Chiller Core

Application for the management of chillers and heat pumps
Code FLCOR_CH0E

ENG User manual

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READ AND SAVE THESE INSTRUCTIONS

Integrated Control Solutions & Energy Savings

CAREL

ITA

IMPORTANT

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- Prevent the electronic circuits from getting wet. Rain, humidity and all types of liquids or condensate contain corrosive minerals that may damage the electronic circuits. In any case, the product should be used or stored in environments that comply with the temperature and humidity limits specified in the manual.
- Do not install the device in particularly hot environments. Too high temperatures may reduce the life of electronic devices, damage them and deform or melt the plastic parts. In any case, the product should be used or stored in environments that comply with the temperature and humidity limits specified in the manual.
- Do not attempt to open the device in any way other than described in the manual.
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- Do not use corrosive chemicals, solvents or aggressive detergents to clean the device.
- Do not use the product for applications other than those specified in the technical manual.

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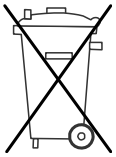
DISPOSAL



INFORMATION FOR USERS ON THE CORRECT HANDLING OF WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE)

In reference to European Union directive 2002/96/EC issued on 27 January 2003 and the related national legislation, please note that:

- WEEE cannot be disposed of as municipal waste and such waste must be collected and disposed of separately;
- the public or private waste collection systems defined by local legislation must be used. In addition, the equipment can be returned to the distributor at the end of its working life when buying new equipment;
- the equipment may contain hazardous substances: the improper use or incorrect disposal of such may have negative effects on human health and on the environment;
- the symbol (crossed-out wheeled bin) shown on the product or on the packaging and on the instruction sheet indicates that the equipment has been introduced onto the market after 13 August 2005 and that it must be disposed of separately;
- in the event of illegal disposal of electrical and electronic waste, the penalties are specified by local waste disposal legislation.

KEY TO THE ICONS

	NOTE: to bring attention to a very important subject; in particular, regarding the practical use of the various functions of the product.
	IMPORTANT: to bring critical issues regarding the use of the Blast Chiller to the attention of the user.
	TUTORIAL: some simple examples to accompany the user in configuring the most common settings.

CONTENTS

1. INTRODUCTION

1.1 Main features

Tool for developers - Chiller Core is the exclusive new application that includes all the essential functions for managing the operation of chillers-heat pumps; it is a tool designed for 1tool developers who need a solid base to start creating custom applications.

Easy to customise - Chiller Core is arranged into modules, meaning the code is easy to follow and edit. Each function of Chiller Core is readily customisable according to needs.

Ideal for field tests - thanks to its extreme flexibility, Chiller Core is the ideal tool for checking the operation of chillers during testing and service.

Usability and display - ChillerCore, developed in line with the new CAREL usability standards, assists the manufacturer in the configuration of the installation. The menu-based system (available on the pGD1 terminal) allows the application to be configured as a tool for instant diagnostics. All this is possible by the immediately accessible overview screens and the commissioning tool.

Quick menus - information on the status of the chiller is accessible directly from the main menu, without needing to access the submenus. Configuration, active function and operating temperature information are arranged in loops of screens, scrolled by pressing the DOWN button from the main screen.

User manual - this manual, as well as describing the features and the operation of the application, guides the developer in understanding and editing the source code.

List of functions:

Main features*	Up to 3 hermetic compressors per circuit
	Up to 4 circuits
	1-4 evaporator circuits
	1-2 condenser units
Hardware	pCO3 medium and large
	pCOxs (with 512KB RAM)
	PGD1
Unit configuration	Air/water chiller – heat pump
	Water/water chiller – heat pump
Languages	Italian
	English
	Chinese
Unit of measure	Temperature: °C, °F
	Pressure: bar, psi (all pressure values are also expressed as temperatures)
	Date format selectable between: dd/mm/yy, mm/dd/yy, yy.mm.dd
Control	P, PI, PID on water inlet temperature
	Dead zone on water outlet temperature
Compressor rotation*	FIFO
	LIFO
	By time
	Fixed (the order of activation and deactivation can be set)
	Possibility to choose to distribute capacity between circuits
Scheduling by calendar	For each time band, the following can be managed: unit on-off and 2 different control set points for CH and HP
	4 daily time bands
	3 special periods (e.g.: store closing times)
	6 special days (e.g.: holidays)
Set point	Up to 2 set points for chiller operation and 2 for heat pump (scheduler)
	Compensation based on outside temperature
Evaporator pumps	1-2 pumps
	Management of attempts to recover water flow with 1 and 2 pumps
	Rotation by time or to replace faulty pump (e.g.: overload, no flow)
	Anti-blocking management on extended inactivity
Condenser pumps	Same functions as for the evaporator pumps
Condenser control	1-2 condenser units
	Speed modulation based on high pressure
Defrost	Individual
	Separate
Prevention	High pressure
	Low pressure
	Antifreeze
Alarms	Automatic and manual management
	Log from application
	Log from Bios
Supervisor protocol	Carel
	Modbus

* The compressor rotation module includes other functions not mentioned here, such as: up to 4 compressors per circuit, management of up to 3 capacity steps per compressor, management of compressors with inverter, order of activation between compressors and capacity steps, fixed rotation with compressors of different capacities, etc.…

1.2 Components and accessories

Chiller Core is optimised for the pCO3 medium/Large and pCOxs (as long as the latter feature 512KB of RAM).

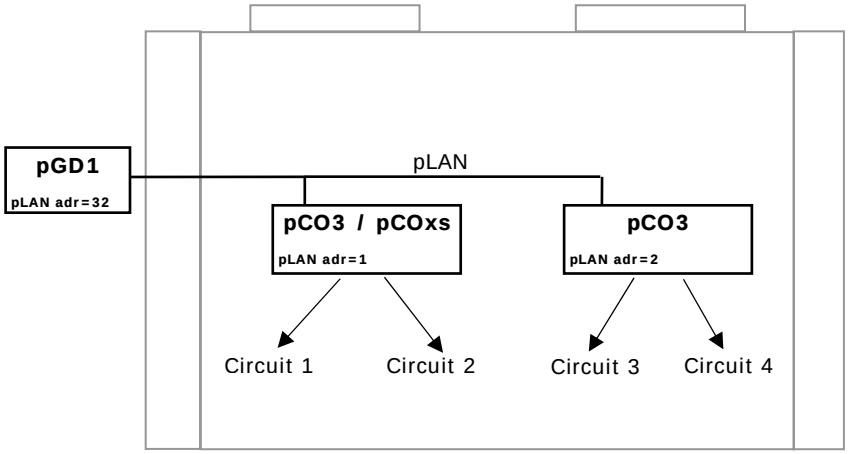


Fig 1.a

pLAN address 1 = Master
pLAN address 2 = Slave

The unit is configured from the Master board, and consequently the various user interface menus can only be accessed if the terminal is communicating with the board set to address 1.
If the terminal is communicating with a board whose address is other than 1, the following screen is displayed:

Fig 1.b

1.3 I/O configurations - types of unit

1.3.1 pCOxs air/water and water/water

	Air/water		Water/water
	CH	CH/HP	CH or HP
Analogue inputs	**1 circ. 2 comp. 1 evap. 1 cond.**	**1 circ. 2 comp. 1 evap. 1 cond.**	**1 circ. 2 comp. 1 evap. 1 cond.**
B1	High press. circ. 1	High press. circ. 1	High press. circ. 1
B2	Outside temp. / Low press. circ. 1	Low press. circ. 1	Outside temp. / Low press. circ. 1
B3	Control water outlet temp.	Control water outlet temp.	Control water outlet temp. / Evaporator outlet temp. (if control is on the water inlet temp. and HP unit)
B4	Control water inlet temp.	Control water inlet temp.	Control water inlet temp. / Evaporator outlet temp. (if control is on the water outlet temp. and HP unit)
Digital inputs			
ID1	High press. circ. 1	High press. circ. 1	High press. circ. 1
ID2	Evaporator water flow	Evaporator water flow	Evaporator water flow
ID3	Remote on-off	Remote on-off	Remote on-off
ID4		Cool/heat changeover	Condenser water flow
ID5	Low press. circ. 1	Low press. circ. 1	Low press. circ. 1
ID6	Serious alarm	Serious alarm	Serious alarm
Digital outputs			
NO1	Evaporator pump	Evaporator pump	Evaporator pump
NO2	Compressor 1 circuit 1	Compressor 1 circuit 1	Compressor 1 circuit 1
NO3	Antifreeze heater	Antifreeze heater	Antifreeze heater
NO4	Compressor 2 circuit 1	4-way valve circuit 1	Compressor 2 circuit 1
NO5	Serious alarm	Compressor 2 circ. 1 / Serious alarm	Serious alarm
Analogue outputs			
Y1 (0-10V)	Condenser fan (e.g.: inverter)	Condenser fan (e.g.: inverter)	Condenser pump (Used as On-Off: Off= 0V On= 10V)
Y2 (0-10V)			
Y3 (PWM)	Condenser fan (e.g.: MCHRTF)	Condenser fan (e.g.: MCHRTF)	

1.3.2 pCO3 Medium CH/HP - air/water

	1-4 circ. 1-8 comp. 1 evap. 1-2 cond.		1-4 circ. 1-8 comp. 2-4 evap. 1-2 cond.	
Analogue inputs	**Master**	**Slave**	**Master**	**Slave**
B1	High press. circ. 1	High press. circ. 3	High press. circ. 1	High press. circ. 3
B2	Low press. circ. 1	Low press. circ. 3	Outside temp./ Low press. circ. 1	Low press. circ. 3
B3	Control water outlet temp.		Control water outlet temp.	
B4	Control water inlet temp.		Control water inlet temp.	
B5			Evap. 1 water outlet temp.	Evap. 3 water outlet temp.
B6	High press. circ. 2	High press. circ. 4	High press. circ. 2	High press. circ. 4
B7	Low press. circ. 2	Low press. circ. 4	Low press. circ. 2	Low press. circ. 4
B8	Outside temp.		Evap. 2 water outlet temp.	Evap. 4 water outlet temp.
Digital inputs				
ID1	High press. circ. 1	High press. circ. 3	High press. circ. 1	High press. circ. 3
ID2	Low press. circ. 1	Low press. circ. 3	Low press. circ. 1	Low press. circ. 3
ID3	Remote on-off		Remote on-off	
ID4	Cool/heat changeover		Cool/heat changeover	
ID5	Evaporator water flow		Evaporator water flow	
ID6	Comp. 1 overload circ. 1	Comp 1 overload circ. 3	Comp. 1 overload circ. 1	Comp 1 overload circ. 3
ID7	Comp. 2 overload circ. 1	Comp 2 overload circ. 3	Comp. 2 overload circ. 1	Comp 2 overload circ. 3
ID8	Serious alarm		Serious alarm	
ID9	High press. circ. 2	High press. circ. 4	High press. circ. 2	High press. circ. 4
ID10	Low press. circ. 2	Low press. circ. 4	Low press. circ. 2	Low press. circ. 4
ID11	Comp. 1 overload circ. 2	Comp. 1 overload circ. 4	Comp. 1 overload circ. 2	Comp. 1 overload circ. 4
ID12	Comp. 2 overload circ. 2	Comp. 2 overload circ. 4	Comp. 2 overload circ. 2	Comp. 2 overload circ. 4
ID13	Evap. pump 1 overload	Evap. pump 2 overload	Evap. pump 1 overload	Evap. pump 2 overload
ID14				
Digital outputs				
NO1	Compressor 1 circuit 1	Compressor 1 circuit 3	Compressor 1 circuit 1	Compressor 1 circuit 3
NO2	Compressor 2 circuit 1	Compressor 2 circuit 3	Compressor 2 circuit 1	Compressor 2 circuit 3
NO3	Compressor 1 circuit 2	Compressor 1 circuit 4	Compressor 1 circuit 2	Compressor 1 circuit 4
NO4	Compressor 2 circuit 2	Compressor 2 circuit 4	Compressor 2 circuit 2	Compressor 2 circuit 4
NO5	Cond. fan unit 1		Cond. fan unit 1	
NO6	Cond. fan unit 2		Cond. fan unit 2	
NO7	Antifreeze heater		Antifreeze heater	
NO8	Serious alarm		Serious alarm	
NO9	Evaporator pump 1	Evaporator pump 2	Evaporator pump 1	Evaporator pump 2
NO10	Liquid solenoid 1	Liquid solenoid 3	Liquid solenoid 1	Liquid solenoid 3
NO11	Liquid solenoid 2	Liquid solenoid 4	Liquid solenoid 2	Liquid solenoid 4
NO12	4-way valve circuit 1	4-way valve circuit 3	4-way valve circuit 1	4-way valve circuit 3
NO13	4-way valve circuit 2	4-way valve circuit 4	4-way valve circuit 2	4-way valve circuit 4
Analogue outputs.				
Y1 (0-10V)	Cond. fan unit 1		Cond. fan unit 1	
Y2 (0-10V)	Cond. fan unit 2		Cond. fan unit 2	
Y3 (0-10V)				
Y3 (0-10V)				

1.3.3 pCO3 Medium CH/HP – water/water

	1-4 circ. 1-8 comp. 1 evap. 1 cond. with slave board only	
Analogue inputs	**Master**	**Slave**
B1	High press. circ. 1	High press. circ. 3
B2	Low press. circ. 1	Low press. circ. 3
B3	Evap. water outlet temp.	
B4	Evap. water inlet temp.	
B5	Cond. water outlet temp. (used for condenser antifreeze on units with reversible refrigerant circuit) Cond. water inlet temp. (used for control on units with reversible water circuit in heat pump operation)	
B6	High press. circ. 2	High press. circ. 4
B7	Low press. circ. 2	Low press. circ. 4
B8	Outside temp.	
Digital inputs		
ID1	High press. circ. 1	High press. circ. 3
ID2	Low press. circ. 1	Low press. circ. 3
ID3	Remote on-off	
ID4	Cool/heat changeover	
ID5	Evaporator water flow	
ID6	Comp. 1 overload circ. 1	Comp. 1 overload circ. 3
ID7	Comp. 2 overload circ. 1	Comp. 2 overload circ. 3
ID8	Serious alarm	
ID9	High press. circ. 2	High press. circ. 4
ID10	Low press. circ. 2	Low press. circ. 4
ID11	Comp. 1 overload circ. 2	Comp. 1 overload circ. 4
ID12	Comp. 2 overload circ. 2	Comp. 2 overload circ. 4
ID13	Evap. pump 1 overload	Evaporator pump 2 overload
ID14	Condenser water flow	
Digital outputs		
NO1	Compressor 1 circuit 1	Compressor 1 circuit 3
NO2	Compressor 2 circuit 1	Compressor 2 circuit 3
NO3	Compressor 1 circuit 2	Compressor 1 circuit 4
NO4	Compressor 2 circuit 2	Compressor 2 circuit 4
NO5	Condenser pump 1	
NO6	Condenser pump 2	
NO7	Antifreeze heater	
NO8	Serious alarm	
NO9	Evaporator pump 1	Evaporator pump 2
NO10	Liquid solenoid 1	Liquid solenoid 3
NO11	Liquid solenoid 2	Liquid solenoid 4
NO12	4-way valve circuit 1	4-way valve circuit 3
NO13	4-way valve circuit 2	4-way valve circuit 4
Analogue outputs		
Y1 (0-10V)		
Y2 (0-10V)		
Y3 (0-10V)		
Y4 (0-10V)		

