** ... **523 - CPnU2**	0	num	●	●	●
128-CRP	**228-CRP**	Digital compressor rated power at line frequency	0 ... 255	100	num	●	●	●





PAR.	DESCRIPTION	RANGE	DEFAULT	M.U.	8900	9100	9900
	FANS						
	Regulation Limits						
341-LSE	Minimum setpoint	-100...600§	**0**	°C	●	●	●
342-HSE	Maximum setpoint	-100...600§	**45.0**	°C	●	●	●
343-SEt	Discharge setpoint	**341-LSE... 342-HSE§**	**35.0**	°C	●	●	●
344-Pbd	Proportional discharge band	-100...600§	**6.0**	°C	●	●	●
345-Cod1	Delta 1 cut-off. Limit to be summed to discharge set to go from ON/OFF to continuous regulation	-100...600§	**1.0**	°C	●	●	●
346-Cod2	Delta 2 cut-off. Limit to be summed to discharge set + delta 1 Cut-off from where modulated regulation control starts	-100...600§	**1.0**	°C	●	●	●
347-dHAL	Hysteresis returning from maximum	-100...600§	**5.0**	°C	●	●	●
348-HAL	Absolute or relative maximum alarm limit	-100...600§	**20.0**	°C	●	●	●
349-dSFo	This parameter has two meanings depending on **314-dSd:** • If 314-dSd=1 (fixed set) → Fixed offset for economy discharge function (value to be subtracted from discharge set point) • If 314-dSd=0 (dynamic set) → Upper limit of dynamic set economy discharge (floating condensation) based on the sum **343-SEt + 349-dSFo**	-100...600§	**2.0**	°C	●	●	●
350-HPP1	Limit 1 absolute or relative high discharge alarm prevention. Control probe discharge regulation value beyond which compressor power does not increase	-100...600§	**10.0**	°C	●	●	●
351-HPP2	Limit 2 absolute or relative high discharge alarm prevention. Discharge regulation value beyond which compressor power is proportionally decreased	-100...600§	**15.0**	°C	●	●	●
353-dLAL	Hysteresis returning from minimum	-100...600§	**5.0**	°C	●	●	●
354-LAL	Absolute or relative minimum alarm limit	-100...600§	**20.0**	°C	●	●	●
355-InLPt	Threshold for INVERTER operation at minimum power	-100...600§	**30.0**	°C	●	●	●
356-dSdo	Dynamic set economy discharge offset (floating condensation). Value to be summed to external temperature in proportion to plant power.	-100...600°	**10.0**	°C	●	●	●
357-dSLdo	Minimum economy discharge dynamic set offset (floating condensation).	-100...600°	**3.0**	°C	●	●	●
358-dSMEt	Maximum external temp. to enable discharge economy dynamic set (floating condensation).	-100...600°	**32.0**	°C	●	●	●
359-LdSP	Minimum economy discharge dynamic set (floating condensation)	-100...600°	**22.0**	°C	●	●	●
360-SCt1	Minimum sub-cooling setpoint (dynamic set floating condensation)	-100...600°	**3.0**	°C	●	●	●
361-SCt2	Maximum Sub-cooling setpoint (dynamic set floating condensation)	-100...600°	**6.0**	°C	●	●	●
362-SCd1	Minimum sub-cooling differential (dynamic set floating condensation)	-100...600°	**1.0**	°C	●	●	●
363-SCoF1	Minimum sub-cooling offset (dynamic set floating condensation)	-100...600°	**0.0**	°C	●	●	●
364-SCd2	Maximum sub-cooling differential (dynamic set floating condensation)	-100...600°	**8.0**	°C	●	●	●
365-SCoF2	Maximum sub-cooling offset (dynamic set floating condensation)	-100...600°	**10.0**	°C	●	●	●
366-EtPr	Disables dynamic setpoint if temperature measured by the sub-temperature probe is greater than the ext. ambient probe temperature + **366-EtPr**. Note. If **366-EtPr = 0** function not enabled	-100...600°	**0.0**	°C	●	●	●





PAR.	DESCRIPTION	RANGE	DEFAULT	M.U.	8900	9100	9900
	Safety times						
323-CIt	Pick-up time. Time for which the fans run at 100% when the fan battery is switched on	0 ... 120	0	sec	●	●	●
324-don	ON steps time. Delay time between the calls of two different steps.	0 ... 999	15	sec	●	●	●
325-doF	OFF steps time. Delay time between switching off two different steps.	0 ... 999	5	sec	●	●	●
326-FStt	Max OFF time. Maximum fans off time.	0 ... 999	0	hours	●	●	●
327-SEr	FAN max usage time.	0 ... 32000	32000	hours	●	●	●
331-FPkUP	Fan pick-up time after maximum OFF time	0 ... 999	10	min	●	●	●
	Inverter						
328-Inot	Max time INVERTER at minimum power	0 ... 999	999	min	●	●	●
329-InPC	INVERTER power step increase/decrease	0 ... 100	10	%	●	●	●
330-InoS	INVERTER minimum power activation mode (no discharge regulator request). **0=**the INVERTER continues at minimum speed defined by **309-InLSP** for the **328-Inot** time after which it is deactivated. **1=**the INVERTER continues at minimum speed defined by **309-InLSP** Note. **309-InLSP≠0**	0 ... 1	1	flag	●	●	●
	Regulation/Alarms						
301-FCFn	FAN control type. **0=**Proportional; **1=**Dead band; **2=** PID	0 ... 2	0	num	●	●	●
302-FACt	Activation mode If **= 0** fans operate independent of compressors. If **= 1** at least one compressor must be on.	0 ... 1	0	flag	●	●	●
303-CoIE	Enable cut-off inverter, **0=**No**; 1=**Yes	0 ... 1	0	flag	●	●	●
304-ItEn	Enabling full control. **0=**No; **1=**Yes	0 ... 1	1	flag	●	●	●
305-It	Integral time	0.1...90.0	90.0	sec	●	●	●
306-PbEn	Enabling proportional control **0=**No; **1=**Yes	0 ... 1	1	flag	●	●	●
307-dtEn	Enabling derivative control **0=**No; **1=**Yes	0 ... 1	0	flag	●	●	●
308-dt	Derivative time	0.1 ... 900	0.1	sec	●	●	●
309-InLSP	minimum fan speed %.	0 ... 100	0	%	●	●	●
310-InMSP	maximum fan speed %.	0 ... 100	100	%	●	●	●
311-InSSP	fan saturation speed %.	0 ... 100	100	%	●	●	●
312-FPP	Enable default power control in case of discharge probe error. **0=** No; **1 =** Yes	0 ... 1	0	flag	●	●	●
313-FPr	Default power when discharge probe error occurs. In case of mixed systems (digital fans + inverter), the inverter is switched off and the value 313-FPr is applied to the digital fans only.	0 ... 100	50	%	●	●	●
314-dSd	Discharge economy function mode **0=** dynamic set (floating condensation); **1=** fixed set	0 ... 1	1	flag	●	●	●
315-PEn	Number of pressure switch alarms that must occur in the time interval set by parameter **316-PEI** so that the alarm goes from automatic to manual. If **= 0** the alarm is always automatic. If **= 33** the alarm is always manual.	0 ... 33	0	num	●	●	●
316-PEI	Time interval for the counting of **315-PEn**	1 ... 15	15	min	●	●	●
317-byPS	Bypass time pressure switch alarms for high and low pressure	0 ... 999	0	min	●	●	●
318-HPPE	Enable HP alarm prevention. **0=**No**; 1=**Yes	0 ... 1	0	flag	●	●	●
319-HPPP	% Power HP alarm prevention	0 ... 100	30	%	●	●	●




PAR.	DESCRIPTION	RANGE	DEFAULT	M.U.	8900	9100	9900
320-HPPd	HP prevention alarm max duration. If the parameter is ≠0 maximum prevention function duration is counted starting from **350-HPP1** when this is exceeded the function is disabled for **321-HPPI** time If parameter is =0 controlof maximum prevention duration disabled	0 ... 999	15	min	●	●	●
321-HPPI	HP prevention alarm minimum interval.	0 ... 999	10	hours	●	●	●
322-rot	Activation Policy. **0=** fixed sequence; **1=** rotation based on hours of operation	0 ... 1	1	flag	●	●	●
	SAFETY MEASURES						
565-odo	Regulation delay from power-on.	0 ... 999	1	sec	●	●	●
566-PAo	Min/max alarm exclusion time from power on.	0 ... 999	15	min	●	●	●
567-tAo	HP/LP bypass time	0 ... 999	0	min	●	●	●
568-Aro	Alarms mute duration	0 ... 9999	15	min	●	●	●
569-PrSAE	Management suction pressure switch HPr/LPr alarm. **0= disabled** Disables alarm management; **1= warning** Only enables alarm warning; **2= alarm** Enables warning and any actions on regulators; **3= alarm + relay** Enables warning, any action on regulators and activates a dedicated relay for any blocking alarm action;	0 ... 3	2	num	●	●	●
570-PSAE	Suction HP/LP Alarm See **569-PrSAE**	0 ... 3	1	num	●	●	●
571-gtSAE	Refrigerant level alarm. See **569-PrSAE**	0 ... 3	2	num	●	●	●
572-gLSAE	Refrigerant leak alarm. See **569-PrSAE**.	0 ... 3	1	num	●	●	●
573-PrdAE	Discharge HPr/LPr alarm See **569-PrSAE**	0 ... 3	2	num	●	●	●
574-PdAE	Discharge HP/LP Alarm See **569-PrSAE**	0 ... 3	1	num	●	●	●
575-FtAE	Fan thermal switch alarm. See **569-PrSAE**	0 ... 3	2	num	●	●	●
576-FInAE	Fan inverter error alarm. See **569-PrSAE**	0 ... 3	2	num	●	●	●
577-SFAE	Fan maintenance alarm. See **569-PrSAE**	0 ... 3	1	num	●	●	●
578-CSAE	Compressor block alarm. See **569-PrSAE**	0 ... 3	2	num	●	●	●
579-CInAE	Compressor inverter error alarm. See **569-PrSAE**	0 ... 3	2	num	●	●	●
580-SCAE	Compressor maintenance alarm. See **569-PrSAE**	0 ... 3	1	num	●	●	●
581-oLAE	Oil level alarm. See **569-PrSAE**	0 ... 3	1	num	●	●	●
582-gAAE	General alarm. See **569-PrSAE**	0 ... 3	2	num	●	●	●
583-rtCAE	RTC alarm. See **569-PrSAE**	0 ... 3	1	num	●	●	●
701-HPPAE	HP prevention alarm management. **0=**Disables alarm management; **1=**Only enables alarm warning;	0 ... 1	1	flag	●	●	●
702-CFAE	Configurable regulator alarm management. See **569-PrSAE**	0 ... 3	1	num	●	●	●
703-COAE	HP/LP/TH/PD compressor alarm management. See **569-PrSAE**	0 ... 3	2	num	●	●	●
704-gtSd	Refrigerant level alarm message delay	0 ... 999	120	sec	●	●	●





PAR.	DESCRIPTION	RANGE	DEFAULT	M.U.	8900	9100	9900
	CONFIGURATION						
639-tAb	Tab. Parameter configuration index set in factory; cannot be modified by User.	0...32767	1	num	●	●	●
640-rtCE	Enable RTC. **Yes (1)** = RTC enabled; **No (0)**= RTC disabled.	0...1	1	flag	●	●	●
641-FtyP	Refrigerant type. **MODELS EWCM EO** **0=**R22; **1=**R134a; **2=**R502; **3=**R404A;**4=**R407C; **5=**R507; **6=**R717; **7=**R410A; **8=**R417a **9=**R744; **10=**R407A; **11=**R407F; **12=**Reserved; **13=**R427A; **14=**Reserved; **15=**R23. **MODELS EWCM EO - HFO** **0=**R434a; **1=**R134a; **2=**R448A; **3=**R404A;**4=**R407C; **5=**R427A; **6=**R717; **7=**R410A; **8=**R452A **9=**R744; **10=**R449A; **11=**R450; **12=**R407A; **13=**R513A; **14=**R407F; **15=**R442A.	0...15	3	num	●	●	●
646-Pb12	PB 1/2 probe type. Configurable in pairs: **0 =** 4-20mA;**1 =**0-5V;**2 =**0-10V	0...2	0	num	●	●	●
647-Pb34	PB 3/4 probe type. Configurable in pairs: **0 =**4-20mA;**1 =**0-5V;**2 =**0-10V **3 =** D.I. Digital input.	0...3	0	num	-	-	●
648-Pb56	PB 5/6 probe type. Configurable in pairs: **3 =** D.I. Digital Input; **4 =** NTC 103 AT; **5 =** PTC KTY81; **6 =** NTC NK103 C1R1	3...6	4	num	●	●	●
649-Pb78	PB 7/8 Probe Type. See **648-Pb56**	3...6	4	num	●	●	●
650-HPb1	PB1 High precision. **0=No, 1=Yes (High Precision)** **High Precision** hundredths of bar / tenths PSI **Low precision:** tenths of bar / PSI	0...1	1	flag	●	●	●
651-HPb2	PB2 High Precision. See **650-HPb1**	0...1	1 **9900** 0 **9100** 0 **8900**	flag	●	●	●
652-AoS1	Select V1 or I1 I1/V1 Analogue Output type. Selectable in voltage (V) or current (I). **0=Voltage, 1=Current**	0...1	0	flag	●	●	●
653-AoS2	Select V2 or I2 I2/V2 Analogue Output type. Selectable in voltage (V) or current (I). **0=Voltage, 1=Current**	0...1	0	flag	●	●	●
654-AoS3	Select V3 or I3 I3/V3 Analogue Output type. Selectable in voltage (V) or current (I). **0=Voltage, 1=Current**	0...1	0	flag	-	-	●
655-CALPb1	PB1 calibration. ALWAYS IN ABSOLUTE VALUES (absolute bar).	-10...10/-145...145	0	bar/PSI	●	●	●
656-CALPb2	PB2 calibration. ALWAYS IN ABSOLUTE VALUES (absolute bar).	-10...10/-145...145	0	bar/PSI	●	●	●
657-CALPb3	PB3 calibration. ALWAYS IN ABSOLUTE VALUES (absolute bar).	-10...10/-145...145	0	bar/PSI	-	-	●
659-CALPb5	PB5 calibration.	-10...10/18...18	0	°C/°F	●	●	●
660-CALPb6	PB6 calibration.	-10...10/18...18	0	°C/°F	●	●	●
661-CALPb7	PB7 calibration.	-10...10/18...18	0	°C/°F	●	●	●
662-CALPb8	PB8 calibration.	-10...10/18...18	0	°C/°F	●	●	●
663-LtPb1	Lower threshold PB1.	-1...1	0.50	bar	●	●	●
663-LtPb1	Lower threshold PB1.	-14.5...145	7.2	PSI	●	●	●
664-UtPb1	Upper threshold PB1.	1...10	8.00	bar	●	●	●
664-UtPb1	Upper threshold PB1.	-14.5...14.5	116.0	PSI	●	●	●
665-LtPb2	Lower threshold PB2.	-1...1 -1...1 -1...1	0.5 **9900** 1 **9100** 1 **8900**	bar	●	●	●
665-LtPb2	Lower threshold PB2.	-14.5...14.5 -14...14 -14...14	7.2 **9900** 14 **9100** 14 **8900**	PSI	●	●	●





PAR.	DESCRIPTION	RANGE	DEFAULT	M.U.	8900	9100	9900
666-UtPb2	Upper threshold PB2.	1...10 1...100 1...100	8.0 **9900** 31.0 **9100** 31.0 **8900**	bar	●	●	●
666-UtPb2	Upper threshold PB2.	14.5...145 14...1450 14...1450	116 **9900** 449 **9100** 449 **8900**	PSI	●	●	●
667-LtPb3	Lower threshold PB3.	-1...1	1	bar	-	-	●
667-LtPb3	Lower threshold PB3.	-14...14	14	PSI	-	-	●
668-UtPb3	Upper threshold PB3.	10...1000	31.0	bar	-	-	●
668-UtPb3	Upper threshold PB3.	14...1450	449	PSI	-	-	●
	DISPLAY						
541-LAng	Language selection **0=** 1st language (local language based on product code) **1=** 2nd language (default ENG) NB: Check product code and availability of languages with Sales Office.	0...1	0	flag	●	●	●
542-toUt	Exit menu timeout. Time, after which, you exit the current menu and go back to the previous menu.	10...1000	300	sec	●	●	●
543-rELP	Selects display in absolute or relative pressure. **0 =** absolute; **1 =** relative.	0...1	1	flag	●	●	●
544-AbS	Minimum high absolute/relative alarms. **0** (No) **=** absolute alarms mode; **1** (Yes) **=** relative alarms mode at set point.	0...1	1	flag	●	●	●
545-UMmIn	Suction UM lower limit **0=** °C; **1=**bar; **2=** °F; **3=** PSI.	0...3	0	num	●	●	●
546-UMMax	Suction UM upper limit **0=** °C; **1=**bar; **2=** °F; **3=** PSI.	0...3	1	num	●	●	●
547-UMCP	Suction UM.	**545-UMmIn** **546-UMMax**	0	num	●	●	●
548-UMFn	Discharge UM.	**545-UMmIn** **546-UMMax**	0	num	●	●	●
549-LoCK	Lock keyboard **0** (No); **1** (Yes). • Lock keyboard → **549-LoCK** • Unlock keyboard → key defined by **550-HKUnL**	0...1	0	flag	●	●	●
550-HKUnL	Unlock Keyboard Hotkey **0=** no key; **1=** F1 single pressure; **2=** F2 single pressure; **3=** F3 single pressure; **4=** Left key single pressure; **5=** Right key single pressure; **6=** OK key single pressure; **7=** F1 prolonged pressure; **8=** F2 prolonged pressure; **9=** F3 prolonged pressure; **10=** Left key prolonged pressure; **11=** Right key prolonged pressure; **12=** OK key prolonged pressure.	0...12	8	num	●	●	●
	FUNCTIONS						
554-drEn	Enable recording data. **0=**No; **1=**Yes	0...1	0	flag	●	●	●
555-HIEn	Enable recording history **0=**No; **1=**Yes	0...1	0	flag	●	●	●
556-ESFn	Energy Saving activation mode. **0=**Disabled; **1=**Suc.Eco.C1; **2=**Suc Eco.C2; **3=**Suc Eco.C1+ Suc Eco.C2; **4=**Discharge Eco; **5=**Suc Eco C1+ Discharge Eco; **6=**Discharge Eco+ Suc. Eco.C2; **7=** Suc.Eco.C1+ Suc Eco C2+Eco. Discharge	0...7	0	num	●	●	●
557-Hrto	SetPoint Maximum heat recovery outlet water temperature	-100...600°	**40.0**	**°C**	●	●	●
558-Hrdt	Delta heat recovery outlet water temperature	-100...600°	**10.0**	**°C**	●	●	●
559-LrCd	Circuit 1 control liquid return activation delay	0...999	15	min	●	●	●
560-Lron	Circuit 1 control liquid return ON time duty cycle	0...999	0	sec	●	●	●
561-LroF	Circuit 1 control liquid return OFF time duty cycle	0...999	0	sec	●	●	●
562-LrCd2	Circuit 2 control liquid return activation delay	0...999	15	min	●	●	●





PAR.	DESCRIPTION	RANGE	DEFAULT	M.U.	8900	9100	9900
563-Lron2	Circuit 2 control liquid return ON time duty cycle	0...999	0	sec	●	●	●
564-LroF2	Circuit 2 control liquid return OFF time duty cycle	0...999	0	sec	●	●	●
750-toUtgLy	Glycol system defrost time out	1...999	30	min	●	●	●
	ADDRESSING						
671-FAA	Family address (**family**) in Televis**System** network. For example: **00 01 00=FAA; 01=dEA**	0...14	0	num	●	●	●
672-dEA	Controller address (**address**) in Televis**System** network.	0...14	0	num	●	●	●
673-PtStLV	Protocol selection RS485: **2=**Micronet (**Televis**) or **3=Modbus RTU** If selecting the Modbus RTU protocol configure parameters **674-675**	2...3	2	num	●	●	●
674-bdrttLV	Baud rate RS485. **0=**9600; **1=**19200; **2=**38400 b/s	0...2	0	num	●	●	●
675-PtytLV	Parity bit RS485. **0=**NONE; **1=**ODD (disparity); **2=**EVEN (parity) If Televis protocol selected parameters 674-675 not significant.	0...2	1	num	●	●	●
676 - PtSEXP	Protocol selection RS485 EXP. **2=**Micronet (**Televis**) or **3=Modbus RTU** If selecting the Modbus RTU protocol configure parameters **677-678-679** **Factory settings to manage RS485 EXP serial with EEV V910/ V800 driver shall NOT be changed.**	2...3	3	num	●	●	●
677 - bdrtEXP	Baud rate RS485 EXP. **0=**9600; **1=**19200; **2=**38400 b/s	0...2	1	num	●	●	●
678 - PtyEXP	Parity bit RS485 EXP **0=**NONE; **1=**ODD (disparity); **2=**EVEN (parity)	0...2	2	num	●	●	●
679 - datEXP	RS485 EXP data bit. **0=**7 data bit; **1=**8 data bit;	0...1	1	flag	●	●	●
680 - EnEtH	Enab. ETHERNET. **0=**No; **1=**Yes;	0...1	0	flag	●	●	●

PAR.	DESCRIPTION		RANGE	DEFAULT	M.U.	8900	9100	9900
	RESOURCE ALLOCATION - Digital Outputs							
584-H201	Relay OUT1	**SEE TABLE CONFIGURATION**	-100...100	9	num	●	●	●
585-H202	Relay OUT2		-100...100	19	num	●	●	●
586-H203	Relay OUT3		-100...100	20	num	●	●	●
587-H204	Relay OUT4		-100...100	10 **8900** 21 **9100** 21 **9900**	num	●	●	●
588-H205	Relay OUT5		-100...100	0 **8900** 10 **9100** 10 **9900**	num	●	●	●
589-H206	Relay OUT6		-100...100	0 **8900** 11 **9100** 11 **9900**	num	●	●	●
590-H207	Relay OUT7		-100...100	0 **8900** 12 **9100** 12 **9900**	num	●	●	●
591-H208	Relay OUT8		-100...100	0	num	-	●	●
592-H209	Relay OUT9		-100...100	0	num	-	●	●
593-H210	Relay OUT10		-100...100	0	num	-	●	●
594-H211	Relay OUT11		-100...100	0	num	-	●	●
595-H212	Relay OUT12		-100...100	0	num	-	●	●
596-H213	Relay OUT13		-100...100	0	num	-	●	●
597-H214	Relay OUT14		-100...100	0	num	-	-	●
598-H215	Relay OUT15		-100...100	0	num	-	-	●
599-H216	Relay OUT16		-100...100	0	num	-	-	●
600-H217	Relay OUT17		-100...100	0	num	-	-	●
601-H218	Relay OUT18		-100...100	0	num	-	-	●
602-H219	Relay OUT19		-100...100	0	num	-	-	●





PAR.	DESCRIPTION		RANGE	DEFAULT	M.U.	8900	9100	9900
	Digital Inputs							
603 - H101	HV DIH1 digital IN	**SEE TABLE CONFIGURATION**	-99...99	-91	num	●	●	●
604 - H102	HV DIH2 digital IN		-99...99	-79	num	●	●	●
605 - H103	HV DIH3 digital IN		-99...99	-80	num	●	●	●
606 - H104	HV DIH4 digital IN		-99...99	-70 **8900** -81 **9100** -81 **9900**	num	●	●	●
607-H105	HV DIH5 digital IN		-99...99	-67 **8900** -70 **9100** -70 **9900**	num	●	●	●
608-H106	HV DIH6 digital IN		-99...99	-69 **8900** -71 **9100** -71 **9900**	num	●	●	●
609-H107	HV DIH7 digital IN		-99...99	-72	num	-	●	●
610-H108	HV DIH8 digital IN		-99...99	-67	num	-	●	●
611-H109	HV DIH9 digital IN		-99...99	-69	num	-	●	●
612-H110	HV DIH10 digital IN		-99...99	0	num	-	●	●
613-H111	HV DIH11 digital IN		-99...99	0	num	-	-	●
614-H112	HV DIH12 digital IN		-99...99	0	num	-	-	●
615-H113	HV DIH13 digital IN		-99...99	0	num	-	-	●
616-H114	HV DIH14 digital IN		-99...99	0	num	-	-	●
617-H301	LV DI1 digital IN	**SEE TABLE CONFIGURATION**	-99...99	0	num	-	●	●
618-H302	LV DI2 digital IN		-99...99	0	num	-	●	●
619-H303	LV DI3 digital IN		-99...99	0	num	-	●	●
620-H304	LV DI4 digital IN		-99...99	0	num	-	●	●
621-H305	LV DI5 digital IN		-99...99	0	num	-	-	●
622-H306	LV DI6 digital IN		-99...99	0	num	-	-	●
	Analogue Inputs							
623-H401	PB1 analogue IN **0=** Disabled; **1=** Circuit C1 suction pressure; **2=** Circuit C2 suction pressure; **3=**Discharge pressure		0...3	1	num	●	●	●
624-H402	PB2 analogue IN. See **623-H401**		0...3	0 **9900** 3 **9100** 3 **8900**	num	●	●	●
625-H403	PB3 analogue IN.	**SEE TABLE CONFIGURATION**	-102...102	3	num	-	-	●
627-H405	PB5 analogue IN.		-109...109	0	num	●	●	●
628-H406	PB6 analogue IN.		-109...109	0	num	●	●	●
629-H407	PB7 analogue IN.		-109...109	0	num	●	●	●
630-H408	PB8 analogue IN.		-109...109	0	num	●	●	●
	Analogue Outputs							
631-H501	V1/I1 analogue OUT **0=**Disabled; **1=**Fan inverter switch-on; **2=**Inverter compressor circuit C1 switch on **3=**Inverter compressor circuit C2 switch on; **4=** regulator analogue output configurable step 1		0...4	2	num	●	●	●
632-H502	V2/I2 analogue OUT. See **631-H501**		0...4	0	num	●	●	●





	FILES SETUP						
452-USId1	User string 1	0...20	*****	string	●	●	●
453-USId2	User string 2	0...20	*****	string	●	●	●
459-rECF	Recordings file name (**.REC**)	0...10	8900-01 9100-01 9900-01	string	●	●	●
460-HISF	Alarm history file name (**.HIS**)	0...10		string	●	●	●
461-dAtF	Parameter file name (**.DAT**)	0...10		string	●	●	●
462-gLoF	Glossary file name (**.GLO**)	0...10		string	●	●	●
	GENERAL REGULATOR						
710-MPCFR	Configurable regulator probe mode **0=**disabled; **1=**probe selected; **2=**difference between probe selected and discharge probe;	0...2	0	num	●	●	●
711-MCFr1	Configurable regulator mode step 1 **0=**Cooling; **1=**Heating;	0...1	0	flag	●	●	●
712-MCFr2	Configurable regulator mode step 2 **0=**Cooling; **1=**Heating;	0...1	0	flag	●	●	●
713-SEtCFR1	Configurable regulator setpoint step 1	-100...600°	**0.0**	**°C**	●	●	●
714-SEtCFR2	Configurable regulator setpoint step 2	-100...600°	**0.0**	**°C**	●	●	●
715-dCFr1	Configurable regulator delta step 1	-100...600°	**1.0**	**°C**	●	●	●
716-dCFr2	Configurable regulator delta step 2	-100...600°	**1.0**	**°C**	●	●	●
717-PbdCFr1	Proportional band step 1	-100...600°	**1.0**	**°C**	●	●	●
718-CodCFR1	Delta cut-off step 1	-100...600°	**1.0**	**°C**	●	●	●
719-CFr1dly	Configurable regulator delay step 1	0...255	0	sec	●	●	●
720-CFr2dly	Configurable regulator delay step 2	0...255	0	sec	●	●	●
721-CFrL1	% minimum step 1	0...100	0	%	●	●	●
722-CFrM1	% maximum step 1	0...100	100	%	●	●	●
723-CFrS1	% saturation step 1	0...100	100	%	●	●	●
724-ECFAw	Enable warning configurable alarm **0=**Disabled; **1=**Enabled;	0...1	0	flag	●	●	●
725-CFAty	Configurable alarm mode **0=**Minimum; **1=**Maximum;	0...1	0	flag	●	●	●
726-SEtwCFA	Configurable alarm warning threshold	-100...600°	**0.0**	**°C**	●	●	●
727-SEtCFA	Configurable alarm setpoint	-100...600°	**0.0**	**°C**	●	●	●
728-dCFA	Configurable alarm differential	-100...600°	**1.0**	**°C**	●	●	●
	EXTERNAL DRIVER						
740 - EEvE	Enable EEV. Enable electronic valve driver **0=**disabled; **1=**step 1; **2=**CO2;	0...2	0	num	●	●	●
741 - drMMT	Delay activation high temperature central (MT) at minimum power	0...999	0	sec	●	●	●
742 - dCOnLT	Delay activation compressor after high temperature central (MT) consent	0...999	0	sec	●	●	●
	User password						
634-PSW1	Password 1.	0…5	*****	string	●	●	●
	Installer Password						
636-PSW3	Password 3.	0...5	*****	string	●	●	●
	The Service password is visible from Service Menu						
	Service Password						
637-PSW4	Password 4.	0...5	*****	string	●	●	●





CONFIGURATION TABLE

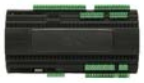
KEY

C1> circuit 1, C2> circuit 2

LP> suction, HP> discharge

No. #	DIGITAL OUTPUTS CONFIGURATION	DIGITAL INPUTS CONFIGURATION
	Output configuration on relay OUT1... OUT19: positive values indicate direct polarity, negative values the contrary.	Digital input configuration high voltage DIH1...DIH14 and low voltage DI1...DI6: positive values indicate direct polarity, negative values the contrary.
0	disabled	disabled
±1	Digital output AUX1	General alarm
±2	Digital output AUX2	Digital input AUX1
±3	Digital output AUX3	Digital input AUX2
±4	Digital output AUX4	Digital input AUX3
±5	Digital output central gas expulsion (gas leak)	Digital input AUX4
±6	Liquid return control digital output C1	Suction economy digital input C1
±7	Liquid return control digital output C2	Suction economy digital input C2
±8	Safety relay digital output	Discharge economy digital input
±9	Cumulative alarm digital output	Energy saving digital input
±10	Switch-on digital fan 1	Liquid refrigerant level
±11	Switch-on digital fan 2	Liquid refrigerant leak
±12	Switch-on digital fan 3	Hot gas defrosting request C1
±13	Switch-on digital fan 4	Hot gas defrosting request C2
±14	Switch-on digital fan 5	Circuit C1 lubricant oil level
±15	Switch-on digital fan 6	Circuit C2 lubricant oil level
±16	Switch-on digital fan 7	Compressor 1 differential pressure switch
±17	Switch-on digital fan 8	Compressor 2 differential pressure switch
±18	Enable INVERTER fan	Compressor 3 differential pressure switch
±19	Compressor 1 switched on	Compressor 4 differential pressure switch
±20	Compressor 2 switched on	Compressor 5 differential pressure switch
±21	Compressor 3 switched on	Compressor 6 differential pressure switch
±22	Compressor 4 switched on	Compressor 7 differential pressure switch
±23	Compressor 5 switched on	Compressor 8 differential pressure switch
±24	Compressor 6 switched on	Compressor 9 differential pressure switch
±25	Compressor 7 switched on	Compressor 10 differential pressure switch
±26	Compressor 8 switched on	Compressor 11 differential pressure switch
±27	Compressor 9 switched on	Compressor 12 differential pressure switch
±28	Compressor 10 switched on	HP Compressor 1
±29	Compressor 11 switched on	HP Compressor 2
±30	Compressor 12 switched on	HP Compressor 3
±31	Enable compressor INVERTER C1	HP Compressor 4
±32	Enable compressor INVERTER C2	HP Compressor 5
±33	Stages 1 Compressor 1	HP Compressor 6
±34	Stages 2 Compressor 1	HP Compressor 7
±35	Stages 3 Compressor 1	HP Compressor 8
±36	Stages 4 Compressor 1	HP Compressor 9
±37	Stages 5 Compressor 1	HP Compressor 10
±38	Stages 1 Compressor 2	HP Compressor 11
±39	Stages 2 Compressor 2	HP Compressor 12
±40	Stages 3 Compressor 2	LP Compressor 1
±41	Stages 4 Compressor 2	LP Compressor 2
±42	Stages 5 Compressor 2	LP Compressor 3
±43	Stages 1 Compressor 3	LP Compressor 4
±44	Stages 2 Compressor 3	LP Compressor 5
±45	Stages 3 Compressor 3	LP Compressor 6
±46	Stages 4 Compressor 3	LP Compressor 7
±47	Stages 5 Compressor 3	LP Compressor 8
±48	Stages 1 Compressor 4	LP Compressor 9
±49	Stages 2 Compressor 4	LP Compressor 10
±50	Stages 3 Compressor 4	LP Compressor 11
±51	Stages 4 Compressor 4	LP Compressor 12
±52	Stages 5 Compressor 4	Compressor 1 thermal switch
±53	Stages 1 Compressor 5	Compressor 2 thermal switch
±54	Stages 2 Compressor 5	Compressor 3 thermal switch
±55	Stages 3 Compressor 5	Compressor 4 thermal switch
±56	Stages 4 Compressor 5	Compressor 5 thermal switch
±57	Stages 5 Compressor 5	Compressor 6 thermal switch
±58	Stages 1 Compressor 6	Compressor 7 thermal switch
±59	Stages 2 Compressor 6	Compressor 8 thermal switch
±60	Stages 3 Compressor 6	Compressor 9 thermal switch

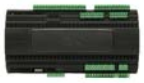




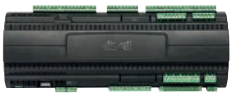
No. #	DIGITAL OUTPUTS CONFIGURATION	DIGITAL INPUTS CONFIGURATION
±61	Stages 4 Compressor 6	Compressor 10 thermal switch
±62	Stages 5 Compressor 6	Compressor 11 thermal switch
±63	Stages 1 Compressor 7	Compressor 12 thermal switch
±64	Stages 2 Compressor 7	Circuit compressor inverter error C1
±65	Stages 3 Compressor 7	Circuit compressor inverter error C2
±66	Stages 4 Compressor 7	Fan inverter error
±67	Stages 5 Compressor 7	Circuit C1 suction gas pressure switch
±68	Stages 1 Compressor 8	Circuit C2 suction gas pressure switch
±69	Stages 2 Compressor 8	Discharge gas pressure switch
±70	Stages 3 Compressor 8	Digital fan thermal switch 1
±71	Stages 4 Compressor 8	Digital fan thermal switch 2
±72	Stages 5 Compressor 8	Digital fan thermal switch 3
±73	Stages 1 Compressor 9	Digital fan thermal switch 4
±74	Stages 2 Compressor 9	Digital fan thermal switch 5
±75	Stages 3 Compressor 9	Digital fan thermal switch 6
±76	Stages 4 Compressor 9	Digital fan thermal switch 7
±77	Stages 5 Compressor 9	Digital fan thermal switch 8
±78	Stages 1 Compressor 10	Fan thermal switch regulated continuously
±79	Stages 2 Compressor 10	Block compressor 1
±80	Stages 3 Compressor 10	Block compressor 2
±81	Stages 4 Compressor 10	Block compressor 3
±82	Stages 5 Compressor 10	Block compressor 4
±83	Stages 1 Compressor 11	Block compressor 5
±84	Stages 2 Compressor 11	Block compressor 6
±85	Stages 3 Compressor 11	Block compressor 7
±86	Stages 4 Compressor 11	Block compressor 8
±87	Stages 5 Compressor 11	Block compressor 9
±88	Stages 1 Compressor 12	Block compressor 10
±89	Stages 2 Compressor 12	Block compressor 11
±90	Stages 3 Compressor 12	Block compressor 12
±91	Stages 4 Compressor 12	Block continuous control compressor C1
±92	Stages 5 Compressor 12	Block continuous control compressor C2
±93	Blocking alarm digital output	-
±94	Configurable regulator digital output step 1	Activation glycol system defrosting
±95	Configurable regulator digital output step 2	minimum activation for HP plant
±96	power status >0% HP plant	reception of power status >0% HP plant
±97	control minimum activation for HP plant	stand-by
±98	control EEV activation from LP plant	forcing suction setpoint 141-LSE circuit 1 / 241-LSE circuit 2
±99	Power delivered greater than 0 or at least one compressor available	forcing discharge setpoint 342 -HSE
±100	Power delivered greater than 0	