1.3.4 pCO3 Large CH/HP - air/water

	1-4 circ. 1-12 comp. 2-4 evap. 1-2 cond.	
Analogue inputs	**Master**	**Slave**
B1	High press. circ. 1	High press. circ. 3
B2	Low press. circ. 1	Low press. circ. 3
B3	Control water outlet temp.	
B4	Control water inlet temp.	
B5	Evap. 1 water outlet temp.	Evap. 3 water outlet temp.
B6	High press. circ. 2	High press. circ. 4
B7	Low press. circ. 2	Low press. circ. 4
B8	Evap. 2 water outlet temp.	Evap. 4 water outlet temp.
B9	Outside temp.	
B10		
Digital inputs		
ID1	High press. circ. 1	High press. circ. 3
ID2	Low press. circ. 1	LP3
ID3	Remote on-off	
ID4	Cool/heat changeover	
ID5	Evaporator water flow	
ID6	Comp. 1 overload circ. 1	Comp. 1 overload circ. 3
ID7	Comp. 2 overload circ. 1	Comp. 2 overload circ. 3
ID8	Serious alarm	
ID9	High press. circ. 2	High press. circ. 4
ID10	Low press. circ. 2	Low press. circ. 4
ID11	Comp. 1 overload circ. 2	Comp. 1 overload circ. 4
ID12	Comp. 2 overload circ. 2	Comp. 2 overload circ. 4
ID13	Evap. pump 1 overload	
ID14	Evap. pump 2 overload	
ID15	Comp. 3 overload circ. 1	Comp. 3 overload circ. 3
ID16	Comp. 3 overload circ. 2	Comp. 3 overload circ. 4
ID17		
ID18		
Digital outputs		
NO1	Compressor 1 circuit 1	Compressor 1 circuit 3
NO2	Compressor 2 circuit 1	Compressor 2 circuit 3
NO3	Compressor 1 circuit 2	Compressor 1 circuit 4
NO4	Compressor 2 circuit 2	Compressor 2 circuit 4
NO5	Cond. fan unit 1	
NO6	Cond. fan unit 2	
NO7	Antifreeze heater	
NO8	Serious alarm	
NO9	Evaporator pump 1	
NO10	Liquid solenoid 1	Liquid solenoid 3
NO11	Liquid solenoid 2	Liquid solenoid 4
NO12	4-way valve circuit 1	4-way valve circuit 3
NO13	4-way valve circuit 2	4-way valve circuit 4
NO14	Compressor 3 circuit 1	Compressor 3 circuit 3
NO15	Compressor 3 circuit 2	Compressor 3 circuit 4
NO16	Evaporator pump 2	
NO17		
NO18		
Analogue outputs		
Y1 (0-10V)	Cond. fan unit 1 (e.g.: inverter)	
Y2 (0-10V)	Cond. fan unit 2 (i.e.: Inverter)	
Y3 (0-10V)		
Y4 (0-10V)		
Y5 (0-10V)		

Y6 (0-10V)		

1.3.5 pCO3 Large CH/HP - water/water

	1-4 circ. 1-12 comp. 2-4 evap. 1-2 cond.	
Analogue inputs	**Master**	**Slave**
B1	High press. circ. 1	High press. circ. 3
B2	Low press. circ. 1	Low press. circ. 3
B3	Control evaporator water outlet temp. / Generic temp. (inlet or outlet) for control (on units with 2 evap. 2 cond. and reversible refrigerant circuit)	
B4	Control evaporator water inlet temp. / Condenser 2 water outlet temp. (on units with 2 evap. 2 cond. and reversible refrigerant circuit)	Condenser 4 water outlet temp. (on units with reversible refrigerant circuit)
B5	Evaporator 1 water outlet temp.	Evaporator 3 water outlet temp.
B6	High press. circ. 2	High press. circ. 4
B7	Low press. circ. 2	Low press. circ. 4
B8	Evaporator 2 water outlet temp.	Evaporator 4 water outlet temp.
B9	Outside temp.	
B10	Condenser 1 water outlet temp. (on units with reversible refrigerant circuit) / Condenser water inlet temp. (on units with reversible water circuit during heat pump operation)	Condenser 3 water outlet temp. (on units with reversible refrigerant circuit)
Digital inputs		
ID1	High press. circ. 1	High press. circ. 3
ID2	Low press. circ. 1	LP3
ID3	Remote on-off	
ID4	Cool/heat changeover	
ID5	Evaporator water flow	
ID6	Comp. 1 overload circ. 1	Comp. 1 overload circ. 3
ID7	Comp. 2 overload circ. 1	Comp. 2 overload circ. 3
ID8	Serious alarm	
ID9	High press. circ. 2	High press. circ. 4
ID10	Low press. circ. 2	Low press. circ. 4
ID11	Comp. 1 overload circ. 2	Comp. 1 overload circ. 4
ID12	Comp. 2 overload circ. 2	Comp. 2 overload circ. 4
ID13	Evaporator pump 1 overload	
ID14	Evaporator pump 2 overload	
ID15	Comp. 3 overload circ. 1	Comp. 3 overload circ. 3
ID16	Comp. 3 overload circ. 2	Comp. 3 overload circ. 4
ID17	Condenser water flow	
ID18		
Digital outputs		
NO1	Compressor 1 circuit 1	Compressor 1 circuit 3
NO2	Compressor 2 circuit 1	Compressor 2 circuit 3
NO3	Compressor 1 circuit 2	Compressor 1 circuit 4
NO4	Compressor 2 circuit 2	Compressor 2 circuit 4
NO5	Condenser pump 1	
NO6	Condenser pump 2	
NO7	Antifreeze heater	
NO8	Serious alarm	
NO9	Evaporator pump 1	
NO10	Liquid solenoid 1	Liquid solenoid 3
NO11	Liquid solenoid 2	Liquid solenoid 4
NO12	4-way valve circuit 1	4-way valve circuit 3
NO13	4-way valve circuit 2	4-way valve circuit 4
NO14	Compressor 3 circuit 1	Compressor 3 circuit 3
NO15	Compressor 3 circuit 2	Compressor 3 circuit 4
NO16	Evaporator pump 2	
NO17		
NO18		

Analogue outputs		
Y1 (0-10V)		
Y2 (0-10V)		
Y3 (0-10V)		
Y4 (0-10V)		
Y5 (0-10V)		
Y6 (0-10V)		

1.3.6 Overview of control and antifreeze probes in the various configurations

Based on the unit configuration and the size of board (pCOxs – pCO3 medium – pCO3 Large), below is an overview of the control and antifreeze probes used on the evaporator and condenser.

Air/water units

Type of unit	Reversible	Operating mode	Control probe	Evaporator antifreeze probe	Condenser antifreeze probe
Chiller	-	Cooling	Evap. inlet B4 or Evap. outlet B3	Control evap. outlet B3 or (not on pCOxs) Evap. outlet circ. 1 B5 master, Evap. outlet circ. 2 B8 master, Evap. outlet circ. 3 B5 slave, Evap. outlet circ. 4 B8 slave.	Not required
Heat pump	-	Heating	Evap. inlet B4 or Evap. outlet B3	Not used	Not required
Chiller / Heat pump	Refrigerant side	Cooling or Heating	Evap. inlet B4 or Evap. outlet B3	Control evap. outlet B3 or (not on pCOxs) Evap. outlet circ. 1 B5 master, Evap. outlet circ. 2 B8 master, Evap. outlet circ. 3 B5 slave, Evap. outlet circ. 4 B8 slave.	Not required

Water/water units

Type of unit	Reversible	Operating mode	Control probe	Evaporator antifreeze probe *	Condenser antifreeze probe**
Chiller	-	Cooling	Evap. inlet B4 or Evap. outlet B3	Control evap. outlet B3 or (not on pCOxs) Evap. outlet circ. 1 B5 master, Evap. outlet circ. 2 B8 master, Evap. outlet circ. 3 B5 slave, Evap. outlet circ. 4 B8 slave.	Not required
Heat pump (only pCOxs)	-	Heating	Cond. inlet B4 or Cond. outlet B3	Depends on the control probe selected: Evap. outlet B3/B4	Not required
Chiller / Heat pump	Water side	Cooling	Evap. inlet B4 or Evap. outlet B3	Control evap. outlet B3 or (not on pCOxs) Evap. outlet circ. 1 B5 master, Evap. outlet circ. 2 B8 master, Evap. outlet circ. 3 B5 slave, Evap. outlet circ. 4 B8 slave.	Not required
Chiller / Heat pump	Water side	Heating	Cond. inlet --- (PCOXS), B5(PCO3M), B10(PCO3L)	Control evap. outlet B3 or (not on pCOxs) Evap. outlet circ. 1 B5 master, Evap. outlet circ. 2 B8 master, Evap. outlet circ. 3 B5 slave, Evap. outlet circ. 4 B8 slave.	Not required
Chiller / Heat pump	Refrigerant side	Cooling	Evap. inlet B4 or Evap. outlet B3	Control evap. outlet B3 or (not on pCOxs) Evap. outlet circ. 1 B5 master, Evap. outlet circ. 2 B8 master, Evap. outlet circ. 3 B5 slave, Evap. outlet circ. 4 B8 slave.	Not required
Chiller / Heat pump	Refrigerant side	Heating	Cond. inlet B4 or Cond. outlet B3	Control evap. outlet B3 or (not on pCOxs) Evap. outlet circ. 1 B5 master, Evap. outlet circ. 2 B8 master, Evap. outlet circ. 3 B5 slave, Evap. outlet circ. 4 B8 slave.	PCOM: Cond. out. temp B5* PCOL: Cond. outlet circ. 1 B10 master* Cond. outlet circ. 2 B4 master* Cond. outlet circ. 3 B10 slave* Cond. outlet circ. 4 B4 slave*

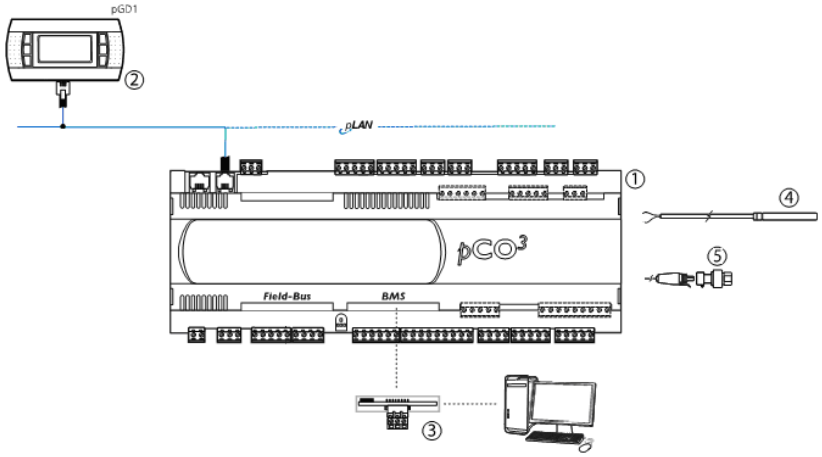
* for further details see the table in the chapter on "Evaporator antifreeze".

** for further details see the table in the chapter on "Condenser antifreeze".

2. HARDWARE FEATURES AND INSTALLATION

2.1 Features of the pCO board

pCO3



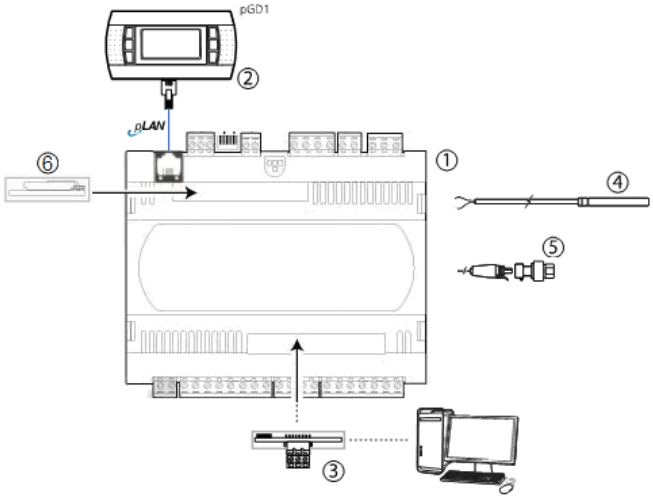
Features of the pCO platform that the application is installed on:

Key

	Description	Code
1	pCO³ Medium, Large controller	PCO3000*L0 / PCO3000*M0
2	pDG1 panel or wall mounting + telephone cable	PGD1000**0 + S90CONN00*
3	Serial card for BMS	Depends on the supervisor connected
4	Temperature sensors	TSC1500030, NTC*****00
5	Pressure sensors	SPKT00***0

pCOxs

Important: this software requires a pCOxs with 512KB of RAM, as the application features user atoms developed in C.
If attempting to download application to a pCO1 or pCOxs with less than 512KB of RAM, pCOLoad blocks the upload of the *.blx file. If the application is still downloaded (e.g.: using Winload), the BIOS shows an error screen and the application will not run: I/O board fault 01.



Key

	Description	Code
1	pCO^{xs} controller	PCO1000CX0
2	pDG1 panel or wall mounting + telephone cable	PGD1000**0 + S90CONN00*
3	Serial card for BMS	Depends on the supervisor connected
4	Temperature sensors	TSC1500030, NTC*****00
5	Pressure sensors	SPKT00***0
6	Clock card	PCO100CLK0
6	Clock card + memory for the BIOS log	PCO100CEF0

3. START UP

The following systems can be used to update and install the Chiller Core application on the pCO board:

- pCO Manager;
- SmartKey programming key.

3.1 pCO Manager

Note: Winload cannot be used to download Chiller Core to a pCO controller, as Winload cannot manage the user atom *.blx file.

All CAREL pCO sistema series 16 bit controllers (see the pCO sistema manual) can update their software from a PC.
CAREL provides a program called pCOLoad and a serial converter with RS485 output (code CVSTDUTLF0) to be connected to the pCO. The special driver, released by CAREL, also needs to be installed on the PC.
The program is included in the installation of the complete "1Tool" program suite or as part of the pCO Manager program, downloadable separately from http://ksa.CAREL.com under "download → support → software utilities".
The installation includes both the program and the user manual. The pCO controller can be connected directly to the PC via the RS485 serial port used for the "pLAN" connection or via the BMS serial port using the RS485 serial card (optional) for the "supervisor" connection.

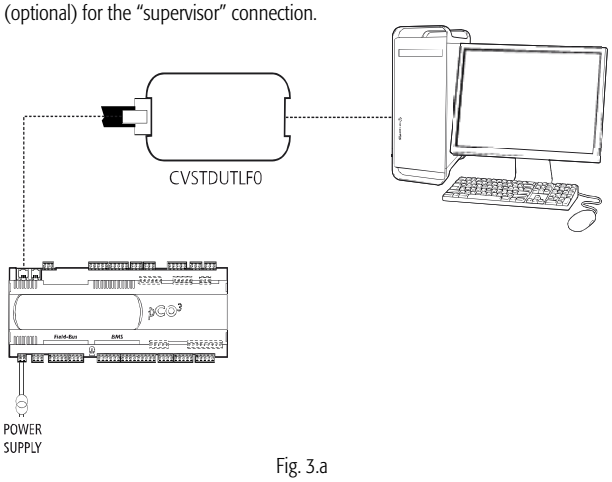


Fig. 3.a

Updating the BOOT is generally NOT RECOMMENDED by CAREL; during production CAREL always loads the BOOT required for the correct operation of the unit. Only in very special cases will CAREL ask the user to update the BOOT. The BIOS can only be loaded via the pLAN serial connection.

Note: Minimum versions for downloading Chiller Core:

- pCO3-pCO1-pCOxs 4.20
- Supernode 4.30

When updating the application and the BIOS, the pCO operating mode switches to low level. In this special mode, the logged data cannot be downloaded to the PC nor can the application be loaded in compressed format. To return the unit to normal communication mode, reset the pCO board.
If uploading the BOOT or BIOS files only, the other application files then need to be uploaded again.
The consequences of interruption to the upload procedure depend on the instant this occurs. In any case, the upload needs to be repeated. If pCOLoad cannot connect to the pCO, a Smart Key must be used to download the BIOS and any other operating application (e.g.: pCO functional test). This refreshes the pCO memory, allowing connection to pCOLoad.

3.1.1 Commissioning Tool

Commissioning tool is configuration and real-time monitoring software used to check the operation of an application installed on a pCO, for commissioning, debugging and maintenance.

This tool can be used to set the configuration parameters, set the values of volatile and permanent variables, save the trend in the main values of the unit to a file, manually manage the unit I/Os using a simulation file and monitor/restore the alarms on the unit where the device is installed.

Chiller CORE is already configured for the virtualisation of all the inputs and outputs, both digital and analogue. Consequently, all inputs and outputs can be overridden using the commissioning tool.

The configuration functions available on the commissioning tool allow the designer to decide which variables will be monitored/logged/plotted or monitored by event, to organise the variables into categories, and to choose the set of configuration parameters.

Support files
Following development of the application, 1tool generates various files during compilation; these include two that are required for commissioning:

<applicationName>.2CF (descriptive of variables)
<applicationName>.2CD (descriptive of categories and access profiles)

As well as these files, the <applicationName>.DEV file that contains the pre-defined set of unit parameters can also be managed.