No. #	CONFIGURATION ANALOGUE INPUT PRESSURE PB3	CONFIGURATION ANALOGUE INPUTS TEMPERATURE PB5 PB6 PB7 PB8
	Input is also configurable as digital. In this case positive values indicate direct polarity, negative ones the contrary. See **CONFIGURATION > 647 - Pb34 = 3**	Inputs can also be configured as digital. In this case positive values indicate direct polarity, negative ones the contrary. See **CONFIGURATION > 648 - Pb56 = 3** **CONFIGURATION > 649 - Pb78 = 3**
0	disabled	disabled
±1	Circuit C1 suction gas pressure	Circuit C1 suction gas temperature
±2	Circuit C2 suction gas pressure	Circuit C2 suction gas temperature
±3	Discharge gas pressure	Discharge gas temperature
±4	General alarm	Internal ambient temperature
±5	Digital input AUX1	External ambient temperature
±6	Digital input AUX2	'Sub-temperature' sensor
±7	Digital input AUX3	Recovery water temperature
±8	Digital input AUX4	Configurable temperature regulator
±9	Suction economy digital input C1	Configurable temperature regulator + Alarm for configurable regulator
±10	Suction economy digital input C2	Temperature alarm for configurable regulator
±11	Discharge economy digital input	General alarm
±12	Energy saving digital input	Digital input AUX1
±13	Liquid refrigerant level	Digital input AUX2
±14	Liquid refrigerant leak	Digital input AUX3
±15	Hot gas defrosting request C1	Digital input AUX4
±16	Hot gas defrosting request C2	Suction economy digital input C1
±17	Circuit C1 lubricant oil level	Suction economy digital input C2
±18	Circuit C2 lubricant oil level	Discharge economy digital input
±19	Compressor 1 differential pressure switch	Energy saving digital input
±20	Compressor 2 differential pressure switch	Liquid refrigerant level
±21	Compressor 3 differential pressure switch	Liquid refrigerant leak
±22	Compressor 4 differential pressure switch	Hot gas defrosting request C1
±23	Compressor 5 differential pressure switch	Hot gas defrosting request C2
±24	Compressor 6 differential pressure switch	Circuit C1 lubricant oil level
±25	Compressor 7 differential pressure switch	Circuit C2 lubricant oil level
±26	Compressor 8 differential pressure switch	Compressor 1 differential pressure switch
±27	Compressor 9 differential pressure switch	Compressor 2 differential pressure switch
±28	Compressor 10 differential pressure switch	Compressor 3 differential pressure switch
±29	Compressor 11 differential pressure switch	Compressor 4 differential pressure switch
±30	Compressor 12 differential pressure switch	Compressor 5 differential pressure switch
±31	HP Compressor 1	Compressor 6 differential pressure switch
±32	HP Compressor 2	Compressor 7 differential pressure switch
±33	HP Compressor 3	Compressor 8 differential pressure switch
±34	HP Compressor 4	Compressor 9 differential pressure switch
±35	HP Compressor 5	Compressor 10 differential pressure switch
±36	HP Compressor 6	Compressor 11 differential pressure switch
±37	HP Compressor 7	Compressor 12 differential pressure switch
±38	HP Compressor 8	HP Compressor 1
±39	HP Compressor 9	HP Compressor 2
±40	HP Compressor 10	HP Compressor 3
±41	HP Compressor 11	HP Compressor 4
±42	HP Compressor 12	HP Compressor 5
±43	LP Compressor 1	HP Compressor 6
±44	LP Compressor 2	HP Compressor 7
±45	LP Compressor 3	HP Compressor 8
±46	LP Compressor 4	HP Compressor 9
±47	LP Compressor 5	HP Compressor 10
±48	LP Compressor 6	HP Compressor 11
±49	LP Compressor 7	HP Compressor 12
±50	LP Compressor 8	LP Compressor 1
±51	LP Compressor 9	LP Compressor 2
±52	LP Compressor 10	LP Compressor 3
±53	LP Compressor 11	LP Compressor 4
±54	LP Compressor 12	LP Compressor 5
±55	Compressor 1 thermal switch	LP Compressor 6
±56	Compressor 2 thermal switch	LP Compressor 7
±57	Compressor 3 thermal switch	LP Compressor 8
±58	Compressor 4 thermal switch	LP Compressor 9
±59	Compressor 5 thermal switch	LP Compressor 10
±60	Compressor 6 thermal switch	LP Compressor 11
±61	Compressor 7 thermal switch	LP Compressor 12

No. #	CONFIGURATION ANALOGUE INPUT PRESSURE PB3	CONFIGURATION ANALOGUE INPUTS TEMPERATURE PB5 PB6 PB7 PB8
±62	Compressor 8 thermal switch	Compressor 1 thermal switch
±63	Compressor 9 thermal switch	Compressor 2 thermal switch
±64	Compressor 10 thermal switch	Compressor 3 thermal switch
±65	Compressor 11 thermal switch	Compressor 4 thermal switch
±66	Compressor 12 thermal switch	Compressor 5 thermal switch
±67	Circuit compressor inverter error C1	Compressor 6 thermal switch
±68	Circuit compressor inverter error C2	Compressor 7 thermal switch
±69	Fan inverter error	Compressor 8 thermal switch
±70	Circuit C1 suction gas pressure switch	Compressor 9 thermal switch
±71	Circuit C2 suction gas pressure switch	Compressor 10 thermal switch
±72	Discharge gas pressure switch	Compressor 11 thermal switch
±73	Digital fan thermal switch 1	Compressor 12 thermal switch
±74	Digital fan thermal switch 2	Circuit compressor inverter error C1
±75	Digital fan thermal switch 3	Circuit compressor inverter error C2
±76	Digital fan thermal switch 4	Fan inverter error
±77	Digital fan thermal switch 5	Circuit C1 suction gas pressure switch
±78	Digital fan thermal switch 6	Circuit C2 suction gas pressure switch
±79	Digital fan thermal switch 7	Discharge gas pressure switch
±80	Digital fan thermal switch 8	Digital fan thermal switch 1
±81	Fan thermal switch regulated continuously	Digital fan thermal switch 2
±82	Block compressor 1	Digital fan thermal switch 3
±83	Block compressor 2	Digital fan thermal switch 4
±84	Block compressor 3	Digital fan thermal switch 5
±85	Block compressor 4	Digital fan thermal switch 6
±86	Block compressor 5	Digital fan thermal switch 7
±87	Block compressor 6	Digital fan thermal switch 8
±88	Block compressor 7	Fan thermal switch regulated continuously
±89	Block compressor 8	Block compressor 1
±90	Block compressor 9	Block compressor 2
±91	Block compressor 10	Block compressor 3
±92	Block compressor 11	Block compressor 4
±93	Block compressor 12	Block compressor 5
±94	Block continuous control compressor C1	Block compressor 6
±95	Block continuous control compressor C2	Block compressor 7
±96	-	Block compressor 8
±97	Activation glycol system defrosting	Block compressor 9
±98	minimum activation for HP plant	Block compressor 10
±99	reception of power status >0% HP plant	Block compressor 11
±100	stand-by	Block compressor 12
±101	forcing suction setpoint 141-LSE circuit 1 / 241-LSE circuit 2	Block continuous control compressor C1
±102	forcing discharge setpoint 342 -HSE	Block continuous control compressor C2
±103		-
±104		Activation glycol system defrosting
±105		minimum activation for HP plant
±106		reception of power status >0% HP plant
±107		stand-by
±108		forcing suction setpoint 141-LSE circuit 1 / 241-LSE circuit 2
±109		forcing discharge setpoint 342 -HSE



15.1. ALARMS

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

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

The alarms can be of 3 types:

Automatic Alarm > AUTO
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 from the alarms menu.

Semi-automatic alarm (by time or events)>
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.

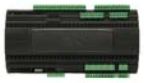
ALARM ACKNOWLEDGEMENT
Alarms can be acknowledged in the Main Display by pressing key F3 once (see Keys and Components section)[1].
The alarm LED flashes.
The relay configured as an alarm relay will be deactivated.

Acknowledgement duration parameter
SAFETY MEASURES > 568-Aro.
If **SAFETY MEASURES > 568-Aro=0** mute is not enabled.

With 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 on again.

1 or from function menu **Mute**

15.1.1. 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 566-Pao time from the device being switched on.

ALARM AND ERROR PROBE > immediate management if enabled

MAXIMUM AND MINIMUM ALARMS > SAFETY MEASURES > 566-PAo

15.1.2. MANAGING ALARMS

Each alarm can be managed singly and configured by parameter:

SAFETY MEASURES > 569-PrSAE
Values attributable to alarm parameters 569-PrSAE...701-HPPAE
Management suction pressure switch HPr/LPr alarm.
0= disabled Disables alarm management;
1= warning Enables alarm warning only;
2= alarm Enables warning and any action on regulators;
3= alarm + relay Enables warning, any actions on regulators and activating a relay for blocking alarm;

Parameter	Managing alarm	Values
570-PSAE	Suction HP/LP Alarm.	**569-PrSAE**
571-gtSAE	Refrigerant Level alarm.	
572-gLSAE	Refrigerant Leak alarm.	
573-PrdAE	Discharge HPr/LPr alarm.	
574-PdAE	Discharge HP/LP Alarm.	
575-FtAE	Fan thermal switch alarm	
576-FInAE	Fan inverter error alarm	
577-SFAE	Fan maintenance alarm.	
578-CSAE	Compressor block alarm.	
579-CInAE	Compressor inverter error alarm.	
580-SCAE	Compressor maintenance alarm.	
581-oLAE	Oil level alarm.	
582-gAAE	General alarm	
583-rtCAE	RTC Alarm.	
701-HPPAE	HP prevention alarm management.	0=Disables alarm management; 1=Only enables alarm warning;
702-CFAE	configurable regulator.	**569-PrSAE**
703-COAE	HP/LP/TH/PD compressor alarm management.	
704-gtSd	Refrigerant level alarm message delay	0...999 sec

Management of probe errors always enabled is an exception.

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





15.1.3. ALARM HISTORY

ENABLING >> FUNCTIONS > 555-HIEn = 1

The history contains a maximum of 50 alarms. A new alarm, after this limit is reached, will result in the loss of the oldest alarm data.
When a new alarm is activated it is entered in the history immediately. 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 occurred in the same hour, its hourly frequency is increased.
The maximum value of hourly frequency is 99.

Each alarm is represented as follows:
- nn Exyzw-hh-dd/mm/yy-ff
• -nn Alarm no. [1...50]
• Exyzw: 'E' followed by alarm code (xy) and system index (zw)
• hh: Time 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: E0102-13-12/06/12-02
Alarm 0102 at 13:00 on 12 June 2012; 2 activations in the hour

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 discharge pressure switch alarm (manual)	06	00	
HP discharge pressure switch alarm (manual)	07	00	
Discharge probe maximum alarm	08	00	
Discharge 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
HP compressor alarm	16	01...02	
LP compressor alarm	17	01...02	
Compressor thermal switch alarm	18	01...02	
Compressor maintenance alarm	19	01...12	01 compressor 1 ... 12 compressor 12
Compressor inverter block alarm	20	01...02	01 circuit 1 02 circuit 2
Compressor inverter maintenance alarm	21	01...02	

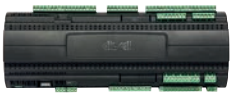




Alarms list	Alarm code (xy)	System index (zw)	Notes
Compressor block alarm	22	01	01 compressor 1 ... 12 compressor 12
Compressor inverter error alarm	23	01...02	01 circuit 1 02 circuit 2
Compressor lubricant oil level alarm	24	01...02	
General system alarm	25	00	
Internal ambient temperature alarm	26	00	
Suction gas probe error alarm	27	01...02	01 circuit 1 02 circuit 2
Discharge gas probe error alarm	28	00	
External ambient temperature alarm	29	00	
Recovery water temperature alarm	30	00	
Sub-cooling temperature alarm	31	00	
Error opening recordings file	32	00	
Error writing recordings file	33	00	
Error closing recordings file	34	00	
Recordings memory full error	35	00	
IO Configuration Error	36	00	
EEPROM Bios error **(Warning)**	37	00	
EEPROM User error **(Warning)**	38	00	
RTC batt exhausted	39	00	
RTC connection error	40	00	
RTC Value Error	41	00	
Discharge HP alarm prevention timeout	42	00	
Configurable regulator warning	43	0	
Configurable regulator alarm	44	0	
Configurable regulator probe error	45	0	
Configurable alarm regulator probe error	46	0	

UPLOADING THE ALARMS HISTORY

See USB Copy Card chapter





15.1.4. DISCHARGE HP ALARM PREVENTION

The discharge HP alarm is prevented by limiting the number of resources that the suction regulator would normally require to activate when the HP control probe value is close to the alarm activation threshold.

ENABLING >> FANS > Regulation Alarms > 318-HPPE = 1

This prevention algorithm is based on the definition of two HP control probe thresholds definable in absolute or relative mode based on parameter **DISPLAY > 544-AbS**:

Minimum/maximum Alarms absolute/relative	Threshold 1 WARNING	Threshold 2 POWER REDUCTION
ASSOLUTE (abs) DISPLAY > 544-AbS = 0	FANS > Regulation Thresholds> 350-HPP1	FANS > Regulation Thresholds> 351-HPP2
RELATIVE (rel) DISPLAY > 544-AbS = 1	FANS > Regulation Thresholds> 343-SEt + FANS > Regulation Thresholds> 350-HPP1	FANS > Regulation Thresholds> 343-SEt + FANS > Regulation Thresholds> 351-HPP2

→ limit 1 exceeded (WARNING)
When the value read by the HP control probe exceeds **limit 1**, resources can no longer be activated by the suction controller.
The power delivered can therefore only decrease in accordance with requests made by the temperature controller.

→← limit 1 - limit 2 interval
New resources will NOT be activated in this interval.

→ limit 2 exceeded (POWER REDUCTION)
The maximum power percentage implemented will be defined by parameter **319-HPPP**.

Example 1:
- Compressor rack power 80%,
- **319-HPPP** = 50%.

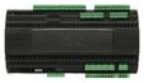
The resources will be deactivated to supply power at the maximum implemented percentage of 50%.

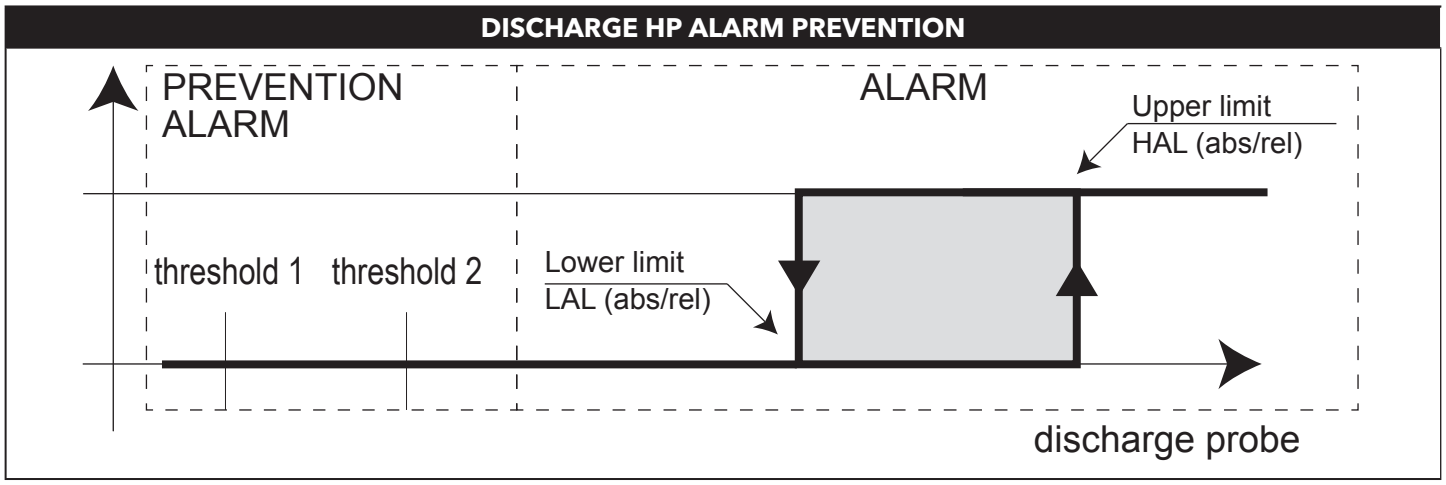
Example 2:
- Compressor rack power 30%,
- **319-HPPP** = 50%.

The power supplied remains at the maximum implemented percentage of 30%.

← values under limit 1 (reset)
For values under **limit 1** the suction controller resumes normal control.







User parameters

The parameters that manage the discharge alarm prevention regulator are:

Folder	Label	Description
FANS Regulation Thresholds	**350-HPP1**	**Threshold 1** absolute or relative discharge HP alarm prevention.
FANS Regulation Thresholds	**351-HPP2**	**Threshold 2** absolute or relative discharge HP alarm prevention.
FANS Regulation/Alarms	**318-HPPE**	Enable discharge HP alarm prevention **0=No; 1=Yes**
FANS Regulation/Alarms	**319-HPPP**	% Power HP alarm prevention
FANS Regulation/Alarms	**320-HPPd**	Maximum duration of discharge HP alarm prevention. If **0 =** output disabled for timeout
FANS Regulation/Alarms	**321-HPPI**	Minimum interval between discharge HP alarm preventions.
SAFETY MEASURES	**701-HPPAE**	HP alarm prevention timeout discharge management. **0=**Disables alarm management; **1=**Enables only the alarm warning

15.1.4.1 DISCHARGE HIGH PREVENTION REGULATION WHEN LIMIT 2 IS EXCEEDED

HOMOGENEOUS STEPS, HOMOGENEOUS STEPS + INVERTER, INVERTER

The maximum power percentage implemented will be defined by parameter **319-HPPP**.

NON-HOMOGENEOUS STEPS

The system will attempt to guarantee a power as close as possible in excess relating to that requested by parameter **319-HPPP**, in line with the resources available at the time of the decision.
Resource deactivation takes place in accordance with the compressor safety times.

SAFETY MEASURES

Parameter **320-HPPd**, if not 0, defines the maximum duration of the prevention algorithm.
When the algorithm remains active for longer than **320-HPPd** (counted from when **limit 1** is exceeded), the algorithm is disabled for the time set in parameter **321-HPPI**.
If enabled by parameter **701-HPPAE**, the alarm message "'**HP Prevent. Timeout** ".
Once delay **321-HPPI** has elapsed and, if the conditions exist, the discharge high alarm prevention can be reactivated.
The alarm automatically resets when the HP control probe value drops below **limit 1** 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, management of this algorithm is not enabled.



15.2. ALARMS TABLES

KEY

C1 > circuit 1, C2 > circuit 2

LP > suction, HP > discharge

Automatic Alarm > AUTO

Manual alarm >

Semi-automatic alarm (by time or events) >

15.2.1. UTILITIES ALARMS TABLE

Display	RESET	Parameter	Block	Description • Notes
Refrigerant Level Plant		571 - gtSAE		**Refrigerant Level** Plant shutdown
Refrigerant Leak Plant		572 - gLSAE		**Refrigerant Leak** Activates central gas expulsion digital output
Th.switch Fan 1...8	**AUTO**	575 - FtAE	1...8(°)	**Fan thermal switch 1... 8** Plant shutdown if all digital fans are on thermal
FANS INV th.switch Discharge	**AUTO**	575 - FtAE		**INVERTER Fan thermal switch** Plant shutdown
Inverter Error Discharge	**AUTO**	576 - FinAE		**Fan inverter error** Plant shutdown
Maintenance Fan 1...8		577 - SFAE	1...8(°)	**Fan maintenance 1...8** Plant Block if all digital fans are in maintenance
FANS INV maintenance Discharge		577 - SFAE		**INVERTER Fan maintenance** Plant shutdown
Oil.Press.Diff Compressor 1...12	**AUTO**	703 -COAE	1...12(°)	**Compressor 1...12 oil differential pressure**
HP Compressor Compressor 1...12	**AUTO**	703 -COAE	1...12(°)	**HP Compressor 1...12**
LP Compressor Compressor 1...12	**AUTO**	703 -COAE	1...12(°)	**LP Compressor 1...12**
Th. switch Compressor 1...12	**AUTO**	703 -COAE	1...12(°)	**Compressor 1...12 thermal switch**



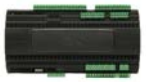
Display	RESET	Parameter	Block	Description • Notes
Maintenance Compressor 1.. 12		580 - SCAE	1...12(°)	**Maintenance compressor 1...12**
COMP INV Block Suction [2]	**AUTO**	578 - CSAE		**Circuit C1 (C2) compressor block alarm**
COMP INV Maintenance Suction [2]		580 - SCAE	(°)	**Circuit C1 (C2) compressor maintenance**
Block Compressor 1.. 12	**AUTO**	578 - CSAE	1...12(°)	**Block compressor 1...12** **Circuit compressor inverter error C1 (C2)** see Analogue Alarm table See NOTA A
Inverter Error Suction [2]	**AUTO**	579 - CInAE	(°)	
Oil level Suction [2]		581 - oLAE		**Circuit C1 [C2] oil level** see Analogue Alarm table See NOTA B
HP al. prev. timeout	**AUTO**	701 - HPPAE		**HP prevention alarm safety timeout output** display only
CFR Alarm Plant	**AUTO**	702 - CFAE		**Configurable regulator block**
CFR Warning Plant	**AUTO**			display only

NOTE A Fan block if **ALL** the following conditions occur:
- all plant compressors are in maintenance
- parameter 302 - FACt = Yes (at least one compressor on)
- no alarm or presence of LP Suction Pressure Switch / Maximum Suction Probe alarms only on one of the two circuits not on both

NOTE B Fan block if **ALL** the following conditions occur:
- all plant circuits have an oil level alarm
- parameter 302 - FACt = Yes (at least one compressor on)
- no alarm or presence of LP Suction Pressure Switch / Maximum Suction Probe alarms only on one of the two circuits not on both

(°) Simultaneous tripping of the thermal switches of all digital fans results in a shutdown alarm





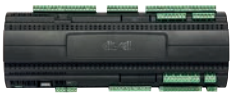
15.2.2. ANALOGUE/DIGITAL ALARMS TABLE

Display C1 [C2]	Type of	Parameter	Set activation	Hysteresis	Shut-down	Description • Notes	Reset	BYPASS
LP Press. Switch Suction [2]		569 - PrSAE	Probe regulation LP <= [133-SEt]	-	[1] [2] – –	**LP suction pressure switch trip** circuit 1 [2] standard machine case otherwise with common outlet only with co-presence of LP Suction Pressure Switch [2] or Minimum Suction Probe [2]	111 - PEn (time window) 112 - PEI (no. operations) Automatic if n° of responses in the time window <= PEn if >PEn manual. If PEn=0 always automatic	113 - byPS
HP Press. Switch Suction [2]		569 - PrSAE	Probe regulation HP <= [133-SEt]	-	[1] [2] – –	**Suction pressure switch activated for high pressure circuit 1 [2]** at 100% standard machine case otherwise with common outlet only with co-presence of Suction HP Pressure Switch [2] or High Temp Suction Probe [2]		113 - byPS
Low Temp Probe Suction [2]	**AUTO**	570 - PSAE	149 - LAL	148 - dLAL	[1] [2] – –	**Low Temp probe in circuit 1 [2] suction** standard machine case otherwise if common outlet only with Suction LP Pressure Switch [2] or Low Temp Suction Probe [2]		[566 - PAO] + [567 - tAo]
High Temp Probe Suction [2]	**AUTO**	570 - PSAE	151 - HAL	150 - dHAL	[1] [2] – –	**High Temp probe in circuit 1 [2] suction** at 100% standard machine case otherwise with common outlet only with co-presence of Suction HP Pressure Switch [2] or High Temp Suction Probe [2]		[566 - PAO] + [567 - tAo]





Display C1 [C2]	Type of	Parameter	Set activation	Hysteresis	Shut-down	Description • Notes	Reset	BYPASS
LP Press. Switch Discharge		573 - PrdAE	Probe regulation LP ≤ [233-SEt]	-		**Low discharge pressure switch activated**	315 - PEn (time window) 316 - PEI (no. operations) Automatic if n° of responses in the time window <= PEn if >PEn manual. If PEn=0 always automatic	317-byPS
HP Press. Switch Discharge		573 - PrdAE	Probe regulation HP <= [233-SEt]	-		**High discharge pressure switch activated** 100%		317-byPS
Low Temp Probe Discharge	**AUTO**	574 - PdAE	354 - LAL	353 - dLAL		**Discharge probe minimum**		[566 - PAO] + [567 - tAo]
High Temp Probe Discharge	**AUTO**	574 - PdAE	348 - HAL	347 - dHAL		**Discharge probe maximum** 100%		[566 - PAO] + [567 - tAo]





15.2.2.1 ANALOGUE/DIGITAL alarms details

LP Suction Pressure Switch

Activation setpoint	LP regulation probe≤ [133-SEt]
Hysteresis	-
Reset	111 - PEn (time window) 112 - PEI (no. operations) Automatic if no. events in time window <= PEn if >PEn manual. If Pen=0 always automatic
NB.	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

Activation setpoint	LP regulation probe > [133-SEt]
Hysteresis	-
Reset	111 - PEn (time window) 112 - PEI (no. operations) Automatic if no. events in time window <= PEn if >PEn manual. If PEn=0 always automatic
NB.	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 probe

Activation setpoint	149 - LAL
Hysteresis	148 - dLAL
Reset	-
NB.	Alarm bypassed at power-on for time 566 - Pao. Alarm disabled in case of suction probe error Bypass 567 - tAo loaded when activation limit exceeded Activation setpoint relative to setpoint if 544 - AbS=1 (149 – LAL is subtracted from setpoint)

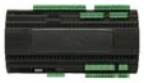
HP suction probe

Activation setpoint	151 - HAL
Hysteresis	150 - dHAL
Reset	-
NB.	Alarm bypassed at power-on for time 566 - Pao. Alarm disabled in case of suction probe error Bypass 567 - tAo loaded when activation limit exceeded Activation setpoint relative to setpoint if 544 - AbS=1 (setpoint is added to 151 - HAL)

LP Discharge Pressure Switch

Activation setpoint	HP regulation probe≤ [233-SEt]
Hysteresis	-
Reset	315 - PEn (time window) 316 - PEI (no. operations) Automatic if no. events in time window <= PEn if >PEn manual. If Pen=0 always automatic
NB.	The bypass is loaded at every power variation applied to the plant not due to the alarm itself. With a suction probe error the alarm is always minimum





HP Discharge Pressure Switch

Activation setpoint	HP regulation probe > [233-SEt]
Hysteresis	-
Reset	315 - PEn (time window) 316 - PEI (no. operations) Automatic if no. events in time window <= PEn if >PEn manual. If PEn=0 always automatic
NB.	The bypass is loaded at every power variation applied to the plant not due to the alarm itself. With a suction probe error the alarm is always minimum

Discharge probe minimum

Activation setpoint	354 - LAL
Hysteresis	353 - dLAL
Reset	-
NB.	Alarm bypassed at power-on for time 566 - PAo. Alarm disabled in case of discharge probe error Bypass 567 - tAo loaded when activation limit exceeded Activation setpoint relative to setpoint if 544 - AbS=1 (354 – LAL is subtracted from setpoint)

Discharge probe maximum

Activation setpoint	348 - HAL
Hysteresis	347 - dHAL
Reset	-
NB.	Alarm bypassed at power-on for time 566 - PAo. Alarm disabled in case of discharge probe error Bypass 567 - tAo loaded when activation limit exceeded Activation setpoint relative to setpoint if 544 - AbS=1 (setpoint is added to 348 - HAL)





15.2.3. PROBES ALARMS TABLE

The probe errors / generic errors are all AUTOMATIC.

Display	Cause	Effect (°)	Description Solution
Generic alarm Plant	Activate digital input Generic alarm	vedi 582 - gAAE	Generic alarm 582 - gAAE
Int. Temp. error Plant	measure values off measurement range • probe faulty	Dynamic setpoint Suction disabled	**Internal ambient temperature** check wiring • replace probe wait for the read temperature value to come back
Regulation Probe Err Suction **Regulation Probe Err Suction [2]**	measure values off measurement range • probe faulty	Managing alarms maximum/minimum suction disabled • Managing alarms suction pressure switch always notified as minimum	**Circuit C1 [C2] suction gas probe** check wiring • replace probe wait for the read temperature value to come back **C1** **108 - CPP = Yes** → resources activated based on **109 - PoPr** **108 - CPP = No** →maintained resources on at time of fault **[C2] analogue**
Regulation Probe Err Discharge	measure values off measurement range • probe faulty	High/low discharge alarms management disabled • Managing alarms pressure switch for discharge always signalled at maximum • Dynamic setpoint Discharge disabled • Alarm prevention maximum discharge disabled	**Discharge gas probe** check wiring • replace probe wait for the read temperature value to come back **312 - FPP = Yes** resources activated → **313 - FPr**, **312 - FPP = No** → resources kept active at the time of failure
External Temp. error Plant	measure values off measurement range • probe faulty	Dynamic setpoint Discharge disabled	**External ambient temperature** check wiring • replace probe wait for the read temperature value to come back
Recovery probe error Plant	measure values off measurement range • probe faulty	Heat recovery function disabled	**Recovery water temperature** check wiring • replace probe wait for the read temperature value to come back
Subcooling Probe Err Plant	measure values off measurement range • probe faulty	Dynamic setpoint Discharge disabled	**Subcooling temperature** check wiring • replace probe wait for the read temperature value to come back
Error Opening File		***	**Error opening data recording files**
Error Writing File		***	**Error writing data recording files**
Error Closing File		***	**Error closing data recording files**
No Space Error		***	**Logged data memory full error**
IO CONFIGURATION error	Wrong setting QuickStart	QuickStart enabled	**IO CONFIGURATION error** Configure the Quickstart parameters and quit CONFIGURATION mode
EEPROM Bios error		**Warning display only**	**EEPROM Bios error**
EEPROM User error		**Warning display only**	**EEPROM User error**





Display	Cause	Effect (°)	Description Solution
RTC Batt Exhausted	RTC batt exhausted	Time Bands disabled if blocked	**RTC batt exhausted** 583 - rtCAE Set date/time
RTC Communication error	RTC does not respond	Time Bands/data logging disabled	**RTC connection error** 583 - rtCAE
RTC Value Error	RTC batt exhausted	Time Bands if blocked	**RTC Value Error** 583 - rtCAE Set date/time
CFR Probe error Plant	measure values off measurement range • probe faulty	configurable regulator disabled	**Configurable regulator probe error** check wiring • replace probe wait for the read temperature value to come back
CFA Probe error Plant	measure values off measurement range • probe faulty	Configurable regulator alarm disabled	**Configurable alarm regulator probe error** check wiring • replace probe wait for the read temperature value to come back
(°) if parameter suitably configured			

16. MODBUS MSK 504 FUNCTIONS AND RESOURCES





Modbus is a client/server protocol for communication between devices connected in a network.
Modbus devices communicate using a **MASTER-SLAVE** technique where just one device (**MASTER**) can send messages. The other devices in the (**SLAVE**) network respond, returning the data requested by the master or executing the action contained in the message sent.

MASTER > The master device can send messages to individual slaves or to the entire network (broadcast) whilst slaves can only respond individually to the master, or to the entire network (broadcast), while slave devices only respond to messages singly to the master.
SLAVE > a device connected to a network that processes information and sends the results to the master using the Modbus protocol.
RTU > The Modbus standard used by Eliwell uses **RTU** coding to transmit data.

16.1. DATA FORMAT (RTU)

The coding model used defines the structure of messages transmitted on the network and the way in which this information is deciphered. The type of coding is usually selected on the basis of specific parameters (baud rate, parity, etc.). Furthermore, some devices support only specific coding models, although it must be the same one for all devices connected in a Modbus network.
The protocol uses the RTU binary method with bytes configured as follows:

DATA BIT > 8 BIT FOR DATA,
PARITY BIT > NONE PARITY BIT (CONFIGURABLE)
STOP BIT > 2 BIT OF STOP.
TRANSMISSION SPEED > MUST BE SET AT 9600 OR 19200 BAUD.