When the commissioning procedure is complete, or for configuration or monitoring, the user can generate the following files:

<applicationName>.2CW (descriptive of categories, access profiles, monitoring groups)
<CommissioningLogFileName>.CSV (commissioning log file, containing the data on the variables recorded during monitoring)

For the configuration phase of the commissioning procedure, the following files must be available: .2CF, 2CD and where necessary .DEVELOPMENT, which can be imported and exported.

For the monitoring phase, as well as the files mentioned above, the .2CW file with the definition of the working environment may be required. The commissioning log file is an output file only.

Connection modes
Each controller has three serial ports (0, 1 and 2), each with its own default protocol:

Port	Default protocol	Description
Serial 0	pLAN	Connection to terminal and pLAN network
Serial 1	BMS	Connection to supervisor
Serial 2	FieldBus	Connection to field devices

There are two modes for commencing local communication between pCO Manager and the controller:

1) Activate the WinLoad protocol on the required port
2) On BMS and FieldBus only, irrespective of the protocol set on the pCO, simply connect pCO Manager and from "Connection settings" select SearchDevice = Auto (BMS or FB). In this case it will take around 15-20 seconds to go online.

Memory limits
The periodical monitoring of the application variables is limited to a maximum of 250 WORDS, freely selectable from the entire memory available to the application. The virtualisation of application variables is limited to a maximum of 50 WORDS, selectable from the entire memory available to the application.
There are no address limits for "one-shot" read/write of individual variables: all memory addresses reserved for the application in all types of memory available on the pCO can be used: X memory, T memory, P memory, E memory.

Note: for further details on installing and updating the software on the pCO controller, see the online help for the pCO Manager program.

3.2 SmartKey

The SMARTKEY programming key can clone the contents of one pCO and then download the data to another identical pCO via the terminal telephone connector (the pLAN must be disconnected). This function is obviously available for all pCO controllers. In addition to this mode, the key can transfer the data logged on a series of pCO devices and download them to the PC.
From the PC, using the SMARTKEY PROGRAMMER, the key can be configured to run certain operations: retrieve logs, program applications, program BIOS, etc.
The SMARTKEY PROGRAMMER is installed together with pCO Manager.
For further details see the online help for the SMARTKEY PROGRAMMER program and the SMARTKEY instruction sheet.

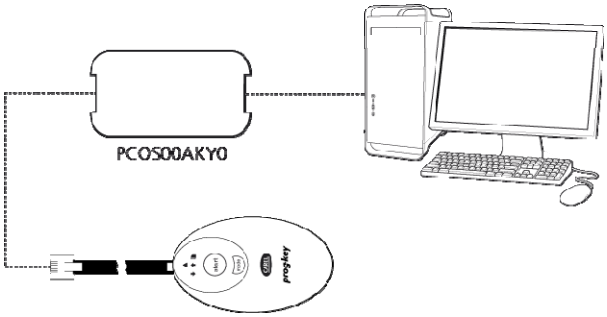


Fig. 3.b

Note: for further details on installing and updating the software on the pCO controller, see the online help for the pCO Manager program.

3.3 Commissioning

When starting the pCO^3/pCO^{XS} board that the application has been installed on, a screen is displayed to choose the program interface language.
Press ENTER to choose the required language.

Note: If no option is selected within the time defined by the corresponding parameter (in the service menu), the current language selected is used.

3.3.1 Setting the terminal address

The address of the terminal can be set in the range from 0 to 32; addresses between 1 and 32 are used by the pLAN protocol, while address 0 identifies the **Local terminal protocol**, used for point-to-point connections and to configure the pCO controller. The default address is 32, which corresponds to the address optimised for the Chiller Core application. The address of the terminal can only be set after having powered the terminal via RJ12 connector. To access configuration mode press ↑, ↓ and ↵ together for at least 5 seconds; the terminal will display a screen similar to the one shown below, with the cursor flashing in the top left corner:

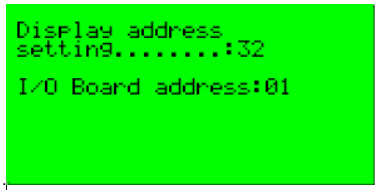


Fig. 3.c

To modify the address of the terminal ("Display address setting") carry out the following operations in sequence.

1. Press ↵ once: the cursor will move to the "Display address setting" field.
2. Select the desired value using ↑ and ↓, and confirm by pressing ↵ again
3. If the value selected is different from the value saved, the following screen will be displayed and the new value will be saved to the permanent memory on the display.

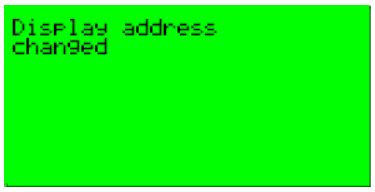


Fig. 3.d

If the address field is set to 0, the terminal communicates with the pCO board using the Local terminal protocol and the "I/O Board address" field disappears, as it no longer has any meaning.

As stated, Chiller Core is optimised to operate with terminal address 32. An automatic procedure configures the master pCO^3 (with address 1) or the pCO^{XS} for communication with this terminal. The procedure starts when the pCO^3/pCO^{XS} controller with address other than 0 detects communication with a device over the pLAN (terminal or other pCO). The procedure is only run once and can only be repeated after powering up the pCO.
The pCO3 with the address set to 2 (slave) does not communicate with the terminal.

⚠ **Important:** if during operation the terminal detects inactivity on the pCO board it is connected to, the display is cancelled and a message similar to the one shown below is displayed.

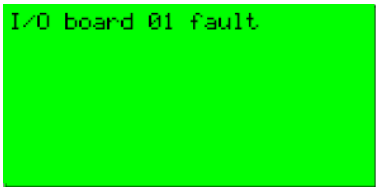


Fig. 3.g

If the terminal detects inactivity of the entire pLAN network, that is, it does not receive any messages from the network for 10 seconds consecutively, the display is cancelled completely and the following message is shown:

Fig. 3.h

3.3.2 Setting the pCO* board address

To complete the installation procedure, set the pLAN address of the pCO board; the pCO^3/pCO^{XS} controllers do not have dipswitches for setting the pLAN network address: the pLAN address can be set from any pGD1 terminal.

1. Set address 0 on the terminal (see the previous sections for details on how to select the address).
2. Power down the pCO.
3. Disconnect any pLAN connections to other controllers from the pCO.
4. Connect the terminal to the pCO.
5. Power up the pCO, pressing the UP and ALARM buttons together on the terminal. After a few seconds, the pCO runs the start-up sequence and the display shows a screen similar to the following:

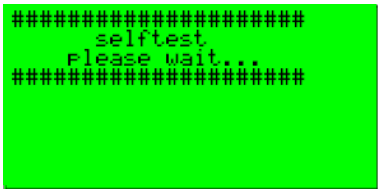


Fig. 3.i

6. From the moment when the screen is displayed, wait 10 seconds and then release the buttons.
7. The pCO interrupts the start-up sequence and shows a configuration screen similar to the following:

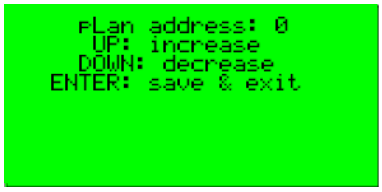


Fig. 3.l

Then change the pLAN address using the ↑ and ↓ buttons on the terminal.

8. Confirm the address by pressing ↵: the pCO completes the start-up sequence and uses the address specified.

Important: if the settings have not been made correctly, the text and the images on the display will be shown in an incorrect and unorderly manner.

4. USER INTERFACE

4.1 Graphic terminal

The Chiller Core user interface is the pGD1 terminal, in the wall or panel mounted versions, or if necessary using the "built-in" terminal installed directly on the pCO3 board (pCOxs does not support the PGD1 built-in display).

Fig. 4.a

This terminal, illustrated in the figure above, features six buttons, with following meanings:

- Alarm	display the list of active alarms.
Prg *- Prg*	enter the main menu tree.
Esc *- Esc*	return to then higher lever screen.
- Up	scroll a list upwards or increase the value shown on the display.
- Down	scroll a list downwards or decrease the value shown on the display.
- Enter	enter the selected submenu or confirm the set value.

4.2 Display

The following figure shows an example of the main screen, highlighting the fields and icons used:

Fig. 4.b

1- Date and time
2- Current operating mode

	Cooling mode
	Heating mode
	Individual defrost in progress
	Separate defrost in progress

3- Main temperature measured by control probe
4- Status of the compressors in the circuits

	Compressor off
	Compressor on
	Compressor forced off
	Compressor limited
	Compressor alarm
(flash)	Compressor starting, awaiting the safety times
(flash)	Compressor stopping, awaiting the safety times

5- Indicates access to the quick menu using DOWN

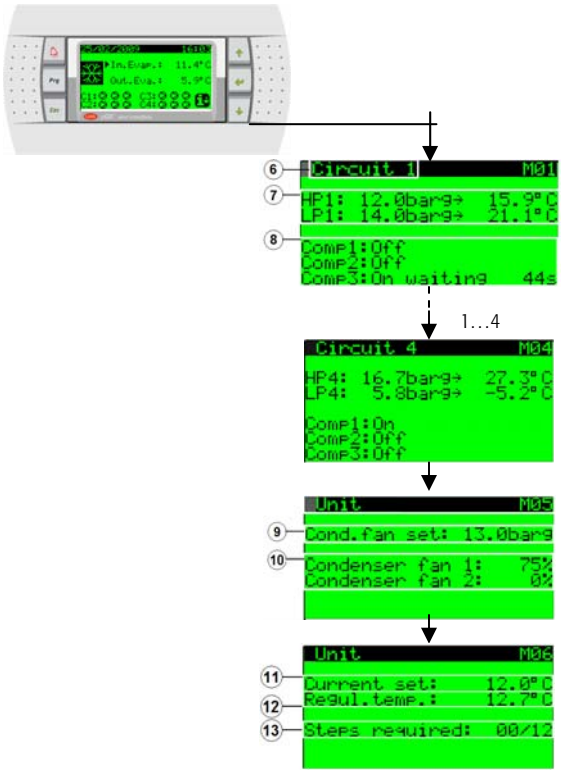


Fig. 4.c

6- Number of circuit
7- High and low pressure expressed (with conversion to temperature)
8- Status of the compressors

Off	Compressor off
Start	Comp. starting *
On	Compressor on
Step 2	Compressor in step 2 *
Step 3	Compressor in step 3 *
Step 4	Compressor in step 4 *
Forced off	Compressor forced off
Limit step 1	Compressor limited to step 1 *
Limit step 2	Compressor limited to step 2 *
Limit step 3	Compressor limited to step 3 *
Off alarm	Compressor alarm
Off wait 180s	Compressor called but can't start due to safety times + countdown
On wait 60s	Compressor can't stop due to safety times + countdown
Manual mode	Compressor in manual operation
On pump-down	Compressor on for pump-down

* These states are not used by Chiller Core, being typical of other types of compressor such as screw compressors.

9- Current condensing pressure set point
10- Condenser fan status
11- Current unit operating set point (considers scheduling by calendar and compensation)

12- Control temperature
13- Number of capacity steps required by the temperature controller in relation to the total number available on the unit

Note: The number of screens and the information on the quick menu depend on the configuration of the unit: number of circuits, number of compressors per circuit and type of condenser control.

5. DESCRIPTION OF THE MENUS

Main menu – Tree of functions

Irrespective of the current screen displayed, pressing Prg accesses the main menu, as shown below

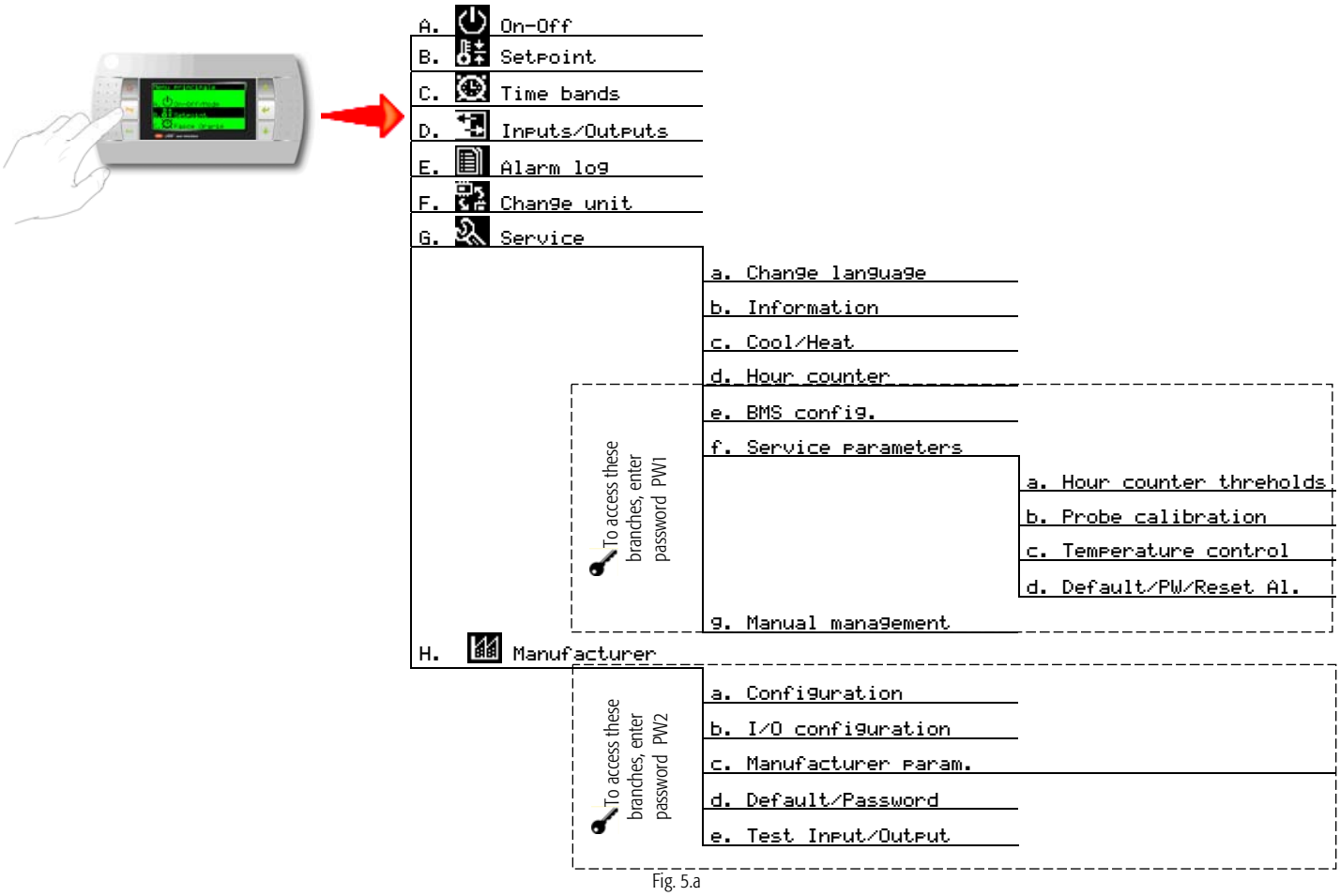


Fig. 5.a

Note: To ensure safe operation of the unit, switch the unit off when setting the parameters in:

- H. Manufacturer → a. Configuration (all screens)
- H. Manufacturer → c. Manufacturer parameters (screen Hc03 only, to change the unit of measure)

If attempting to set the parameters on these screens, a warning will be shown on the last row. Example:

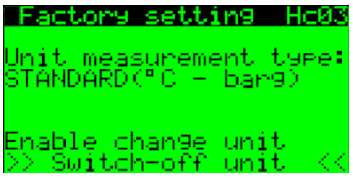


Fig 5.b

All the screens are identified by an index displayed in the field at the top right. The index is unique and is made up of the codes of the level 1, 2 and 3 menus that the screen belongs to. When there is more than one screen in the same submenu, these are identified by a progressive number.

For example, the following screen is identified by the index Gfc01:

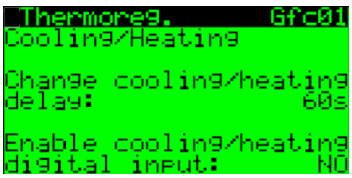


Fig 5.c

Therefore, it is the first screen (01) in the "Temperature control" (c) submenu under the "Parameters service" (f) menu, which in turn is under the "Service" (G) item on the main menu.