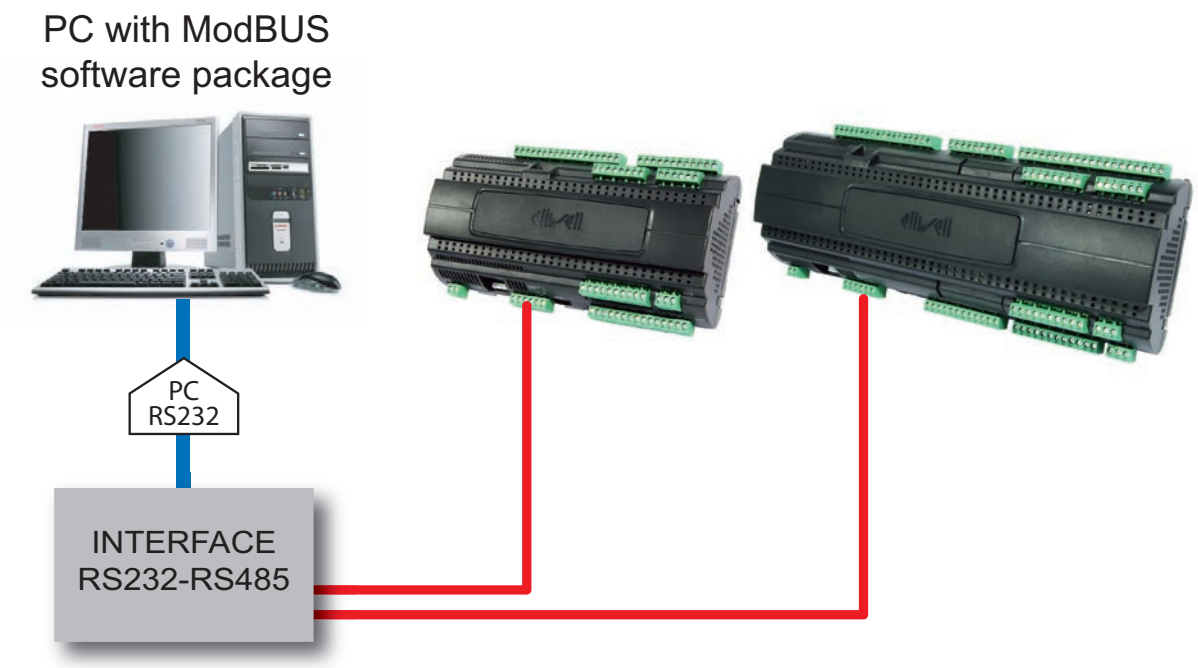
Parameter setting allows full configuration of the device
Parameters can be changed by:

- device keyboard
- USB Copy Card
- sending data via Modbus protocol directly to an individual controller, or broadcasting it, using the address 0 (broadcast)

NETWORK

The 2 connection diagrams for using Modbus are shown below:

ModBus connection via RS485






16.1.1. MODBUS COMMANDS AVAILABLE AND DATA AREAS

The following commands are implemented:

<table>
<tr><th>Modbus command</th><th>Description of command</th></tr>
<tr><td>03 (hex 0x03)</td><td>Reading 16 consecutive registers for Client side.</td></tr>
<tr><td>16 (hex 0x10)</td><td>Writing 15 consecutive registers for Client side</td></tr>
<tr><td>20 (hex 0x14)</td><td>Reading 1 register for operations and alarms history</td></tr>
<tr><td>43 (hex 0x2B)</td><td>Reading device ID
It is possible to read the following 3 fields:
<table>
<tr><th>Field code</th><th>Field description</th></tr>
<tr><td>0</td><td>Manufacturer ID (='ELIWELL☐☐')
spaces ☐ = space</td></tr>
<tr><td>1</td><td>Device model/polycarbonate ID
format EWCM9900: 010_0401
format EWCM9100: 010_0402
format EWCM8900: 010_0403
PCH = 16 (10 hex) POLI (EWCM9900) = 1025 (0401 hex)
PCH = 16 (10 hex) POLI (EWCM9100) = 1026 (0402 hex)
PCH = 16 (10 hex) POLI (EWCM8900) = 1027 (0403 hex)</td></tr>
<tr><td>2</td><td>Device family (MSK 504)/version ID
format: 01F8_0013
MSK = 504 (1F8 hex) REL = 19 (13 hex)</td></tr>
</table></td></tr>
</table>

Length restrictions

Maximum length in bytes of messages sent to device	30 BYTES
Maximum length in bytes of messages received by the device	30 BYTES

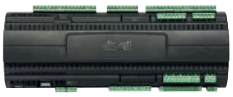
16.1.2. ADDRESS CONFIGURATION

The serial RS485 can be used to configure the device, parameters, states, and variables with Modbus via the Modbus protocol.

The address 0 is used for broadcast messages that all slaves recognise.
Slaves don't respond to broadcast messages.

The parameters for configuring the device are:

Folder	Parameter	Description	Values
ADDRESSING	**673-PtStLV**	Protocol selection RS485	**2=**Micronet (**Televis**) **3= Modbus RTU**
ADDRESSING	**674-bdrttLV**	Baud rate RS485.	**0=**9600 b/s; **1=**19200 b/s; **2=**38400 b/s;
ADDRESSING	**675-PtytLV**	Parity bit RS485.	**0**= NONE; **1=** ODD (disparity); **2**= EVEN (parity)
ADDRESSING	**676 - PtSEXP**	Protocol selection RS485 EXP.	**2=**Micronet (**Televis**) **3= Modbus RTU**
ADDRESSING	**677 - bdrtEXP**	Baud rate RS485 EXP.	**0=**9600; **1=**19200; **2=**38400 b/s;
ADDRESSING	**678 - PtyEXP**	Parity bit RS485 EXP	**0**= NONE; **1=** ODD (disparity); **2**= EVEN (parity)
ADDRESSING	**679 - datEXP**	Data bit RS485 EXP	**0=**7 data bit; **1=**8 data bit;





NOTE: To guarantee correct operation, the controller must be switched off and switched on again after modification of parameters

IMPORTANT: Remember to set **2 stop BIT.**

16.1.3. PASSWORDS AND STRINGS

To read and write strings there are 3 cases
5 character strings > 3 WORDS
10 character strings > 5 WORDS
20 character strings > 10 WORDS

PASSWORD >5 character strings
With a 5 character string (for passwords) you read 3 **WORDS** where the last byte is 'discarded' - see the example

password **abcde**

1st WORD		2nd WORD		3rd WORD	
MSB BYTE	LSD BYTE	BYTES	BYTES	BYTES	BYTES
a	b	c	d	e	ø

ø = value to be discarded

reading/writing PASSWORD > 5 character string

Reading/writing password **PSW1 = +**** register 1**

1st WORD		2nd WORD		3rd WORD	
BYTES	BYTES	BYTES	BYTES	BYTES	BYTES
+	*	*	*	*	ø
0x2B	0x2A	0x2A	0x2A	0x2A	0x00

ø = value to be discarded

writing register 1 command 16 (0x10)

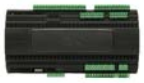
writing command > ADR 10 00 01 00 03 06 2B 2A 2A 2A 2A 00
response > 01 10 00 01 00 03 CRC CRC

reading register 1 command 03 (0x03)

reading command > ADR 03 00 01 00 03
response > 01 03 06 2B 2A 2A 2A 2A 00 CRC CRC

ADR: EWCM address
CRC: checksum





reading/writing PASSWORD > 5 character string

Reading/writing password **PSW1 = QQ □□□**
QQ followed by 3 spaces □ + **ø** = value to be discarded

1st WORD		2nd WORD		3rd WORD	
BYTES	BYTES	BYTES	BYTES	BYTES	BYTES
Q	Q	□	□	□	ø
0x51	0x51	0x20	0x20	0x20	0x00

DATA FILE >20 character string

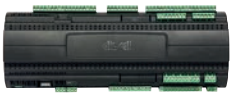
String with 19 characters **'HW:□CRC□1.0□□□□□□ '**
spaces = □
The character no. 20 is discarded as 'null': the useless part is placed as 0

BYTES 1							BYTES 8							BYTES 15				BYTES 19	BYTES 20
H	W	:	□	□	□	C	R	C	□	1	.	0	□	□	□	□	□	□	-
0x48	0x57	0x3A	0x20	0x20	0x20	0x43	0x52	0x43	0x20	0x31	0x2E	0x30	0x20	0x20	0x20	0x20	0x20	0x20	0x00

DATA FILE >20 character string

String with 20 characters '**EMPTY**'

BYTES 1							BYTES 8							BYTES 15				BYTES 19	BYTES 20
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00





16.2. MODBUS TABLES

The tables below list all information required to read, write and decode all accessible resources in the device.

There are 2 tables:

> '**PARAMETERS TABLE**' includes all configuration parameters for the device memorised in the non-volatile memory of the device

> '**CLIENT TABLE**' includes all resources of IO and alarm status available in the device's volatile memory.

Description of columns:

FOLDER
This indicates the label of the folder containing the parameter in question.

LABEL
This indicates the label used to display the parameters in the menu of the device.

PAR. VALUE ADDRESS
The whole part represents the address of the MODBUS register containing the value of the resource to be read or written in the device. The value after the point indicates the position of the most significant data bit inside the register; if not indicated it is taken to be zero. This information is always provided when the register contains more than one information item, and it is necessary to distinguish which bits actually represent the data (the working size of the data indicated in the column DATA SIZE is also taken into consideration).
Given that the modbus registers have the size of one WORD (16 bit), the index number after the point can vary from 0 (least significant bit –LSb–) to 15 (most significant bit –MSb–).
Examples (in binary form the least significant bit is the first on the right):

PAR. VALUE ADDRESS	DATA SIZE	Value	Content of register	
8806	WORD	1350	1350	(0000010101000110)
8806	BYTES	70	1350	(00000101**01000110**)
8806.8	BYTES	5	1350	(**00000101**01000110)
8806.14	1 BIT	0	1350	(0**0**000010101000110)
8806.7	4 BIT	10	1350	(00000**1010**1000110)

IMPORTANTE: when the register contains more than one piece of data, the write procedure is as follows:

- read current value of register
- modify bits for the resource concerned
- write register

R/W
Indicates if resources are read/write, read-only or write-only:

R the resource is read-only
W the resource is write-only
RW the resource is both read and write

DESCRIPTION
is the description of parameters in the **LABEL** column.

DATA SIZE
Indicates the size of data in bits
All data are in **WORDS**
Strings and passwords are **multiple** registers: however addresses remain **consecutive**

CPL
When the field indicates **'Y'**, the value read by the register needs to be converted because the value is a number with a sign.
In other cases the value is always positive or null.
To carry out the conversion, proceed as follows:

- If the value in the register is between 0 and 32.767, the result is the value itself (zero and positive values)
- If the value in the register is between 32.768 and 65.535, the result is the value of the register - 65.536 (negative values)

RANGE
Describes the interval of values that can be assigned to the parameter. It can be correlated with other device parameters (indicated in the parameter label).

M.U.
Unit of measurement for values converted based on rules indicated in columns **CPL and EXP.**





16.2.1. PARAMETERS TABLE

EWCM EO foresees a group of parameters representing the same variable in different units of measurement
Parameters are duplicated / quadrupled depending on the Unit of Measurement shown on the display.
For example, the parameter for the 141 – LSE Compressors minimum setpoint folder is quadrupled as:

- 141 – LSE **– 1** minimum setpoint °C
- 141 – LSE **– 2** minimum setpoint °F
- 141 – LSE **– 3** minimum setpoint bar
- 141 – LSE **– 4** minimum setpoint PSI

In the following parameter table, the parameter is repeated 4 times in 4 different lines with suffix – 1,…-4.

NOTE: Modbus Reading Command: **03 (0x03)** and Modbus Writing command: **16 (0x10)**

FOLDER	LABEL	Value PAR. ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	EXP	M.U.
Password	634-PSW1	1	RW	634 - PSW1 Password 1	3 WORDS		0 ... 5		string
Password	636-PSW3	3	RW	636 - PSW3 Password 3	3 WORDS		0 ... 5		string
Password	637-PSW4	4	RW	637 - PSW4 Password 4	3 WORDS		0 ... 5		string
Password	638-PSW5	5	RW	638 - PSW5 Password 5	3 WORDS		0 ... 5		string
Files Setup	452-USId1	6	RW	452 - USId1 User string 1	20 WORDS		0 ... 20		string
Files Setup	453-USId2	7	RW	453 - USId2 User string 2	20 WORDS		0 ... 20		string
Files Setup	459-rECF	13	RW	459 - rECF REC file name	10 WORDS		0 ... 10		string
Files Setup	460-HISF	14	RW	460 - HISF HIS file name	10 WORDS		0 ... 10		string
Files Setup	461-dAtF	15	RW	461 - dAtF DAT file name	10 WORDS		0 ... 10		string
Files Setup	462-gLoF	16	RW	462 - gLoF GLO file name	10 WORDS		0 ... 10		string
Configuration	639-tAb	103	RW	639 - tAb TAB	WORD		0 ... 32767		num
Configuration	640-rtCE	104	RW	640 - rtCE Enable RTC	WORD		0 ... 1		flag
Configuration	641-FtyP	105	RW	641 - FtyP Refrigerant type	WORD		0 ... 15		num
Configuration	646-Pb12	110	RW	646 - Pb12 - PB 1/2 probe Type	WORD		0 ... 2		num
Configuration	647-Pb34	111	RW	647 - Pb34 - PB 3/4 probe Type	WORD		0 ... 3		num
Configuration	648-Pb56	112	RW	648 - Pb56 PB 5/6 probe type	WORD		3 ... 6		num
Configuration	649-Pb78	113	RW	649 - Pb78 PB 7/8 probe type	WORD		3 ... 6		num
Configuration	650-HPb1	114	RW	650 - HPb1 PB1 High precision	WORD		0 ... 1		flag
Configuration	651-HPb2	115	RW	651 - HPb2 PB2 High precision	WORD		0 ... 1		flag
Configuration	652-AoS1	116	RW	652 - AoS1 - Select V1 or I1	WORD		0 ... 1		flag
Configuration	653-AoS2	117	RW	653 - AoS2 - Select V2 or I2	WORD		0 ... 1		flag
Configuration	654-AoS3	118	RW	654 - AoS3 - Select V3 or I3	WORD		0 ... 1		flag
Configuration	655-CALPb1-1	119	RW	655 - CALPb1 PB1 calibration	WORD	Y	-1000 ... 1000	-2	bar
Configuration	655-CALPb1-2	120	RW	655 - CALPb1 PB1 calibration	WORD	Y	-1450 ... 1450	-1	Psi
Configuration	655-CALPb1-3	121	RW	655 - CALPb1 PB1 calibration	WORD	Y	-100 ... 100	-1	bar
Configuration	655-CALPb1-4	122	RW	655 - CALPb1 PB1 calibration	WORD	Y	-145 ... 145		Psi
Configuration	655-CALPb1-5	123	RW	655 - CALPb1 PB1 calibration	WORD	Y	-100 ... 100	-1	°C
Configuration	655-CALPb1-6	124	RW	655 - CALPb1 PB1 calibration	WORD	Y	-180 ... 180	-1	°F
Configuration	656-CALPb2-1	125	RW	656 - CALPb2 - PB2 calibration	WORD	Y	-1000 ... 1000	-2	bar
Configuration	657-CALPb2-2	126	RW	656 - CALPb2 - PB2 calibration	WORD	Y	-1450 ... 1450	-1	Psi
Configuration	658-CALPb2-3	127	RW	656 - CALPb2 - PB2 calibration	WORD	Y	-100 ... 100	-1	bar
Configuration	659-CALPb2-4	128	RW	656 - CALPb2 - PB2 calibration	WORD	Y	-145 ... 145		Psi
Configuration	658-CALPb2-5	129	RW	656 - CALPb2 - PB2 calibration	WORD	Y	-100 ... 100	-1	°C
Configuration	659-CALPb2-6	130	RW	656 - CALPb2 - PB2 calibration	WORD	Y	-180 ... 180	-1	°F
Configuration	657-CALPb3-1	131	RW	657 - CALPb3 - PB3 calibration	WORD	Y	-100 ... 100	-1	bar
Configuration	657-CALPb3-2	132	RW	657 - CALPb3 - PB3 calibration	WORD	Y	-145 ... 145		Psi
Configuration	657-CALPb3-3	133	RW	657 - CALPb3 - PB3 calibration	WORD	Y	-100 ... 100	-1	°C
Configuration	657-CALPb3-4	134	RW	657 - CALPb3 - PB3 calibration	WORD	Y	-180 ... 180	-1	°F
Configuration	659-CALPb5-1	139	RW	659 - CALPb5 PB5 calibration	WORD	Y	-100 ... 100	-1	°C
Configuration	659-CALPb5-2	140	RW	659 - CALPb5 PB5 calibration	WORD	Y	-180 ... 180	-1	°F
Configuration	660-CALPb6-1	141	RW	660 - CALPb6 PB6 calibration	WORD	Y	-100 ... 100	-1	°C





FOLDER	LABEL	Value PAR. ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	EXP	M.U.
Configuration	660-CALPb6-2	142	RW	660 - CALPb6 PB6 calibration	WORD	Y	-180 ... 180	-1	°F
Configuration	661-CALPb7-1	143	RW	661 - CALPb7 PB7 calibration	WORD	Y	-100 ... 100	-1	°C
Configuration	661-CALPb7-2	144	RW	661 - CALPb7 PB7 calibration	WORD	Y	-180 ... 180	-1	°F
Configuration	662-CALPb8-1	145	RW	662 - CALPb8 PB8 calibration	WORD	Y	-100 ... 100	-1	°C
Configuration	662-CALPb8-2	146	RW	662 - CALPb8 PB8 calibration	WORD	Y	-180 ... 180	-1	°F
Configuration	663-LtPb1-1	147	RW	663 - LtPb1 Lower threshold PB1	WORD	Y	-100 ... 100	-2	bar
Configuration	663-LtPb1-2	148	RW	663 - LtPb1 Lower threshold PB1	WORD	Y	-145 ... 145	-1	Psi
Configuration	663-LtPb1-3	149	RW	663 - LtPb1 Lower threshold PB1	WORD	Y	-10 ... 10	-1	bar
Configuration	663-LtPb1-4	150	RW	663 - LtPb1 Lower threshold PB1	WORD	Y	-14 ... 14		Psi
Configuration	664-UtPb1-1	151	RW	664 - UtPb1 Upper threshold PB1	WORD		100 ... 1000	-2	bar
Configuration	664-UtPb1-2	152	RW	664 - UtPb1 Upper threshold PB1	WORD		145 ... 1450	-1	Psi
Configuration	664-UtPb1-3	153	RW	664 - UtPb1 Upper threshold PB1	WORD		10 ... 1000	-1	bar
Configuration	664-UtPb1-4	154	RW	664 - UtPb1 Upper threshold PB1	WORD		14 ... 1450		Psi
Configuration	665-LtPb2-1	155	RW	665 - LtPb2 Lower threshold PB2	WORD	Y	-100 ... 100	-2	bar
Configuration	665-LtPb2-2	156	RW	665 - LtPb2 Lower threshold PB2	WORD	Y	-145 ... 145	-1	Psi
Configuration	665-LtPb2-3	157	RW	665 - LtPb2 Lower threshold PB2	WORD	Y	-10 ... 10	-1	bar
Configuration	665-LtPb2-4	158	RW	665 - LtPb2 Lower threshold PB2	WORD	Y	-14 ... 14		Psi
Configuration	666-UtPb2-1	159	RW	666 - UtPb2 Upper threshold PB2	WORD		100 ... 1000	-2	bar
Configuration	666-UtPb2-2	160	RW	666 - UtPb2 Upper threshold PB2	WORD		145 ... 1450	-1	Psi
Configuration	666-UtPb2-3	161	RW	666 - UtPb2 Upper threshold PB2	WORD		10 ... 1000	-1	bar
Configuration	666-UtPb2-4	162	RW	666 - UtPb2 Upper threshold PB2	WORD		14 ... 1450		Psi
Configuration	667-LtPb3-1	163	RW	667 - LtPb3 Lower threshold PB3	WORD	Y	-10 ... 10	-1	bar
Configuration	667-LtPb3-2	164	RW	667 - LtPb3 Lower threshold PB3	WORD	Y	-14 ... 14		Psi
Configuration	668-UtPb3-1	165	RW	668 - UPb3 Upper threshold PB3	WORD		10 ... 1000	-1	bar
Configuration	668-UtPb3-2	166	RW	668 - UPb3 Upper threshold PB3	WORD		14 ... 1450		Psi
Configuration	669-LtPb4-1	167	RW	669 - LtPb4 Lower threshold PB4	WORD	Y	-10 ... 10	-1	bar
Configuration	669-LtPb4-2	168	RW	669 - LtPb4 Lower threshold PB4	WORD	Y	-14 ... 14		Psi
Configuration	670-UtPb4-1	169	RW	670 - UtPb4 Upper threshold PB4	WORD		10 ... 1000	-1	bar
Configuration	670-UtPb4-2	170	RW	670 - UtPb4 Upper threshold PB4	WORD		14 ... 1450		Psi
Addressing	671-FAA	171	RW	671 - FAA Family address	WORD		0 ... 14		num
Addressing	672-dEA	172	RW	672 - dEA Controller address	WORD		0 ... 14		num
Addressing	673-PtStLV	173	RW	673 - PtS485 Protocol selection RS485	WORD		2 ... 3		num
Addressing	674-bdrttLV	174	RW	674 - bdrt485 Baud rate RS485	WORD		0 ... 2		num
Addressing	675-PtytLV	175	RW	675 - Pty485 Parity bit RS485	WORD		0 ... 2		num
Addressing	676-PtSEXP	176	RW	676 - PtSExP Protocol selection EXP	WORD		2 ... 3		num
Addressing	677-bdrtEXP	177	RW	677 - bdrtExP Baud rate EXP	WORD		0 ... 2		num
Addressing	678-PtyEXP	178	RW	678 - PtytLV Parity Bit EXP	WORD		0 ... 2		num
Addressing	679-datEXP	179	RW	679 - datEXP Data bit EXP	WORD		0 ... 1		flag
Addressing	680-EnEtH	180	RW	680 - EnEtH Enab. ETHERNET	WORD		0 ... 1		flag
QuickStart	501-tyPE	512	RW	501 - TyPE Type of plant	WORD		0 ... 2		num
QuickStart	502-PC1	513	RW	502 - PC1 Compressor 1 power	WORD		1 ... 255		num
QuickStart	503-PC2	514	RW	503 - PC2 Compressor 2 power	WORD		1 ... 255		num
QuickStart	504-PC3	515	RW	504 - PC3 Compressor 3 power	WORD		1 ... 255		num
QuickStart	505-PC4	516	RW	505 - PC4 Compressor 4 power	WORD		1 ... 255		num
QuickStart	506-PC5	517	RW	506 - PC5 Compressor 5 power	WORD		1 ... 255		num
QuickStart	507-PC6	518	RW	507 - PC6 Compressor 6 power	WORD		1 ... 255		num
QuickStart	508-PC7	519	RW	508 - PC7 Compressor 7 power	WORD		1 ... 255		num
QuickStart	509-PC8	520	RW	509 - PC8 Compressor 8 power	WORD		1 ... 255		num
QuickStart	510-PC9	521	RW	510 - PC9 Compressor 9 power	WORD		1 ... 255		num
QuickStart	511-PC10	522	RW	511 - PC10 Compressor 10 power	WORD		1 ... 255		num
QuickStart	512-PC11	523	RW	512 - PC11 Compressor 11 power	WORD		1 ... 255		num
QuickStart	513-PC12	524	RW	513 - PC12 Compressor 12 power	WORD		1 ... 255		num
QuickStart	520-Fnty	531	RW	520 - Fnty Fan mode	WORD		0 ... 5		num
QuickStart	521-nFn	532	RW	521 - nFn Number of fans	WORD		1 ... 8		num
QuickStart	522-CtyP	533	RW	522 - CtyP Circuit 1 type	WORD		0 ... 3		num
QuickStart	523-CPnU	534	RW	523 - CPnU Number of compressors circuit 1	WORD		0 ... 12		num





FOLDER	LABEL	Value PAR. ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	EXP	M.U.
QuickStart	524-CtyP2	535	RW	524 - CtyP2 Circuit 2 type	WORD		0 ... 3		num
QuickStart	525-CPnU2	536	RW	525 - CPnU2 Number of compressors circuit 2	WORD		0 ... 12		num
QuickStart	514-EAAL	525	RW	514 - EAAL Enable cumulative alarms digital output	WORD		0 ... 1		flag
QuickStart	515-EACI	526	RW	515 - EACI Compressor inverter enabling digital output	WORD		0 ... 1		flag
QuickStart	516-EAFI	527	RW	516 - EAFI Fan inverter enabling digital output	WORD		0 ... 1		flag
QuickStart	517-EACIE	528	RW	517 - EACIE Compressor inverter 1 and 2 error digital input	WORD		0 ... 1		flag
QuickStart	518-EAFIE	529	RW	518 - EAFIE Fan inverter error digital input	WORD		0 ... 1		flag
QuickStart	519-EAgA	530	RW	519 - EAAL Enable generic alarm digital input	WORD		0 ... 1		flag
General Regulator	710-MPCFR	592	RW	710 - MPCFR Configurable regulator probe mode	WORD		0 ... 2		num
General Regulator	713-SEtCFR1-1	595	RW	713 - SEtCFR1 Configurable regulator setpoint step 1	WORD	Y	-1000 ... 6000	-1	°C
General Regulator	714-SEtCFR2-1	596	RW	714 - SEtCFR2 Configurable regulator setpoint step 2	WORD	Y	-1000 ... 6000	-1	°C
General Regulator	715-dCFr1-1	597	RW	715 - dCFr1 Configurable regulator delta step 1	WORD		1 ... 300	-1	°C
General Regulator	716-dCFr2-1	598	RW	716 - dCFr2 Configurable regulator delta step 2	WORD		1 ... 300	-1	°C
General Regulator	717-PbdCFr1-1	599	RW	717 - PbdCFr1 Proportional band step 1	WORD		1 ... 300	-1	°C
General Regulator	718-CodCFR1-1	600	RW	718 - CodCFR1 Delta cut-off step 1	WORD		1 ... 300	-1	°C
General Regulator	713-SEtCFR1-2	601	RW	713 - SEtCFR1 Configurable regulator setpoint step 1	WORD	Y	-1500 ... 9999	-1	°F
General Regulator	714-SEtCFR2-2	602	RW	714 - SEtCFR2 Configurable regulator setpoint step 2	WORD	Y	-1500 ... 9999	-1	°F
General Regulator	715-dCFr1-2	603	RW	715 - dCFr1 Configurable regulator delta step 1	WORD		0 ... 540	-1	°F
General Regulator	716-dCFr2-2	604	RW	716 - dCFr2 Configurable regulator delta step 2	WORD		0 ... 540	-1	°F
General Regulator	717-PbdCFr1-2	605	RW	717 - PbdCFr1 Proportional band step 1	WORD		1 ... 540	-1	°F
General Regulator	718-CodCFR1-2	606	RW	718 - CodCFR1 Delta cut-off step 1	WORD		1 ... 540	-1	°F
General Regulator	719-CFr1dly	607	RW	719 - CFr1dly Configurable regulator delay step 1	WORD		0 ... 255		s
General Regulator	720-CFr2dly	608	RW	720 - CFr2dly Configurable regulator delay step 2	WORD		0 ... 255		s
General Regulator	721-CFrL1	609	RW	721 - CFrL1 % minimum step 1	WORD		0 ... 100		%
General Regulator	722-CFrM1	610	RW	722 - CFrM1 % maximum step 1	WORD		0 ... 100		%
General Regulator	723-CFrS1	611	RW	723 - CFrS1 % saturation step 1	WORD		0 ... 100		%
General Regulator	726-SEtwCFA-1	614	RW	726 - SEtwCFA Configurable alarm warning threshold	WORD	Y	-1000 ... 6000	-1	°C
General Regulator	727-SEtCFA-1	615	RW	727 - SEtCFA Configurable alarm setpoint	WORD	Y	-1000 ... 6000	-1	°C
General Regulator	728-dCFA-1	616	RW	728 - dCFA Configurable alarm differential	WORD		1 ... 300	-1	°C
General Regulator	726-SEtwCFA-2	617	RW	726 - SEtwCFA Configurable alarm warning threshold	WORD	Y	-1500 ... 9999	-1	°F
General Regulator	727-SEtCFA-2	618	RW	727 - SEtCFA Configurable alarm setpoint	WORD	Y	-1500 ... 9999	-1	°F
General Regulator	728-dCFA-2	619	RW	728 - dCFA Configurable alarm differential	WORD		1 ... 540	-1	°F
General Regulator	711-MCFr1	593	RW	711 - MCFr1 Configurable regulator mode step 1	WORD		0 ... 1		flag
General Regulator	712-MCFr2	594	RW	712 - MCFr2 Configurable regulator mode step 2	WORD		0 ... 1		flag
General Regulator	724-ECFAw	612	RW	724 - ECFAw Enable warning configurable alarm	WORD		0 ... 1		flag
General Regulator	725-CFAty	613	RW	725 - CFAty Configurable alarm mode	WORD		0 ... 1		flag
External Driver	740-EEvE	640	RW	740 - EEvE Enable electronic valve driver	WORD		0 ... 2		num
External Driver	741-drMMT	641	RW	741 - drMMT Delay activation high temperature central (MT) at minimum power	WORD		0 ... 999		s
External Driver	742-dCOnLT	642	RW	742 - dCOnLT Delay activation compressor after high temperature central (MT) consent	WORD		0 ... 999		s
Display	542-toUt	784	RW	542 - toUt Exit menu timeout	WORD		10 ... 1000		s
Display	545-UMmIn	787	RW	545 - UM mIn Min suction/discharge UM	WORD		0 ... 3		num
Display	546-UMMax	788	RW	546 - UM Max Max suction/discharge UM	WORD		0 ... 3		num



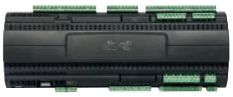


FOLDER	LABEL	Value PAR. ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	EXP	M.U.
Display	547-UMCP	789	RW	547 - UMCP Suction UM	WORD		545-UMMIn 546-UMax		num
Display	548-UMFn	790	RW	548 - UMFn Discharge UM	WORD		545-UMMIn 546-UMax		num
Display	550-HKUnL	792	RW	550 - HKUnL Unlock keyboard hotkey	WORD		0 ... 12		num
Display	541-LAng	783	RW	541 - LAng - Language selection	WORD		0 ... 1		flag
Display	543-rELP	785	RW	543 - rELP Relative pressure	WORD		0 ... 1		flag
Display	544-AbS	786	RW	544 - AbS Relative Alarms	WORD		0 ... 1		flag
Display	549-LoCK	791	RW	549 - LoCK Keyboard lock	WORD		0 ... 1		flag
Functions	556-ESFn	1684	RW	556 - ESFn Energy Saving Type	WORD		0 ... 7		num
Functions	557-Hrto-1	1685	RW	557- Hrto Max heat recovery outlet water temperature	WORD	Y	-1000 ... 6000	-1	°C
Functions	558-Hrdt-1	1686	RW	558- Hrto Delta heat recovery outlet water temperature	WORD	Y	-1000 ... 6000	-1	°C
Functions	557-Hrto-2	1687	RW	557- Hrto Max heat recovery outlet water temperature	WORD	Y	-1500 ... 9999	-1	°F
Functions	558-Hrdt-2	1688	RW	558- Hrto Delta heat recovery outlet water temperature	WORD	Y	-1500 ... 9999	-1	°F
Functions	559-LrCd	1689	RW	559 - LrCd Control liquid return activation delay	WORD		0 ... 999		min
Functions	560-Lron	1690	RW	560- Lron Control liquid return ON time (duty cycle)	WORD		0 ... 999		s
Functions	561-LroF	1691	RW	561 -LroF Control liquid return OFF time (duty cycle)	WORD		0 ... 999		s
Functions	562-LrCd2	1692	RW	562 - LrCd2 Control liquid return activation delay	WORD		0 ... 999		min
Functions	563-Lron2	1693	RW	563 - Lron2 Control liquid return ON time (duty cycle)	WORD		0 ... 999		s
Functions	564-LroF2	1694	RW	564 - LroF2 Control liquid return OFF time (duty cycle)	WORD		0 ... 999		s
Functions	750-toUtgLy	1695	RW	750 - toUtgLy Glycol defrost time out	WORD		1 ... 999		min
Functions	554-drEn	1682	RW	554 - drEn Enable recording data	WORD		0 ... 1		flag
Functions	555-HIEn	1683	RW	555 - HIEn Enable recording History	WORD		0 ... 1		flag
Safety Measures	565-odo	1844	RW	565 - odo Output delay at power-on	WORD		0 ... 999		s
Safety Measures	566-PAo	1845	RW	566 - PAo HP/LP bypass time at power-on	WORD		0 ... 999		min
Safety Measures	567-tAo	1846	RW	567 - tAo HP/LP bypass time	WORD		0 ... 999		min
Safety Measures	568-Aro	1847	RW	568 - Aro Alarms mute duration	WORD		0 ... 9999		min
Safety Measures	569-PrSAE	1848	RW	569 - PrSAE - Suction HrP/LPr Alarm	WORD		0 ... 3		num
Safety Measures	570-PSAE	1849	RW	570 - PSAE Suction HP/LP Alarm	WORD		0 ... 3		num
Safety Measures	571-gtSAE	1850	RW	571 - gtSAE - Refrigerant level alarm	WORD		0 ... 3		num
Safety Measures	572-gLSAE	1851	RW	572 - gLSAE - Refrigerant leak alarm	WORD		0 ... 3		num
Safety Measures	573-PrdAE	1852	RW	573 - PrdAE - Discharge HPr/LPr Alarm	WORD		0 ... 3		num
Safety Measures	574-PdAE	1853	RW	574 - PSAE Discharge HP/LP Alarm	WORD		0 ... 3		num
Safety Measures	575-FtAE	1854	RW	575 - FtAE Fan thermal switch alarm	WORD		0 ... 3		num
Safety Measures	576-FInAE	1855	RW	576 - EAFIE Fan inverter error alarm	WORD		0 ... 3		num
Safety Measures	577-SFAE	1856	RW	577 - SFAE Fan maintenance alarm	WORD		0 ... 3		num
Safety Measures	578-CSAE	1857	RW	578 - FtAE Compressor block alarm	WORD		0 ... 3		num
Safety Measures	579-CInAE	1858	RW	579 - CInAE Compressor inverter error Alarm	WORD		0 ... 3		num
Safety Measures	580-SCAE	1859	RW	580 - SCAE Compressor maintenance alarm	WORD		0 ... 3		num
Safety Measures	581-oLAE	1860	RW	581 - oLAE Oil Level Alarm	WORD		0 ... 3		num
Safety Measures	582-gAAE	1861	RW	582 - gAAE General alarm	WORD		0 ... 3		num
Safety Measures	583-rtCAE	1862	RW	583 - rtCAE RTC Alarm	WORD		0 ... 3		num
Safety Measures	701-HPPAE	1863	RW	701 - HPPAE HP prevention alarm management	WORD		0 ... 1		num
Safety Measures	702-CFAE	1864	RW	702 - CFAE Configurable regulator alarm management	WORD		0 ... 3		num
Safety Measures	703-COAE	1865	RW	703 - COAE HP/LP/TH/PD compressor alarm management	WORD		0 ... 3		num
Safety Measures	704-gtSd	1866	RW	704 – gtSd Refrigerant level alarm message delay	WORD		0 ... 999		s





FOLDER	LABEL	Value PAR. ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	EXP	M.U.
Resource Allocation	584-H201	2304	RW	584 - H201 Relay OUT1	WORD	Y	-100 ... 100		num
Resource Allocation	585-H202	2305	RW	585 - H202 Relay OUT2	WORD	Y	-100 ... 100		num
Resource Allocation	586-H203	2306	RW	586 - H203 Relay OUT3	WORD	Y	-100 ... 100		num
Resource Allocation	587-H204	2307	RW	587 - H204 Relay OUT4	WORD	Y	-100 ... 100		num
Resource Allocation	588-H205	2308	RW	588 - H205 Relay OUT5	WORD	Y	-100 ... 100		num
Resource Allocation	589-H206	2309	RW	589 - H206 Relay OUT6	WORD	Y	-100 ... 100		num
Resource Allocation	590-H207	2310	RW	590 - H207 Relay OUT7	WORD	Y	-100 ... 100		num
Resource Allocation	591-H208	2311	RW	591 - H208 Relay OUT8	WORD	Y	-100 ... 100		num
Resource Allocation	592-H209	2312	RW	592 - H209 Relay OUT9	WORD	Y	-100 ... 100		num
Resource Allocation	593-H210	2313	RW	593 - H210 Relay OUT10	WORD	Y	-100 ... 100		num
Resource Allocation	594-H211	2314	RW	594 - H211 Relay OUT11	WORD	Y	-100 ... 100		num
Resource Allocation	595-H212	2315	RW	595 - H212 Relay OUT12	WORD	Y	-100 ... 100		num
Resource Allocation	596-H213	2316	RW	596 - H213 Relay OUT13	WORD	Y	-100 ... 100		num
Resource Allocation	597-H214	2317	RW	597 - H214 Relay OUT14	WORD	Y	-100 ... 100		num
Resource Allocation	598-H215	2318	RW	598 - H215 Relay OUT15	WORD	Y	-100 ... 100		num
Resource Allocation	599-H216	2319	RW	599 - H216 Relay OUT16	WORD	Y	-100 ... 100		num
Resource Allocation	600-H217	2320	RW	600 - H217 Relay OUT17	WORD	Y	-100 ... 100		num
Resource Allocation	601-H218	2321	RW	601 - H218 Relay OUT18	WORD	Y	-100 ... 100		num
Resource Allocation	602-H219	2322	RW	602 - H219 Relay OUT19	WORD	Y	-100 ... 100		num
Resource Allocation	603-H101	2323	RW	603 - H101 HV DIH1 digital IN	WORD	Y	-99 ... 99		num
Resource Allocation	604-H102	2324	RW	604 - H102 HV DIH2 digital IN	WORD	Y	-99 ... 99		num
Resource Allocation	605-H103	2325	RW	605 - H103 HV DIH3 digital IN	WORD	Y	-99 ... 99		num
Resource Allocation	606-H104	2326	RW	606 - H104 HV DIH4 digital IN	WORD	Y	-99 ... 99		num
Resource Allocation	607-H105	2327	RW	607 - H105 HV DIH5 digital IN	WORD	Y	-99 ... 99		num
Resource Allocation	608-H106	2328	RW	608 - H106 HV DIH6 digital IN	WORD	Y	-99 ... 99		num
Resource Allocation	609-H107	2329	RW	609 - H107 HV DIH7 digital IN	WORD	Y	-99 ... 99		num
Resource Allocation	610-H108	2330	RW	610 - H108 HV DIH8 digital IN	WORD	Y	-99 ... 99		num
Resource Allocation	611-H109	2331	RW	611 - H109 HV DIH9 digital IN	WORD	Y	-99 ... 99		num
Resource Allocation	612-H110	2332	RW	612 - H110 HV DIH10 digital IN	WORD	Y	-99 ... 99		num
Resource Allocation	613-H111	2333	RW	613 - H111 HV DIH11 digital IN	WORD	Y	-99 ... 99		num
Resource Allocation	614-H112	2334	RW	614 - H112 HV DIH12 digital IN	WORD	Y	-99 ... 99		num
Resource Allocation	615-H113	2335	RW	615 - H113 HV DIH13 digital IN	WORD	Y	-99 ... 99		num
Resource Allocation	616-H114	2336	RW	616 - H114 HV DIH14 digital IN	WORD	Y	-99 ... 99		num
Resource Allocation	617-H301	2337	RW	617 - H301 LV DI1 digital IN	WORD	Y	-99 ... 99		num
Resource Allocation	618-H302	2338	RW	618 - H302 LV DI2 digital IN	WORD	Y	-99 ... 99		num
Resource Allocation	619-H303	2339	RW	619 - H303 LV DI3 digital IN	WORD	Y	-99 ... 99		num
Resource Allocation	620-H304	2340	RW	620 - H304 LV DI4 digital IN	WORD	Y	-99 ... 99		num
Resource Allocation	621-H305	2341	RW	621 - H305 LV DI5 digital IN	WORD	Y	-99 ... 99		num
Resource Allocation	622-H306	2342	RW	622 - H306 LV DI6 digital IN	WORD	Y	-99 ... 99		num
Resource Allocation	623-H401	2343	RW	623 - H401 PB1 analogue IN	WORD		0 ... 3		num
Resource Allocation	624-H402	2344	RW	624 - H402 PB2 analogue IN	WORD		0 ... 3		num
Resource Allocation	625-H403	2345	RW	625 - H403 PB3 analogue IN	WORD	Y	-102 ... 102		num
Resource Allocation	627-H405	2347	RW	627 - H405 PB5 analogue IN	WORD	Y	-109 ... 109		num
Resource Allocation	628-H406	2348	RW	628 - H406 PB6 analogue IN	WORD	Y	-109 ... 109		num
Resource Allocation	629-H407	2349	RW	629 - H407 PB7 analogue IN	WORD	Y	-109 ... 109		num
Resource Allocation	630-H408	2350	RW	630 - H408 PB8 analogue IN	WORD	Y	-109 ... 109		num
Resource Allocation	631-H501	2351	RW	631 - H501 V1/I1 analogue OUT	WORD		0 ... 4		num
Resource Allocation	632-H502	2352	RW	632 - H502 V2/I2 analogue OUT	WORD		0 ... 4		num
Resource Allocation	633-H503	2353	RW	633 - H503 V3/I3 analogue OUT	WORD		0 ... 4		num
Compressors	552-PoLI	4169	RW	552 - PoLI Activation Policy	WORD		0 ... 3		num
Compressors	553-SEr	4170	RW	553 - Ser Compressor max usage time	WORD		0 ... 32000		hours
Compressors	141-LSE-1	4096	RW	141 – LSE Minimum setpoint	WORD	Y	-1000 ... 6000	-1	°C
Compressors	142-HSE-1	4097	RW	142 - HSE Maximum setpoint	WORD	Y	-1000 ... 6000	-1	°C
Compressors	143-SEt-1	4098	RW	143 - SEt Suction setpoint	WORD	Y	141-LSE-1... 142-HSE-1	-1	°C
Compressors	144-Pbd-1	4099	RW	144 - Pbd Proportional band	WORD	Y	-1000 ... 6000	-1	°C





FOLDER	LABEL	Value PAR. ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	EXP	M.U.
Compressors	145-PbdE-1	4100	RW	145 - PbdE Extended proportional band	WORD	Y	-1000 ... 6000	-1	°C
Compressors	146-dSPo1-1	4101	RW	146 - dSPo1 Offset 1 for dynamic set	WORD	Y	-1000 ... 6000	-1	°C
Compressors	147-dSPo2-1	4102	RW	147 - dSPo2 Offset 2 for dynamic set	WORD	Y	-1000 ... 6000	-1	°C
Compressors	148-dLAL-1	4103	RW	148 - dLAL LAL delta	WORD	Y	-1000 ... 6000	-1	°C
Compressors	149-LAL-1	4104	RW	149 - LAL Minimum alarm	WORD	Y	-1000 ... 6000	-1	°C
Compressors	150-dHAL-1	4105	RW	150 - dHAL HAL delta	WORD	Y	-1000 ... 6000	-1	°C
Compressors	151-HAL-1	4106	RW	151 - HAL Maximum alarm	WORD	Y	-1000 ... 6000	-1	°C
Compressors	154-InLPt-1	4107	RW	154 - InLPt Threshold for Inverter operation at minimum power	WORD	Y	-1000 ... 6000	-1	°C
Compressors	155-AtdS-1	4108	RW	155 - AtdS Ambient temperature dynamic set	WORD	Y	-1000 ... 6000	-1	°C
Compressors	156-dAtdS-1	4109	RW	156 - dAtdS AtdS differential	WORD	Y	-1000 ... 6000	-1	°C
Compressors	141-LSE-2	4110	RW	141 – LSE Minimum setpoint	WORD	Y	-1500 ... 9999	-1	°F
Compressors	142-HSE-2	4111	RW	142 - HSE Maximum setpoint	WORD	Y	-1500 ... 9999	-1	°F
Compressors	143-SEt-2	4112	RW	143 - SEt Suction setpoint	WORD	Y	141-LSE-2... 142-HSE-2	-1	°F
Compressors	144-Pbd-2	4113	RW	144 - Pbd Proportional band	WORD	Y	-1500 ... 9999	-1	°F
Compressors	145-PbdE-2	4114	RW	145 - PbdE Extended proportional band	WORD	Y	-1500 ... 9999	-1	°F
Compressors	146-dSPo1-2	4115	RW	146 - dSPo1 Offset 1 for dynamic set	WORD	Y	-1500 ... 9999	-1	°F
Compressors	147-dSPo2-2	4116	RW	147 - dSPo2 Offset 2 for dynamic set	WORD	Y	-1500 ... 9999	-1	°F
Compressors	148-dLAL-2	4117	RW	148 - dLAL LAL delta	WORD	Y	-1500 ... 9999	-1	°F
Compressors	149-LAL-2	4118	RW	149 - LAL Minimum alarm	WORD	Y	-1500 ... 9999	-1	°F
Compressors	150-dHAL-2	4119	RW	150 - dHAL HAL delta	WORD	Y	-1500 ... 9999	-1	°F
Compressors	151-HAL-2	4120	RW	151 - HAL Maximum alarm	WORD	Y	-1500 ... 9999	-1	°F
Compressors	154-InLPt-2	4121	RW	154 - InLPt Threshold for Inverter operation at minimum power	WORD	Y	-1500 ... 9999	-1	°F
Compressors	155-AtdS-2	4122	RW	155 - AtdS Ambient temperature dynamic set	WORD	Y	-1500 ... 9999	-1	°F
Compressors	156-dAtdS-2	4123	RW	156 - dAtdS AtdS differential	WORD	Y	-1500 ... 9999	-1	°F
Compressors	141-LSE-3	4124	RW	141 – LSE Minimum setpoint	WORD	Y	-100 ... 6800	-2	bar
Compressors	142-HSE-3	4125	RW	142 - HSE Maximum setpoint	WORD	Y	-100 ... 6800	-2	bar
Compressors	143-SEt-3	4126	RW	143 - SEt Suction setpoint	WORD	Y	141-LSE-3... 142-HSE-3	-2	bar
Compressors	144-Pbd-3	4127	RW	144 - Pbd Proportional band	WORD	Y	-100 ... 6800	-2	bar
Compressors	145-PbdE-3	4128	RW	145 - PbdE Extended proportional band	WORD	Y	-100 ... 6800	-2	bar
Compressors	146-dSPo1-3	4129	RW	146 - dSPo1 Offset 1 for dynamic set	WORD	Y	-100 ... 6800	-2	bar
Compressors	147-dSPo2-3	4130	RW	147 - dSPo2 Offset 2 for dynamic set	WORD	Y	-100 ... 6800	-2	bar
Compressors	148-dLAL-3	4131	RW	148 - dLAL LAL delta	WORD	Y	-100 ... 6800	-2	bar
Compressors	149-LAL-3	4132	RW	149 - LAL Minimum alarm	WORD	Y	-100 ... 6800	-2	bar
Compressors	150-dHAL-3	4133	RW	150 - dHAL HAL delta	WORD	Y	-100 ... 6800	-2	bar
Compressors	151-HAL-3	4134	RW	151 - HAL Maximum alarm	WORD	Y	-100 ... 6800	-2	bar
Compressors	154-InLPt-3	4135	RW	154 - InLPt Threshold for Inverter operation at minimum power	WORD	Y	-100 ... 6800	-2	bar
Compressors	141-LSE-4	4138	RW	141 – LSE Minimum setpoint	WORD	Y	-145 ... 9999	-1	Psi
Compressors	142-HSE-4	4139	RW	142 - HSE Maximum setpoint	WORD	Y	-145 ... 9999	-1	Psi
Compressors	143-SEt-4	4140	RW	143 - SEt Suction setpoint	WORD	Y	141-LSE-4... 142-HSE-4	-1	Psi
Compressors	144-Pbd-4	4141	RW	144 - Pbd Proportional band	WORD	Y	-145 ... 9999	-1	Psi
Compressors	145-PbdE-4	4142	RW	145 - PbdE Extended proportional band	WORD	Y	-145 ... 9999	-1	Psi
Compressors	146-dSPo1-4	4143	RW	146 - dSPo1 Offset 1 for dynamic set	WORD	Y	-145 ... 9999	-1	Psi
Compressors	147-dSPo2-4	4144	RW	147 - dSPo2 Offset 2 for dynamic set	WORD	Y	-145 ... 9999	-1	Psi
Compressors	148-dLAL-4	4145	RW	148 - dLAL LAL delta	WORD	Y	-145 ... 9999	-1	Psi
Compressors	149-LAL-4	4146	RW	149 - LAL Minimum alarm	WORD	Y	-145 ... 9999	-1	Psi
Compressors	150-dHAL-4	4147	RW	150 - dHAL HAL delta	WORD	Y	-145 ... 9999	-1	Psi
Compressors	151-HAL-4	4148	RW	151 - HAL Maximum alarm	WORD	Y	-145 ... 9999	-1	Psi
Compressors	154-InLPt-4	4149	RW	154 - InLPt Threshold for Inverter operation at minimum power	WORD	Y	-145 ... 9999	-1	Psi
Compressors	121-oFon	4152	RW	121 - oFon Compressor OFF - ON time	WORD		0 ... 999		min
Compressors	122-donF	4153	RW	122 - donF Compressor ON - OFF time	WORD		0 ... 999		s
Compressors	123-onon	4154	RW	123 - onon Compressor ON - ON time	WORD		0 ... 999		min





FOLDER	LABEL	Value PAR. ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	EXP	M.U.
Compressors	124-don	4155	RW	124 - don ON steps time	WORD		0 ... 999		s
Compressors	125-doF	4156	RW	125 - doF OFF steps time	WORD		0 ... 999		s
Compressors	126-FdLy	4157	RW	126 -FdLy Enable dOn 1' step up (start up).	WORD		0 ... 1		flag
Compressors	127-FdLF	4158	RW	127 - FdLF Enable dOF 1' step down	WORD		0 ... 1		flag
Compressors	114-InLFr	4159	RW	114 - InLFr Inverter minimum frequency	WORD		0 ... 100		%
Compressors	115-InMFr	4160	RW	115 - InLFr Inverter maximum frequency	WORD		0 ... 100		%
Compressors	116-InSFr	4161	RW	116 - InLFr Switch on inverter frequency	WORD		0 ... 100		%
Compressors	117-InRP	4162	RW	117 - InRP Inverter rated power	WORD		0 ... 255		num
Compressors	129-Inot	4163	RW	129 - InLPt Max time Inverter at minimum power	WORD		0 ... 999		min
Compressors	130-InLt	4164	RW	130 - InLt Interval inverter minimum power / step activation	WORD		0 ... 999		s
Compressors	131-InoFon	4165	RW	131 - InoFon Inverter OFF - ON time	WORD		0 ... 999		s
Compressors	132-Inonon	4166	RW	132 - Inonon Inverter ON - ON time	WORD		0 ... 999		s
Compressors	133-InSwt	4167	RW	133 - InSwt Minimum inverter switch time	WORD		0 ... 999		s
Compressors	101-CCFn	4172	RW	101 - CCFn Compressors control type	WORD		0 ... 2		num
Compressors	103-It	4174	RW	103 - It Integral time	WORD		1 ... 900	-1	s
Compressors	106-dt	4177	RW	106 - dt Derivative time	WORD		1 ... 900	-1	s
Compressors	107-dSS	4178	RW	107 - dSS Dynamic suction set mode	WORD		0 ... 1		num
Compressors	109-PoPr	4180	RW	109 - PoPr Default power value in case of suction probe error	WORD		0 ... 100		%
Compressors	111-PEn	4182	RW	111 - PEn Max number of pressure switch alarm in the PEI interval (automatic to manual alarm)	WORD		0 ... 33		num
Compressors	112-PEI	4183	RW	112 – PEI - PEn interval	WORD		1 ... 15		min
Compressors	113-byPS	4184	RW	113 - byPS HPr-LPr bypass time	WORD		0 ... 999		min
Compressors	118-PtSE	4185	RW	118 - PtSE Compressor steps sequence	WORD		0 ... 2		num
Compressors	120-nCPC	4187	RW	120 - nCPC Selection Master compressor	WORD		0 ...523-CPnU		num
Compressors	128-CRP	4188	RW	128 - CRP Digital compressor rated power	WORD		0 ... 255		num
Compressors [2]	241-LSE-1	4189	RW	241 – LSE Minimum setpoint	WORD	Y	-1000 ... 6000	-1	°C
Compressors [2]	242-HSE-1	4190	RW	242 - HSE Maximum setpoint	WORD	Y	-1000 ... 6000	-1	°C
Compressors [2]	243-SEt-1	4191	RW	243 - SEt Suction setpoint	WORD	Y	241-LSE-1... 242-HSE-1	-1	°C
Compressors [2]	244-Pbd-1	4192	RW	244 - Pbd Proportional band	WORD	Y	-1000 ... 6000	-1	°C
Compressors [2]	245-PbdE-1	4193	RW	245 - PbdE Extended prop. band	WORD	Y	-1000 ... 6000	-1	°C
Compressors [2]	246-dSPo1-1	4194	RW	246 - dSPo1 Offset 1 for dyn set	WORD	Y	-1000 ... 6000	-1	°C
Compressors [2]	247-dSPo2-1	4195	RW	247 - dSPo2 Offset 2 for dyn set	WORD	Y	-1000 ... 6000	-1	°C
Compressors [2]	248-dLAL-1	4196	RW	248 - dLAL LAL delta	WORD	Y	-1000 ... 6000	-1	°C
Compressors [2]	249-LAL-1	4197	RW	249 - LAL Minimum alarm	WORD	Y	-1000 ... 6000	-1	°C
Compressors [2]	250-dHAL-1	4198	RW	250 - dHAL HAL delta	WORD	Y	-1000 ... 6000	-1	°C
Compressors [2]	251-HAL-1	4199	RW	251 - HAL Maximum alarm	WORD	Y	-1000 ... 6000	-1	°C
Compressors [2]	254-InLPt-1	4200	RW	254 - InLPt Threshold for Inverter operation at minimum power	WORD	Y	-1000 ... 6000	-1	°C
Compressors [2]	255-AtdS-1	4201	RW	255 - AtdS Ambient temperature dynamic set	WORD	Y	-1000 ... 6000	-1	°C
Compressors [2]	256-dAtdS-1	4202	RW	256 - dAtdS AtdS differential	WORD	Y	-1000 ... 6000	-1	°C
Compressors [2]	241-LSE-2	4203	RW	241 – LSE Minimum setpoint	WORD	Y	-1500 ... 9999	-1	°F
Compressors [2]	242-HSE-2	4204	RW	242 - HSE Maximum setpoint	WORD	Y	-1500 ... 9999	-1	°F
Compressors [2]	243-SEt-2	4205	RW	243 - SEt Suction setpoint	WORD	Y	241-LSE-2... 242-HSE-2	-1	°F
Compressors [2]	244-Pbd-2	4206	RW	244 - Pbd Proportional band	WORD	Y	-1500 ... 9999	-1	°F
Compressors [2]	245-PbdE-2	4207	RW	245 - PbdE Extended prop. band	WORD	Y	-1500 ... 9999	-1	°F
Compressors [2]	246-dSPo1-2	4208	RW	246 - dSPo1 Offset 1 for dyn set	WORD	Y	-1500 ... 9999	-1	°F
Compressors [2]	247-dSPo2-2	4209	RW	247 - dSPo2 Offset 2 for dyn set	WORD	Y	-1500 ... 9999	-1	°F
Compressors [2]	248-dLAL-2	4210	RW	248 - dLAL LAL delta	WORD	Y	-1500 ... 9999	-1	°F
Compressors [2]	249-LAL-2	4211	RW	249 - LAL Minimum alarm	WORD	Y	-1500 ... 9999	-1	°F
Compressors [2]	250-dHAL-2	4212	RW	250 - dHAL HAL delta	WORD	Y	-1500 ... 9999	-1	°F
Compressors [2]	251-HAL-2	4213	RW	251 - HAL Maximum alarm	WORD	Y	-1500 ... 9999	-1	°F



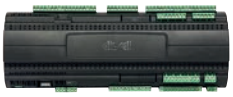


FOLDER	LABEL	Value PAR. ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	EXP	M.U.
Compressors [2]	254-InLPt-2	4214	RW	254 - InLPt Threshold for Inverter operation at minimum power	WORD	Y	-1500 ... 9999	-1	°F
Compressors [2]	255-AtdS-2	4215	RW	255 - AtdS Ambient temperature dynamic set	WORD	Y	-1500 ... 9999	-1	°F
Compressors [2]	256-dAtdS-2	4216	RW	256 - dAtdS AtdS differential	WORD	Y	-1500 ... 9999	-1	°F
Compressors [2]	241-LSE-3	4217	RW	241 – LSE Minimum setpoint	WORD	Y	-100 ... 6800	-2	bar
Compressors [2]	242-HSE-3	4218	RW	242 - HSE Maximum setpoint	WORD	Y	-100 ... 6800	-2	bar
Compressors [2]	243-SEt-3	4219	RW	243 - SEt Suction setpoint	WORD	Y	241-LSE-3... 242-HSE-3	-2	bar
Compressors [2]	244-Pbd-3	4220	RW	244 - Pbd Proportional band	WORD	Y	-100 ... 6800	-2	bar
Compressors [2]	245-PbdE-3	4221	RW	245 - PbdE Extended prop. band	WORD	Y	-100 ... 6800	-2	bar
Compressors [2]	246-dSPo1-3	4222	RW	246 - dSPo1 Offset 1 for dyn set	WORD	Y	-100 ... 6800	-2	bar
Compressors [2]	247-dSPo2-3	4223	RW	247 - dSPo2 Offset 2 for dyn set	WORD	Y	-100 ... 6800	-2	bar
Compressors [2]	248-dLAL-3	4224	RW	248 - dLAL LAL delta	WORD	Y	-100 ... 6800	-2	bar
Compressors [2]	249-LAL-3	4225	RW	249 - LAL Minimum alarm	WORD	Y	-100 ... 6800	-2	bar
Compressors [2]	250-dHAL-3	4226	RW	250 - dHAL HAL delta	WORD	Y	-100 ... 6800	-2	bar
Compressors [2]	251-HAL-3	4227	RW	251 - HAL Maximum alarm	WORD	Y	-100 ... 6800	-2	bar
Compressors [2]	254-InLPt-3	4228	RW	254 - InLPt Threshold for Inverter operation at minimum power	WORD	Y	-100 ... 6800	-2	bar
Compressors [2]	241-LSE-4	4231	RW	241 – LSE Minimum setpoint	WORD	Y	-145 ... 9999	-1	Psi
Compressors [2]	242-HSE-4	4232	RW	242 - HSE Maximum setpoint	WORD	Y	-145 ... 9999	-1	Psi
Compressors [2]	243-SEt-4	4233	RW	243 - SEt Suction setpoint	WORD	Y	241-LSE-4... 242-HSE-4	-1	Psi
Compressors [2]	244-Pbd-4	4234	RW	244 - Pbd Proportional band	WORD	Y	-145 ... 9999	-1	Psi
Compressors [2]	245-PbdE-4	4235	RW	245 - PbdE Extended prop. band	WORD	Y	-145 ... 9999	-1	Psi
Compressors [2]	246-dSPo1-4	4236	RW	246 - dSPo1 Offset 1 for dyn set	WORD	Y	-145 ... 9999	-1	Psi
Compressors [2]	247-dSPo2-4	4237	RW	247 - dSPo2 Offset 2 for dyn set	WORD	Y	-145 ... 9999	-1	Psi
Compressors	248-dLAL-4	4238	RW	248 - dLAL LAL delta	WORD	Y	-145 ... 9999	-1	Psi
Compressors	249-LAL-4	4239	RW	249 - LAL Minimum alarm	WORD	Y	-145 ... 9999	-1	Psi
Compressors	250-dHAL-4	4240	RW	250 - dHAL HAL delta	WORD	Y	-145 ... 9999	-1	Psi
Compressors [2]	251-HAL-4	4241	RW	251 - HAL Maximum alarm	WORD	Y	-145 ... 9999	-1	Psi
Compressors [2]	254-InLPt-4	4242	RW	254 - InLPt Threshold for Inverter operation at minimum power	WORD	Y	-145 ... 9999	-1	Psi
Compressors [2]	221-oFon	4245	RW	221 - oFon Compressor OFF - ON time	WORD		0 ... 999		min
Compressors [2]	222-donF	4246	RW	222 - donF Compressor ON - OFF time	WORD		0 ... 999		s
Compressors [2]	223-onon	4247	RW	223 - onon Compressor ON - ON time	WORD		0 ... 999		min
Compressors [2]	224-don	4248	RW	224 - don ON steps time	WORD		0 ... 999		s
Compressors [2]	225-doF	4249	RW	225 - doF OFF steps time	WORD		0 ... 999		s
Compressors [2]	226-FdLy	4250	RW	226 -FdLy Enable dOn 1' step up (start up).	WORD		0 ... 1		flag
Compressors [2]	227-FdLF	4251	RW	227 - FdLF Enable dOF 1' step down	WORD		0 ... 1		flag
Compressors [2]	214-InLSP	4252	RW	214 - InLFr Inverter minimum frequency	WORD		0 ... 100		%
Compressors [2]	215-InMSP	4253	RW	215 - InLFr Inverter maximum frequency	WORD		0 ... 100		%
Compressors [2]	216-InSSP	4254	RW	216 - InLFr Switch inverter frequency	WORD		0 ... 100		%
Compressors [2]	217-InRP	4255	RW	217 - InRP Inverter rated power	WORD		0 ... 255		num
Compressors [2]	229-Inot	4256	RW	229 - InLPt Max time inverter at minimum power	WORD		0 ... 999		min
Compressors [2]	230-InLt	4257	RW	230 - InLt Interval inverter minimum power / step activation	WORD		0 ... 999		s
Compressors [2]	231-InoFon	4258	RW	231 - InoFon Inverter OFF - ON time	WORD		0 ... 999		s
Compressors [2]	232-Inonon	4259	RW	232 - Inonon Inverter ON - ON time	WORD		0 ... 999		s
Compressors [2]	233-InSwt	4260	RW	233 - InSwt Minimum inverter switch time	WORD		0 ... 999		s
Compressors [2]	201-CCFn	4261	RW	201 - CCFn Compressors control type	WORD		0 ... 2		num
Compressors [2]	203-It	4263	RW	203 - It Integral time	WORD		1 ... 900	-1	s
Compressors [2]	206-dt	4266	RW	206 - dt Derivative time	WORD		1 ... 900	-1	s
Compressors [2]	207-dSS	4267	RW	207 - dSS Dynamic suction set mode	WORD		0 ... 1		num
Compressors [2]	209-PoPr	4269	RW	209 - PoPr Default power value in case of suction probe error	WORD		0 ... 100		%
Compressors [2]	211-PEn	4271	RW	211 - PEn Max number of pressure switch alarm in the PEI interval (automatic to manual alarm)	WORD		0 ... 33		num





FOLDER	LABEL	Value PAR. ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	EXP	M.U.
Compressors [2]	212-PEI	4272	RW	212 – PEI - Pen interval	WORD		1 ... 15		min
Compressors [2]	213-byPS	4273	RW	213 - byPS HPr-LPr bypass time	WORD		0 ... 999		min
Compressors [2]	218-PtSE	4274	RW	218 - PtSE Compressor steps sequence	WORD		0 ... 2		num
Compressors [2]	220-nCPC	4276	RW	220 - nCPC Selection Master compressor	WORD		P700 ... P351		num
Compressors [2]	228-CRP	4277	RW	228 - CRP Digital compressor rated power	WORD		0 ... 255		num
Fans	341-LSE-1	4352	RW	341 – LSE Minimum setpoint	WORD	Y	-1000 ... 6000	-1	°C
Fans	342-HSE-1	4353	RW	342 - HSE Maximum setpoint	WORD	Y	-1000 ... 6000	-1	°C
Fans	343-SEt-1	4354	RW	343 - SEt - Discharge setpoint	WORD	Y	P703 ... P704	-1	°C
Fans	344-Pbd-1	4355	RW	344 - Pbd Proportional band	WORD	Y	-1000 ... 6000	-1	°C
Fans	345-Cod1-1	4356	RW	345 - Cod1 Delta 1 cut-off	WORD	Y	-1000 ... 6000	-1	°C
Fans	346-Cod2-1	4357	RW	346 - Cod2 Delta 2 cut-off	WORD	Y	-1000 ... 6000	-1	°C
Fans	347-dHAL-1	4358	RW	347 - dHAL HAL delta	WORD	Y	-1000 ... 6000	-1	°C
Fans	348-HAL-1	4359	RW	348 - HAL Maximum alarm	WORD	Y	-1000 ... 6000	-1	°C
Fans	349-dSFo-1	4360	RW	349 - dSFo Fixed offset dynamic set	WORD	Y	-1000 ... 6000	-1	°C
Fans	350-HPP1-1	4361	RW	350 - HPP1 HP alarm prevention limit 1	WORD	Y	-1000 ... 6000	-1	°C
Fans	351-HPP2-1	4362	RW	351 - HPP2 HP alarm prevention limit 2	WORD	Y	-1000 ... 6000	-1	°C
Fans	353-dLAL-1	4364	RW	353 - dLAL LAL delta	WORD	Y	-1000 ... 6000	-1	°C
Fans	354-LAL-1	4365	RW	354 - LAL Minimum alarm	WORD	Y	-1000 ... 6000	-1	°C
Fans	355-InLPt-1	4366	RW	355 - InLPt Threshold for Inverter operation at minimum power	WORD	Y	-1000 ... 6000	-1	°C
Fans	356-dSdo-1	4367	RW	356 - dSdo Dynamic offset dynamic set	WORD	Y	-1000 ... 6000	-1	°C
Fans	357-dSLdo-1	4368	RW	357 - dSLdo Minimum dynamic offset dynamic set	WORD	Y	-1000 ... 6000	-1	°C
Fans	358-dSMEt-1	4369	RW	358 - dSMEt Max external temp. dynamic set	WORD	Y	-1000 ... 6000	-1	°C
Fans	359-LdSP-1	4370	RW	359 - LdSP Minimum dynamic set	WORD	Y	-1000 ... 6000	-1	°C
Fans	360-SCt1-1	4371	RW	360 - SCt1 Minimum sub-cooling	WORD	Y	-1000 ... 6000	-1	°C
Fans	361-SCt2-1	4372	RW	361 - SCt2 Maximum sub-cooling	WORD	Y	-1000 ... 6000	-1	°C
Fans	362-SCd1-1	4373	RW	362 - SCd1 Sub-cooling delta 1	WORD	Y	-1000 ... 6000	-1	°C
Fans	363-SCoF1-1	4374	RW	363 - SCoF1 Sub-cooling offset 1	WORD	Y	-1000 ... 6000	-1	°C
Fans	364-SCd2-1	4375	RW	364 - SCd2 Sub-cooling delta 2	WORD	Y	-1000 ... 6000	-1	°C
Fans	365-SCoF2-1	4376	RW	365 - SCoF2 Sub-cooling offset 2	WORD	Y	-1000 ... 6000	-1	°C
Fans	366-EtPr-1	4377	RW	366 - EtPr Minimum external / sub-cooling temperature delta to enable dynamic set	WORD	Y	-1000 ... 6000	-1	°C
Fans	341-LSE-2	4378	RW	341 – LSE Minimum setpoint	WORD	Y	-1500 ... 9999	-1	°F
Fans	342-HSE-2	4379	RW	342 - HSE Maximum setpoint	WORD	Y	-1500 ... 9999	-1	°F
Fans	343-SEt-2	4380	RW	343 - SEt - Discharge setpoint	WORD	Y	P729 ... P730	-1	°F
Fans	344-Pbd-2	4381	RW	344 - Pbd Proportional band	WORD	Y	-1500 ... 9999	-1	°F
Fans	345-Cod1-2	4382	RW	345 - Cod1 Delta 1 cut-off	WORD	Y	-1500 ... 9999	-1	°F
Fans	346-Cod2-2	4383	RW	346 - Cod2 Delta 2 cut-off	WORD	Y	-1500 ... 9999	-1	°F
Fans	347-dHAL-2	4384	RW	347 - dHAL HAL delta	WORD	Y	-1500 ... 9999	-1	°F
Fans	348-HAL-2	4385	RW	348 - HAL Maximum alarm	WORD	Y	-1500 ... 9999	-1	°F
Fans	349-dSFo-2	4386	RW	349 - dSFo Fixed offset dynamic set	WORD	Y	-1500 ... 9999	-1	°F
Fans	350-HPP1-2	4387	RW	350 - HPP1 HP alarm prevention limit 1	WORD	Y	-1500 ... 9999	-1	°F
Fans	351-HPP2-2	4388	RW	351 - HPP2 HP alarm prevention limit 2	WORD	Y	-1500 ... 9999	-1	°F
Fans	353-dLAL-2	4390	RW	353 - dLAL LAL delta	WORD	Y	-1500 ... 9999	-1	°F
Fans	354-LAL-2	4391	RW	354 - LAL Minimum alarm	WORD	Y	-1500 ... 9999	-1	°F
Fans	355-InLPt-2	4392	RW	355 - InLPt Threshold for Inverter operation at minimum power	WORD	Y	-1500 ... 9999	-1	°F
Fans	356-dSdo-2	4393	RW	356 - dSdo Dynamic offset dynamic set	WORD	Y	-1500 ... 9999	-1	°F
Fans	357-dSLdo-2	4394	RW	357 - dSLdo Minimum dynamic offset dynamic set	WORD	Y	-1500 ... 9999	-1	°F
Fans	358-dSMEt-2	4395	RW	358 - dSMEt Max external temp. dynamic set	WORD	Y	-1500 ... 9999	-1	°F
Fans	359-LdSP-2	4396	RW	359 - LdSP Minimum dynamic set	WORD	Y	-1500 ... 9999	-1	°F
Fans	360-SCt1-2	4397	RW	360 - SCt1 Minimum sub-cooling	WORD	Y	-1500 ... 9999	-1	°F
Fans	361-SCt2-2	4398	RW	361 - SCt2 Maximum sub-cooling	WORD	Y	-1500 ... 9999	-1	°F
Fans	362-SCd1-2	4399	RW	362 - SCd1 Sub-cooling delta 1	WORD	Y	-1500 ... 9999	-1	°F
Fans	363-SCoF1-2	4400	RW	363 - SCoF1 Sub-cooling offset 1	WORD	Y	-1500 ... 9999	-1	°F
Fans	364-SCd2-2	4401	RW	364 - SCd2 Sub-cooling delta 2	WORD	Y	-1500 ... 9999	-1	°F