6. FUNCTIONS

6.1 Management of analogue inputs

Below is a flow chart detailing management of the analogue inputs:

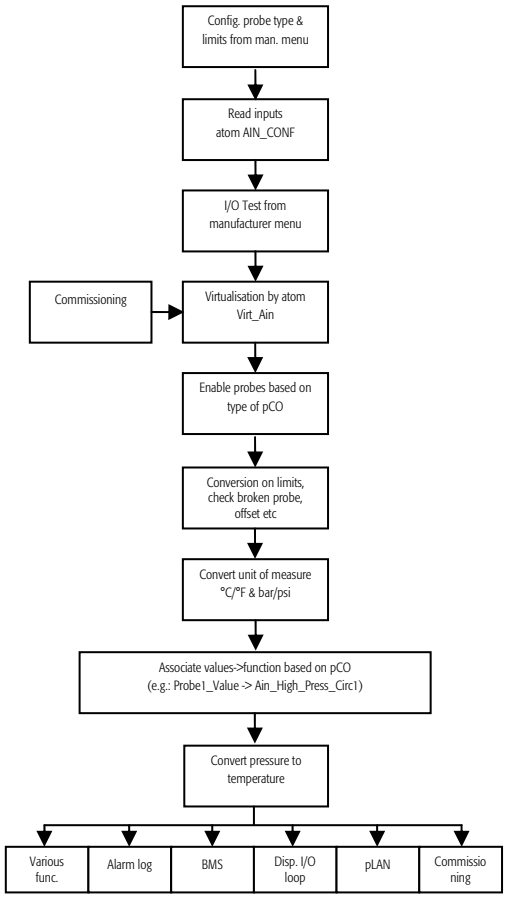


Fig 6.1.a

Probe	Type	Limits	UOM	Offset	Alarm delay
HP	0-1V 0-10V 0-20mA 4-20mA 0-5V	-999.9 to 999.9 Default 0 to 34.5bar	barg/ psig	-9.9 to 9.9	10s
LP	0-1V 0-10V 0-20mA 4-20mA 0-5V	-999.9 to 999.9 Default 0 to 34.5bar	barg/ psig	-9.9 to 9.9	10s
Temp.	NTC	-999.9/999.9	°C/°F	-9.9 to 9.9	10s

6.2 Management of digital inputs

Below is a flow chart detailing management of the digital inputs:

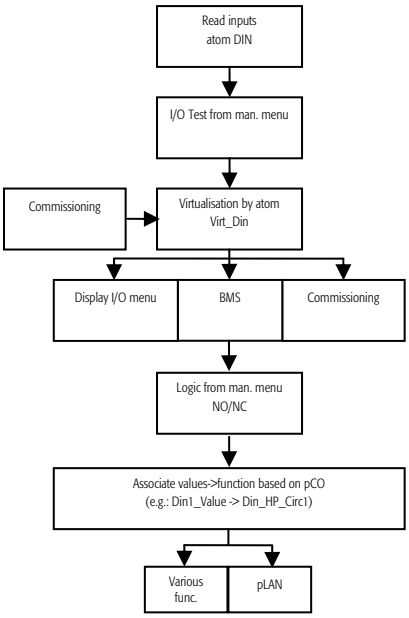


Fig 6.2.a

6.3 Management of digital outputs

Below is a flow chart detailing management of the digital outputs:

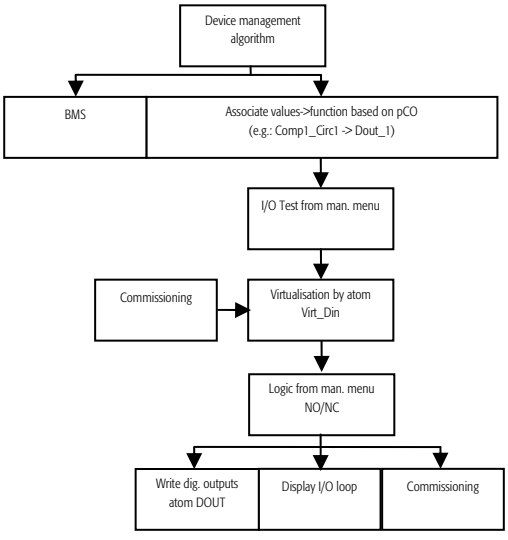


Fig. 6.3.c

6.4 Management of analogue outputs

Below is a flow chart detailing management of the digital outputs:

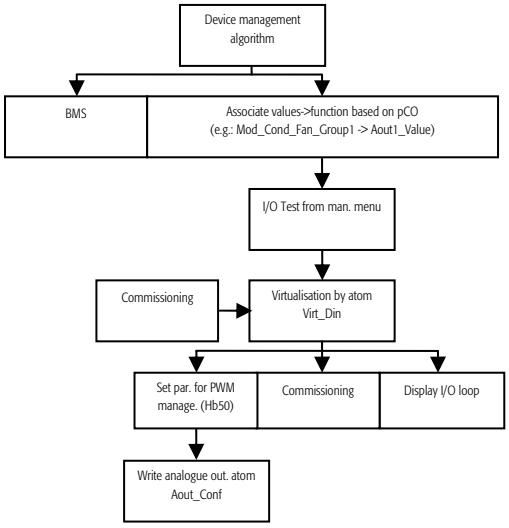


Fig 6.4.d

6.5 Test inputs and outputs

Under the Manufacturer menu → Test Inputs/Outputs, all the inputs and outputs on the pCO*, both digital and analogue, can be tested. The diagrams shown in the previous chapters, describing the management of the inputs and outputs, also include the "I/O Test from manufacturer menu" block, used to identify the effect of each of the functions.

Note: The test inputs and outputs procedure ignores all the safety features on the various devices, and consequently must be performed with special care!

As a result, when enabling the function the maximum time needs to be set, after which the procedure is disabled automatically. These 2 parameters are included in the first screen under the Hfxx loop:

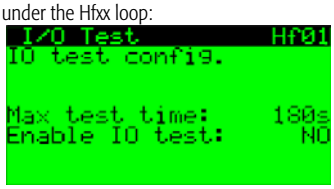


Fig. 6.5.a

Example of testing an analogue input used for a pressure probe:

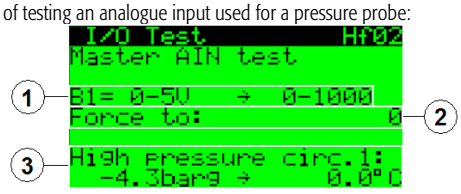


Fig. 6.5.b

1- Type of probe selected for pressure probes. This cannot be set, and simply describes the setting made in the I/O configuration menu.
As an analogue input is being tested, the override is performed by setting a value from 0 to 1000, as occurs when reading the input
2- Override value used
3- Name of the probe being tested and the corresponding override pressure / temperature value. This depends on the probe limits set in the I/O configuration menu.

Example of testing a digital input:

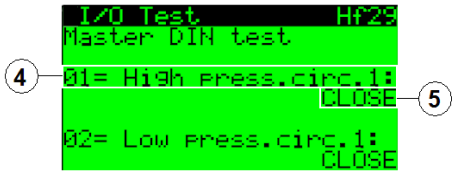


Fig. 6.5.c

4- Number and description of the digital input
5- Override

Example of testing a digital output:

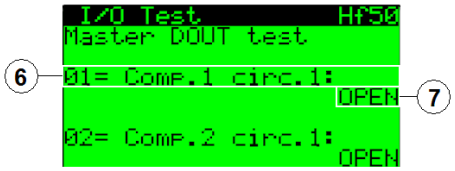


Fig. 6.5.d

6- Number and description of the digital input
7- Override

Example of testing an analogue output:

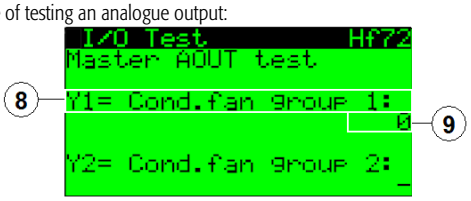


Fig. 6.5.e

8- Number and description of the analogue output
9- Override, 0-1000

6.6 Circuit and compressor management

Chiller Core comes with a new family of macroblocks and modules for managing the circuits, compressors and safety devices.
The underlying philosophy is that each of these only performs the function it was created for, based on the requirements and the feedback from other macroblocks/modules.
The system has been designed to be modular and expandable.
E.g.: The management of compressor start-up (direct, star-delta or partwinding) has been separated from the macroblocks/modules for the management of compressor operation. In this way, with a single macroblock for start-up, different types of compressor can be controlled (scroll, piston, screw) replacing or adding specific macroblocks and modules that manage the compressor safety features, such as safety times, capacity steps, etc.
The page below provides an overview of the management macroblocks/modules and the main interactions between them.

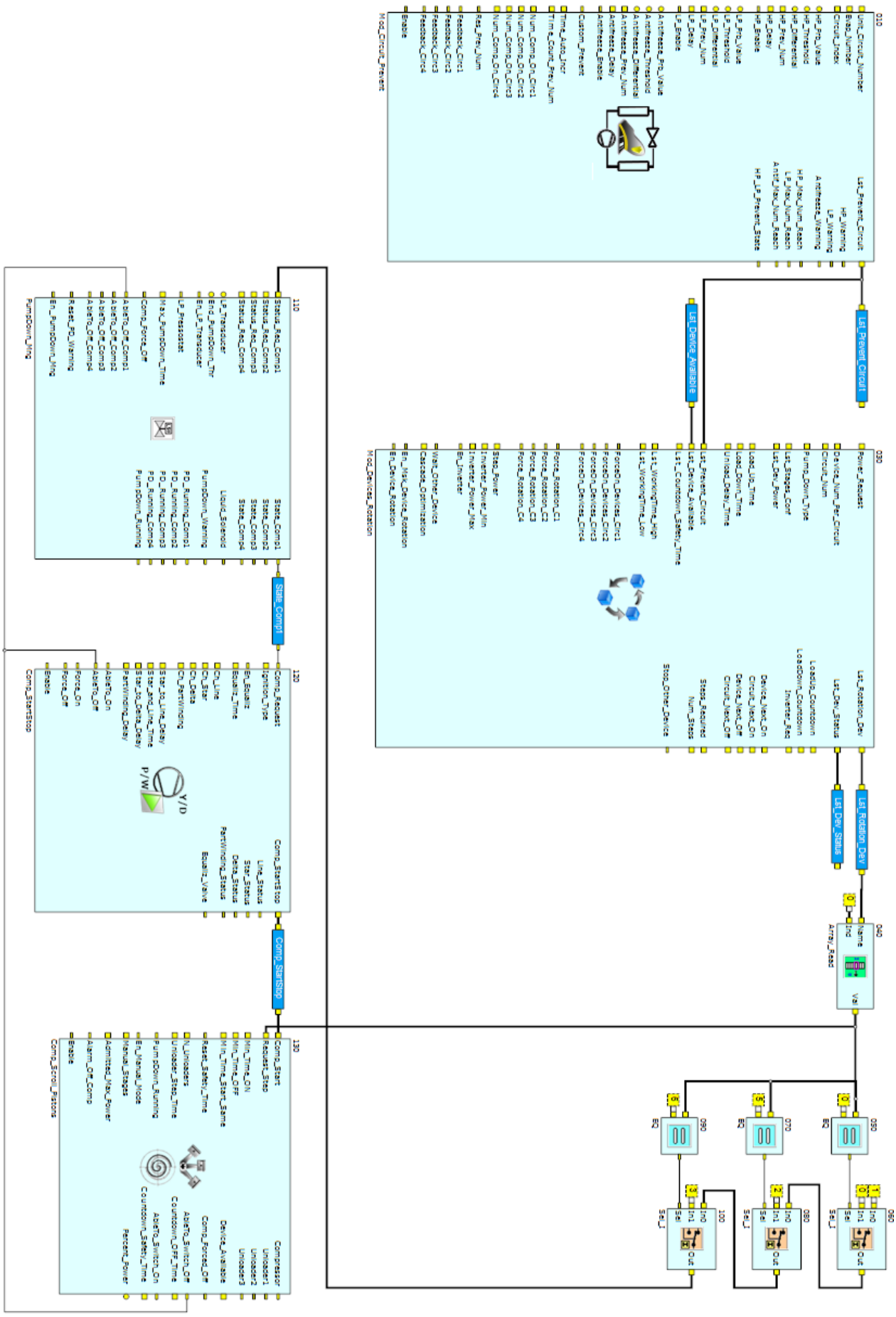


Fig 6.6.a

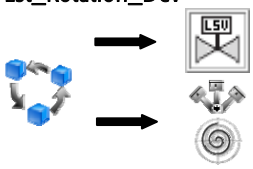
Lst_Prevent_Circuit

Structure of the list

Address	0	1	2	3	4	5	6
Circuits involved	1	2	3	4	1 and 2 (for antifreeze)	3 and 4 (for antifreeze)	All (for antifreeze)
Values	0 to 32767	0 to 32767	0 to 32767	0 to 32767	0 to 32767	0 to 32767	0 to 32767

If a circuit is in conditions whereby the activation of a prevention function is required, Mod_Circuit_Prevent increases the value of the variable at the address in the list corresponding to the circuit in question. If the condition persists, Mod_Circuit_Prevent keeps increasing the value after each set interval of time. Mod_Device_Rotation checks whether the capacity of the circuit can be decreased and decides which device or capacity step to deactivate based on the rotation set.

Lst_Rotation_Dev



Structure of the list with multiple circuits

Address	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Circuits	1				2				3				4			
Comp.	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Values	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6

Structure of the list with just 1 circuit

Address	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Circuit	1															
Comp.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Values	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6

Mod_Device_Rotation manages the rotation between the circuits and compressors and returns the request for each of the selected compressors to the output list, Lst_Rotation_Dev. This gives rise to any pump-down calls, processed by PumpDown_Management, and the compressor capacity request, used by Comp_Scroll_Pistons.

Below is the meaning of the possible values for each address in the list:

Lst_Rotation_Dev	Description
0	Compressor off
1	Compressor on or compressor step 1 (e.g.: Compressor on at 25%)
2	Compressor step 2 (e.g.: Compressor on at 50%)
3	Compressor step 3 (e.g.: Compressor on at 75%)
4	Compressor step 4 (e.g.: Compressor on at 100%)
5	Compressor on with pump-down
6	Compressor off with pump-down

Lst_Dev_Status

Structure of the list with multiple circuits

Address	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Circuits	1				2				3				4			
Comp.	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Values	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14

Structure of the list with just 1 circuit

Address	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Circuit	1															
Comp.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Values	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14

Mod_Device_Rotation, based on the feedback received on the operation of the compressors and management of compressor rotation, returns a list with the operating status of the compressors.
Below are the meanings of the values possible for each address in the list and the corresponding display on the user interface:

Lst_Dev_Status	Image on the main screen	Status in the quick menu
0. Compressor off		Off
1. Compressor starting * 2. Compressor on or in step 1 3. Compressor in step 2* 4. Compressor in step 3* 5. Compressor in step 4*		Start* On Step 2* Step 3* Step 4*
6. Compressor forced off		Forced off
7. Compressor limited to step 1 * 8. Compressor limited to step 2 * 9. Compressor limited to step 3 *		Limit to step 1* Limit to step 2* Limit to step 3*
10. Compressor alarm		Off from alarm
11. Compressor called but cannot start due to safety times	(flashing)	Off wait 180s
12. Compressor cannot stop due to safety times	(flashing)	On wait 60s
13. Compressor in manual operation	None, unit off	Manual mode
14. Compressor on for pump-down		On for pump-down

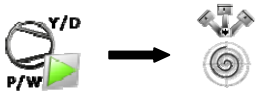
* These states are not used by Chiller Core, being typical of other types of compressor, such as screw compressors.