FOLDER	LABEL	Value PAR. ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	EXP	M.U.
Fans	365-SCoF2-2	4402	RW	365 - SCoF2 Sub-cooling offset 2	WORD	Y	-1500 ... 9999	-1	°F
Fans	366-EtPr-2	4403	RW	366 - EtPr Minimum external / sub-cooling temperature delta to enable dynamic set	WORD	Y	-1500 ... 9999	-1	°F
Fans	341-LSE-3	4404	RW	341 – LSE Minimum setpoint	WORD	Y	-10 ... 1000	-1	bar
Fans	342-HSE-3	4405	RW	342 - HSE Maximum setpoint	WORD	Y	-10 ... 1000	-1	bar
Fans	343-SEt-3	4406	RW	343 - SEt - Discharge setpoint	WORD	Y	341-LSE-3... 342-HSE-3	-1	bar
Fans	344-Pbd-3	4407	RW	344 - Pbd Proportional band	WORD	Y	-10 ... 1000	-1	bar
Fans	345-Cod1-3	4408	RW	345 - Cod1 Delta 1 cut-off	WORD	Y	-10 ... 1000	-1	bar
Fans	346-Cod2-3	4409	RW	346 - Cod2 Delta 2 cut-off	WORD	Y	-10 ... 1000	-1	bar
Fans	347-dHAL-3	4410	RW	347 - dHAL HAL delta	WORD	Y	-10 ... 1000	-1	bar
Fans	348-HAL-3	4411	RW	348 - HAL Maximum alarm	WORD	Y	-10 ... 1000	-1	bar
Fans	349-dSFo-3	4412	RW	349 - dSFo Fixed offset dynamic set	WORD	Y	-10 ... 1000	-1	bar
Fans	350-HPP1-3	4413	RW	350 - HPP1 HP alarm prevention limit 1	WORD	Y	-10 ... 1000	-1	bar
Fans	351-HPP2-3	4414	RW	351 - HPP2 HP alarm prevention limit 2	WORD	Y	-10 ... 1000	-1	bar
Fans	353-dLAL-3	4416	RW	353 - dLAL LAL delta	WORD	Y	-10 ... 1000	-1	bar
Fans	354-LAL-3	4417	RW	354 - LAL Minimum alarm	WORD	Y	-10 ... 1000	-1	bar
Fans	355-InLPt-3	4418	RW	355 - InLPt Threshold for Inverter operation at minimum power	WORD	Y	-10 ... 1000	-1	bar
Fans	341-LSE-4	4430	RW	341 – LSE Minimum setpoint	WORD	Y	-14 ... 1450		Psi
Fans	342-HSE-4	4431	RW	342 - HSE Maximum setpoint	WORD	Y	-14 ... 1450		Psi
Fans	343-SEt-4	4432	RW	343 - SEt - Discharge setpoint	WORD	Y	341-LSE-4... 342-HSE-4		Psi
Fans	344-Pbd-4	4433	RW	344 - Pbd Proportional band	WORD	Y	-14 ... 1450		Psi
Fans	345-Cod1-4	4434	RW	345 - Cod1 Delta 1 cut-off	WORD	Y	-14 ... 1450		Psi
Fans	346-Cod2-4	4435	RW	346 - Cod2 Delta 2 cut-off	WORD	Y	-14 ... 1450		Psi
Fans	347-dHAL-4	4436	RW	347 - dHAL HAL delta	WORD	Y	-14 ... 1450		Psi
Fans	348-HAL-4	4437	RW	348 - HAL Maximum alarm	WORD	Y	-14 ... 1450		Psi
Fans	349-dSFo-4	4438	RW	349 - dSFo Fixed offset dynamic set	WORD	Y	-14 ... 1450		Psi
Fans	350-HPP1-4	4439	RW	350 - HPP1 HP alarm prevention limit 1	WORD	Y	-14 ... 1450		Psi
Fans	351-HPP2-4	4440	RW	351 - HPP2 HP alarm prevention limit 2	WORD	Y	-14 ... 1450		Psi
Fans	353-dLAL-4	4442	RW	353 - dLAL LAL delta	WORD	Y	-14 ... 1450		Psi
Fans	354-LAL-4	4443	RW	354 - LAL Minimum alarm	WORD	Y	-14 ... 1450		Psi
Fans	355-InLPt-4	4444	RW	355 - InLPt Threshold for Inverter operation at minimum power	WORD	Y	-14 ... 1450		Psi
Fans	323-Clt	4456	RW	323 - Clt Pick-up time	WORD		0 ... 120		s
Fans	324-don	4457	RW	324 - don ON steps time	WORD		0 ... 999		s
Fans	325-doF	4458	RW	325 - doF OFF steps time	WORD		0 ... 999		s
Fans	326-FStt	4459	RW	326 - FStt Max OFF time	WORD		0 ... 999		hours
Fans	327-SEr	4460	RW	327 - SEr Fan max usage time	WORD		0 ... 32000		hours
Fans	331-FPkUP	4461	RW	331 - FPkUP Pick-up time	WORD		0 ... 999		min
Fans	328-Inot	4462	RW	328 - InLPt Maximum time inverter at minimum power	WORD		0 ... 999		min
Fans	329-InPC	4463	RW	329 - InPC % inverter variation	WORD		1 ... 100		%
Fans	330-InoS	4464	RW	330 - InLPt Inverter minimum power activation mode	WORD		0 ... 1		num
Fans	301-FCFn	4465	RW	301 – FCFn FAN control type	WORD		0 ... 2		num
Fans	305-It	4469	RW	305 - It Integral time	WORD		1 ... 900	-1	s
Fans	308-dt	4472	RW	308 - dt Derivative time	WORD		1 ... 900	-1	s
Fans	309-InLSP	4473	RW	309 - InLSP Minimum speed	WORD		0 ... 100		%
Fans	310-InMSP	4474	RW	310 - InMSP Maximum speed	WORD		0 ... 100		%
Fans	311-InSSP	4475	RW	311 - InSSP Saturation speed	WORD		0 ... 100		%
Fans	313-FPr	4477	RW	313 - PoPr Default power value in case of discharge probe error	WORD		0 ... 100		%
Fans	314-dSd	4478	RW	314 - dSd Dynamic discharge set mode	WORD		0 ... 1		num
Fans	315-PEn	4479	RW	315 - PEn Max number of pressure switch alarms in the PEI interval (automatic to manual alarm)	WORD		0 ... 33		num





FOLDER	LABEL	Value PAR. ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	EXP	M.U.
Fans	316-PEI	4480	RW	316 – PEI - Pen interval	WORD		1 ... 15		min
Fans	317-byPS	4481	RW	317 - byPS HPr-LPr bypass time	WORD		0 ... 999		min
Fans	319-HPPP	4483	RW	319 - HPPP % Power reduction HP alarm prevention	WORD		1 ... 100		%
Fans	320-HPPd	4484	RW	320 - HPPd HP prevention alarm max duration	WORD		0 ... 999		min
Fans	321-HPPI	4485	RW	321 - HPPI HP prevention alarm minimum interval	WORD		0 ... 999		hours
Fans	318-HPPE	4482	RW	318 - HPPE Enable HP prevention alarm	WORD		0 ... 1		flag
Fans	322-rot	4486	RW	322 - rot Activation policy	WORD		0 ... 1		flag
Fans	302-FACt	4466	RW	302 - FACt Activation mode	WORD		0 ... 1		flag
Fans	303-CoIE	4467	RW	303 - CoIE Enable cut-off inverter	WORD		0 ... 1		flag
Fans	304-ItEn	4468	RW	304 - ItEn Integral control	WORD		0 ... 1		flag
Fans	306-PbEn	4470	RW	306 - PbEn Proportional control	WORD		0 ... 1		flag
Fans	307-dtEn	4471	RW	307 - dtEn Derivative control	WORD		0 ... 1		flag
Fans	312-FPP	4476	RW	312 - FPP Enable default power control in case of discharge probe error	WORD		0 ... 1		flag
Compressors	551-Stty	4168	RW	551 - Stty Central setpoint	WORD		0 ... 1		flag
Compressors	698-SUPFr	4171	RW	698 – SUPFr Line frequency	WORD		0 ... 1		flag
Compressors	102-ItEn	4173	RW	102 - ItEn Integral control	WORD		0 ... 1		flag
Compressors	104-PbEn	4175	RW	104 - PbEn Proportional control	WORD		0 ... 1		flag
Compressors	105-dtEn	4176	RW	105 - dtEn Derivative control	WORD		0 ... 1		flag
Compressors	108-CPP	4179	RW	108 - CPP Enable default power control in case of suction probe error	WORD		0 ... 1		flag
Compressors [2]	202-ItEn	4262	RW	202 - ItEn Integral control	WORD		0 ... 1		flag
Compressors [2]	204-PbEn	4264	RW	204 - PbEn Proportional control	WORD		0 ... 1		flag
Compressors [2]	205-dtEn	4265	RW	205 - dtEn Derivative control	WORD		0 ... 1		flag
Compressors [2]	208-CPP	4268	RW	208 - CPP Enable default power control in case of suction probe error	WORD		0 ... 1		flag





16.2.2. CLIENT TABLE

NOTE: Modbus Reading Command: **03 (0x03)** and Modbus Writing command: **16 (0x10)**

ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	EXP	M.U.
4752	R	Suction probe circuit 1	WORD	Y	-32768 ... 32767	-1	°C
4753	R	Suction probe circuit 1	WORD	Y	-32768 ... 32767	-1	°F
4754	R	Suction probe circuit 1	WORD	Y	-32768 ... 32767	-2	bar
4755	R	Suction probe circuit 1	WORD	Y	-32768 ... 32767	-1	Psi
4778	R	Suction setpoint circuit 1	WORD	Y	-32768 ... 32767	-1	°C
4779	R	Suction setpoint circuit 1	WORD	Y	-32768 ... 32767	-1	°F
4780	R	Suction setpoint circuit 1	WORD	Y	-32768 ... 32767	-2	bar
4781	R	Suction setpoint circuit 1	WORD	Y	-32768 ... 32767	-1	Psi
2192	R	Suction setpoint offset circuit 1	WORD		0 ... 32767	-1	°C
2192	R	Suction setpoint offset circuit 1	WORD		0 ... 32767	-1	°F
2192	R	Suction setpoint offset circuit 1	WORD		0 ... 32767	-2	bar
2192	R	Suction setpoint offset circuit 1	WORD		0 ... 32767	-1	Psi
4756	R	Suction probe circuit 2	WORD	Y	-32768 ... 32767	-1	°C
4757	R	Suction probe circuit 2	WORD	Y	-32768 ... 32767	-1	°F
4758	R	Suction probe circuit 2	WORD	Y	-32768 ... 32767	-2	bar
4759	R	Suction probe circuit 2	WORD	Y	-32768 ... 32767	-1	Psi
4782	R	Suction setpoint circuit 2	WORD	Y	-32768 ... 32767	-1	°C
4783	R	Suction setpoint circuit 2	WORD	Y	-32768 ... 32767	-1	°F
4784	R	Suction setpoint circuit 2	WORD	Y	-32768 ... 32767	-2	bar
4785	R	Suction setpoint circuit 2	WORD	Y	-32768 ... 32767	-1	Psi
2183	R	Suction setpoint offset circuit 2	WORD		0 ... 32767	-1	°C
2183	R	Suction setpoint offset circuit 2	WORD		0 ... 32767	-1	°F
2183	R	Suction setpoint offset circuit 2	WORD		0 ... 32767	-2	bar
2183	R	Suction setpoint offset circuit 2	WORD		0 ... 32767	-1	Psi
4760	R	Discharge probe	WORD	Y	-32768 ... 32767	-1	°C
4761	R	Discharge probe	WORD	Y	-32768 ... 32767	-1	°F
4762	R	Discharge probe	WORD	Y	-32768 ... 32767	-1	bar
4763	R	Discharge probe	WORD	Y	-32768 ... 32767		Psi
4786	R	Discharge setpoint	WORD	Y	-32768 ... 32767	-1	°C
4787	R	Discharge setpoint	WORD	Y	-32768 ... 32767	-1	°F
4788	R	Discharge setpoint	WORD	Y	-32768 ... 32767	-1	bar
4789	R	Discharge setpoint	WORD	Y	-32768 ... 32767		Psi
4764	R	Internal ambient probe	WORD	Y	-32768 ... 32767	-1	°C
4765	R	Internal ambient probe	WORD	Y	-32768 ... 32767	-1	°F
4766	R	External ambient probe	WORD	Y	-32768 ... 32767	-1	°C
4767	R	External ambient probe	WORD	Y	-32768 ... 32767	-1	°F
4768	R	Sub-cooling temperature probe	WORD	Y	-32768 ... 32767	-1	°C
4769	R	Sub-cooling temperature probe	WORD	Y	-32768 ... 32767	-1	°F
4770	R	Heat recovery water probe	WORD	Y	-32768 ... 32767	-1	°C
4771	R	Heat recovery water probe	WORD	Y	-32768 ... 32767	-1	°F
4772	R	Configurable regulator probe	WORD	Y	-32768 ... 32767	-1	°C
4773	R	Configurable regulator probe	WORD	Y	-32768 ... 32767	-1	°F
4774	R	Configurable regulator probe and configurable alarm	WORD	Y	-32768 ... 32767	-1	°C
4775	R	Configurable regulator probe and configurable alarm	WORD	Y	-32768 ... 32767	-1	°F
4776	R	Configurable alarm probe	WORD	Y	-32768 ... 32767	-1	°C
4777	R	Configurable alarm probe	WORD	Y	-32768 ... 32767	-1	°F
534	R	Num. compressor circuit 1	WORD		0 ... 12		num
4790	R	Power delivered by circuit 1	WORD		0 ... 100		%
536	R	Num. compressor circuit 2	WORD		0 ... 12		num
4791	R	Power delivered by circuit 2	WORD		0 ... 100		%
532	R	Number of fans	WORD		1 ... 8		num
1024	R	Selection compressor 1	WORD		0 ... 1		flag
4659	R	Compressor 1	WORD		0 ... 32767		num
5040	R	Compressor 1 step 1 relay	WORD		0 ... 1		flag
5041	R	Compressor 1 step 2 relay	WORD		0 ... 1		flag
5042	R	Compressor 1 step 3 relay	WORD		0 ... 1		flag
5043	R	Compressor 1 step 4 relay	WORD		0 ... 1		flag
5044	R	Compressor 1 step 5 relay	WORD		0 ... 1		flag
4645	R	Power generated by compressor 1	WORD		0 ... 100		%





ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	EXP	M.U.
1038	R	Operation hours compressor 1	WORD		0 ... 32000		num
1025	R	Selection compressor 2	WORD		0 ... 1		flag
4660	R	Compressor 2	WORD		0 ... 32767		num
5045	R	Compressor 2 step 1 relay	WORD		0 ... 1		flag
5046	R	Compressor 2 step 2 relay	WORD		0 ... 1		flag
5047	R	Compressor 2 step 3 relay	WORD		0 ... 1		flag
5048	R	Compressor 2 step 4 relay	WORD		0 ... 1		flag
5049	R	Compressor 2 step 5 relay	WORD		0 ... 1		flag
4646	R	Power generated by compressor 2	WORD		0 ... 100		%
1039	R	Operation hours compressor 2	WORD		0 ... 32000		num
1026	R	Selection compressor 3	WORD		0 ... 1		flag
4661	R	Compressor 3	WORD		0 ... 32767		num
5050	R	Compressor 3 step 1 relay	WORD		0 ... 1		flag
5051	R	Compressor 3 step 2 relay	WORD		0 ... 1		flag
5052	R	Compressor 3 step 3 relay	WORD		0 ... 1		flag
5053	R	Compressor 3 step 4 relay	WORD		0 ... 1		flag
5054	R	Compressor 3 step 5 relay	WORD		0 ... 1		flag
4647	R	Power generated by compressor 3	WORD		0 ... 100		%
1040	R	Operation hours compressor 3	WORD		0 ... 32000		num
1027	R	Selection compressor 4	WORD		0 ... 1		flag
4662	R	Compressor 4	WORD		0 ... 32767		num
5055	R	Compressor 4 step 1 relay	WORD		0 ... 1		flag
5056	R	Compressor 4 step 2 relay	WORD		0 ... 1		flag
5057	R	Compressor 4 step 3 relay	WORD		0 ... 1		flag
5058	R	Compressor 4 step 4 relay	WORD		0 ... 1		flag
5059	R	Compressor 4 step 5 relay	WORD		0 ... 1		flag
4648	R	Power generated by compressor 4	WORD		0 ... 100		%
1041	R	Operation hours compressor 4	WORD		0 ... 32000		num
1028	R	Selection compressor 5	WORD		0 ... 1		flag
4663	R	Compressor 5	WORD		0 ... 32767		num
5060	R	Compressor 5 step 1 relay	WORD		0 ... 1		flag
5061	R	Compressor 5 step 2 relay	WORD		0 ... 1		flag
5062	R	Compressor 5 step 3 relay	WORD		0 ... 1		flag
5063	R	Compressor 5 step 4 relay	WORD		0 ... 1		flag
5064	R	Compressor 5 step 5 relay	WORD		0 ... 1		flag
4649	R	Power generated by compressor 5	WORD		0 ... 100		%
1042	R	Operation hours compressor 5	WORD		0 ... 32000		num
1029	R	Selection compressor 6	WORD		0 ... 1		flag
4664	R	Compressor 6	WORD		0 ... 32767		num
5065	R	Compressor 6 step 1 relay	WORD		0 ... 1		flag
5066	R	Compressor 6 step 2 relay	WORD		0 ... 1		flag
5067	R	Compressor 6 step 3 relay	WORD		0 ... 1		flag
5068	R	Compressor 6 step 4 relay	WORD		0 ... 1		flag
5069	R	Compressor 6 step 5 relay	WORD		0 ... 1		flag
4650	R	Power generated by compressor 6	WORD		0 ... 100		%
1043	R	Operation hours compressor 6	WORD		0 ... 32000		num
1030	R	Selection compressor 7	WORD		0 ... 1		flag
4665	R	Compressor 7	WORD		0 ... 32767		num
5070	R	Compressor 7 step 1 relay	WORD		0 ... 1		flag
5071	R	Compressor 7 step 2 relay	WORD		0 ... 1		flag
5072	R	Compressor 7 step 3 relay	WORD		0 ... 1		flag
5073	R	Compressor 7 step 4 relay	WORD		0 ... 1		flag
5074	R	Compressor 7 step 5 relay	WORD		0 ... 1		flag
4651	R	Power generated by compressor 7	WORD		0 ... 100		%
1044	R	Operation hours compressor 7	WORD		0 ... 32000		num
1031	R	Selection compressor 8	WORD		0 ... 1		flag
4666	R	Compressor 8	WORD		0 ... 32767		num
5075	R	Compressor 8 step 1 relay	WORD		0 ... 1		flag
5076	R	Compressor 8 step 2 relay	WORD		0 ... 1		flag
5077	R	Compressor 8 step 3 relay	WORD		0 ... 1		flag
5078	R	Compressor 8 step 4 relay	WORD		0 ... 1		flag
5079	R	Compressor 8 step 5 relay	WORD		0 ... 1		flag




ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	EXP	M.U.
4652	R	Power generated by compressor 8	WORD		0 ... 100		%
1045	R	Operation hours compressor 8	WORD		0 ... 32000		num
1032	R	Selection compressor 9	WORD		0 ... 1		flag
4667	R	Compressor 9	WORD		0 ... 32767		num
5080	R	Compressor 9 step 1 relay	WORD		0 ... 1		flag
5081	R	Compressor 9 step 2 relay	WORD		0 ... 1		flag
5082	R	Compressor 9 step 3 relay	WORD		0 ... 1		flag
5083	R	Compressor 9 step 4 relay	WORD		0 ... 1		flag
5084	R	Compressor 9 step 5 relay	WORD		0 ... 1		flag
4653	R	Power generated by compressor 9	WORD		0 ... 100		%
1046	R	Operation hours compressor 9	WORD		0 ... 32000		num
1033	R	Selection compressor 10	WORD		0 ... 1		flag
4668	R	Compressor 10	WORD		0 ... 32767		num
5085	R	Compressor 10 step 1 relay	WORD		0 ... 1		flag
5086	R	Compressor 10 step 2 relay	WORD		0 ... 1		flag
5087	R	Compressor 10 step 3 relay	WORD		0 ... 1		flag
5088	R	Compressor 10 step 4 relay	WORD		0 ... 1		flag
5089	R	Compressor 10 step 5 relay	WORD		0 ... 1		flag
4654	R	Power generated by compressor 10	WORD		0 ... 100		%
1047	R	Operation hours compressor 10	WORD		0 ... 32000		num
1034	R	Selection compressor 11	WORD		0 ... 1		flag
4669	R	Compressor 11	WORD		0 ... 32767		num
5090	R	Compressor 11 step 1 relay	WORD		0 ... 1		flag
5091	R	Compressor 11 step 2 relay	WORD		0 ... 1		flag
5092	R	Compressor 11 step 3 relay	WORD		0 ... 1		flag
5093	R	Compressor 11 step 4 relay	WORD		0 ... 1		flag
5094	R	Compressor 11 step 5 relay	WORD		0 ... 1		flag
4655	R	Power generated by compressor 11	WORD		0 ... 100		%
1048	R	Operation hours compressor 11	WORD		0 ... 32000		num
1035	R	Selection compressor 12	WORD		0 ... 1		flag
4670	R	Compressor 12	WORD		0 ... 32767		num
5095	R	Compressor 12 step 1 relay	WORD		0 ... 1		flag
5096	R	Compressor 12 step 2 relay	WORD		0 ... 1		flag
5097	R	Compressor 12 step 3 relay	WORD		0 ... 1		flag
5098	R	Compressor 12 step 4 relay	WORD		0 ... 1		flag
5099	R	Compressor 12 step 5 relay	WORD		0 ... 1		flag
4656	R	Power generated by compressor 12	WORD		0 ... 100		%
1049	R	Operation hours compressor 12	WORD		0 ... 32000		num
1036	R	Selection compressor inverter circuit 1	WORD		0 ... 1		flag
4671	R	State of compressor piloted by inverter, suction section 1	WORD		0 ... 32767		num
4657	R	Power of compressor piloted by the inverter, suction section 1	WORD		0 ... 100		%
1050	R	Compressor inverter running hours circuit 1	WORD		0 ... 32000		num
1037	R	Selection compressor inverter circuit 2	WORD		0 ... 1		flag
4672	R	State of compressor piloted by inverter, suction section 2	WORD		0 ... 32767		num
4658	R	Power of compressor piloted by the inverter, suction section 2	WORD		0 ... 100		%
1051	R	Compressor inverter running hours circuit 2	WORD		0 ... 32000		num
4678	R	Fan state 1	WORD		0 ... 32767		num
1280	R	Fan running time 1	WORD		0 ... 32000		num
4679	R	Fan state 2	WORD		0 ... 32767		num
1281	R	Fan running time 2	WORD		0 ... 32000		num
4680	R	Fan state 3	WORD		0 ... 32767		num
1282	R	Fan running time 3	WORD		0 ... 32000		num
4681	R	Fan state 4	WORD		0 ... 32767		num
1283	R	Fan running time 4	WORD		0 ... 32000		num
4682	R	Fan state 5	WORD		0 ... 32767		num
1284	R	Fan running time 5	WORD		0 ... 32000		num
4683	R	Fan state 6	WORD		0 ... 32767		num
1285	R	Fan running time 6	WORD		0 ... 32000		num
4684	R	Fan state 7	WORD		0 ... 32767		num
1286	R	Fan running time 7	WORD		0 ... 32000		num





ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	EXP	M.U.
4685	R	Fan state 8	WORD		0 ... 32767		num
1287	R	Fan running time 8	WORD		0 ... 32000		num
4686	R	Fan piloted by inverter	WORD		0 ... 32767		num
4677	R	Power generated by fans piloted by inverter	WORD		0 ... 100		%
1288	R	Fan inverter running hours	WORD		0 ... 32000		num
5101	R	Configurable regulator relay step 1	WORD		0 ... 1		flag
4795	R	Power delivered by configurable regulator step 1	WORD		0 ... 100		%
5102	R	Configurable regulator relay step 2	WORD		0 ... 1		flag
2662	R	Valve opening percentage	WORD		0 ... 1000	-1	%
2660	R	Valve overheating temperature	WORD	Y	-32768 ... 32767	-1	°C
2654	R	Valve discharge pressure	WORD	Y	-32768 ... 32767	-1	Psi
2652	R	Valve on status	1 bit		0 ... 1		flag
4631	R	Economy function, suction section 1	WORD		0 ... 1		flag
4632	R	Economy function, suction section 2	WORD		0 ... 1		flag
4633	R	Economy, discharge section	WORD		0 ... 1		flag
4634	R	AUX output 1	WORD		0 ... 1		flag
4635	R	AUX output 2	WORD		0 ... 1		flag
4636	R	AUX output 3	WORD		0 ... 1		flag
5011	R	AUX output 4	WORD		0 ... 1		flag
4637	R	Glycol defrost on	WORD		0 ... 1		flag
4638	R	Energy saving function	WORD		0 ... 1		flag
4639	R	Alarm mute	WORD		0 ... 1		flag
4640	R	Heat recovery	WORD		0 ... 1		flag
4641	R	Liquid return control function, suction section 1	WORD		0 ... 1		flag
4642	R	Liquid return control function, suction section 2	WORD		0 ... 1		flag
4643	R	Hot gas defrost circuit 1 on	WORD		0 ... 1		flag
4644	R	Hot gas defrost circuit 2 on	WORD		0 ... 1		flag
4735	R	Stand-by	WORD		0 ... 1		flag
4796	R	Alarm	WORD		0 ... 32767		num
2161	R	General alarm	WORD		0 ... 1		flag
2049	R	High pressure switch, suction section 1	WORD		0 ... 2		num
2048	R	Low pressure switch, suction section 1	WORD		0 ... 2		num
2051	R	High pressure switch, suction section 2	WORD		0 ... 2		num
2050	R	Low pressure switch, suction section 2	WORD		0 ... 2		num
2052	R	High pressure, suction section 1	WORD		0 ... 1		flag
2053	R	Low pressure, suction section 1	WORD		0 ... 1		flag
2054	R	High pressure, suction section 2	WORD		0 ... 1		flag
2055	R	Low pressure, suction section 2	WORD		0 ... 1		flag
2056	R	Refrigerant level low	WORD		0 ... 2		num
2057	R	Refrigerant leakage	WORD		0 ... 2		num
2058	R	Low pressure switch, discharge section	WORD		0 ... 2		num
2059	R	High pressure switch, discharge section	WORD		0 ... 2		num
2060	R	High pressure, discharge section	WORD		0 ... 1		flag
2061	R	Low pressure, discharge section	WORD		0 ... 1		flag
2159	R	Oil level low, suction section 1	WORD		0 ... 2		num
2160	R	Oil level low, suction section 2	WORD		0 ... 2		num
2097	R	Block compressor 1	WORD		0 ... 1		flag
2109	R	Compressor 1 differential pressure switch	WORD		0 ... 1		flag
2121	R	High pressure compressor 1	WORD		0 ... 1		flag
2133	R	Low pressure compressor 1	WORD		0 ... 1		flag
2145	R	Thermal switch compressor 1	WORD		0 ... 1		flag
2081	R	Compressor 1 operating hours exceeded warning	WORD		0 ... 2		num
2098	R	Block compressor 2	WORD		0 ... 1		flag
2110	R	Compressor 2 differential pressure switch	WORD		0 ... 1		flag
2122	R	High pressure compressor 2	WORD		0 ... 1		flag
2134	R	Low pressure compressor 2	WORD		0 ... 1		flag
2146	R	Thermal switch compressor 2	WORD		0 ... 1		flag
2082	R	Compressor 2 operating hours exceeded warning	WORD		0 ... 2		num
2099	R	Block compressor 3	WORD		0 ... 1		flag
2111	R	Compressor 3 differential pressure switch	WORD		0 ... 1		flag
2123	R	High pressure compressor 3	WORD		0 ... 1		flag
2135	R	Low pressure compressor 3	WORD		0 ... 1		flag





ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	EXP	M.U.
2147	R	Thermal switch compressor 3	WORD		0 ... 1		flag
2083	R	Compressor 3 operating hours exceeded warning	WORD		0 ... 2		num
2100	R	Block compressor 4	WORD		0 ... 1		flag
2112	R	Compressor 4 differential pressure switch	WORD		0 ... 1		flag
2124	R	High pressure compressor 4	WORD		0 ... 1		flag
2136	R	Low pressure compressor 4	WORD		0 ... 1		flag
2148	R	Thermal switch compressor 4	WORD		0 ... 1		flag
2084	R	Compressor 4 operating hours exceeded warning	WORD		0 ... 2		num
2101	R	Block compressor 5	WORD		0 ... 1		flag
2113	R	Compressor 5 differential pressure switch	WORD		0 ... 1		flag
2125	R	High pressure compressor 5	WORD		0 ... 1		flag
2137	R	Low pressure compressor 5	WORD		0 ... 1		flag
2149	R	Thermal switch compressor 5	WORD		0 ... 1		flag
2085	R	Compressor 5 operating hours exceeded warning	WORD		0 ... 2		num
2102	R	Block compressor 6	WORD		0 ... 1		flag
2114	R	Compressor 6 differential pressure switch	WORD		0 ... 1		flag
2126	R	High pressure compressor 6	WORD		0 ... 1		flag
2138	R	Low pressure compressor 6	WORD		0 ... 1		flag
2150	R	Thermal switch compressor 6	WORD		0 ... 1		flag
2086	R	Compressor 6 operating hours exceeded warning	WORD		0 ... 2		num
2103	R	Block compressor 7	WORD		0 ... 1		flag
2115	R	Compressor 7 differential pressure switch	WORD		0 ... 1		flag
2127	R	High pressure compressor 7	WORD		0 ... 1		flag
2139	R	Low pressure compressor 7	WORD		0 ... 1		flag
2151	R	Thermal switch compressor 7	WORD		0 ... 1		flag
2087	R	Compressor 7 operating hours exceeded warning	WORD		0 ... 2		num
2104	R	Block compressor 8	WORD		0 ... 1		flag
2116	R	Compressor 8 differential pressure switch	WORD		0 ... 1		flag
2128	R	High pressure compressor 8	WORD		0 ... 1		flag
2140	R	Low pressure compressor 8	WORD		0 ... 1		flag
2152	R	Thermal switch compressor 8	WORD		0 ... 1		flag
2088	R	Compressor 8 operating hours exceeded warning	WORD		0 ... 2		num
2105	R	Block compressor 9	WORD		0 ... 1		flag
2117	R	Compressor 9 differential pressure switch	WORD		0 ... 1		flag
2129	R	High pressure compressor 9	WORD		0 ... 1		flag
2141	R	Low pressure compressor 9	WORD		0 ... 1		flag
2153	R	Thermal switch compressor 9	WORD		0 ... 1		flag
2089	R	Compressor 9 operating hours exceeded warning	WORD		0 ... 2		num
2106	R	Block compressor 10	WORD		0 ... 1		flag
2118	R	Compressor 10 differential pressure switch	WORD		0 ... 1		flag
2130	R	High pressure compressor 10	WORD		0 ... 1		flag
2142	R	Low pressure compressor 10	WORD		0 ... 1		flag
2154	R	Thermal switch compressor 10	WORD		0 ... 1		flag
2090	R	Compressor 10 operating hours exceeded warning	WORD		0 ... 2		num
2107	R	Block compressor 11	WORD		0 ... 1		flag
2119	R	Compressor 11 differential pressure switch	WORD		0 ... 1		flag
2131	R	High pressure compressor 11	WORD		0 ... 1		flag
2143	R	Low pressure compressor 11	WORD		0 ... 1		flag
2155	R	Thermal switch compressor 11	WORD		0 ... 1		flag
2091	R	Compressor 11 operating hours exceeded warning	WORD		0 ... 2		num
2108	R	Block compressor 12	WORD		0 ... 1		flag
2120	R	Compressor 12 differential pressure switch	WORD		0 ... 1		flag
2132	R	High pressure compressor 12	WORD		0 ... 1		flag
2144	R	Low pressure compressor 12	WORD		0 ... 1		flag
2156	R	Thermal switch compressor 12	WORD		0 ... 1		flag
2092	R	Compressor 12 operating hours exceeded warning	WORD		0 ... 2		num
2093	R	Stop compressor piloted by inverter, suction section 1	WORD		0 ... 1		flag
2157	R	Inverter Error, suction section 1	WORD		0 ... 1		flag
2095	R	Running time of compressor piloted by inverter has been exceeded, suction section 1	WORD		0 ... 2		num
2094	R	Stop compressor piloted by inverter, suction section 2	WORD		0 ... 1		flag
2158	R	Inverter Error, suction section 2	WORD		0 ... 1		flag





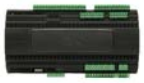
ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	EXP	M.U.
2096	R	Running time of compressor piloted by inverter has been exceeded, suction section 2	WORD		0 ... 2		num
2062	R	Thermal protection fan 1	WORD		0 ... 1		flag
2072	R	Fan exceeded running time 1	WORD		0 ... 2		num
2063	R	Thermal protection fan 2	WORD		0 ... 1		flag
2073	R	Fan exceeded running time 2	WORD		0 ... 2		num
2064	R	Thermal protection fan 3	WORD		0 ... 1		flag
2074	R	Fan exceeded running time 3	WORD		0 ... 2		num
2065	R	Thermal protection fan 4	WORD		0 ... 1		flag
2075	R	Fan exceeded running time 4	WORD		0 ... 2		num
2066	R	Thermal protection fan 5	WORD		0 ... 1		flag
2076	R	Fan exceeded running time 5	WORD		0 ... 2		num
2067	R	Thermal protection fan 6	WORD		0 ... 1		flag
2077	R	Fan exceeded running time 6	WORD		0 ... 2		num
2068	R	Thermal protection fan 7	WORD		0 ... 1		flag
2078	R	Fan exceeded running time 7	WORD		0 ... 2		num
2069	R	Thermal protection fan 8	WORD		0 ... 1		flag
2079	R	Fan exceeded running time 8	WORD		0 ... 2		num
2071	R	Inverter error, discharge section	WORD		0 ... 1		flag
2070	R	Thermal switch for fan piloted by inverter	WORD		0 ... 1		flag
2080	R	Running time of fan piloted by inverter exceeded	WORD		0 ... 2		num
2162	R	High pressure alarm prevention timeout, discharge section	WORD		0 ... 1		flag
2164	R	Suction probe error, suction section 1	WORD		0 ... 1		flag
2165	R	Suction probe error, suction section 2	WORD		0 ... 1		flag
2166	R	Discharge probe error	WORD		0 ... 1		flag
2163	R	Internal temperature probe error	WORD		0 ... 1		flag
2167	R	External temperature probe error	WORD		0 ... 1		flag
2168	R	Heat recovery temperature probe error	WORD		0 ... 1		flag
2169	R	Sub-cooling temperature probe error	WORD		0 ... 1		flag
2170	R	Configurable regulator probe error	WORD		0 ... 1		flag
2171	R	Configurable alarm regulator probe error	WORD		0 ... 1		flag
2172	R	Error opening recordings file	WORD		0 ... 1		flag
2173	R	Error writing recordings file	WORD		0 ... 1		flag
2174	R	Error closing recordings file	WORD		0 ... 1		flag
2175	R	Recordings memory full error	WORD		0 ... 1		flag
2176	R	Configuration error alarm	WORD		0 ... 1		flag
2177	R	External eeprom CRC error alarm	WORD		0 ... 1		flag
2178	R	External eeprom user parameters CRC error alarm	WORD		0 ... 1		flag
2179	R	RTA battery low alarm	WORD		0 ... 1		flag
2180	R	RTC communication error alarm	WORD		0 ... 1		flag
2181	R	Alarm RTC register value not consistent	WORD		0 ... 1		flag
2182	R	Configurable regulator alarm	WORD		0 ... 1		flag
2183	R	Configurable regulator warning	WORD		0 ... 1		flag
2652.1	R	Valve alarm status	1 bit		0 ... 1		flag
2185	R	Valve 1 no-link alarm	WORD		0 ... 1		flag
4752	R	Analogue input 1 failure	WORD		0 ... 1		flag
4753	R	Analogue input 2 failure	WORD		0 ... 1		flag
4754	R	Analogue input 3 failure	WORD		0 ... 1		flag
4755	R	Analogue input 4 failure	WORD		0 ... 1		flag
4756	R	Analogue input 5 failure	WORD		0 ... 1		flag
4757	R	Analogue input 6 failure	WORD		0 ... 1		flag
4758	R	Analogue input 7 failure	WORD		0 ... 1		flag
4759	R	Analogue input 8 failure	WORD		0 ... 1		flag
4760	R	Analogue input 9 failure	WORD		0 ... 1		flag
4761	R	Analogue input 10 failure	WORD		0 ... 1		flag
4762	R	Analogue input 11 failure	WORD		0 ... 1		flag
4763	R	Analogue input 12 failure	WORD		0 ... 1		flag
4764	R	Analogue input 13 failure	WORD		0 ... 1		flag
4765	R	Analogue input 14 failure	WORD		0 ... 1		flag
4766	R	Analogue input 15 failure	WORD		0 ... 1		flag
4767	R	Analogue input 16 failure	WORD		0 ... 1		flag