State_CompX

PumpDown_Mng manages the pump down procedure in a circuit with a maximum 4 of compressors, when called.
PumpDown_Mng is called to activated pump-down on a specific compressor. The macroblock activates the compressor (pump-down on power-up) or keeps it running (pump-down on shutdown), while however closing the liquid solenoid valve, so as to be able to empty the evaporator.
PumpDown_Mng is transparent, that is, it forwards the start and stop requests for the compressors not involved in the pump down procedure, while keeping management of the liquid solenoid active.
Below are the meanings of the values of the output pin, State_Comp1-2-3-4:

State_CompX	Description
0	Compressor stop request
1	compressor start request

Comp_StartStop



Comp_StartStop manages the start of a generic compressor based on a start request.
Chiller Core only uses direct starting, however Comp_StartStop can manage star-delta and partwinding starting.
Comp_StartStop also manages the function for balancing the pressure before the compressor starts.
Below are the meanings of the values of the output pin, Comp_StartStop:

Comp_StartStop	Description
0	Compressor stop request
1	Compressor start request with balancing
2	Compressor starting
3	Compressor start request

Lst_Device_Available

Comp_Scroll_Piston manages scroll and reciprocating compressors: activation of capacity steps, safety times, compressor shutdown due to alarm, capacity limitation and manual operation.
Based on current operation, Comp_Scroll_Piston assigns a value to the output, Device_Available:

Device_Available	Description
0	Compressor off

1	Compressor starting*
2	Compressor on or in step 1
3	Compressor in step 2*
4	Compressor in step 3*
5	Compressor in step 4*
6	Compressor forced off
7	Compressor limited to step 1*
8	Compressor limited to step 2*
9	Compressor limited to step 3*
10	Compressor alarm
11	Compressor called but cannot start due to safety times
12	Compressor cannot stop due to safety times
13	Compressor in manual operation
14	Compressor on for pump-down

* These states are not used by Chiller Core, being typical of other types of compressor, such as screw compressors.

In Chiller Core, the value of Device_Available is used as feedback for the Mod_Device_Rotation module. However, the Device_Available value for all the compressors must be sent to a list, with the following structure :

Structure of the list with multiple circuits

Addresses	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Circuits	1				2				3				4			
Comp.	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Values	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14

Structure of the list with just 1 circuit

Addresses	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Circuit	1															
Comp.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Values	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14

6.7 Alarm prevention

Chiller Core includes the Mod_Circuit_Prevent module, which manages the prevention of the following alarms:

- High pressure
- Low pressure
- Antifreeze

For each of these, the module requests the shutdown of the compressors in the circuit in question, and sends a warning to the alarm menu (screens included in the module). One module can work in synch with any other three modules, providing support for up to four refrigerant circuits. The stop requests are sent to a single list that can be controlled by the Mod_Device_Rotation module, which handles the function for deciding which compressor to stop.

In antifreeze, conditions the module may request the shutdown of the compressors in one circuit, a pair of circuits or all the circuits. This means that all the possible combinations of refrigerant-water circuits can be managed.

Note: The description of each prevention function is shown in the following chapters:
- Evaporator antifreeze
- Condenser antifreeze
- High pressure: alarm and prevention
- Low pressure: alarm and prevention

Note: For details on the format of the list, see the chapter on Circuit and compressor management, under Lst_Prevent_Circuit

For details, see the on-line documents on the Circuit_Prevent module

6.8 Circuit and compressor rotation

Chiller Core uses the Mod_Device_Rotation module for rotating the circuits and compressors.
This module, unlike all the others, contains several user atoms developed in C. For this reason, the pCO running the software must have 512KB of RAM available, which is normal for the pCO3 platform, but not for the pCOxs, whose code must be PCO1000CX0.
Below are some of the features of the module:

- Up to 4 circuits with a maximum of 4 compressors per circuit*; Chiller Core can manage a maximum of 4 circuits and 3 compressors per circuit.
- Up to 16 compressors in just 1 circuit*
- Up to 3 capacity steps per compressor*
- Possibility to balance the capacity between circuits
- Capacity step activation order CssCss or CCssss
- FIFO rotation
- LIFO rotation
- Rotation based on compressor operating hours
- Fixed rotation even on compressors with different capacities*
- One Compressor controlled by inverter
- Forced start-up of all the compressors in a circuit
- Forced rotation between the compressors in a circuit
- Compressor requests based on feedback on device status
- Reduction in capacity for prevention on circuit-pair of circuits or unit
- Pump-down: indicates which compressor requires pump-down when starting and/or stopping the circuit
- Double line of devices (typically used on compressor racks)*

* Chiller Core does not exploit all of the features of the module, and manages a maximum of 4 circuits with 3 compressors without capacity steps, all with the same capacity and without controlling the inverter.

Note: For details on the format of the lists see chapter 6.5

For details, see the on-line documents on the Mod_Device_Rotation module

6.9 Pump-down

Chiller Core can manage 3 types of pump-down (Ha07):
- When the circuit starts
- When the circuit stops
- When the circuit starts and stops

The Mod_Device_Rotation module indicates the circuit and compressor used for the pump down procedure, while the actual procedure itself is managed by the PumpDown_Mng macroblock.
As the pump-down procedure applies to the circuit, Chiller Core features 4 PumpDown_Mng macroblocks, that is, one for each circuit.
If any type of pump-down is enabled, when requested by Mod_Device_Rotation, PumpDown_Mng activates the circuit with the liquid solenoid valve closed and the compressor involved in pump-down running. This status continues until a low pressure value is measured by the transducer (threshold Gfc14) or the pressure switch, or for a maximum settable time (Gfc14) with a consequent alarm signal.

Note: The Mod_Device_Rotation module decides independently when pump-down is required, however needs feedback on when the procedure is completed. This information is available from Lst_Device_Available. When Mod_Device_Rotation detects switching from status 14 (compressor on for pump-down) to any other status, the pump-down request is terminated.
When pump-down is requested the circuit may already have the required low pressure conditions, therefore the procedure will not be performed. In this case, however, Mod_Device_Rotation needs to be informed that the procedure has been completed, therefore for one program cycle pump-down is signalled as being in progress, even if the compressor is stopped immediately.

Note: With the pCOxs the pump down procedure is not available, as the liquid solenoid valve is not controlled.

Note: For details see the description of State_CompX in chapter 6.5

For details, see the on-line documents on the PumpDown_Mng macroblock

6.10 Start compressor

Chiller Core only manages compressors with direct starting.
Despite this, the software includes the Comp_StartStop macroblock, which manages the following types of starting:
- Direct
- Star/delta
- Partwinding

Comp_StartStop also manages the balancing of the suction and discharge pressure before the compressor starts, so as to reduce the load on the compressor when starting. This function is not used in Chiller Core.

Note: For star/delta or partwinding starting, Comp_StartStop directly manages the digital outputs, and in fact requires information on the digital output channels involved. Make sure then that the same outputs are not written to at the same time in other parts of the application (typically on the sheet dedicated to digital outputs).

Note: Comp_StartStop does not manage the compressor alarms directly. Therefore, it needs to know whether the compressor can start or stop. In Chiller Core, this feedback comes directly from the Comp_Scroll_Piston macroblock.

For details, see the on-line documents on the Comp_StartStop macroblock

6.11 Compressor management

Chiller Core manages scroll compressors. The actual activation of the compressors is managed by the Comp_Scroll_Pistons macroblock, which in response to a request, manages the activation and deactivation of a scroll compressor, as well as the capacity steps, if configured.
Even if this function is included, Chiller Core does not manage compressors with capacity steps. The developer needs to modify the software to support these types of compressors.

Comp_Scroll_Pistons manages all the typical safety times of a scroll or piston compressor, such as:
- Minimum on time;
- Minimum off time;
- Minimum time between consecutive starts.

These can be set in the manufacturer menu on screen Hc06.

Comp_Scroll_Pistons does not manage the logic of the compressor alarms, but rather provides an input pin that receives all the alarms that shutdown the compressor. In the event of faults, Comp_Scroll_Pistons immediately stops the compressor, even if the minimum on time has not yet elapsed.

There are some in which the compressor must be forced off or operated at a specific capacity level. Comp_Scroll_Pistons has an input pin called Admitted_Max_Power that is limits compressor capacity.
In Chiller Core, as the compressor is either on or off, there are no capacity limits, but rather the compressor is forced off in the following cases:

- Compressor disabled manually (Gg02, Gg03, Gg04, Gg05)
- Transients for reversing the cycle in normal operation
- Transients for reversing the cycle when starting and ending the defrost procedure

Comp_Scroll_Pistons can be used to manage the compressor manually (Gg06, Gg07, Gg08, Gg09). During manual operation, the compressor alarms are monitored. The safety times, described previously, are ignored.

For details, see the on-line documents on the Comp_Scroll_Pistons macroblock

6.12 Control set point

Chiller Core manages units that can operate in both cooling and heating mode. Each mode uses its own control water temperature set point, settable in the Set point menu. The screen for setting the set point will displayed depending on the unit configuration, chiller, heat pump or chiller-heat pump.

If even just one time band is enabled, then 2 separate set points can be set for each operating mode. The time bands define which of the set points will be used for temperature control.

In the Temperature control menu, the minimum and maximum limits can be set for the cooling (Gfc11) and heating (Gfc12) set point. These are obviously affected by the setting of the unit of measure °C/°F.

Below are the screens available the set point menu:

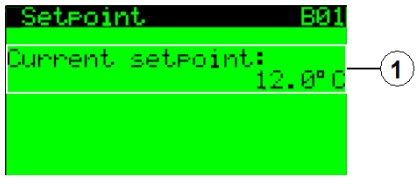


Fig. 6.13.a

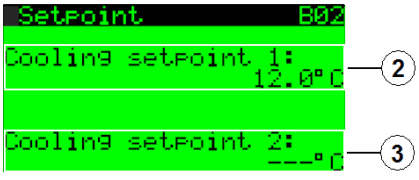


Fig. 6.13.b

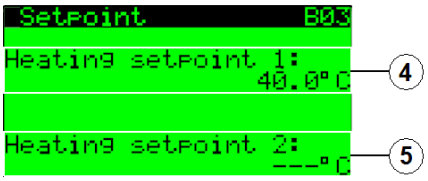


Fig. 6.13.c

1- Current set point used for temperature control. This considers the time band in progress and set point compensation. The same parameter is also displayed in the quick menu, on screen M06 (see chapter 4.1, Graphic terminal)

2- Cooling set point 1, settable by the user;

3- Cooling set point 2, settable by the user. Can only be set if at least 1 time band is enabled

4- Heating set point 1, settable by the user;

5- Heating set point 2, settable by the user. Can only be set if at least 1 time band is enabled

6.13 Set point compensation

Chiller Core manages the compensation of the control set point using the Setpoint_Compensation macroblock.

Compensation can be enabled (Ha13) only if the outside temperature sensor (Hb07) used for the compensation function is enabled.

The logical sequence of operations is as follows:

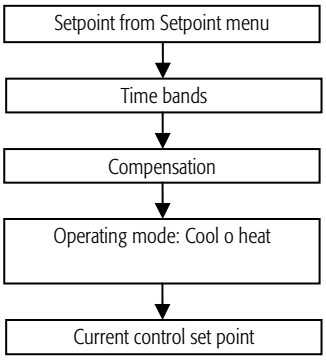


Fig. 6.14.a

The Setpoint_Compensation strategy page shows the logic applied:

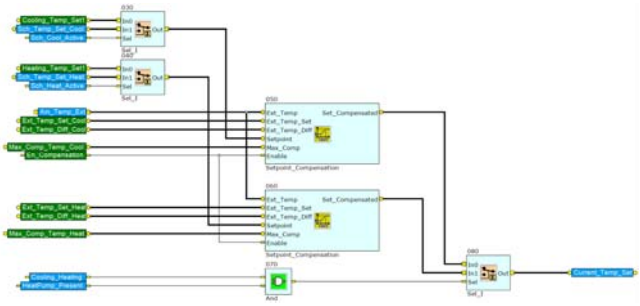


Fig. 6.14.b

The compensation configuration parameters are found in the Temperature control menu: Gfc15 for cooling, Gfc16 for heating.

For the operating logic of the compensation function and the corresponding macroblocks, see the on-line documents on Setpoint_Compensation

6.14 Unit On-Off

The unit can be switched On-Off from the On-Off menu.

The function is found on the OnOff_CoolHeat_Scheduler page and managed by the Mod_OnOff_Unit_Status module.

The logical sequence of operations is as follows:

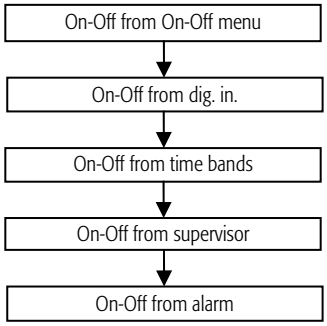


Fig. 6.15.a

Consequently alarms have the highest priority.

If the user needs to create additional unit states, the Mod_OnOff_Unit_Status module provides 3 pins, Custom_On_1/2/3, which have no effect on the actual on-off status but rather only on the unit operating status typically shown on the user interface.

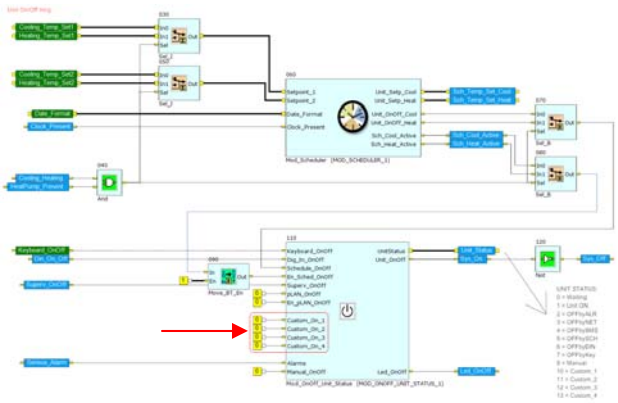


Fig. 6.15.b

The unit off status is shown on the main screen on the last 2 rows of the PGD1. Below are 2 examples:

If the unit is Off and there is no active shutdown alarm, the first screen will be:

Fig. 6.15.c

If the unit is On yet forced off by a shutdown alarm, then the screen will be:

Fig. 6.15.d

For details, see the on-line documents on the Mod_OnOff_Unit_Status macroblock

6.15 Temperature control

Two types of temperature control are featured:

Control probe	Type of control
Water inlet temperature	Proportional (P, PI, PID)
Water outlet temperature	Dead zone

Both types of control return a value between 0 and 1000, corresponding to the temperature control request to be satisfied in order to reach the control set point.
This value is sent to the Mod_Device_Rotation module, which sorts the requests and calls the activation or deactivation of the compressors in the various circuits configured.

6.15.1 Proportional

Control is managed by the Mod_Temp_Reg module.
The module processes the value of the water inlet temperature (see the table in chapter 1.3.6) and, based on the type of control selected (Gfc03 and Gfc04) proportional, proportional-integral or proportional-integral-differential (P, PI ,PID), returns one value from 0 to 1000 for heating and another for cooling, corresponding to the temperature control request to be satisfied in order to reach the control set point.

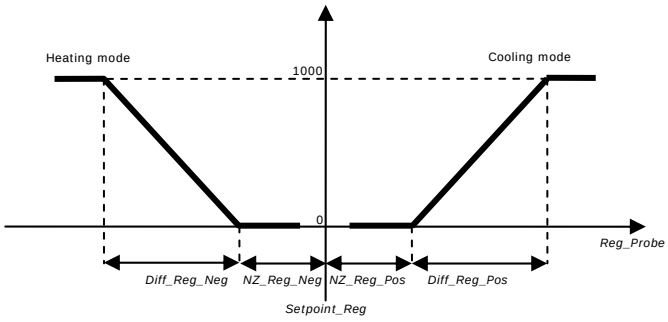


Fig. 6.16.a

An input pin is used to select the operating mode between:
1- Heating
2- Cooling
3- Automatic
In Chiller Core, automatic mode is not used.

With this type of control, when the water inlet temperature reaches the set point, all the compressors are off (in accordance with the safety times and the integral and derivative action). All the compressors will be on when reaching set point + dead zone + differential (in accordance with the alarms and safety times).