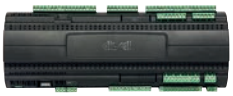


ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	EXP	M.U.
4768	R	Analogue input 17 failure	WORD		0 ... 1		flag
4769	R	Analogue input 18 failure	WORD		0 ... 1		flag
4770	R	Analogue input 19 failure	WORD		0 ... 1		flag
4771	R	Analogue input 20 failure	WORD		0 ... 1		flag
4772	R	Analogue input 21 failure	WORD		0 ... 1		flag
4773	R	Analogue input 22 failure	WORD		0 ... 1		flag
4774	R	Analogue input 23 failure	WORD		0 ... 1		flag
4775	R	Analogue input 24 failure	WORD		0 ... 1		flag
4776	R	Analogue input 25 failure	WORD		0 ... 1		flag
4777	R	Analogue input 26 failure	WORD		0 ... 1		flag
376	W	Instrument On/Off	WORD		0 ... 1		flag
791	W	Keyboard locked	WORD		0 ... 1		flag
791	W	Keyboard unlocked	WORD		0 ... 1		flag
330	W	Alarm mute	WORD		0 ... 1		flag
319	W	Reset alarm history	WORD		0 ... 1		flag
321	W	Alarm manual reset	WORD		0 ... 1		flag
322	W	Enable/disable economy, suction section 1	WORD		0 ... 1		flag
323	W	Enable/disable economy, suction section 2	WORD		0 ... 1		flag
324	W	Enable/disable economy, discharge section	WORD		0 ... 1		flag
329	W	Enable/disable energy saving	WORD		0 ... 1		flag
325	W	On/Off Auxiliary 1	WORD		0 ... 1		flag
326	W	On/Off Auxiliary 2	WORD		0 ... 1		flag
327	W	On/Off Auxiliary 3	WORD		0 ... 1		flag
331	W	Reset compressor running time 1	WORD		0 ... 1		flag
354	W	Selection compressor 1	WORD		0 ... 1		flag
332	W	Reset compressor running time 2	WORD		0 ... 1		flag
355	W	Selection compressor 2	WORD		0 ... 1		flag
333	W	Reset compressor running time 3	WORD		0 ... 1		flag
356	W	Selection compressor 3	WORD		0 ... 1		flag
334	W	Reset compressor running time 4	WORD		0 ... 1		flag
357	W	Selection compressor 4	WORD		0 ... 1		flag
335	W	Reset compressor running time 5	WORD		0 ... 1		flag
358	W	Selection compressor 5	WORD		0 ... 1		flag
336	W	Reset compressor running time 6	WORD		0 ... 1		flag
359	W	Selection compressor 6	WORD		0 ... 1		flag
337	W	Reset compressor running time 7	WORD		0 ... 1		flag
360	W	Selection compressor 7	WORD		0 ... 1		flag
338	W	Reset compressor running time 8	WORD		0 ... 1		flag
361	W	Selection compressor 8	WORD		0 ... 1		flag
339	W	Reset compressor running time 9	WORD		0 ... 1		flag
362	W	Selection compressor 9	WORD		0 ... 1		flag
340	W	Reset compressor running time 10	WORD		0 ... 1		flag
363	W	Selection compressor 10	WORD		0 ... 1		flag
341	W	Reset compressor running time 11	WORD		0 ... 1		flag
364	W	Selection compressor 11	WORD		0 ... 1		flag
342	W	Reset compressor running time 12	WORD		0 ... 1		flag
365	W	Selection compressor 12	WORD		0 ... 1		flag
343	W	Reset running time of compressor piloted by inverter, suction section 1	WORD		0 ... 1		flag
366	W	Selection/de-selection compressor piloted by inverter, suction section 1	WORD		0 ... 1		flag
344	W	Reset running time of compressor piloted by inverter, suction section 2	WORD		0 ... 1		flag
367	W	Selection/de-selection compressor piloted by inverter, suction section 2	WORD		0 ... 1		flag
345	W	Reset fan running hours 1	WORD		0 ... 1		flag
346	W	Reset fan running hours 2	WORD		0 ... 1		flag
347	W	Reset fan running hours 3	WORD		0 ... 1		flag
348	W	Reset fan running hours 4	WORD		0 ... 1		flag
349	W	Reset fan running hours 5	WORD		0 ... 1		flag
350	W	Reset fan running hours 6	WORD		0 ... 1		flag
351	W	Reset fan running hours 7	WORD		0 ... 1		flag
352	W	Reset fan running hours 8	WORD		0 ... 1		flag





ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	EXP	M.U.
353	W	Reset running time of the fan piloted by the inverter, discharge section	WORD		0 ... 1		flag
306	W	Request open configuration mode	WORD		0 ... 1		flag
306	W	Request exit configuration mode with allocation of resources	WORD		0 ... 1		flag
306	W	Request exit configuration mode without allocation of resources	WORD		0 ... 1		flag
421	W	Disable automatic update of associated parameters	WORD		0 ... 1		flag
421	W	Automatic update of associated parameters active	WORD		0 ... 1		flag
2194	W	Refresh watchdog floating suction setpoint	WORD		0 ... 65535		flag





17.1. ELECTRICAL CONNECTIONS

Important! Make sure the appliance is switched off before working on the electrical connections.

The device is equipped with removable screw terminals to connect wires having a maximum cross section of 2.5 mm^2 (a single conductor per terminal for power feed connections): please refer to the label on the device for details on terminal ratings. Do not exceed the maximum permitted current; for higher loads, use a contactor with sufficient power capacity. Make certain the power supply voltage matches the rated voltage of the device.

Probes have no connection polarity and can be extended using a normal two-core cable (note that extension of probe leads influences the instrument's electromagnetic compatibility - EMC: take great care with the wiring). Probe cables, power supply cables and the TTL serial cables should be routed separately from power cables.

17.2. DISCLAIMER

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While all possible care has been taken to ensure the accuracy of this document, ELIWELL CONTROLS SRL cannot accept liability for any damage resulting from its use. The same applies to any person or company involved in preparing and editing this document. ELIWELL CONTROLS SRL reserves the right to make aesthetic or functional changes at any time without notice.

17.3. LIABILITY AND RESIDUAL RISKS

ELIWELL CONTROLS SRL declines any liability for damage due to:
- installation/use other than expressly specified and, in particular, in conflict with the safety prescriptions set down in regulations and/or specified herein;
- use on panels that do not provide adequate protection against electric shocks, 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 that do not comply with statutory laws and regulations.

17.4. CONDITIONS OF USE

Permitted use

For safety reasons, the device must be installed and used in accordance with the instructions provided. In particular, parts carrying dangerous voltages must not be accessible under normal conditions. The device must be adequately protected from water and dust with regard to the application, and must only be accessible using tools (with the exception of the front panel). The device is suitable for use in household refrigeration appliances and/or similar equipment and has been tested for safety aspects in accordance with the harmonized European reference standards.

Prohibited use

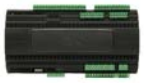
Any use other than what is expressly permitted is prohibited. The relay contacts provided are mechanical and subject to failure. Any protection devices required by product standards, or suggested by good practice in view of obvious safety requirements, must be installed outside the device.

17.5. DISPOSAL



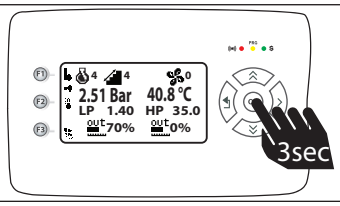
The appliance (or the product) must be disposed of separately in compliance with the local standards in force on waste disposal.





18.1. SERVICE MENU

ACCESS TO SERVICE MENU



MENU 01/02
Diagnostics
Service
Clock and bands

SERVICE 01/04
Recordings
Utilities state
Reset Alarm History

SERVICE 02/04
Copy Card
IO Test
IO State

SERVICE 03/04
EEV
User Setting
Service Password

SERVICE 04/04
FW: 504_09 02/09/13

Please Note.
EEV menu is available only if
740 - EEvE ≠ 0

SERVICE

SERVICE PASSWORD
The password is composed of 5 alphanumeric characters.

DEFAULT PASSWORD > *** > direct access to service menu**

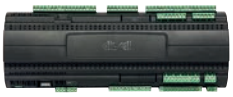
ACCESS PASSWORD > the label **PASSWORD** appears

press the 'OK' key and set the password with the 'UP' and 'DOWN' keys.
If the password is correct, pressing 'OK' opens the Service Menu

MODIFY SERVICE PASSWORD (PASSWORD 4)

SERVICE 03/04
EEV
Save User Setting
Service Password

SERV. PSW 001/001
637 - PSW4
Password 4.
******





Recordings
Menu composed of 2 folders:
• Upload to Copy Card: allows 'uploading' the operation recordings history to Copy Card - see USB Copy Card chapter.
• Reset Recordings: cancels (resets) all recordings - operation recordings history. Confirmation of deletion will be requested (**Confirm Del.**). Confirm with OK/DX (right); to exit press SX (left).

Utilities status
Displays status of compressors and fans

RESET > CANCELLATION (Res) hours of operation
Move onto the selected utility with the UP and DOWN keys and confirm resetting with the OK / DX (right) key.

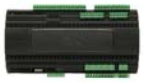
SERVI 01/03 Recordings **Utilities state** Reset Alarm History	SERV. PSW 001/001 637 - PSW4 Password 4. ******
UTILI 01/01 **Compressors** Fans	UTILI 01/01 Compressors **Fans**
COMPR 01/03 Res Comp1 0 hours Res Comp2 30 hours Res Comp3 26 hours	FANS 01/01 Reset Fan1 2 hours Reset Fan2 20 hours Reset Fan3 18 hours

SELECT/DESELECT each single compressor
See INVERTER Error Alarms section

Sel Comp1 → YES compressor selected
Sel Comp2 → NO compressor deselected
Sel CInv1 → YES compressor INVERTER selected

COMPR 01/03 Sel Comp1 Yes Sel Comp2 No Sel Comp3 Yes	COMPR 03/03 CInv1 Sel Yes

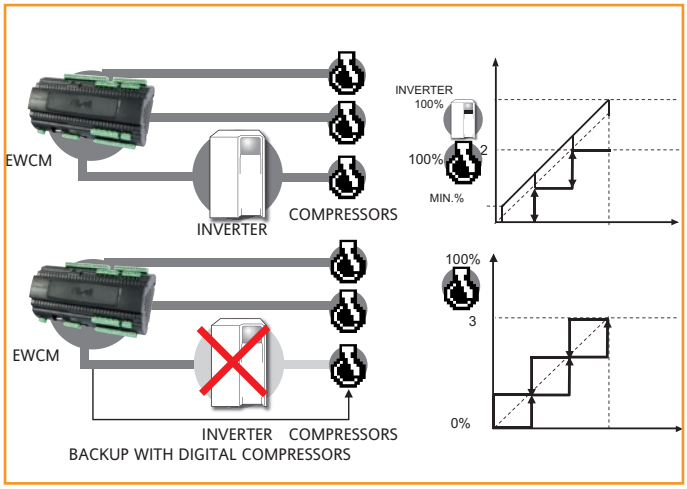
Compressors can be selected (**Yes**) or deselected (**No**) singly.
Deselecting a compressor resets the compressor alarms which will not be controlled, and its 'availability' within the system.
It is possible to reset times of digital compressors and of the continuous compressor.

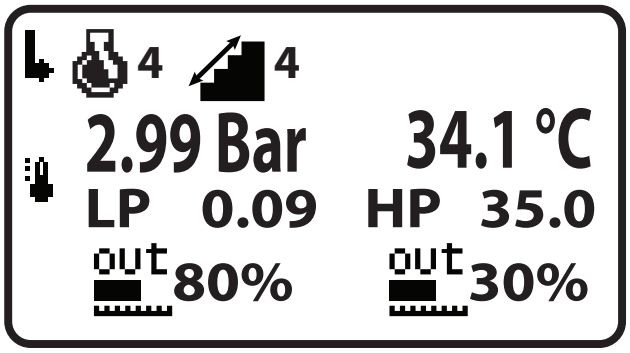
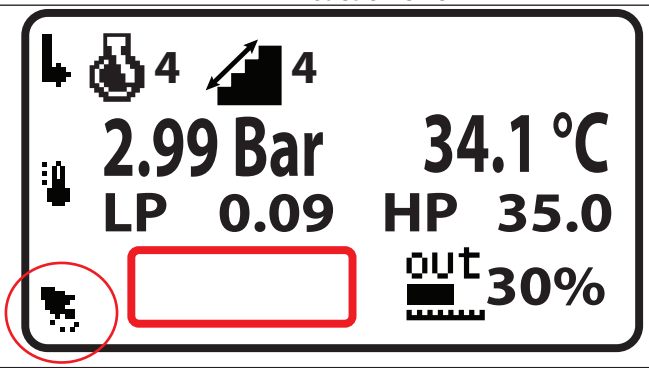
INVERTER SUCTION ERROR
EWCM EO manages compressor behaviour with an INVERTER error through configuration of Quick Start parameters **522 - Cpty** and **524 - Cpty2** with the following settings

CIRCUIT 1 → **522 - Cpty = 3** that is managing homogeneous + INVERTER steps, in an INVERTER error
CIRCUIT 2 → **524 - Cpty2 = 3** that is managing homogeneous + INVERTER steps, in an INVERTER error

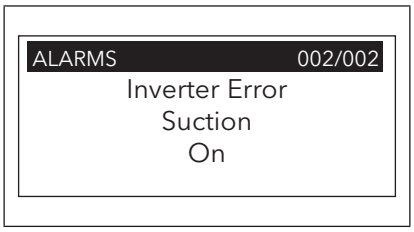
REGULATION OF SUCTION WITH BACKUP INVERTER



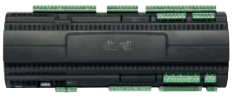
In these cases control is automatically switched to digital compressors.

normal operations	INVERTER suction error
	

The Alarm appears in the Alarms Menu



In the Service Menu the display of operating times and selection of the compressor INVERTER will automatically switch to a digital output.




normal operations	INVERTER suction error
COMPR 01/03 Res Comp1 0 hours Res Comp2 30 hours Res CInv 2 hours	COMPR 01/03 Res Comp1 0 hours Res Comp2 30 hours **Res Comp3 2 hours**
COMPR 01/03 Sel Comp1 Yes Sel Comp2 Yes Sel CInv Yes	COMPR 01/03 Sel Comp1 Yes Sel Comp2 Yes **Sel Comp3 Yes**

The compressor INVERTER is switched to digital 3 output
Note that compressor INVERTER usage times will be the same as those of the corresponding digital compressor:

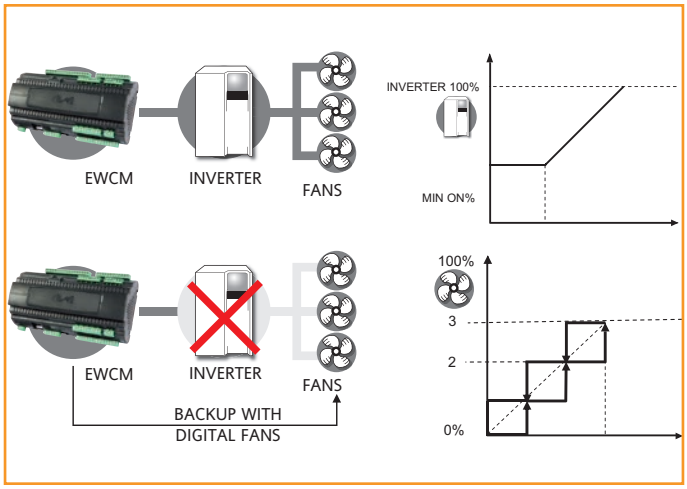
While operating in backup the continuous compressor digital input block is used to block digital compressor 3 which is really the compressor connected to the inverter piloted digitally.

ALARMS 002/002
Cont. Comp Block
Suction
On

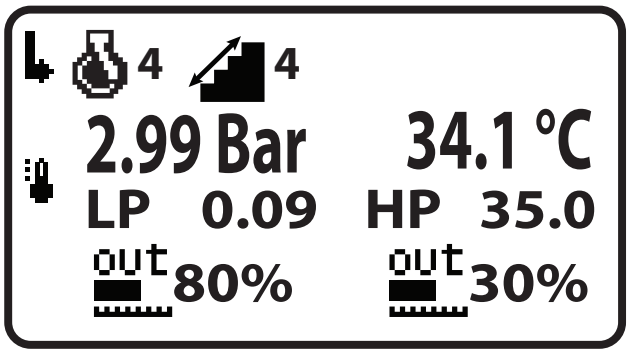
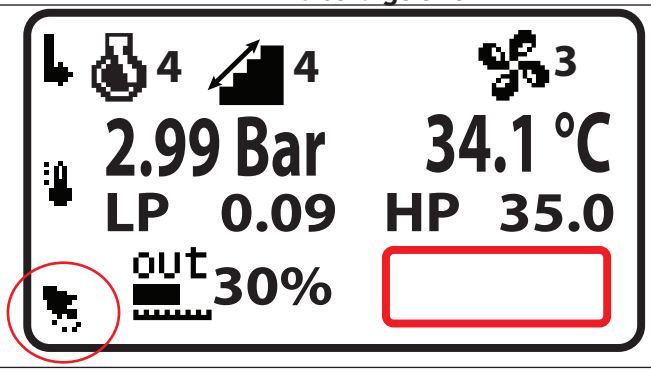
INVERTER DISCHARGE ERROR
EWCM EO manages compressor behaviour with an INVERTER error through the Quick Start parameter **520 - Fnty** with the following settings

520 - Fnty = 3 that is control through INVERTER, with an INVERTER error
520 - Fnty = 5 that is control through digital + INVERTER, with an INVERTER error

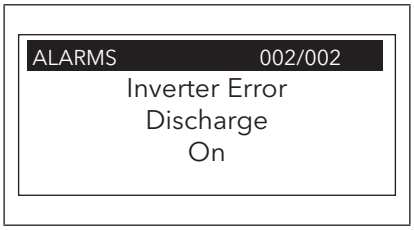
REGULATION OF DISCHARGE WITH BACKUP INVERTER



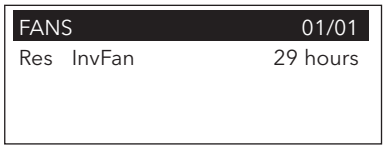
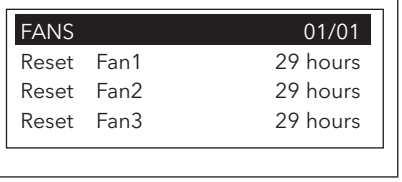
In these cases control is automatically switched to digital fans.

normal operations	INVERTER discharge error
	

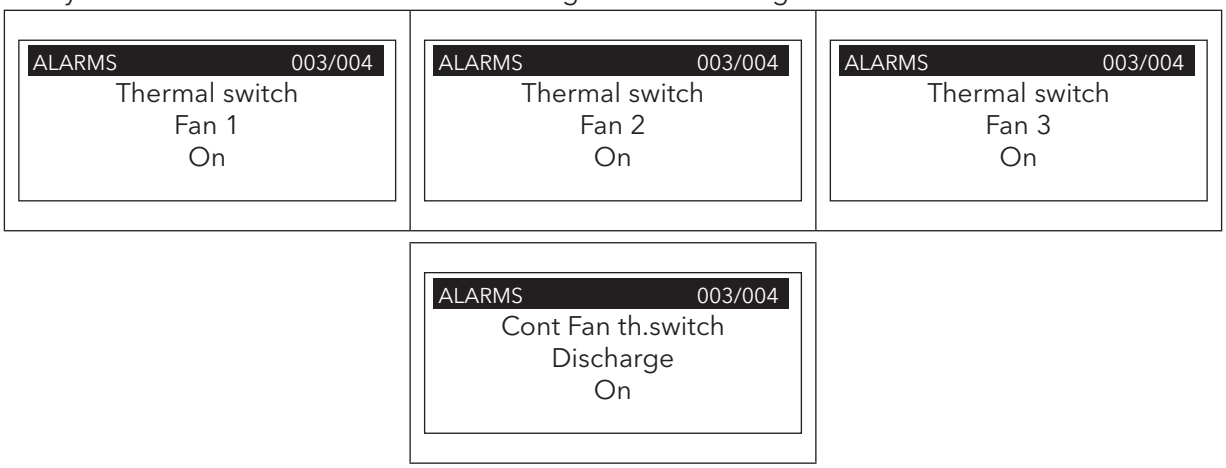
The Alarm appears in the Alarms Menu

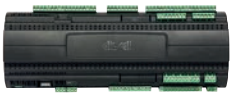


In the Service Menu both the display of the operating times and the selection of the fan INVERTER will automatically switch to a digital output. (example with 3 fans in parallel)

normal operations	INVERTER discharge error
	

While operating in backup all digital fan thermal switches are activated
If the continuous fan thermal switch is activated during backup operations (inverter error ventilation on) nothing happens except it being displayed.
This alarm only blocks ventilation if the inverter discharge error is no longer on.







Reset Alarm History
Menu to clear (reset) the alarm history.
Confirmation of deletion will be requested (**Confirm Del.**).
Confirm with OK/DX (right); to exit press SX (left).

Copy Card
See USB Copy Card chapter

IO Test
Manual management (**test**) of outputs present
To test the outputs it is necessary to enable manual mode:
access the Manual Mode Menu by pressing OK, press the DX (right) key and press UP to change from No to Yes.
Exit the Menu with the SX (left) key.

SERVI 02/03 Copy Card **IO Test** IO State	IO TE 01/01 **Manual** **YES** Outx Test Vx/Ix Test
OUTX TEST 01/05 Out1 Off Out2 Off Out3 Off	VX/IX TEST 01/01 V1/I1 20% V2/I2 0%
COMPR 01/03 Res Comp1 0 hours Res Comp2 30 hours Res Comp3 26 hours	FANS 01/01 Reset Fan1 2 hours Reset Fan2 20 hours Reset Fan3 18 hours

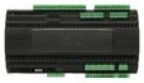
Outx Test > From this folder you can set (Set) in a similar way to what was described above for the digital outputs from No to Yes.
Vx/Ix Test > Similarly to what was described above, analogue outputs will be activated in a percentage:
with the OK key, use the DX (right) key and the UP/DOWN keys to increase or decrease the percentage of the analogue output.

IO State
Menu that displays inputs/outputs present

SERVI 02/03 Copy Card IO Test **IO State**	IO ST 01/02 PBx Vx/Ix DIx/DIHx
	IO ST 02/02 Outx

PBx > values read by analogue inputs
Vx/Ix > values read by analogue outputs
DIx/DIHx > values read by digital inputs **OFF** or **ON**
Outx > values read of digital outputs **OFF** or **ON**





18.1.1. EEV

If

EXTERNAL DRIVER > 740 - EEvE = 1 →step1 / 740 - EEvE = 2 →CO2

the Service Menu displays the **EEV** folder

SERVICE 01/03	SERVICE 02/03	SERVICE 03/03	SERVICE
Recordings	Copy Card	**EEV**	
Utilities state	IO Test	Service Password	
Reset Alarm History	IO State	FW: 504_01 03/08/12	

SERVICE PASSWORD
If the electronic expansion valve is present, you can monitor valve driver 'status' through the Service menu (read only)

EEV 01/02		EEV 02/02			EEV SERVICE
On/Off	Off	SHT	0.0 °C		
Alarm	Off	Disch. Pres	0.0 Bar		
Out %	100.0%	Comm. Err.	On		

On/Off: display of EEV driver status.

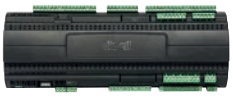
Alarm: display of EEV driver alarm status.
The alarm does not block the EWCM EO resources if used for sub-cooling (generic regulator, step1),
The alarm blocks EWCM EO resources with the CO2 condenser. The alarm is always automatic.

Out %: Valve opening percentage.

SHT: Valve overheating temperature.

Disch. Pres: Pressure the driver uses to regulate high pressure. In nominal conditions it is a probe configured on the driver read by the EWCM. With a probe error or not configured the value is written on the driver by the EWCM.

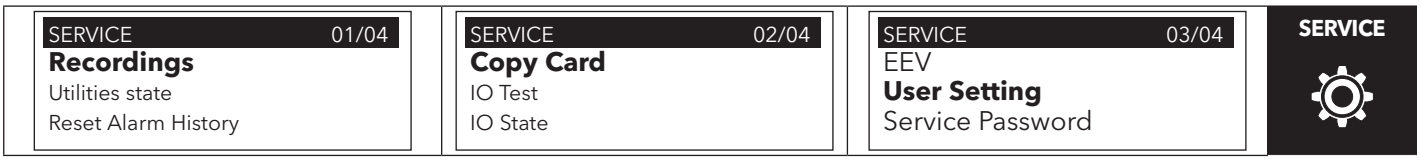
Comm. Err: Communication error with the EEV driver.





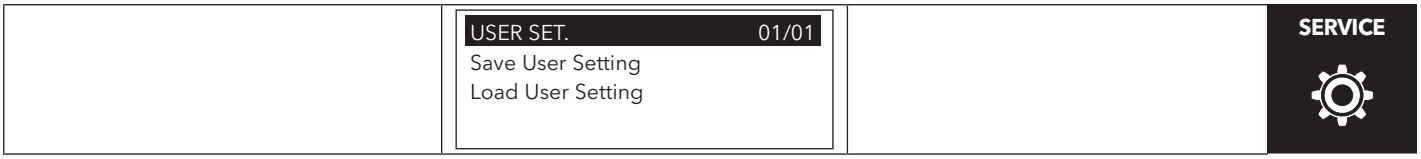
18.1.2. USER SETTINGS

In Service menu a folder **Save User Setting** is available

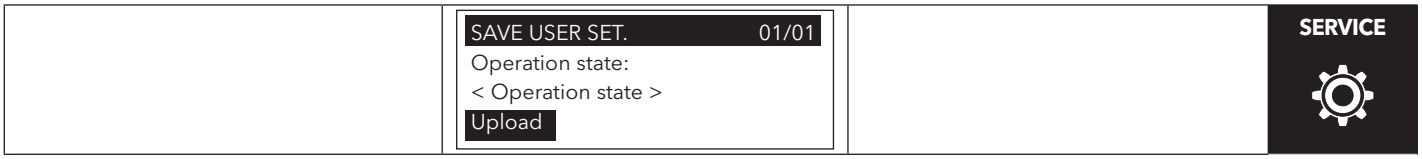


User Settings

The customer, once assisted configuration is complete, I/O configured and the regulation parameters set, can save the machine status in order to restore the settings as necessary.



To 'freeze' the current machine status, access Save User Setting, navigate to Upload and press OK.

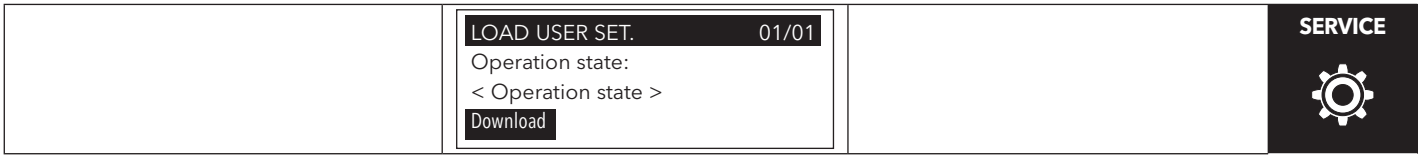


The message that will appear will be:

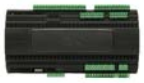
<Operation state>
The state of the operation can be:
• No operation
• Operation in progress (°)
• Operation Terminated (operation terminated successfully).
(°) N.B! wait: it can take a few minutes.

If necessary (if memory error detected), EWCM EO will automatically reset the machine with the default settings.
User can save the current default settings (user setting) manually (menu service) or automatically when a parameter is changed (1 h after the modification all the user setting will be overwritten).
The default setting is initialized per default at the factory settings.

Conversely, to 'restore' machine status manually with the customised user settings (access **Load User Setting**, navigate to Download and press OK.

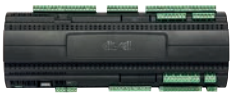






PLEASE NOTE THAT THE SERVICE MENU IS FOR USE BY AUTHORISED PERSONNEL ONLY.
THE MENU IS PASSWORD PROTECTED.
THE MENU ALLOWS SYSTEM MAINTENANCE AND ENABLES RESOURCES AND LOADS TO BE REMOVED AND ADDED.

THE LAST MENU ITEM INDICATES THE FIRMWARE VERSION OF THE INSTRUMENT AND CORRESPONDING DATE.
EXAMPLE FW: 504.09 02/09/13
PLEASE PROVIDE THIS INFORMATION WHEN CONTACTING TECHNICAL SUPPORT





19.1. INTRODUCTION

This section illustrates the various applications and examples of systems managed by EWCM EO and the relative programs **(.dat)** supplied by Eliwell available in the website www.eliwell.com

Examples referred to model EWCM 9900 EO (18DIN) with default settings
Inputs and outputs maintain compatibility with models EWCM 9900 and EWCM 9100 EO (13 DIN)
Applications do not modify regulation limits, alarms and safety times.
Some settings given as examples could require the specific application to be adapted.

19.2. PROGRAMS AND APPLICATIONS

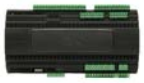
File names **.dat** contain maximum 8 upper case characters

Programs	Description	Application	DAT
Program 1	EWCM EO + 1 x V910 via I/O	**CO2**	**9900AB01**
Program 2	EWCM EO + 1 x V910 via serial port RS485		**9900AB02**
Program 3 LT	EWCM high synchronisation		**99BTAB03**
Program 3 MT	EWCM low synchronisation		**99TNAB03**
Program 4	EWCM EO + Gas cooler		**9900AB04**
Program 5	EWCM EO + 2 x V910 double exchanger (redundant)		**9900AB05**
Program 6	EWCM EO single circuit with compressors ON/OFF (condensation by steps)	**single circuit**	**9900AB06**
Program 7	EWCM EO single circuit with compressors ON/OFF and inverter (condensation by steps)	**single circuit**	**9900AB07**
Program 8	EWCM EO double circuit with compressors ON/OFF and inverter (condensation by steps)	**double circuit only EWCM 9900 EO**	**9900AB08**
Program 9	EWCM single circuit with compressors ON/OFF (condensation with inverter)	**single circuit**	**9900AB09**
Program 10	EWCM EO single circuit with compressors ON/OFF and inverter (condensation with inverter)	**single circuit**	**9900AB10**
Program 11	EWCM EO double circuit with compressors ON/OFF and inverter (condensation with inverter)	**double circuit only EWCM 9900 EO**	**9900AB11**
Program 12	EWCM EO floating condensation at set points	**condensation floating set points**	**9900AB12**
Program 13	EWCM EO configurable regulator ON/OFF at a COOL mode activation point management of warning and maximum alarm limit	**configurable regulator**	**9900AB13**
Program 14	EWCM EO configurable regulator ON/OFF with two activation points		**9900AB14**
Program 15	EWCM EO + V800 via I/O fixed temperature sub-cooling	**sub-cooling**	**9900AB15**
Program 16	EWCM EO + V910 via serial port RS485 floating temperature sub-cooling		**9900AB16**

The map must be downloaded with USB Copy Card[1]
Having downloaded the map from USB to EWCM EO extract USB Copy Card and EWCM EO resets automatically

1 See '8.1. usb copy card' page 43

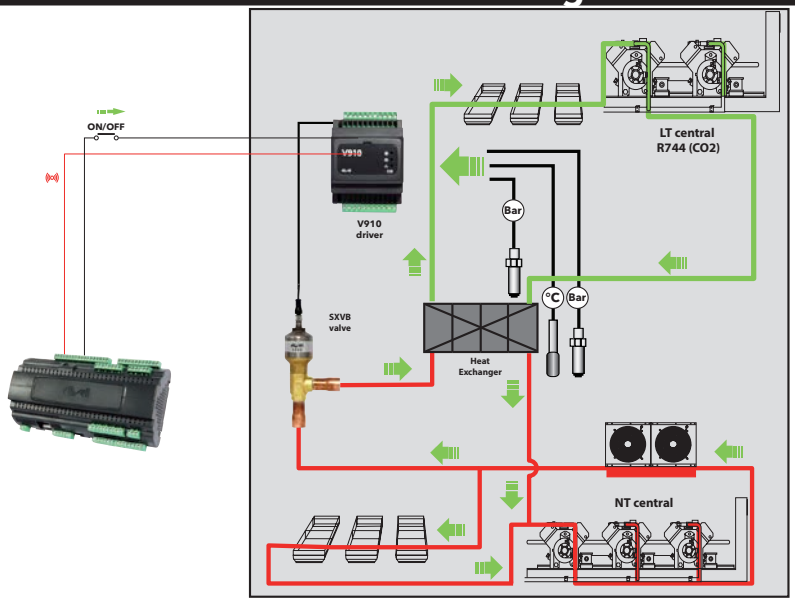




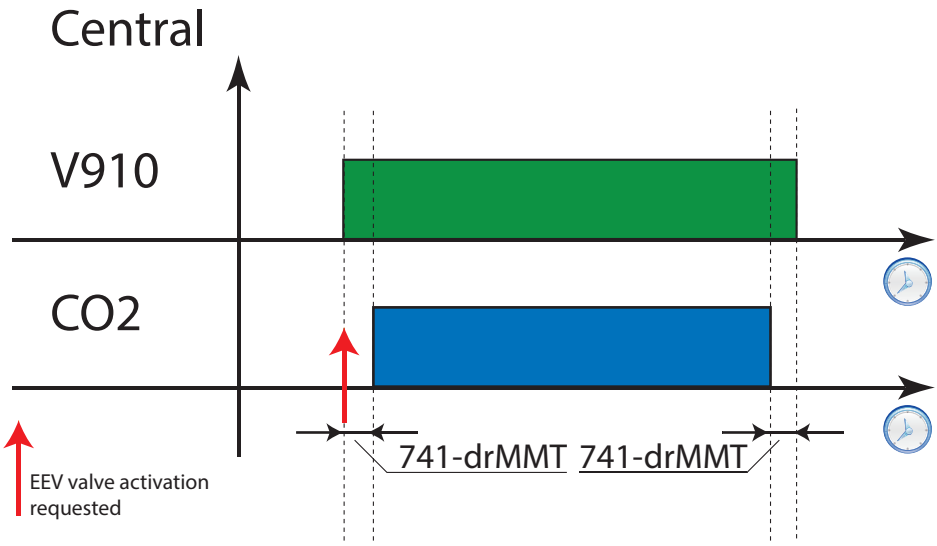
19.2.1. PROGRAM 1 - 9900AB01
EWCM + V910 DIGITAL COMMANDS

EWCM EO manages an EEV driver for intermediate exchanger, through a digital output (command) and a digital input (block).
In this way it can command a V910 or third party driver.