For details, see the on-line documents on the Mod_Temp_reg module

6.15.2 Dead zone

Control is performed by the Mod_Neutral_Zone_Temp module.
The module processes the value of the water outlet temperature (see table in chapter 1.3.6) and returns a value from 0 to 1000 corresponding to the temperature control request to be satisfied in order to reach the control set point.
The following figure describes the function that returns the capacity required in cooling mode:

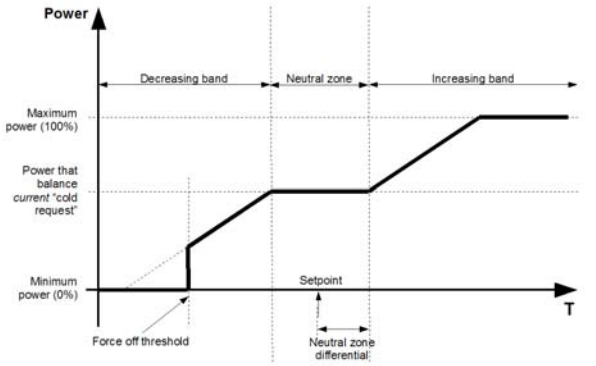


Fig. 6.16.b

And in heating mode:

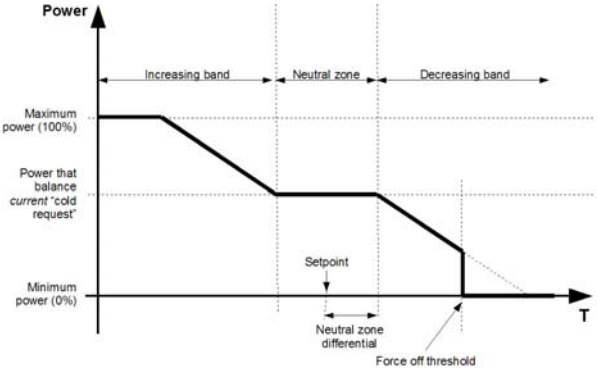


Fig. 6.16.c

The rate of increase/decrease (that is, the slope of the line) within the bands depends on a further parameter calculated by Mod_Neutral_Zone_Temp, which is the time taken to reach the maximum (100%, if increasing) or minimum (0%, if decreasing) capacity required.
The following figure shows the function that calculates this time in cooling mode:

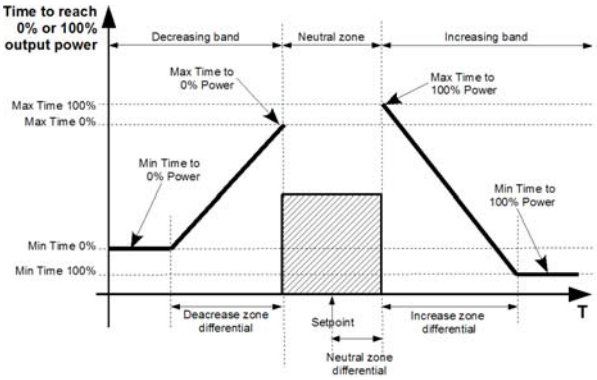


Fig. 6.16.d

And in heating mode:

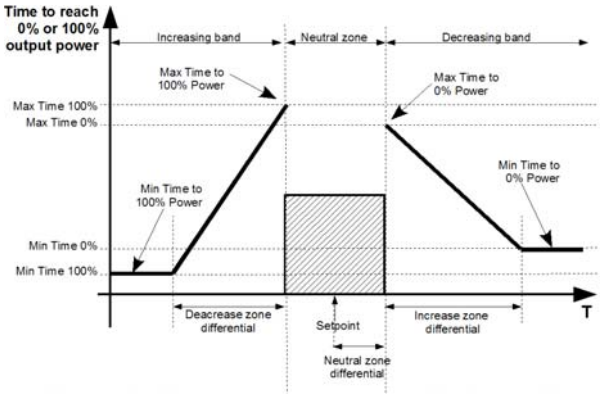


Fig. 6.16.e

In cooling mode, with dead zone control, the compressors are called to start when the water outlet temperature is higher than the dead zone set point + differential (capacity increase zone). The start request increases faster the higher the temperature, as can be seen in the diagrams above.
When the temperature is between the dead zone (neutral zone) set point +/- differential, the request remains unchanged and thus the number of compressors operating remains unvaried.
When the temperature is lower than the dead zone set point - differential (capacity decrease zone), the request descends and consequently the compressors are gradually stopped. The request decreases faster the lower the temperature, as can be seen in the diagrams above.
In heating mode, the control diagram is exactly the opposite.

For details, see the on-line documents on the Mod_Neutral_Zone_Temp module.

6.16 Evaporator pumps

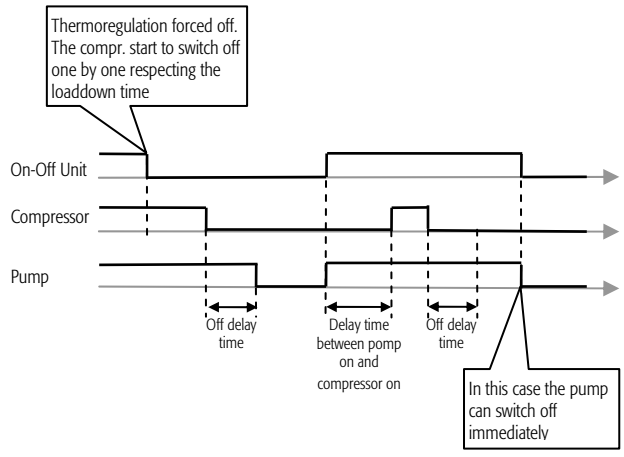
Chiller Core manages up to two evaporator pumps using the Mod_Pumps module.
These are used in both air/water and water/water units (Ha01), the only thing that changes is the start/stop request.

The evaporator pump starts when the unit starts. The exception is for water/water units with reversible water circuit when the unit is operating in heat pump mode, and the pump is on the condenser side. In this case, the settings for the condenser pump on screen Gfc20 are used:

- Always on with unit on
- On if at least one compressor is on.

A delay can be set (Gfc17) from when the pump starts before enabling temperature control.

In addition, a time can be set (Gfc17) that the pump operates for after the last compressor stops (see the note at the end of the paragraph). If when the unit is shutdown the compressors have all been off for at least the pump off delay time, then the pump stops immediately.



Below is a diagram that represents operation with just one pump configured:

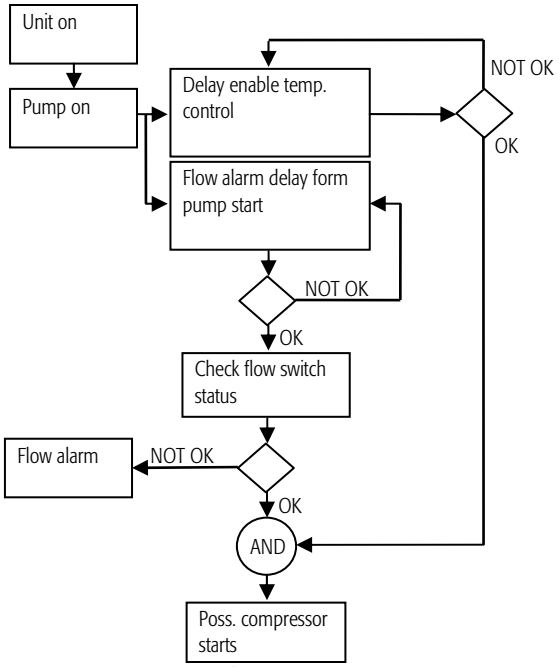


Fig. 6.17.a

It should be noted that temperature control is not enabled until stable flow conditions are measured after the flow alarm delay at pump start. This guarantees that no compressors start until there is flow.

Up to two evaporator pumps can be enabled (Ha08). Mod_Pumps includes the following functions:

- With two pumps, manual or automatic changeover between the pumps to equally divide the workload and operating hours on each pump. Automatic changeover occurs:
  1) When a certain time period elapses (Gfc19).
  2) With pump overload or no flow on one of the two pumps.
- Management of pump overload. Fault signal and immediate shutdown of the pump. Management of changeover when a second pump is installed
- Management of the flow switch that monitors the circulation of fluid in the system. Management of changeover when a second pump is installed.
- Attempts to recover flow: the maximum number of attempts can be set (Ha08) to recover water flow.
- Management of anti-blocking, with occasional activation of the pump when the system is off for long periods (Ha09)
- Management of antifreeze with activation of the pump to circulate the fluid

If a number of attempts is set to recover flow, and only one pump is configured, when no flow is measured the pump is stopped and the warning signal is activated. The pump will automatically start again after 90 seconds (constant, connected to pin in the module), and if flow is measured after the delay from start-up the warning is automatically cancelled and the pump continues operating, otherwise the number of warnings is increased on the screen and the procedure starts again, until reaching the maximum number of attempts, when the alarm is signalled.
If on the other hand 2 pumps are configured, the pumps are activated alternately until the maximum number of attempts is reached for each pump.

Note: Irrespective of the shutdown delay set, if there at least one compressor is running, the pump is always on. Only after the last compressor stops can the pump can be shut down, after the shutdown delay.

For details, see the on-line documents on the Mod_Pumps module.

6.17 Condenser pumps

Chiller Core manages up to two condenser pumps using the Mod_Pumps module, in the same way as for the evaporator pumps.
These are only used on water/water units (Ha01).

Irrespective of the type of condenser (individual or separate), there is always just one group of condenser pumps, which may feature one or two pumps.

The pumps can be set (Gfc20) to start:
- Always with unit on
- If at least one compressor is on.

The exception is for units with reversible water circuit when the unit is operating in heat pump mode, and the pump is on the evaporator side and therefore must always be operating when the unit is on.

A delay can be set to shut down the pump after the last compressor stops.

Chiller Core does not manage the for the condenser pump overload.

Mod_Pumps features the following functions:
- With two pumps, manual or automatic changeover between the pumps to equally divide the workload and operating hours on each pump. Automatic changeover occurs:
  1) When a certain time period elapses ((Gfc22).
  2) With no flow on one of the two pumps.
- Management of the flow switch that monitors the circulation of fluid in the system. Management of changeover when a second pump is installed.
- Attempts to recover flow: the maximum number of attempts can be set (Ha10) to recover water flow.
- Management of anti-blocking, with occasional activation of the pump when the system is off for long periods (Ha11)
- Management of the condenser antifreeze with activation of the pump to circulate the fluid

If a number of attempts is set to recover flow, and only one pump is configured, when no flow is measured the pump is stopped and the warning signal is activated. The pump will automatically start again after 90 seconds (constant, connected to pin in the module), and if flow is measured after the delay from start-up the warning is automatically cancelled and the pump continues operating, otherwise the number of warnings is increased on the screen and the procedure starts again, until reaching the maximum number of attempts, when the alarm is signalled.
If on the other hand 2 pumps are configured, the pumps are activated alternately until the maximum number of attempts is reached for each pump.

For details, see the on-line documents on the Mod_Pumps module.

6.18 Condenser fans

Condenser control can be set as individual or separate in the manufacturer menu (Ha04). Below is a table that summarises the probes used to control the fans in each unit configuration:

Circuits	Type of cond.	Fan control probes	
		Chiller	Heat pump
1	Individual	HP circ. 1	LP circ. 1
2	Individual	The higher HP between circ. 1 and circ. 2	The lower LP between circ. 1 and circ. 2
2	Separate	Fan 1: HP circ. 1 Fan 2: HP circ. 2	Fan 1: LP circ. 1 Fan 2: LP circ. 2
3	Individual	The higher HP between circ. 1, circ. 2, circ. 3	The lower LP between circ. 1, circ. 2, circ. 3
4	Individual	The higher HP between circ. 1, circ. 2, circ. 3, circ. 4	The lower LP between circ. 1, circ. 2, circ. 3, circ. 4
4	Separate	Fan 1: The higher HP between circ. 1 and circ. 2 Fan 2: The higher HP between circ. 3 and circ. 4	Fan 1: The lower LP between circ. 1 and circ. 2 Fan 2: The lower LP between circ. 3 and circ. 4

Example:
2 circuits and individual condenser control

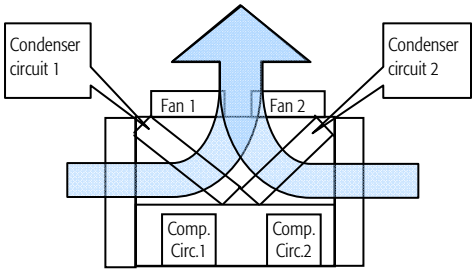


Fig. 6.19.a

2 circuits and separate condenser control

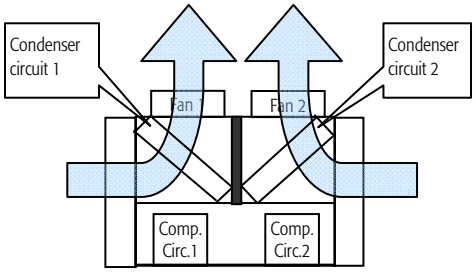


Fig. 6.19.b

The groups of fan are controlled using 2 Condenser_Fan macroblocks. The first of the two is used two in the case of individual condenser control, and both in the case of separate control.
Irrespective of the unit configuration and the type of condenser control, fan management is always performed by the master board.

6.18.1 Fan management

As mentioned, the groups of fan are controlled using 2 Condenser_Fan macroblocks.

The minimum and maximum speed of the fan groups can be set on screen Gfc26.

Control depends on whether the unit is operating in cooling or heating mode.

Cooling mode:
Control is modulating and is performed on the high pressure value. In the service menu (Gfc23), the control set point and differential can be set in barg, associated with the corresponding temperature value:

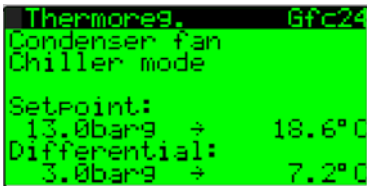


Fig. 6.19.c

The control diagram is shown below:

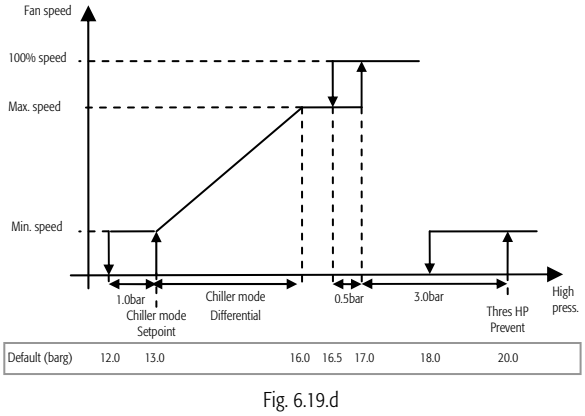


Fig. 6.19.d

In the graph some of the offsets are expressed with a numeric value, indicating that they cannot be modified on the display, but rather set with constants in the strategy.
The graph shows the fan activated at 100% with a fixed offset of 3.0barg in relation to the high pressure prevention threshold. If the high pressure prevention function is disabled, then the offset refers to the high pressure alarm threshold (Gfc33 default 23.0barg).

Heating mode:
Control is modulating and is performed on the low pressure value. In the service menu (Gfc24), the control set point and differential can be set in barg, associated with the corresponding temperature value:

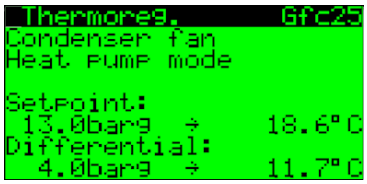


Fig. 6.19.e

The control diagram is shown below:

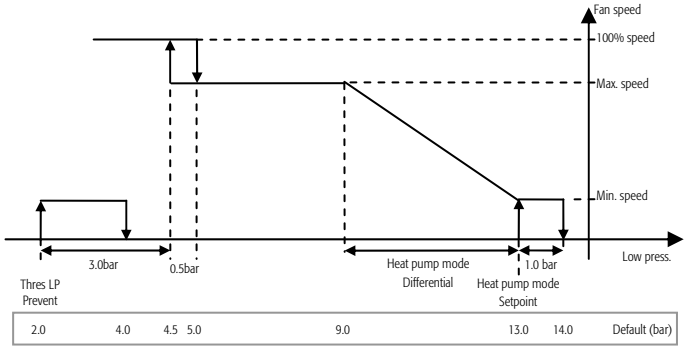


Fig. 6.19.f

In the graph some of the offsets are expressed with a numeric value, indicating that they cannot be modified on the display, but rather set with constants in the strategy.
The graph shows the fan activated at 100% with a fixed offset of 3.0barg in relation to the low pressure prevention threshold. If the prevention of low pressure was disabled, then the offset refers to the low pressure alarm threshold (Gfc30 default 1.5barg).