EWCM EO ● V910 via digital



9900AB01



Folder	Parameter	Description	LT	DAT
EXTERNAL DRIVER	**740 - EEvE**	Enable electronic valve driver	2	
EXTERNAL DRIVER	**741 - drMMT**	Delay activation high temperature central (MT) at minimum power	0 … 999"	
RESOURCE ALLOCATION Digital Outputs	**584-H201 ÷ 602-H219**	control EEV activation from LP plant	±98	OUT13
RESOURCE ALLOCATION Digital Inputs	**603-H101 ÷ 622-H306**	General alarm	±1	DIL4





Notes
No relay must be configured with values 96 and 97: **584-H201 ÷ 602-H219 ≠ 96 and 97**

Settings necessary on **V910**:

At least one digital input **ddI1 or ddI2 = +/- 1 (On)**:

Parameter	Description	Value	Notes
dL40	Configuration of digital input ddI1	= 1 (on)	• 0 = digital input not configured • ±1 = ON/OFF regulation • ±2 = defrost • ±3 = alarm • ±4 = system operating mode (only modes 0 and 1)
dL41	Configuration of digital input ddI2		

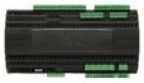
At least one digital output **ddO1 / ddO2 = +/- 2 (Alarm)**:

Parameter	Description	Value	Notes
dL90	digital output configuration ddO1	= 2 (AL)	0 = output controlled from serial ±1 = solenoid valve control ±2 = alarm output
dL91	digital output configuration ddO2 (Open collector)		

Type of regulation **dF02=0** from digital input

Parameter	Description	Value	Notes
dF02	Selection of type of valve regulator activation	= 0 (digital input)	0= digital input 1= Serial 2= reg. ON/OFF 3= EWCM

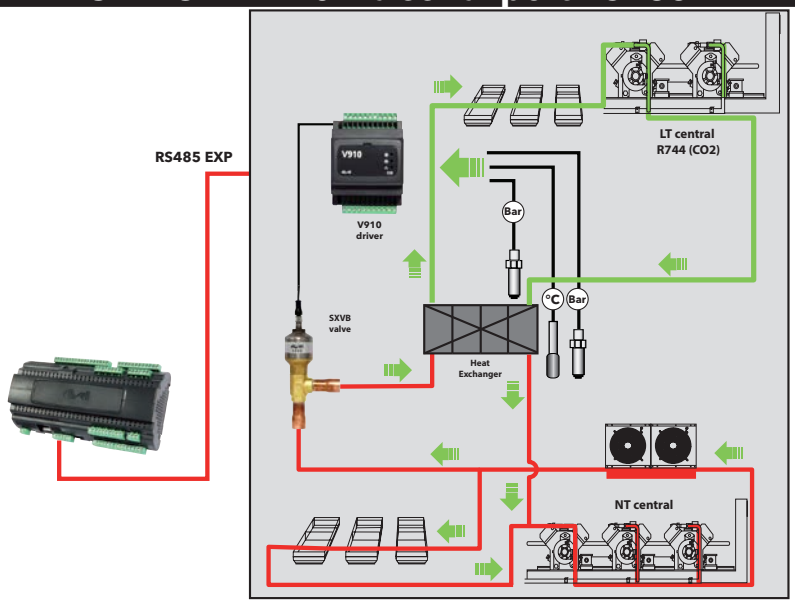




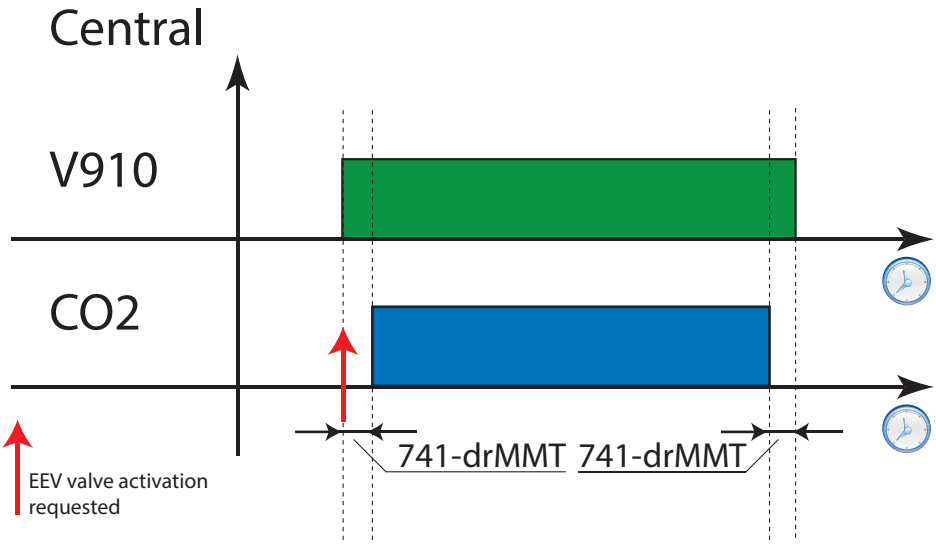
19.2.2. PROGRAM 2 -9900AB02
EWCM EO + V910 - COMMAND BY SERIAL PORT RS485 EXP

The EWCM system controller is equipped with a second serial port (RS485 EXP) which can be used to control the V910 directly. In this way you can have the operation status in the menu (of the EWCM) and the more important V910 sizes.

EWCM EO ● V910 via serial port RS485 EXP



9900AB02



Folder	Parameter	Description	LT	DAT
EXTERNAL DRIVER	**740 - EEvE**	Enable electronic valve driver	2	
EXTERNAL DRIVER	**741 - drMMT**	Delay activation high temperature central (MT) at minimum power	0 ... 999"	





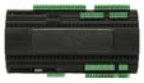
N.B.:
No relay must be configured with values 96, 97, 98: **584-H201 ÷ 602-H219 ≠ 96, 97, 98**

Settings necessary on **V910**:

Parameter	Description	Value	Notes
dF02	Selection of type of valve regulator activation	= 3 (EWCM)	0= digital input 1= Serial 2= reg. ON/OFF 3= EWCM

Addressing and Protocol
Modbus RTU 18200 baud, and 1

Parameter	Description	Value	Notes
dF00	COM0 protocol selection	= 1	0= Micronet (Televis) 1= **Modbus RTU** 2= NOT USED 3= NOT USED
dF30	Modbus protocol controller address	= 1	values from 1 to 255
dF31	Modbus protocol controller baud rate	= 4 (19200)	0= 1200 baud 1= 2400 baud 2= 4800 baud 3= 9600 baud 4= **19200** baud 5= 38400 baud 6= 57600 baud 7= 115200 baud
dF32	Modbus protocol controller parity	=1 (EVEN)	0= NONE; 1= **EVEN** (parity) 2= ODD (disparity)

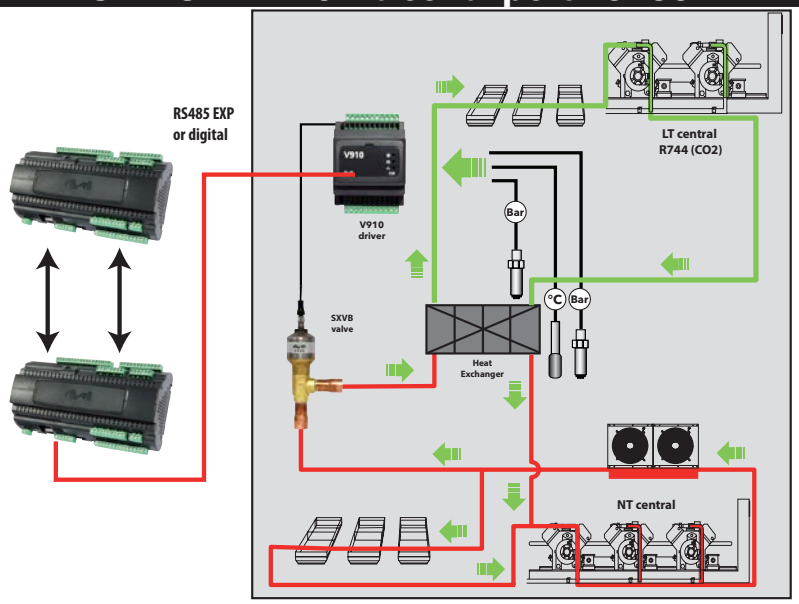
19.2.3. PROGRAM 3 - 99TNAB03 / 99BTAB03
HIGH AND LOW TEMPERATURE EWCM PLANT SYNCHRONISATION

MT DAT plant: 99TNAB03

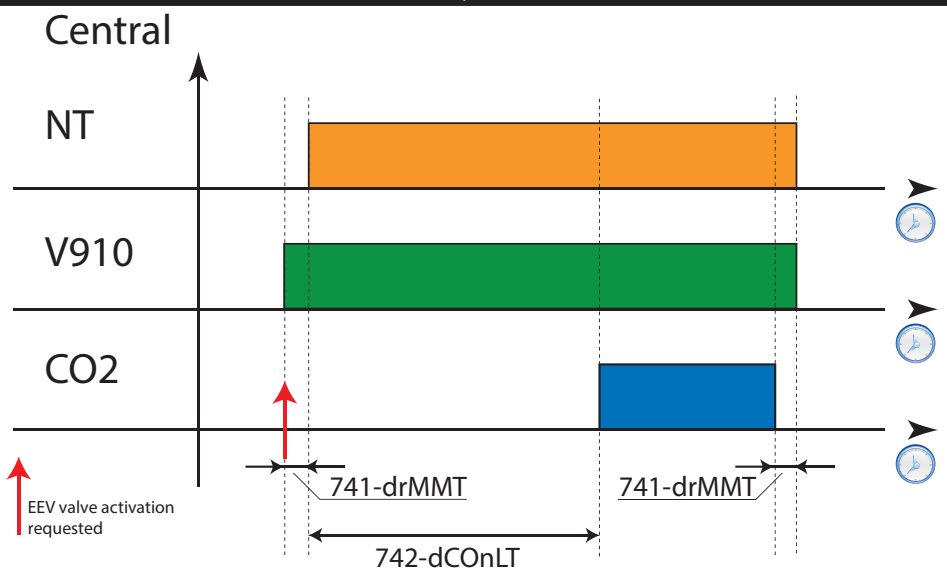
LT DAT plant: 99BTAB03

By synchronising two EWCM EO (high and low temperature plants) discharge pressure stability of LT side can be improved.
This occurs as the low temperature plant only activates its compressors after the high temp. plant has been on for a certain time.
If the high temperature plant is not on, synchronisation forces the high temperature plant to operate at minimum.

EWCM EO ● V910 via serial port RS485 EXP



99BTAB03/99TNAB03







Folder	Parameter	Description	MT	LT	DAT
EXTERNAL DRIVER	**740 - EEvE**	Enable electronic valve driver		2	
EXTERNAL DRIVER	**741 – drMMT**	Delay activation high temperature central (MT) at minimum power		0 … 999"	
EXTERNAL DRIVER	**742 - dCOnLT**	Delay activation compressor after high temperature central (MT) consent		0 … 999"	
RESOURCE ALLOCATION Digital Outputs	**584-H201 ÷ 602-H219**	**MT** power status >0% high temp. plant **LT** EEV activation command from high temp. plant	±96	±97	OUT13
RESOURCE ALLOCATION Digital Inputs	**603-H101 ÷ 622-H306**	**MT** minimum activation for high temp. plant **LT** reception of power status > 0% high temp. plant	±95	±96	DIL4

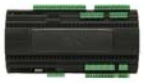
If synchronisation with IO add:

Folder	Parameter	Description	LT	DAT
RESOURCE ALLOCATION Digital Outputs	**584-H201 ÷ 602-H219**	control EEV activation from LP plant	±98	OUT13
RESOURCE ALLOCATION Digital Inputs	**603-H101 ÷ 622-H306**	General alarm	±1	DIL4

N.B.:
Settings necessary on **V910**:

Parameter	Description	Value	Notes
dF02	Selection of type of valve regulator activation	= 3 (EWCM)	0= digital input 1= Serial 2= reg. ON/OFF 3= EWCM





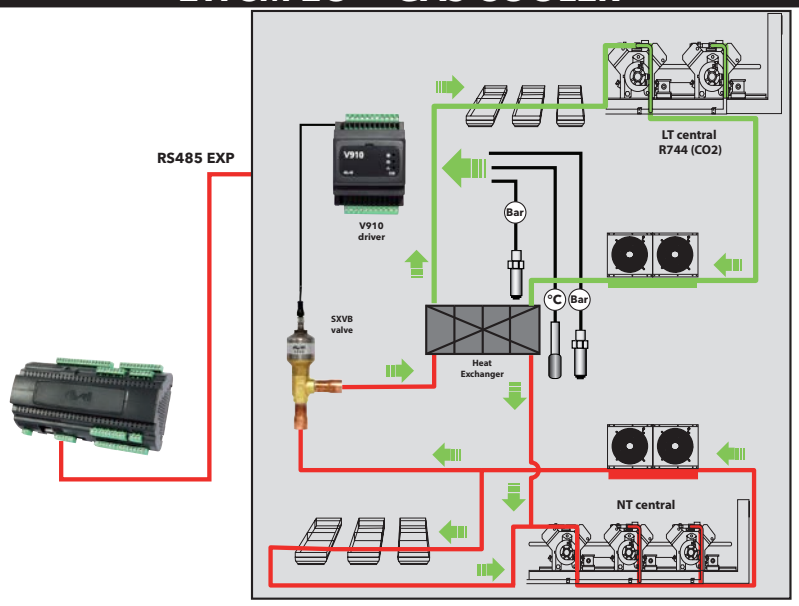
Addressing and Protocol
Modbus RTU 18200 baud, and 1

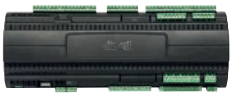
Parameter	Description	Value	Notes
dF00	COM0 protocol selection	= 1	0=Micronet (Televis) 1= **Modbus RTU** 2=NOT USED 3=NOT USED
dF30	Modbus protocol controller address	= 1	values from 1 to 255
dF31	Modbus protocol controller baud rate	= 4 (19200)	0= 1200 baud 1= 2400 baud 2= 4800 baud 3= 9600 baud 4= **19200** baud 5= 38400 baud 6= 57600 baud 7= 115200 baud
dF32	Modbus protocol controller parity	=1 (EVEN)	0= NONE; 1= **EVEN** (parity) 2= ODD (disparity)

19.2.4. PROGRAM 4 - 9900AB04
EWCM WITH GAS COOLER

Use of a gas cooler, placed between the compressor CO2 circuit outlet and the intermediate exchanger, allows for initial cooling of gas using external air.
The gas cooler can have one (or more) fans controlled by EWCM EO (LT side) directly.
Maximum efficiency is obtained by modulating gas cooler fans based on external temperature (floating condensation).

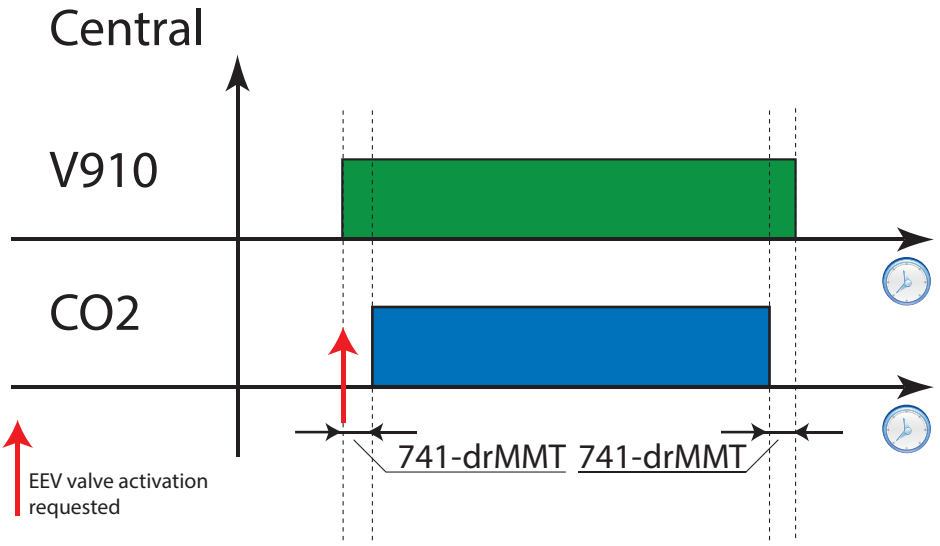
EWCM EO ● GAS COOLER







9900AB04



EWCM EO and digital fans

Folder	Parameter	Description	LT	DAT
EXTERNAL DRIVER	**740 - EEvE**	Enable electronic valve driver	2	
EXTERNAL DRIVER	**741 – drMMT**	Delay activation high temperature central (MT) at minimum power	0 … 999"	
QUICK START	**520-Fnty**	Fan mode (2= digital, control through relay)	2	digital
QUICK START	**521 - nFn**	Number of fans	2	
FANS Regulation/Alarms	**301 - FCFn**	Fan control type	0	Proportional
FANS Regulation/Alarms	**302 - FACt**	Activation mode	1	Depends on compressors
FANS Regulation limits	**343 - SEt**	Discharge setpoint		25.0 Bar
FANS Regulation limits	**344 - Pbd**	Proportional band		2.0 Bar
RESOURCE ALLOCATION Digital Outputs	**584-H201 ÷ 602-H219**	Fans 1 and 2 activation command	±10 ±11	OUT5/OUT6
RESOURCE ALLOCATION Digital Inputs	**603-H101 ÷ 622-H306**	Fans 1 and 2 thermal switch	±70 ±71	DIH5/DIH6
RESOURCE ALLOCATION Analogue Inputs	**623-H401 ÷ 630-H408**	Discharge probe	3	PB3





N.B.:
No relay must be configured with values 96, 97, 98: **584-H201 ÷ 602-H219 ≠ 96, 97, 98**

Settings necessary on **V910**:

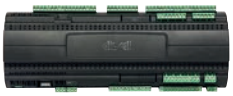
Parameter	Description	Value	Notes
dF02	Selection of type of valve regulator activation	= 3 (EWCM)	0= digital input 1= Serial 2= reg. ON/OFF 3= EWCM

EWCM EO + V910 via serial port (RS485)

Folder	Parameter	Description	LT	DAT
EXTERNAL DRIVER	**740 - EEvE**	Enable electronic valve driver	2	
EXTERNAL DRIVER	**741 - drMMT**	Delay activation high temperature central (MT) at minimum power	0 … 999"	
RESOURCE ALLOCATION Digital Outputs	**584-H201 ÷ 602-H219**	control EEV activation from LP plant	±98	
RESOURCE ALLOCATION Digital Inputs	**603-H101 ÷ 622-H306**	Fans 1 and 2 thermal switch	±1	DIH5/DIH6

Addressing and Protocol
Modbus RTU 18200 baud, and 1

Parameter	Description	Value	Notes
dF00	COM0 protocol selection	= 1	0=Micronet (Televis) 1= **Modbus RTU** 2= NOT USED 3= NOT USED
dF30	Modbus protocol controller address	= 1	values from 1 to 255
dF31	Modbus protocol controller baud rate	= 4 (19200)	0= 1200 baud 1= 2400 baud 2= 4800 baud 3= 9600 baud 4= **19200** baud 5= 38400 baud 6= 57600 baud 7= 115200 baud
dF32	Modbus protocol controller parity	=1 (EVEN)	0= NONE; 1= **EVEN** (parity) 2= ODD (disparity)

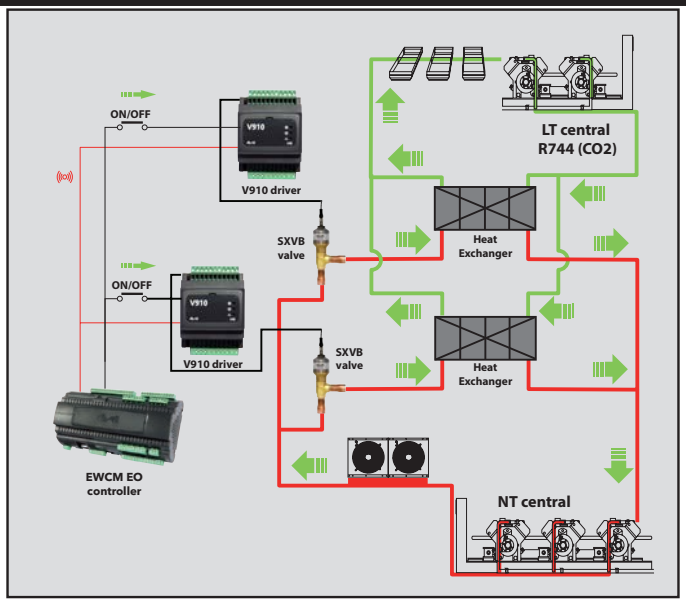




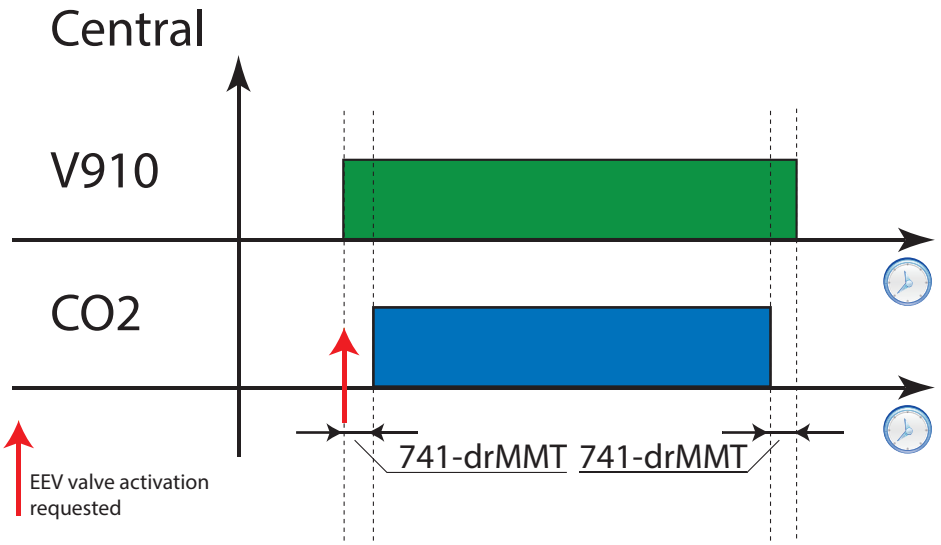
19.2.5. PROGRAM 5 -9900AB05
EWCM WITH DOUBLE INTERMEDIATE EXCHANGER

Use of two intermediate exchangers of equal power in parallel (with a capacity of at least 60-70% maximum capacity required) allows:
redundancy: reduction of machine stops due to breakdowns
greater power: the system increases cooling power by the simple increase (at a later moment) of compressors.
Each V910 driver has its own activation relay to maintain electric insulation between them.
The drivers' alarm relays are placed in serial: when both V910 drivers block EWCM EO stops.

EWCM EO ●DOUBLE EXCHANGER



9900AB05



Folder	Parameter	Description	LT	DAT
EXTERNAL DRIVER	**740 - EEvE**	Enable electronic valve driver	2	
EXTERNAL DRIVER	**741 - drMMT**	Delay activation high temperature central (MT) at minimum power	0 ... 999"	
RESOURCE ALLOCATION Digital Outputs	**584-H201 ÷ 602-H219**	control EEV activation from LP plant	±98	OUT12
RESOURCE ALLOCATION Digital Outputs	**584-H201 ÷ 602-H219**	control EEV activation from LP plant	±98	OUT13
RESOURCE ALLOCATION Digital Inputs	**603-H101 ÷ 622-H306**	Fans 1 and 2 thermal switch	±1	DIH5/DIH6





N.B.:
No relay must be configured with values 96, 97: **584-H201 ÷ 602-H219 ≠ 96, 97**

Settings necessary on **V910**:

At least one digital input **ddI1 or ddI2 = +/- 1 (On)**:

Parameter	Description	Value	Notes
dL40	Configuration of digital input ddI1	= 1 (on)	• 0 = digital input not configured • ±1 = ON/OFF regulation • ±2 = defrost • ±3 = alarm • ±4 = system operating mode (only modes 0 and 1)
dL41	Configuration of digital input ddI2		

At least one digital output **ddO1 / ddO2 = +/- 2 (Alarm)**:

Parameter	Description	Value	Notes
dL90	digital output configuration ddO1	= 2 (AL)	0 = output controlled from serial ±1 = solenoid valve control ±2 = alarm output
dL91	digital output configuration ddO2 (Open collector)		

Type of regulation **dF02=0** from digital input

Parameter	Description	Value	Notes
dF02	Selection of type of valve regulator activation	= 0 (digital input)	0= digital input 1= Serial 2= reg. ON/OFF 3= EWCM





19.2.6. PROGRAM 6 - 9900AB06
EWCM SINGLE CIRCUIT WITH COMPRESSORS ON/OFF CONDENSATION BY STEPS

Single circuit control with 3 full compressors and DB regulation.
Condensation control with 3 digital fans and proportional regulation with lateral set point compared to band.

Folder	Parameter	Description	MT	DAT
COMPRESSORS Regulation/Alarms	**101 - CCFn**	Compressor control type (1 = Dead Band)	1	
FANS Regulation/Alarms	**301 - FCFn**	Fan control type (0 = proportional)	0	
COMPRESSORS Regulation/Alarms	**551 - Stty**	Central setpoint (0 = lateral setpoint)	0	OUT12
QUICK START	**501-tyPE**	Type of plant	0	
	502-PC1	Compressor 1 power	1	
	503-PC2	Compressor 2 power	1	
	504-PC3	Compressor 3 power	1	
	520-Fnty	Fan mode	2	
	521-nFn	Number of fans	3	
	522-CtyP	Circuit 1 type	0	
	523-CPnU	Number of compressors circuit 1	3	
	514-EAAL	Enable cumulative alarms digital output	1	
	515-EACI	Compressor inverter enabling digital output	0	
	516-EAFI	Fan inverter enabling digital output	0	
	517-EACIE	Compressor inverter 1 and 2 error digital input	0	
	518-EAFIE	Fan inverter error digital output	0	
	519-EAgA	Enable generic alarm digital input	0	
RESOURCE ALLOCATION Digital Outputs	**584-H201**	Alarm	9	OUT1
	585-H202	Compressor 1 switched on	19	OUT2
	586-H203	Compressor 2 switched on	20	OUT3
	587-H204	Compressor 3 switched on	21	OUT4
	588-H205	Switch-on digital fan 1	10	OUT5
	589-H206	Switch-on digital fan 2	11	OUT6
	590-H207	Switch-on digital fan 3	12	OUT7
RESOURCE ALLOCATION Digital Inputs	**603-H101**	Block compressor 1	-79	DIH1
	604-H102	Block compressor 2	-80	DIH2
	605-H103	Block compressor 3	-81	DIH3
	606-H104	Digital fan thermal switch	-70	DIH4
	607-H105	Digital fan thermal switch	-71	DIH5
	608-H106	Digital fan thermal switch	-72	DIH6
	609-H107	Circuit C1 suction pressure switch	-67	DIH7
	610-H108	Discharge pressure switch	-69	DIH8
RESOURCE ALLOCATION Analogue Inputs	**623-H401**	Circuit C1 suction pressure	1	PB1
	625-H403	Discharge pressure	3	PB3
EWCM 9100 EO	**624-H402**	Discharge pressure	3	PB2

NB. for **EWCM 9100 EO** the discharge pressure probe will be allocated on PB2

Note. IO configuration from automatic Allocation through Quick Start.

Note. Parameters from **584-H201 to 633-H503** not indicated in the table must be on 0.





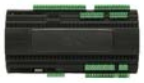
19.2.7. PROGRAM 7 - 9900AB07
EWCM SINGLE CIRCUIT WITH COMPRESSORS ON/OFF AND INVERTER CONDENSATION BY STEPS

Single circuit control with 3 full compressors and inverter, PI regulation (derivative component disabled).
Condensation control with 3 digital fans and proportional regulation with lateral set point compared to band.
All compressors have the same rated power.

- Line frequency 50Hz
- Min inverter frequency: 30Hz
- Inverter switch-on frequency: 30Hz

Folder	Parameter	Description	MT	DAT
COMPRESSORS Regulation/Alarms	**101 - CCFn**	Compressor control type (2 = PID)	2	
FANS Regulation/Alarms	**301 - FCFn**	Fan control type (0 = proportional)	0	
COMPRESSORS Regulation/Alarms	**551 - Stty**	Central setpoint (0 = lateral setpoint)	0	
COMPRESSORS Regulation/Alarms	**102-ItEn**	Integral control	1	
COMPRESSORS Regulation/Alarms	**104-PbEn**	Proportional control	1	
COMPRESSORS Regulation/Alarms	**105-dtEn**	Derivative control	0	
COMPRESSORS Regulation/Alarms	**103-It**	Integral time	450	
COMPRESSORS Regulation/Alarms	**698 - SUPFr**	698 – SUPFr Line frequency	0 (50Hz)	
COMPRESSORS Inverter	**114 - InLFr**	Inverter minimum frequency	30	
COMPRESSORS Inverter	**115 - InMFr**	Inverter maximum frequency	60	
COMPRESSORS Inverter	**116 - InSFr**	Switch inverter frequency	30	
COMPRESSORS Inverter	**117 - InRP**	Inverter rated power	100	
COMPRESSORS Regulation/Alarms	**128 - CRP**	Digital compressor rated power	100	
COMPRESSORS Inverter	**129-Inot**	Max time Inverter at minimum power	1	
COMPRESSORS Inverter	**130-InLt**	Interval inverter minimum power / step activation	0	
Quick Start	**501-tyPE**	Type of plant	0	
	502-PC1	Compressor 1 power	1	
	503-PC2	Compressor 2 power	1	
	504-PC3	Compressor 3 power	1	
	520-Fnty	Fan mode	2	
	521-nFn	Number of fans	3	
	522-CtyP	Circuit 1 type	2	
	523-CPnU	Number of compressors circuit 1	3	
	514-EAAL	Enable cumulative alarms digital output	1	
	515-EACI	Compressor inverter enabling digital output	0	
	516-EAFI	Fan inverter enabling digital output	0	
	517-EACIE	Compressor inverter 1 and 2 error digital input	0	
	518-EAFIE	Fan inverter error digital output	0	
	519-EAgA	Enable generic alarm digital input	0	
RESOURCE ALLOCATION Digital Outputs	**584-H201**	Alarm	9	OUT1
	585-H202	Compressor 1 switched on	19	OUT2
	586-H203	Compressor 2 switched on	20	OUT3
	587-H204	Compressor 3 switched on	21	OUT4
	588-H205	Switch-on digital fan 1	10	OUT5
	589-H206	Switch-on digital fan 2	11	OUT6
	590-H207	Switch-on digital fan 3	12	OUT7





Folder	Parameter	Description	MT	DAT
RESOURCE ALLOCATION Digital Inputs	**603-H101**	Block continuous control compressor C1	-91	DIH1
	604-H102	Block compressor 1	-79	DIH2
	605-H103	Block compressor 2	-80	DIH3
	606-H104	Block compressor 3	-81	DIH4
	607-H105	Digital fan thermal switch	-70	DIH5
	608-H106	Digital fan thermal switch	-71	DIH6
	609-H107	Digital fan thermal switch	-72	DIH7
	610-H108	Circuit C1 suction pressure switch	-67	DIH8
	611-H109	Discharge pressure switch	-69	DIH9
RESOURCE ALLOCATION Analogue Inputs	**623-H401**	Circuit C1 suction pressure	1	PB1
	625-H403	Discharge pressure	3	PB3
EWCM 9100 EO	**624-H402**	Discharge pressure	3	PB2
RESOURCE ALLOCATION Analogue Outputs	**631-H501**	Circuit C1 compressor inverter switch on	2	AO1

NB. for **EWCM 9100 EO** the discharge pressure probe will be allocated on PB2

Note. IO configuration from automatic Allocation through Quick Start.

Note. Parameters from **584-H201 to 633-H503** not indicated in the table must be on 0.





19.2.8. PROGRAM 8 - 9900AB08
EWCM DOUBLE CIRCUIT WITH COMPRESSORS ON/OFF AND INVERTER CONDENSATION BY STEPS

NOTE: Only valid for EWCM 9900 EO

Control of 2 circuits with full compressors and inverter, PI regulation (derivative component disabled).

- **LT**: 3 full compressors + inverter
- **MT**: 2 full compressors + inverter

Condensation control with 3 digital fans and proportional regulation with lateral set point compared to band.
All compressors have the same rated power.

- Line frequency 50Hz
- Min inverter frequency: 30Hz
- Inverter switch-on frequency: 30Hz
- Max inverter frequency: 60Hz

Circuit	Folder	Parameter	Description	MT	DAT
1	**COMPRESSORS Regulation/Alarms**	**101 - CCFn**	Compressor control type (2 = PID)	2	
1 2	**FANS Regulation/Alarms**	**301 - FCFn**	Fan control type (0 = proportional)	0	
1 2	**COMPRESSORS Regulation/Alarms**	**551 - Stty**	Central setpoint (0 = lateral setpoint)	0	
1	**COMPRESSORS Regulation/Alarms**	**102-ItEn**	Integral control	1	
1	**COMPRESSORS Regulation/Alarms**	**104-PbEn**	Proportional control	1	
1	**COMPRESSORS Regulation/Alarms**	**105-dtEn**	Derivative control	0	
1	**COMPRESSORS Regulation/Alarms**	**103-It**	Integral time	450	
1 2	**COMPRESSORS Regulation/Alarms**	**698 - SUPFr**	Line frequency	0 (50Hz)	
1	**COMPRESSORS Inverter**	**114 - InLFr**	Inverter minimum frequency	30	
1	**COMPRESSORS Inverter**	**115 - InMFr**	Inverter maximum frequency	60	
1	**COMPRESSORS Inverter**	**116 - InSFr**	Switch-on inverter frequency	30	
1	**COMPRESSORS Inverter**	**117 - InRP**	Inverter rated power	100	
1	**COMPRESSORS Regulation/Alarms**	**128 - CRP**	Digital compressor rated power	100	
1	**COMPRESSORS Inverter**	**129-Inot**	Max time Inverter at minimum power	1	
1	**COMPRESSORS Inverter**	**130-InLt**	Interval inverter minimum power / step activation	0	
2	**COMPRESSORS [2] Regulation/Alarms**	**201 - CCFn**	Compressor control type (2 = PID)	2	
2	**COMPRESSORS [2] Regulation/Alarms**	**202-ItEn**	Integral control	1	
2	**COMPRESSORS [2] Regulation/Alarms**	**204-PbEn**	Proportional control	1	
2	**COMPRESSORS [2] Regulation/Alarms**	**205-dtEn**	Derivative control	0	
2	**COMPRESSORS [2] Regulation/Alarms**	**203-It**	Integral time	450	
2	**COMPRESSORS [2] Inverter**	**214 - InLFr**	Inverter minimum frequency	30	
2	**COMPRESSORS [2] Inverter**	**215 - InMFr**	Inverter maximum frequency	60	





Circuit	Folder	Parameter	Description	MT	DAT
2	**COMPRESSORS [2] Inverter**	**216 - InSFr**	Switch inverter frequency	30	
2	**COMPRESSORS [2] Inverter**	**217 - InRP**	Inverter rated power	100	
2	**COMPRESSORS [2] Regulation/Alarms**	**228 - CRP**	Digital compressor rated power	100	
2	**COMPRESSORS [2] Inverter**	**229-Inot**	Max time Inverter at minimum power	1	
2	**COMPRESSORS [2] Inverter**	**230-InLt**	Interval inverter minimum power / step activation	0	
	Quick Start	**501-tyPE**	Type of plant	1	
		502-PC1	Compressor 1 power	1	
		503-PC2	Compressor 2 power	1	
		504-PC3	Compressor 3 power	1	
		506-PC5	Compressor 5 power (compressor 1 / circuit 2)	1	
		507-PC6	Compressor 6 power (compressor 2 / circuit 2)	1	
		520-Fnty	Fan mode	2	
		521-nFn	Number of fans	3	
		522-CtyP	Circuit 1 type	2	
		523-CPnU	Number of compressors circuit 1	3	
		524-CtyP2	Circuit 2 type	2	
		525-CPnU2	Number of compressors circuit 2	2	
		514-EAAL	Enable cumulative alarms digital output	1	
		515-EACI	Compressor inverter enabling digital output	0	
		516-EAFI	Fan inverter enabling digital output	0	
		517-EACIE	Compressor inverter 1 and 2 error digital input	0	
		518-EAFIE	Fan inverter error digital output	0	
		519-EAgA	Enable generic alarm digital input	0	
	RESOURCE ALLOCATION Digital Outputs	**584-H201**	Alarm	9	OUT1
		585-H202	Compressor 1 switched-on	19	OUT2
		586-H203	Compressor 2 switched on	20	OUT3
		587-H204	Compressor 3 switched-on	21	OUT4
		588-H205	Compressor 5 switched on	23	OUT5
		589-H206	Compressor 6 switched on	24	OUT6
		590-H207	Switch-on digital fan 1	10	OUT7
		591-H208	Switch-on digital fan 2	11	OUT8
		592-H209	Switch-on digital fan 3	12	OUT9
	RESOURCE ALLOCATION Digital Inputs	**603-H101**	Block continuous control compressor C1	-91	DIH1
		604-H102	Block compressor 1	-79	DIH2
		605-H103	Block compressor 2	-80	DIH3
		606-H104	Block compressor 3	-81	DIH4
		607-H105	Block continuous control compressor C2	-92	DIH5
		608-H106	Block compressor 5	-83	DIH6
		609-H107	Block compressor 6	-84	DIH7
		610-H108	Digital fan thermal switch	-70	DIH8
		611-H109	Digital fan thermal switch	-71	DIH9
		612-H110	Digital fan thermal switch	-72	DIH10
		613-H111	Circuit C1 suction pressure switch	-67	DIH11
		614-H112	Circuit C2 suction pressure switch	-68	DIH12
		615-H113	Discharge pressure switch	-69	DIH13
	RESOURCE ALLOCATION Analogue Inputs	**623-H401**	Circuit C1 suction pressure	1	PB1
		624-H402	Circuit C2 suction pressure	2	PB2
		625-H403	Discharge pressure	3	PB3
	RESOURCE ALLOCATION Analogue Outputs	**631-H501**	Circuit C1 compressor inverter switch on	2	AO1
		632-H502	Circuit C2 compressor inverter switch on	3	AO2

Note. IO configuration from automatic Allocation through Quick Start.

Note. Parameters from **584-H201 to 633-H503** not indicated in the table must be on 0.





19.2.9. PROGRAM 9 - 9900AB09
EWCM SINGLE CIRCUIT WITH COMPRESSORS ON/OFF CONDENSATION WITH INVERTER

Single circuit control with 3 full compressors and Dead Band regulation.
Condensation control with fan inverters and proportional regulation with lateral set point compared to band.
Fan switch on and switch off cut off is disabled.

Folder	Parameter	Description	MT	DAT
COMPRESSORS Regulation/Alarms	**101 - CCFn**	Compressor control type (1 = Dead Band)	1	
FANS Regulation/Alarms	**301 - FCFn**	Fan control type (0 = proportional)	0	
COMPRESSORS Regulation/Alarms	**551 - Stty**	Central setpoint (0 = lateral setpoint)	0	
FANS Regulation/Alarms	**303 - CoIE**	Enable cut-off inverter	0	
FANS Regulation/Alarms	**309-InLSP**	Minimum speed	20	
FANS Regulation/Alarms	**310-InMSP**	Maximum speed	100	
FANS Regulation/Alarms	**311-InSSP**	Saturation speed	100	
FANS Regulation Limits	**345-Cod1**	Delta 1 cut-off	0	
FANS Regulation Limits	**346-Cod2**	Delta 2 cut-off	0	
FANS Inverter	**328 - Inot**	Max time Inverter at minimum power	1	
FANS Inverter	**330 - InoS**	Inverter minimum power activation mode	0	
Quick Start	**501-tyPE**	Type of plant	0	
	502-PC1	Compressor 1 power	1	
	503-PC2	Compressor 2 power	1	
	504-PC3	Compressor 3 power	1	
	520-Fnty	Fan mode	1	
	522-CtyP	Circuit 1 type	0	
	523-CPnU	Number of compressors circuit 1	3	
	514-EAAL	Enable cumulative alarms digital output	1	
	515-EACI	Compressor inverter enabling digital output	0	
	516-EAFI	Fan inverter enabling digital output	0	
	517-EACIE	Compressor inverter 1 and 2 error digital input	0	
	518-EAFIE	Fan inverter error digital output	0	
	519-EAgA	Enable generic alarm digital input	0	
RESOURCE ALLOCATION Digital Outputs	**584-H201**	Alarm	9	OUT1
	585-H202	Compressor 1 switched on	19	OUT2
	586-H203	Compressor 2 switched on	20	OUT3
	587-H204	Compressor 3 switched on	21	OUT4
RESOURCE ALLOCATION Digital Inputs	**603-H101**	Block compressor 1	-79	DIH1
	604-H102	Block compressor 2	-80	DIH2
	605-H103	Block compressor 3	-81	DIH3
	606-H104	Fan thermal switch regulated continuously	-78	DIH4
	607-H105	Circuit C1 suction pressure switch	-67	DIH5
	608-H106	Discharge pressure switch	-69	DIH6
RESOURCE ALLOCATION Analogue Inputs	**623-H401**	Circuit C1 suction pressure	1	PB1
	625-H403	Discharge pressure	3	PB3
EWCM 9100 EO	**624-H402**	Discharge pressure	3	PB2
RESOURCE ALLOCATION Analogue Outputs	**631-H501**	Fan inverter switched on	1	AO1

NB. for **EWCM 9100 EO** the discharge pressure probe will be allocated on PB2

Note. IO configuration from automatic Allocation through Quick Start.





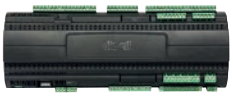
Note. Parameters from **584-H201 to 633-H503** not indicated in the table must be on 0.

19.2.10. PROGRAM 10 - 9900AB10 EWCM SINGLE CIRCUIT WITH COMPRESSORS ON/OFF AND INVERTER CONDENSATION WITH INVERTER

Single circuit control with 3 full compressors and inverter, PI regulation (derivative component disabled). Condensation control with fan inverters and proportional regulation with lateral set point compared to band. Fan switch on and switch off cut off is disabled. All compressors have the same rated power.

- Line frequency 50Hz
- Min inverter frequency: 30Hz
- Inverter switch-on frequency: 30Hz
- Max inverter frequency: 60Hz

Folder	Parameter	Description	MT	DAT
COMPRESSORS Regulation/Alarms	**101 - CCFn**	Compressor control type (2 = PID)	2	
FANS Regulation/Alarms	**301 - FCFn**	Fan control type (0 = proportional)	0	
COMPRESSORS Regulation/Alarms	**551 - Stty**	Central setpoint (0 = lateral setpoint)	0	
COMPRESSORS Regulation/Alarms	**102-ItEn**	Integral control	1	
COMPRESSORS Regulation/Alarms	**104-PbEn**	Proportional control	1	
COMPRESSORS Regulation/Alarms	**105-dtEn**	Derivative control	0	
COMPRESSORS Regulation/Alarms	**103-It**	Integral time	450	
COMPRESSORS Regulation/Alarms	**698 - SUPFr**	Line frequency	0 (50Hz)	
COMPRESSORS Inverter	**114 - InLFr**	Inverter minimum frequency	30	
COMPRESSORS Inverter	**115 - InMFr**	Inverter maximum frequency	60	
COMPRESSORS Inverter	**116 - InSFr**	Switch-on inverter frequency	30	
COMPRESSORS Inverter	**117 - InRP**	Inverter rated power	100	
COMPRESSORS Regulation/Alarms	**128 - CRP**	Digital compressor rated power	100	
COMPRESSORS Inverter	**129-Inot**	Max time Inverter at minimum power	1	
COMPRESSORS Inverter	**130-InLt**	Interval inverter minimum power / step activation	0	
FANS Regulation/Alarms	**303 - CoIE**	Enable cut-off inverter	0	
FANS Regulation/Alarms	**309-InLSP**	Minimum speed	20	
FANS Regulation/Alarms	**310-InMSP**	Maximum speed	100	
FANS Regulation/Alarms	**311-InSSP**	Saturation speed	100	
FANS Regulation Limits	**345-Cod1**	Delta 1 cut-off	0	
FANS Regulation Limits	**346-Cod2**	Delta 2 cut-off	0	
FANS Inverter	**328 - Inot**	Max time Inverter at minimum power	1	
FANS Inverter	**330 - InoS**	Inverter minimum power activation mode	0	





Folder	Parameter	Description	MT	DAT
Quick Start	501-tyPE	Type of plant	0	
	502-PC1	Compressor 1 power	1	
	503-PC2	Compressor 2 power	1	
	504-PC3	Compressor 3 power	1	
	520-Fnty	Fan mode	1	
	522-CtyP	Circuit 1 type	2	
	523-CPnU	Number of compressors circuit 1	3	
	514-EAAL	Enable cumulative alarms digital output	1	
	515-EACI	Compressor inverter enabling digital output	0	
	516-EAFI	Fan inverter enabling digital output	0	
	517-EACIE	Compressor inverter 1 and 2 error digital input	0	
	518-EAFIE	Fan inverter error digital output	0	
	519-EAgA	Enable generic alarm digital input	0	
RESOURCE ALLOCATION Digital Outputs	584-H201	Alarm	9	OUT1
	585-H202	Compressor 1 switched on	19	OUT2
	586-H203	Compressor 2 switched on	20	OUT3
	587-H204	Compressor 3 switched on	21	OUT4
RESOURCE ALLOCATION Digital Inputs	603-H101	Block continuous control compressor C1	-91	DIH1
	604-H102	Block compressor 1	-79	DIH2
	605-H103	Block compressor 2	-80	DIH3
	606-H104	Block compressor 3	-81	DIH4
	607-H105	Fan thermal switch regulated continuously	-78	DIH5
	608-H106	Circuit C1 suction pressure switch	-67	DIH6
	609-H107	Discharge pressure switch	-69	DIH7
RESOURCE ALLOCATION Analogue Inputs	623-H401	Circuit C1 suction pressure	1	PB1
	625-H403	Discharge pressure	3	PB3
EWCM 9100 EO	624-H402	Discharge pressure	3	PB2
RESOURCE ALLOCATION Analogue Outputs	631-H501	Circuit C1 compressor inverter switch on	2	AO1
	632-H502	Fan inverter switched on	1	AO2

NB. for **EWCM 9100 EO** the discharge pressure probe will be allocated on PB2

Note. IO configuration from automatic Allocation through Quick Start.

Note. Parameters from **584-H201 to 633-H503** not indicated in the table must be on 0.





19.2.11. PROGRAM 11 - 9900AB11 EWCM DOUBLE CIRCUIT WITH COMPRESSORS ON/OFF AND INVERTER CONDENSATION WITH INVERTER

NOTE: Only valid for EWCM 9900 EO

Control of 2 circuits with full compressors and inverter, PI regulation (derivative component disabled).

- **LT**: 3 full compressors + inverter
- **MT**: 2 full compressors + inverter

Condensation control with fan inverters and proportional regulation with lateral set point compared to band. Fan switch on and switch off cut off is disabled. All compressors have the same rated power.

- Line frequency 50Hz
- Min inverter frequency: 30Hz
- Inverter switch-on frequency: 30Hz
- Max inverter frequency: 60Hz

Circuit	Folder	Parameter	Description	MT	DAT
1	**COMPRESSORS Regulation/Alarms**	**101 - CCFn**	Compressor control type (2 = PID)	2	
1 2	**FANS Regulation/Alarms**	**301 - FCFn**	Fan control type (0 = proportional)	0	
1 2	**COMPRESSORS Regulation/Alarms**	**551 - Stty**	Central setpoint (0 = lateral setpoint)	0	
1	**COMPRESSORS Regulation/Alarms**	**102-ItEn**	Integral control	1	
1	**COMPRESSORS Regulation/Alarms**	**104-PbEn**	Proportional control	1	
1	**COMPRESSORS Regulation/Alarms**	**105-dtEn**	Derivative control	0	
1	**COMPRESSORS Regulation/Alarms**	**103-It**	Integral time	450	
1 2	**COMPRESSORS Regulation/Alarms**	**698 - SUPFr**	Line frequency	0 (50Hz)	
1	**COMPRESSORS Inverter**	**114 - InLFr**	Inverter minimum frequency	30	
1	**COMPRESSORS Inverter**	**115 - InMFr**	Inverter maximum frequency	60	
1	**COMPRESSORS Inverter**	**116 - InSFr**	Switch-on inverter frequency	30	
1	**COMPRESSORS Inverter**	**117 - InRP**	Inverter rated power	100	
1	**COMPRESSORS Regulation/Alarms**	**128 - CRP**	Digital compressor rated power	100	
1	**COMPRESSORS Inverter**	**129-Inot**	Max time Inverter at minimum power	1	
1	**COMPRESSORS Inverter**	**130-InLt**	Interval inverter minimum power / step activation	0	
2	**COMPRESSORS [2] Regulation/Alarms**	**201 - CCFn**	Compressor control type (2 = PID)	2	
2	**COMPRESSORS [2] Regulation/Alarms**	**202-ItEn**	Integral control	1	
2	**COMPRESSORS [2] Regulation/Alarms**	**204-PbEn**	Proportional control	1	
2	**COMPRESSORS [2] Regulation/Alarms**	**205-dtEn**	Derivative control	0	
2	**COMPRESSORS [2] Regulation/Alarms**	**203-It**	Integral time	450	
2	**COMPRESSORS [2] Inverter**	**214 - InLFr**	Inverter minimum frequency	30	
2	**COMPRESSORS [2] Inverter**	**215 - InMFr**	Inverter maximum frequency	60	





Circuit	Folder	Parameter	Description	MT	DAT
2	**COMPRESSORS [2] Inverter**	**216 - InSFr**	Switch-on inverter frequency	30	
2	**COMPRESSORS [2] Inverter**	**217 - InRP**	Inverter rated power	100	
2	**COMPRESSORS [2] Regulation/Alarms**	**228 - CRP**	Digital compressor rated power	100	
2	**COMPRESSORS [2] Inverter**	**229-Inot**	Max time Inverter at minimum power	1	
2	**COMPRESSORS [2] Inverter**	**230-InLt**	Interval inverter minimum power / step activation	0	
	FANS Regulation/Alarms	**303 - CoIE**	Enable cut-off inverter	0	
	FANS Regulation/Alarms	**309-InLSP**	Minimum speed	20	
	FANS Regulation/Alarms	**310-InMSP**	Maximum speed	100	
	FANS Regulation/Alarms	**311-InSSP**	Saturation speed	100	
	FANS Regulation Limits	**345-Cod1**	Delta 1 cut-off	0	
	FANS Regulation Limits	**346-Cod2**	Delta 2 cut-off	0	
	FANS Inverter	**328 - Inot**	Max time Inverter at minimum power	1	
	FANS Inverter	**330 - InoS**	Inverter minimum power activation mode	0	
	QUICK START	**501-tyPE**	Type of plant	1	
		502-PC1	Compressor 1 power	1	
		503-PC2	Compressor 2 power	1	
		504-PC3	Compressor 3 power	1	
		506-PC5	Compressor 5 power (compressor 1 / circuit 2)	1	
		507-PC6	Compressor 6 power (compressor 2 / circuit 2)	1	
		520-Fnty	Fan mode	1	
		522-CtyP	Circuit 1 type	2	
		523-CPnU	Number of compressors circuit 1	3	
		524-CtyP2	Circuit 2 type	2	
		525-CPnU2	Number of compressors circuit 2	2	
		514-EAAL	Enable cumulative alarms digital output	1	
		515-EACI	Compressor inverter enabling digital output	0	
		516-EAFI	Fan inverter enabling digital output	0	
		517-EACIE	Compressor inverter 1 and 2 error digital input	0	
		518-EAFIE	Fan inverter error digital output	0	
		519-EAgA	Enable generic alarm digital input	0	
	RESOURCE ALLOCATION Digital Outputs	**584-H201**	Alarm	9	OUT1
		585-H202	Compressor 1 switched on	19	OUT2
		586-H203	Compressor 2 switched on	20	OUT3
		587-H204	Compressor 3 switched on	21	OUT4
		588-H205	Compressor 5 switched on	23	OUT5
		589-H206	Compressor 6 switched on	24	OUT6




Circuit	Folder	Parameter	Description	MT	DAT
	RESOURCE ALLOCATION Digital Inputs	**603-H101**	Block continuous control compressor C1	-91	DIH1
		604-H102	Block compressor 1	-79	DIH2
		605-H103	Block compressor 2	-80	DIH3
		606-H104	Block compressor 3	-81	DIH4
		607-H105	Block continuous control compressor C2	-92	DIH5
		608-H106	Block compressor 5	-83	DIH6
		609-H107	Block compressor 6	-84	DIH7
		610-H108	Fan thermal switch regulated continuously	-78	DIH8
		611-H109	Circuit C1 suction pressure switch	-67	DIH9
		612-H110	Circuit C2 suction pressure switch	-68	DIH10
		613-H111	Discharge pressure switch	-69	DIH11
	RESOURCE ALLOCATION Analogue Inputs	**623-H401**	Circuit C1 suction pressure	1	PB1
		624-H402	Circuit C2 suction pressure	2	PB2
		625-H403	Discharge pressure	3	PB3
	RESOURCE ALLOCATION Analogue Outputs	**631-H501**	Circuit C1 compressor inverter switch on	2	AO1
		632-H502	Circuit C2 compressor inverter switch on	3	AO2

Note. IO configuration from automatic Allocation through Quick Start.

Note. Parameters from **584-H201 to 633-H503** not indicated in the table must be on 0.

19.2.12. PROGRAMMA 12 - 9900AB12 EWCM CONDENSATION AT FLOATING SETPOINT

Floating setpoint condensation based on external temperature.
Discharge gas sub-cooling control not enabled.

Make sure the discharge economy function is on through one of the options available:

1. time band programmed;
2. dedicated digital input for the function in question;
3. key;
4. functions menu;
5. remote control (supervision system or Web);
6. 'Energy Saving' function;

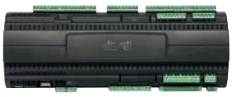
Please note that the dynamic set point is limited downwards by parameter **359 – LdSP** and upwards by:

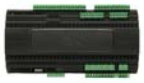
343-SEt + 349-dSFo

In the example **349-dSFo = 0** the upper limit is parameter **343-SEt** (Discharge set point).

Folder	Parameter	Description	MT	DAT
FANS Regulation/Alarms	**314 - dSd**	Dynamic discharge set mode	0	
FANS Regulation limits	**358-dSMEt**	Max external temp. dynamic set	28.0	
FANS Regulation limits	**356-dSdo**	Dynamic offset dynamic set	10.0	
FANS Regulation limits	**357 - dSLdo**	Minimum dynamic offset dynamic set	6.0	
FANS Regulation limits	**349 - dSFo**	Fixed offset dynamic set (max dynamic set = 349 – dSFo + 343-SEt)	0.0	
FANS Regulation limits	**359 - LdSP**	Minimum dynamic set	25.0	
RESOURCE ALLOCATION Digital Inputs	**630-H408**	External ambient temperature	5	PB8

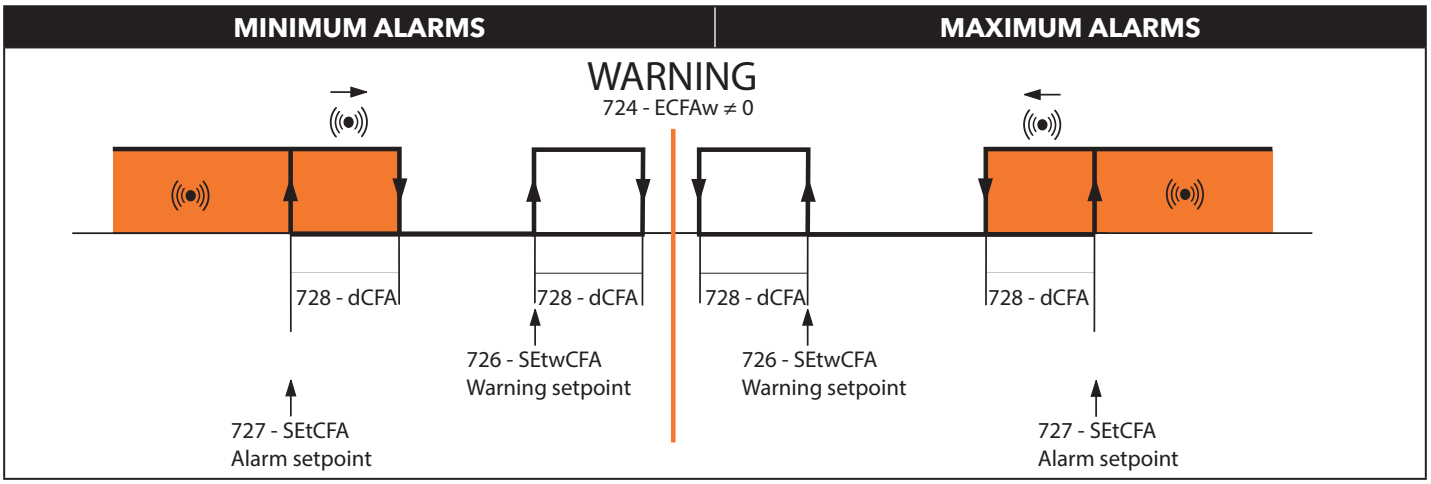
To disable sub-cooling control just make sure the relative temperature probe is not allocated:
make sure that none of the parameters from 627-H405 to 630-H408 is configured with 6.





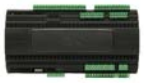
19.2.13. PROGRAM 13 - 9900AB13
EWCM CONFIGURABLE REGULATOR ON/OFF

Alarms have two intervention limits, a 'warning' (signal) and the alarm itself both configurable
The warning can be enabled or not through **724-ECFAw** (0=Disabled; 1=Enabled)
The minimum or maximum alarm is configurable through **725-CFAty 0**=Minimum; **1**=Maximum



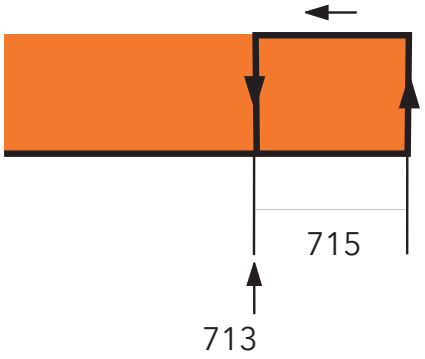
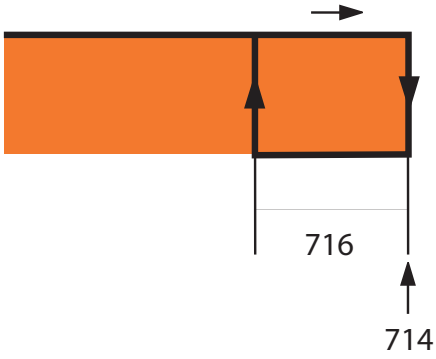
Folder	Parameter	Description	MT	DAT
GENERAL REGULATOR	**710-MPCFR**	Configurable regulator probe mode	1	
	711-MCFr1	Configurable regulator mode step 1 (0= Cooling)	0	
	713-SEtCFR1	Configurable regulator setpoint step 1	20.0 °C	
	715-dCFr1	Configurable regulator delta step 1	2.0 °C	
	719-CFr1dly	Configurable regulator delay step 1	0	
	724-ECFAw	Enable warning configurable alarm	1	
	725-CFAty	Configurable alarm mode	1	
	726-SEtwCFA1	Configurable alarm warning threshold	30.0 °C	
	727-SEtCFA-1	Configurable alarm setpoint	40.0 °C	
	728-dCFA-1	Configurable alarm differential	5.0 °C	
SAFETY MEASURES	**702-CFAE**	Configurable regulator alarm management (2 = Alarm)	2	
RESOURCE ALLOCATION Digital Inputs	**630-H408**	Configurable temperature regulator	8	PB8
RESOURCE ALLOCATION Digital Outputs	**596-H213**	General regulator digital output step 1	94	OUT13



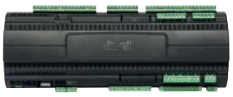


19.2.14. PROGRAM 14 - 9900AB14
EWCM CONFIGURABLE REGULATOR ON/OFF AT TWO ACTIVATION POINTS

For each of the steps, COOL or HEAT can be selected with the parameters
711-MCFr1 and **712-MCFr2**
Each step has its own fixed and differential set

step 1 example COOL mode 711-MCFr1= 0	step 2 example HEAT mode 712-MCFr2= 1
	
713-SEtCFR1 Configurable regulator setpoint step 1	**714-SEtCFR2** Configurable regulator setpoint step 2
715-dCFr1 Configurable regulator delta step 1	**716-dCFr2** Configurable regulator delta step 2

Folder	Parameter	Description	MT	DAT
GENERAL REGULATOR	**710-MPCFR**	Configurable regulator probe mode	1	
	711-MCFr1	Configurable regulator mode step 1	0 (COOL)	
	712-MCFr2	Configurable regulator mode step 2	1 (HEAT)	
	713-SEtCFR1	Configurable regulator setpoint step 1	80.0 °C	
	714-SEtCFR2	Configurable regulator setpoint step 2	-10.0 °C	
	715-dCFr1	Configurable regulator delta step 1	5.0 °C	
	715-dCFr2	Configurable regulator delta step 2	5.0 °C	
	719-CFr1dly	Configurable regulator delay step 1	0	
	720-CFr2dly	Configurable regulator delay step 2	0	
	724-ECFAw	Enable warning configurable alarm	1	
	725-CFAty	Configurable alarm mode	1	
	726-SEtwCFA-1	Configurable alarm warning threshold	30.0 °C	
	727-SEtCFA-1	Configurable alarm setpoint	40.0 °C	
	728-dCFA-1	Configurable alarm differential	5.0 °C	
SAFETY MEASURES	**702-CFAE**	Configurable regulator alarm management (2 = Alarm)	2	
RESOURCE ALLOCATION Digital Inputs	**630-H408**	Configurable temperature regulator	8	PB8
RESOURCE ALLOCATION Digital Outputs	**595-H212**	General regulator digital output step 1	94	OUT12
RESOURCE ALLOCATION Digital Outputs	**596-H213**	General regulator digital output step 2	95	OUT13



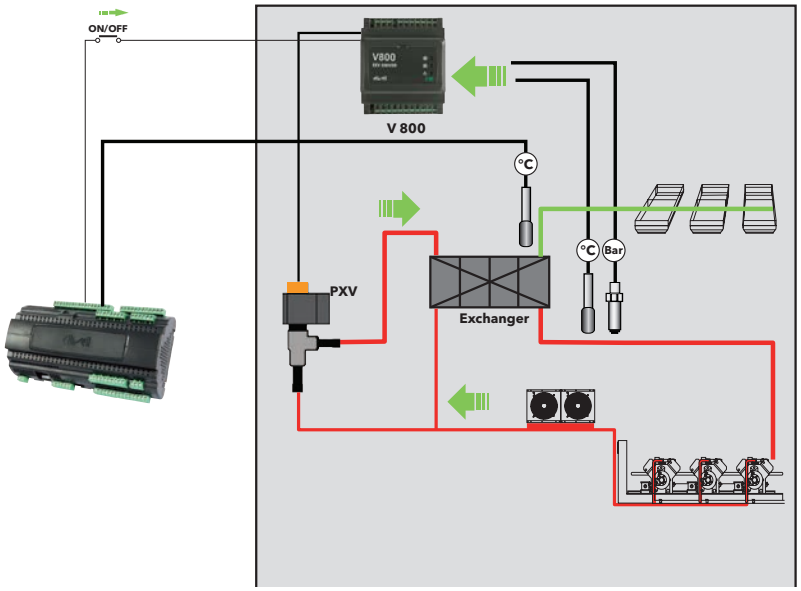


19.2.15. PROGRAM 15 - 9900AB15
EWCM + V800 COMMAND FROM DIGITAL SUB-COOLING AT FIXED TEMPERATURE

The regulator regulates gas temperature output from sub-cooling exchanger.
EWCM EO manages an EEV driver for intermediate exchanger, through a digital output (command) ON/OFF and a digital input (block).
In this way it can command a V800 or third party driver.

713-SEtCFR1 is referred to condensation set point > 35 °C

EWCM EO ● V800 via digital

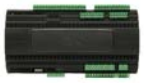


Folder	Parameter	Description	MT	DAT
GENERAL REGULATOR	**710-MPCFR**	Configurable regulator probe mode	1	
	711-MCFr1	Configurable regulator mode step 1	0 (COOL)	
	713-SEtCFR1	Configurable regulator setpoint step 1	30.0 °C	
	715-dCFr1	Configurable regulator delta step 1	2.0 °C	
	719-CFr1dly	Configurable regulator delay step 1	0	
	724-ECFAw	Enable warning configurable alarm	0	
SAFETY MEASURES	**702-CFAE**	Configurable regulator alarm management (0 = disabled)	0	
RESOURCE ALLOCATION Digital Inputs	**630-H408**	Configurable temperature regulator	8	PB8
RESOURCE ALLOCATION Digital Outputs	**596-H213**	General regulator digital output step 1	94	OUT13

N.B.: Settings necessary on **V800**:

Parameter	Description	Value	Notes
H11	Configurability and polarity digital input DI1	1 = (ON/OFF)	0 = disabled; ±1 = ON/OFF driver; ± 2 = Defrost; ±3 = Alarm.
H12	Configurability and polarity digital input DI2	1 = (ON/OFF)	
H30	Control from digital inputs or serial	= di (Digital Input)	di = digital input (Stand-Alone mode only); LAn = LAn Eliwell; rEt= remote

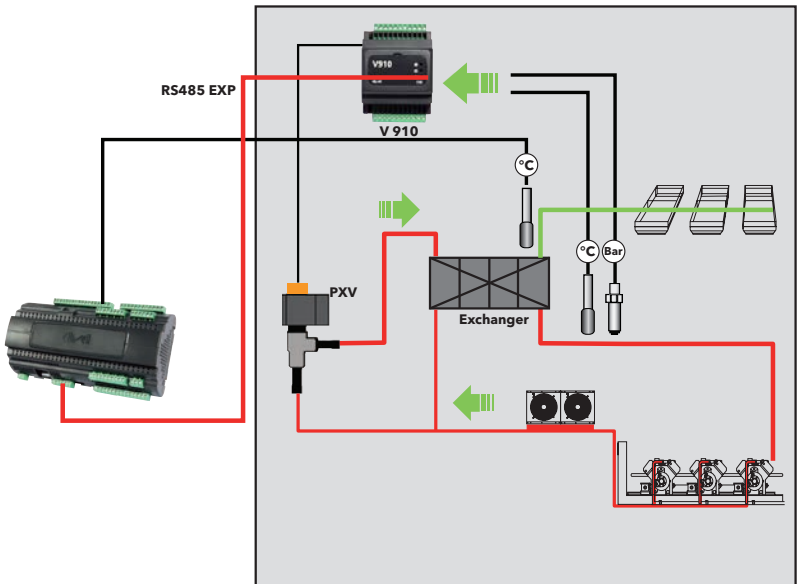




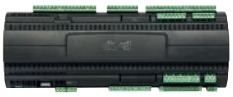
19.2.16. PROGRAM 16 - 9900AB16
EWCM + V910 COMMAND FROM RS485 EXPSUB-COOLING AT FLOATING TEMPERATURE

The regulator regulates temperature difference of gas output to sub-cooling exchanger.
The EWCM system controller is equipped with a second serial port (RS485 EXP) which can be used to control the V910 directly. In this way you can have the operation status in the menu (of the EWCM) and the more important V910 sizes.
The regulator regulates on difference between discharge pressure temperature and gas temperature output from sub-cooling exchanger.

EWCM EO ● V910 via RS485 EXP



Folder	Parameter	Description	MT	DAT
GENERAL REGULATOR	**710-MPCFR**	Configurable regulator probe mode	2	
	711-MCFr1	Configurable regulator mode step 1	1 (HEAT)	
	713-SEtCFR1	Configurable regulator setpoint step 1	5.0 °C	
	715-dCFr1	Configurable regulator delta step 1	2.0 °C	
	719-CFr1dly	Configurable regulator delay step 1	0	
	724-ECFAw	Enable warning configurable alarm	0	
SAFETY MEASURES	**702-CFAE**	Configurable regulator alarm management (0=disabled)	0	
RESOURCE ALLOCATION Digital Inputs	**630-H408**	Configurable temperature regulator	8	PB8





Settings necessary on **V910**:

Parameter	Description	Value	Notes
dF02	Selection of type of valve regulator activation	= 3 (EWCM)	0= digital input 1= Serial 2= reg. ON/OFF 3= EWCM

EWCM EO + V910 via serial port (RS485)

Folder	Parameter	Description	LT	DAT
EXTERNAL DRIVER	**740 - EEvE**	Enable electronic valve driver	2	

Addressing and Protocol
Modbus RTU 18200 baud, and 1

Parameter	Description	Value	Notes
dF00	COM0 protocol selection	= 1	0= Micronet (Televis) 1= **Modbus RTU** 2= NOT USED 3= NOT USED
dF30	Modbus protocol controller address	= 1	values from 1 to 255
dF31	Modbus protocol controller baud rate	= 4 (19200)	0= 1200 baud 1= 2400 baud 2= 4800 baud 3= 9600 baud 4= **19200** baud 5= 38400 baud 6= 57600 baud 7= 115200 baud
dF32	Modbus protocol controller parity	=1 (EVEN)	0 =NONE; 1 =**EVEN** (parity) 2 =ODD (disparity)

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