6.18.2 Speed-up and force fans on when circuit starts

Whenever the group of fans is started, the fans are activated with the maximum output set for a certain time, so as to overcome the initial inertia and decrease the peak time. The macroblock provides a pin for setting the speed-up time, in Chiller Core this is done in the service menu, screen Gfc25 (point 1 Fig. 6.19.g). If equal to zero, speed-up is not performed.
In addition, the fans can be activated at the maximum output set when the first compressor in the circuit starts yet with control pressure would not be sufficient alone to justify the fan being activated. The time can be set in the service menu on screen Gfc25 (point 2 Fig. 6.19.g). If equal to zero, the function is disabled.

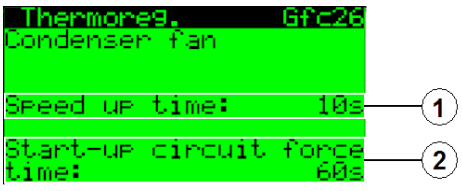


Fig. 6.19.g

For details, see the on-line documents on the Condenser_Fan macroblock

6.19 Defrost

During heat pump operation on air/water units, the outside coil works as an evaporator. If the outside temperature is low, ice may form the coil same, consequently reducing the efficiency of the unit. In this case, the defrost function should be activated.
Activation of the defrost depends on the value read by the reference probe (pressure transducer, low pressure side) and a delay set (Gfc28) from when the activation threshold (Gfc27) is exceeded, as shown in the following figure:

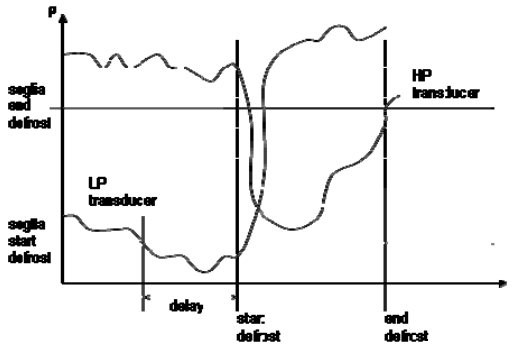


Fig. 6.20.a

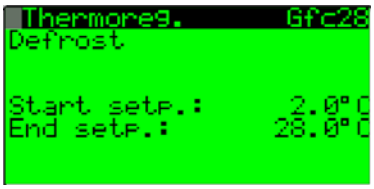


Fig. 6.20.b

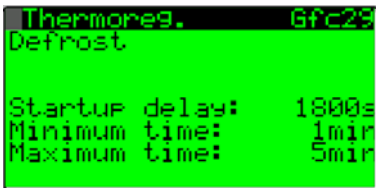


Fig. 6.20.c

The defrost ends when the reference probe (pressure transducer, high pressure side) value exceeds the end defrost threshold (Gfc27) ; in any case, the defrost must last a minimum time.

If the high pressure value exceeds the end defrost threshold before the minimum time has elapsed, then the condenser fans are enabled and start operating in chiller mode so as to prevent the unit from shutting down due to high pressure.

In the event of simultaneous defrosts on different circuits, one circuit may reach the end defrost threshold before the other circuits, in which case the compressors in that circuit are stopped and the 4-way valves are maintained in the chiller position, until all the circuits reach the end defrost threshold. When the last circuit has reached the end defrost threshold, then the dripping procedure starts, with the active compressors remaining on (those that are off remain off) and the condenser fans operating at 100%.

Alternatively, a fixed defrost duration can be set; in this case, just one reference probe is required, to determine the activation of the function:

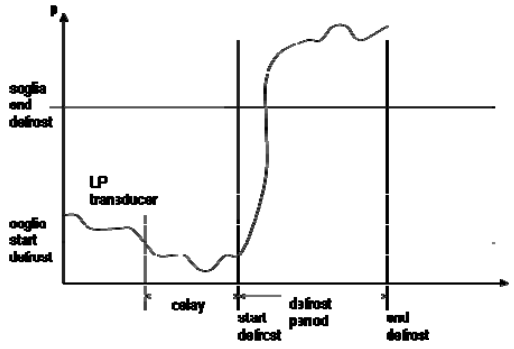


Fig. 6.20.d

The defrost function involves the reversing of the circuit operating cycle. During defrost, the condenser fans are forced OFF to assist defrosting, except for the case described previously.

The "dripping" function can also be set, which involves operating the fans at 100% for a certain time (Gfc29) after the end of the defrost. If the dripping time is zero, then this phase is not performed.

A time can be set (Gfc29) to reverse the cycle at the start and end of the defrost procedure. If the time is set to zero, then the cycle is reversed "on the go", with the compressors on. If the time is greater than zero, then the compressors are switched off for the set time and the cycle is reversed half way through the time.

A minimum time can be set (Gfc29) between the end of one defrost and the start of the next.

The following figure shows how the various components in circuit and the defrost phases are managed:

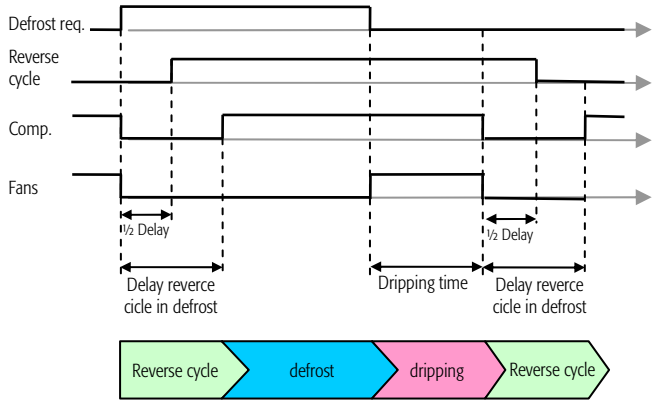


Fig. 6.20.e

Fig. 6.20.f

If there are multiple condensing circuits, the following defrost modes are managed (Ha12):

- Individual defrost: if one circuit requires defrosting, the entire unit goes into defrost mode. The circuits that do not require defrosting reverse the cycle yet the compressors remain off.
- Separate defrost: the first circuit that requires defrosting goes into defrost mode. The other circuits remain in heat pump mode and cannot call a defrost until the defrost in progress ends.

Note: during defrost, the compressor safety times are ignored. Likewise, the pump-down function settings are also ignored.

6.20 Clock and time bands

pCO^3 is fitted with an internal clock with backup battery that stores the time and date for all the associated functions.

pCOxs features an optional clock card. If the clock card is fitted (see the codes in chapter 2.1), the clock needs to be enabled from the manufacturer menu. Only if the clock is enabled can the date and time be displayed on the main screen, the time bands managed, the calendar programmed and the date and time recorded in the alarm log.

If the clock, both inside the pCO3 and the optional card enabled, malfunctions, an alarm is generated. The alarm appears even if the pCOxs has the clock enabled but the card is not fitted:

Fig. 6.21.a

Chiller Core does not use the clock memory, P memory, but rather an alarm is activated if there are problems reading/writing the parameters:

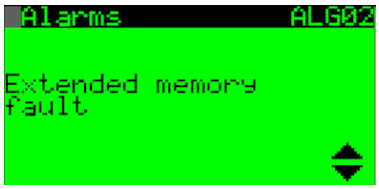


Fig. 6.21.b

The time, date, time bands, closing periods and holidays are set from the main C. Time bands menu. The following screens are displayed in sequence:

- Time and date setting
- Four daily time bands
- Special periods, up to a max. of three
- Holidays/special dates, up to a max. of six

The time bands and calendar are programmed using the Mod_Scheduler module (see corresponding documents).
The following figure details the function:

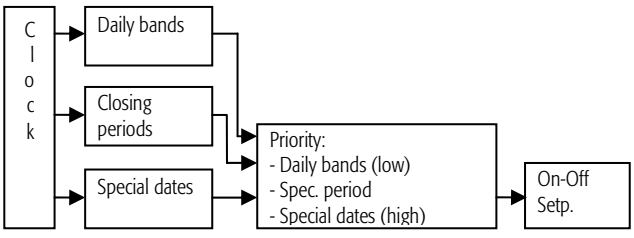


Fig. 6.21.c

For each daily time band, special period, special date, the set point or unit off time can be set:

Cooling	Heating
Off	Off
Cooling set 1	Heating set 1
Cooling set 2	Heating set 2

Off: The unit is switched off
Set 1: the unit is on and the temperature control uses set point 1
Set 2: th the unit is on and the temperature control uses set point 2. Set point 1 and Set point 2 are set in the B. Setpoint menu. The setting screens are:

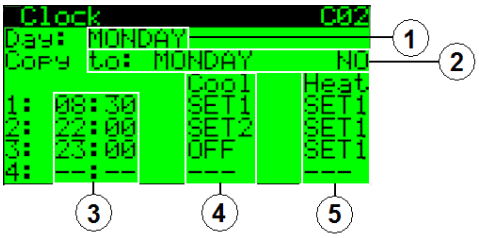


Fig. 6.21.d

10- Day. If "---" then the daily time bands are disabled
11- The settings for the current day can be copied to another day
12- Time band start time. The band ends when the following band starts.

Example:
Band 1 starts at 8:30 and ends at 22:00
Band 2 starts at 22:00 and ends at 23:00
Band 3 starts at 23:00 and ends at 8:30
The software activates the bands in increasing order.
If "---"the band is disabled

13- Settings used when the unit is in cooling mode
14- Settings used when the unit is in heating mode

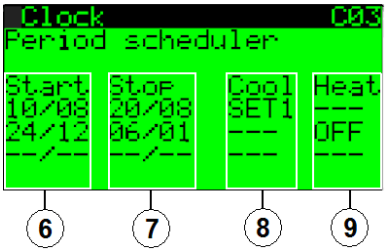


Fig. 6.21.e

15- Special period start date
16- Special period end date
17- Settings used when the unit is in cooling mode
18- Settings used when the unit is in heating mode

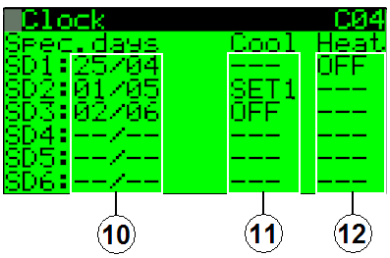


Fig. 6.21.f

19- Special day
20- Settings used when the unit is in cooling mode
21- Settings used when the unit is in heating mode

Priority:
The daily time bands have the lowest priority, while the special periods have medium priority and the special days have highest priority.
Example:
- Heating mode
- Daily time band: from 8:30 to 22:00 → SET1
- Special period: from 24/12 to 06/01 → OFF
- Special day: 02/01 → SET1

In this case, from 24/12 to 06/01 the time bands will be ignored and the unit will be off due to the special period setting, except for on the special day 02/01 when the unit will switch on and use set point 1

For details, see the on-line documents on the Mod_Scheduler module.

6.21 Date format setting

Three different types of date format can be set (Hc02):
1- Day/Month/year: dd/mm/yy
2- Month/Day/year: mm/dd/yy
3- Year/Month/Day: yy/mm/dd

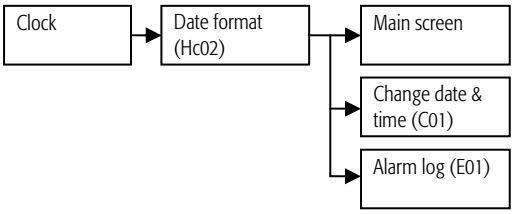


Fig. 6.22.a

6.22 Cooling/heating

Chiller Core manages chiller and chiller-heat pump units; pCOxs cannot manage the reversing valve, and consequently on chiller or heat pump units can be controlled.
The diagram below provides an overview of the types of operation managed:

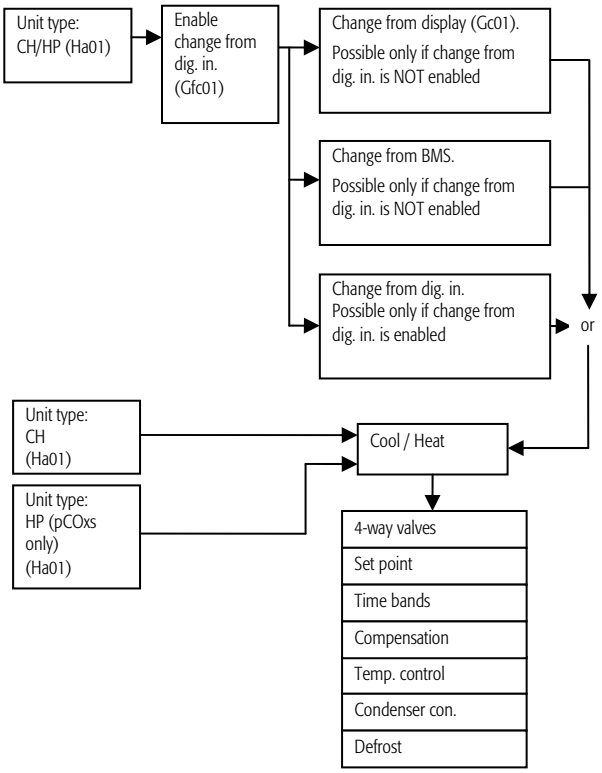


Fig. 6.23.a

Below is the procedure applied when changing mode:
1- Request change mode
2- All compressors immediately shutdown. The unit remains on.
3- Wait "Cool/heat change delay" (Gfc01)
4- Reverse 4-way valve
5- Change set point, temperature control, bands etc.
6- Wait "Cool/heat change delay" (Gfc01)
7- Compressors re-enabled

6.23 Modifying the Carel defaults

The default values are assigned to the variables using a function available on the HW_SW_Check and Default page.

When the default procedure is activated, the pCO* buffer memory is completely cancelled and then the default value are assigned to the parameters.

At the end of the default installation procedure, the "Initialisation completed Switch unit off to confirm data" screen is displayed. The user can only switch the pCO* off and on again to ensure the variables are loaded into X memory.

6.23.1 How to add a default

To manage the default parameters, the following functions are used:

- Move_IT_En_10: for integer or analogue variables;
- Move_BT_En_10: for digital variables.

To assign the default values, the variables need to be connected to the pins on the Move_IT_En_10 or Move_BT_En_10 macroblock. If necessary, add other macroblocks, making sure they are inside the "VK_Default" Jump.
Below is an extract of the code:

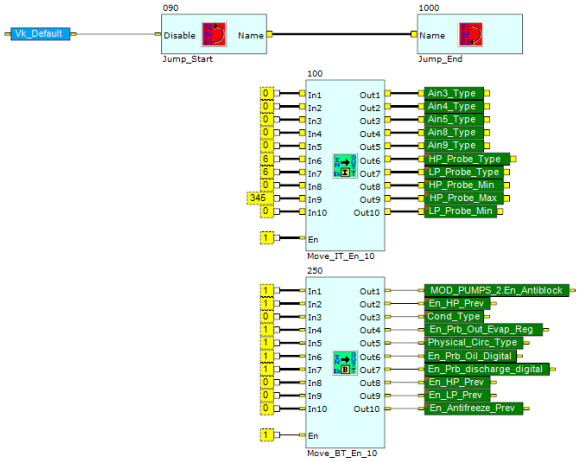


Fig. 6.24.a

For analogue parameters that are dependent on unit of measure, two defaults need to be entered. For further details, see the chapter on "Changing the unit of measure".

6.23.2 How to change the default values

To modify the default values, simply change the value of the constant connected to Move_IT_En_10 and Move_BT_En_10. For analogue parameters with two units of measure, both default values need to be changed.

6.23.3 How to install the default values

There are three different ways to install the Carel default values on the pCO*:

1. From the manufacturer menu: in screen He02 the user can set the default values and cancel the memory;
2. When first installing the application on the pCO*;
3. When updating the version of the application;

6.24 Changing the unit of measure

The temperature and pressure units of measure can be changed:
Temperature: °C ←→ °F.
Pressure: barg ←→ psig

When changing unit of measure, the temperature and pressure settings are restored to the default values. This means that there are two default values for all the temperature and pressure parameters.
The parameters not affected by the change in unit of measure, such as the number of circuits, number of compressors etc. keep their value.

The unit of measure can be changed in the manufacturer menu → Manufacturer parameters, screen Hc03.
When the unit of measure is being changed, a screen is displayed to warn the user that all the customised temperature and pressure settings will be overwritten:

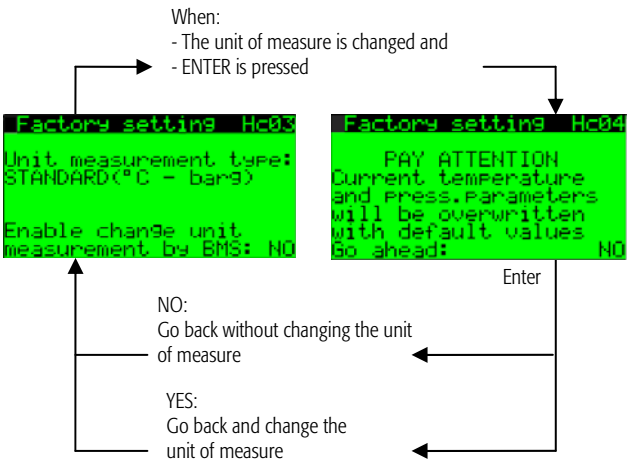


Fig. 6.25.a

The unit of measure can only be changed when the unit is off. If the unit is on, when pressing ENTER on the screen, the last row shows the message " >>Turn unit off<<".

At the end of the conversion of the unit of measure, the "Initialisation completed Switch unit off to confirm data" screen is displayed, in the same way as for the installation of the default values. The user can then only switch the pCO* off and on again.

The unit of measure can be changed from the supervisor. As the operation requires special care, given that it returns the pressure and temperature parameters to the default values, it must be accessed from the manufacturer menu (Hc03).
Therefore, the parameter for setting the unit of measure from the supervisor changes from read-only (R) to read/write (RW) as follows:
Change_UM_by_BMS: 0 → read-only;
Change_UM_by_BMS: 1 → read/write.

6.24.1 How to add new variables affected by the change in the unit of measure

Probe readings from analogue inputs:
To convert the temperatures, the CEL_FAHR macroblock is used, where "Unit_Meas_Type" pin is connected to the "Unit_Meas_Type" variable (see Figure).

To convert the pressure, simply change the minimum and maximum probe limits, managed as input pins on the Ain_Mng macroblock. The limits are converted using the defaults, as explained above.
Nonetheless, for uniformity with the other analogue inputs, the BAR_PSI macroblock is provided, where the "Unit_Meas_Type" pin is connected to the constant 0, thus making it transparent.

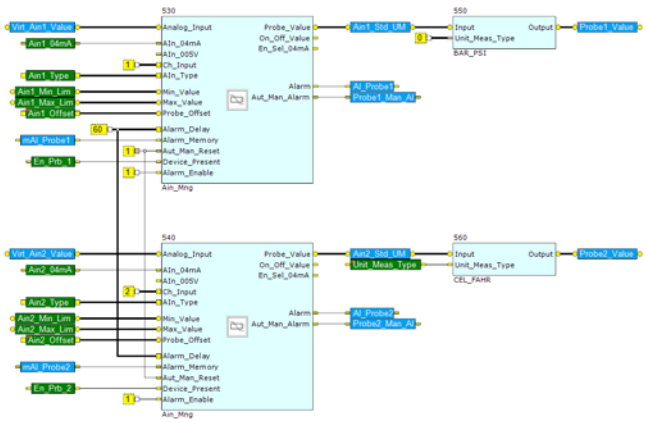


Fig. 6.25.b

Parameters:
For each parameter added, the two defaults on the "Unit_Measurement_Mng" strategy page need to be managed, one for the international units of measure and the other for Imperial.
The new parameters and the corresponding defaults are appended to the current ones. When necessary, add other Move_IT_En_10 macroblocks, making sure they are inside the corresponding Jump.
Below is an extract of the code:

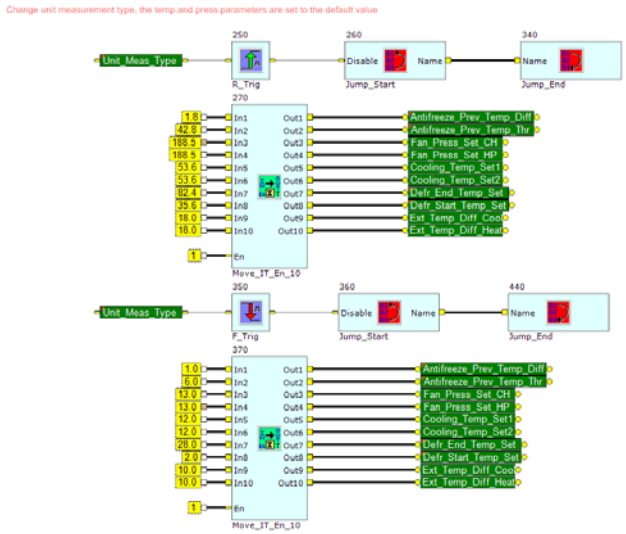


Fig. 6.25.c

6.25 Modifying the user defaults

The user can customise the unit configuration, safe the configuration (He03) and then use it again when required (Gfd03).
For each configuration saved, the date is recorded as a reference.
The defaults can only be restored when they have previously been saved, otherwise the restore screen is disabled (Gfd03).

After restoring the user defaults, is displayed the "Initialisation completed Switch unit off to confirm data" screen is displayed, in the same way as for the installation of the default values. The user can then only switch the pCO* off and on again.

6.25.1 How to add new variables to the user defaults

The following modules/macroblocks are used to manage the user defaults:

- Mod_M_Store_Dev: Module only used once.
  This manages the request to save and restore the default values. The module features the screens used to save the defaults (manufacturer menu):

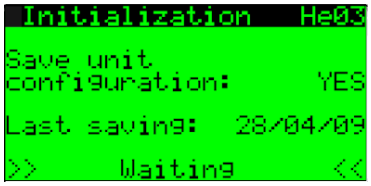


Fig. 6.26.a

and then restore them (service menu):

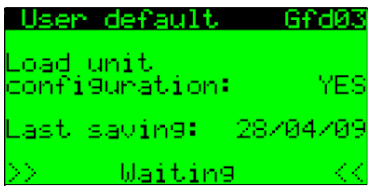


Fig. 6.26.b

- Mod_S_Store_Dev_W: saves the values of the integer and analogue variables.
- Mod_S_Store_Dev_B: saves the values of the digital variables.

To add new variables, these must be connected to the pins in the Mod_S_Store_Dev_W or Mod_S_Store_Dev_B module. Add other macroblocks is necessary. The "Store" and "Restore" pins are automatically connected to the Mod_M_Store_Dev module. Below is an extract of the code:

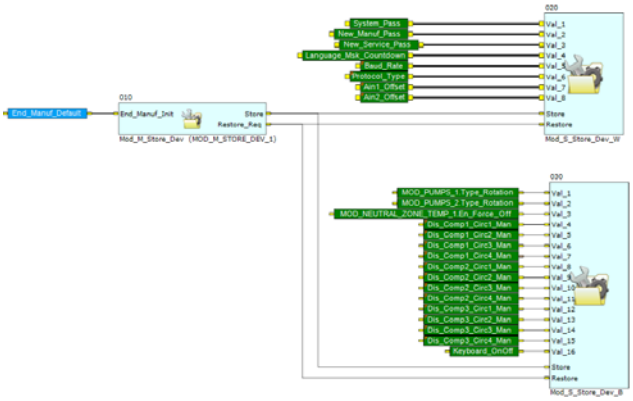


Fig. 6.26.c

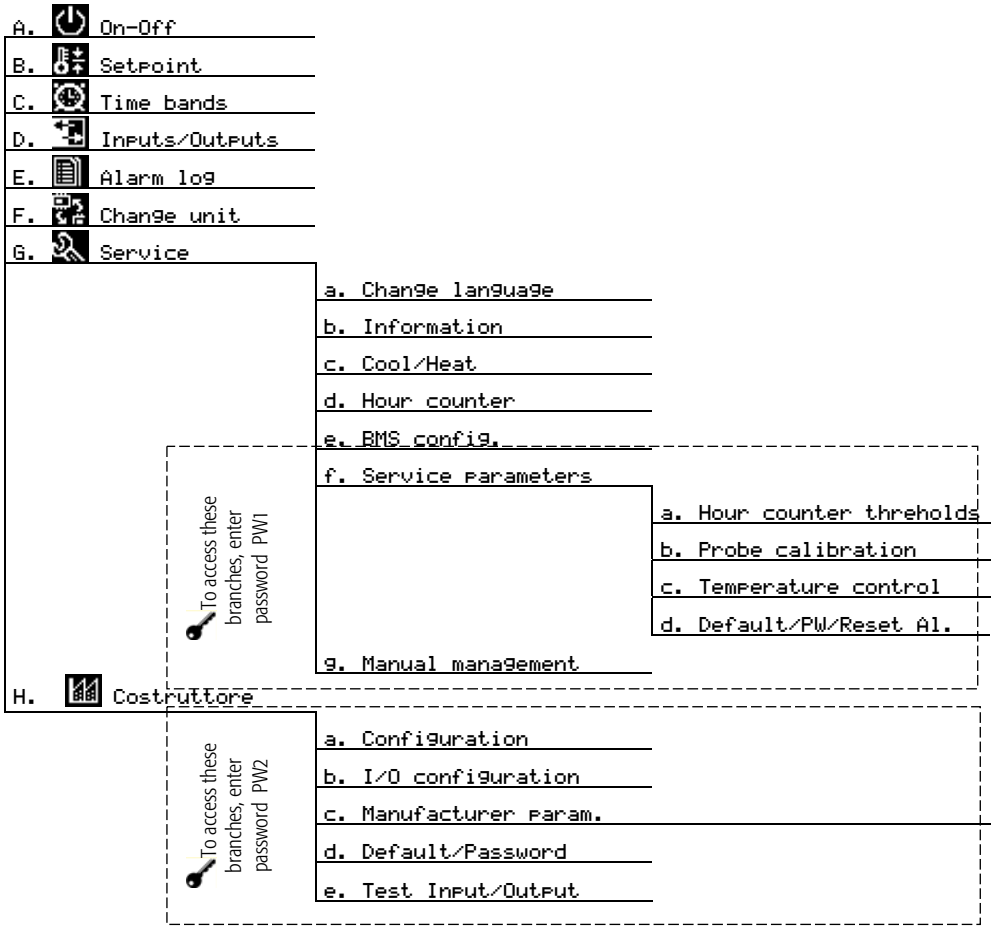
6.26 Manual device management

The devices can be controlled manually by the user, from the Service menu → Manual management.
Below are the features of manual device operation:

Device	Remarks
Compressor X Circuit X	Safety times bypassed; all compressor alarms are observed
Liquid solenoid circuit X	-
Evaporator pump 1 - 2	The flow alarm is disabled; Pump thermal overload alarm active.
Condenser pump 1 - 2	The flow alarm is disabled; Pump thermal overload alarm active.
4-way valve circuit X	-
Condenser fans 1 – 2	Speed-up is disabled
Antifreeze heater	-

Manual mode can only be activated when the unit is off. If the unit is on, when pressing ENTER on the screen, the last row shows the message " >>Turn unit off<<".
If the unit is switched on during manual mode, all the devices return to normal operation

7. TABLE OF PARAMETERS



"Mask index": indicates the unique the address of each screen, and consequently the settable parameters available on the screen; for example, with reference to the tree of functions shown above, to reach the parameter with screen index (Mask index) `Gfc05`, proceed as follows:

Main menu → `G.` Service → `f.` Service paramters (after having entered the corresponding password PW1) → `c. Temperature control` and scroll the screens to number 5 (`05`).

Below is the table of parameters that can be displayed on the terminal.

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
On-Off Unit										
A01	Unit address:	Address of the controller in a pLAN network	0	---	0	31	---	I	---	---
	Actual state:	Unit status	0	---	0	9	0: ---	I	---	---
							1: Unit On			
							2: OFFbyALR			
							3: OFFbyNET			
							4: OFFbyBMS			
							5: OFFbySCH			
							6: OFFbyDIN			
							7: OFFbyKEY			
							8: ---			
							9: OFF_CST1			
							10: OFF_CST2			
							11: OFF_CST3			
							12: OFF_CST4			
	Change to:	Temporary variable for manage the OnOff unit status	0	---	0	1	0: SWITCH OFF	I	---	---
							1: SWITCH ON			
Setpoint										
B01	Current setpoint:	Current setpoint	---	°C / °F	-999,9	999,9	---	A	R	33
B02	Cooling setpoint 1:	Cooling temperature setpoint1	12	°C	Gfc11	Gfc11	---	A	R/W	29
			53	°F	Gfc11	Gfc11	---			
	Cooling setpoint 2:	Cooling temperature setpoint2	12	°C	Gfc11	Gfc11	---	A	R/W	30
			53	°F	Gfc11	Gfc11	---			

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
B03	Heating setpoint 1:	Heating temperature setpoint1	40	°C	Gfc12	Gfc12	---	A	R/W	31
			104	°F	Gfc12	Gfc12	---			
	Heating setpoint 2:	Heating temperature setpoint2	40	°C	Gfc12	Gfc12	---	A	R/W	32
			104	°F	Gfc12	Gfc12	---	---		
Clock/Scheduler										
C01	Day:	Week day calculation based on current date	0	---	0	7	0: ***	I	---	---
							1: Monday			
							2: Tuesday			
							3: Wednesday			
							4: Thursday			
							5: Friday			
							6: Saturday			
							7: Sunday			
		Date format	1	---	0	2	0: ---	I	14	R/W
							1: dd/mm/yy			
							2: mm/dd/yy			
							3: yy.mm.dd			
	Date:	New day	---	day	1	31	---	I		
		New month	---	month	1	12	---	I		
		New year	---	year	0	99	---	I		
	Hour:	New hour	---	h	0	23	---	I		
		New minute	---	m	0	59	---	I		
C02	Day:	Scheduler settings	0	---	0	7	0: MONDAY	I	---	---
							1: TUESDAY			
							2: WEDNESDAY			
							3: THURSDAY			
							4: FRIDAY			
							5: SATURDAY			
							6: SUNDAY			
							7: ---			
	Copy to:	Day target for the scheduler copy	0	---	0	7	0: MONDAY	I	---	---
							1: TUESDAY			
							2: WEDNESDAY			
							3: THURSDAY			
							4: FRIDAY			
							5: SATURDAY			
							6: SUNDAY			
							7: ALL			
		Start copy procedure	0	---	0	1	0: NO	I	---	---
							1: YES			
	1:	F1 Start hour	0	---	0	24	0 - 23	I	---	---
		F1 Start minute	0	---	0	59	0 - 59	I	---	---
		F1 Set Cool type	0	---	0	3	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
		F1 Set Heat Type	0	---	0	3	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
	2:	F2 Start hour	0	---	0	24	0 - 23	I	---	---
		F2 Start minute	0	---	0	59	0 - 59	I	---	---
		F2 Set Cool type	0	---	0	3	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
		F2 Set Heat Type	0	---	0	3	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
	3:	F3 Start Hour	0	---	0	24	0 - 23	I	---	---
		F3 Start minute	0	---	0	59	0 - 59	I	---	---
		F3 Set Cool type	0	---	0	3	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
		F3 Set Heat Type	0	---	0	3	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
	4:	F4 Start hour	0	---	0	24	0 - 23	I	---	---
		F4 Start minute	0	---	0	59	0 - 59	I	---	---
		F4 Set Cool Type	0	---	0	3	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
		F4 Set Heat Type	0	---	0	3	0: ---	I	---	---
							1: OFF			
							2: SET1			

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
							3: SET2			
C03	Period scheduler Start Stop Cool Heat	Period 1 start day	0	---	0	31	---	I	---	---
		Period 1 start month	0	---	0	12	---	I	---	---
		Period 1 stop day	0	---	0	31	---		---	---
		Period 1 stop month	0	---	0	12	---		---	---
		Period 1 cool set type	0	---	0	3	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
		Period 1 heat set type	0	---	0	3	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
		Period 2 start day	0	---	0	31	---	I	---	---
		Period 2 start month	0	---	0	12	---	I	---	---
		Period 2 stop day	0	---	0	31	---		---	---
		Period 2 stop month	0	---	0	12	---		---	---
		Period 2 cool set type	0	---	0	3	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
		Period 2 heat set type	0	---	0	3	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
		Period 3 start day	0	---	0	31	---	I	---	---
		Period 3 start month	0	---	0	12	---	I	---	---
		Period 3 stop day	0	---	0	31	---		---	---
		Period 3 stop month	0	---	0	12	---		---	---
		Period 3 cool set type	0	---	0	3	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
		Period 3 heat set type	0	---	0	3	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
C04	Spec.days Cool Heat SD1:	Special day 1 day	0	---	0	31	0 - 31	I	---	---
		Special day 1 month	0	---	0	12	0 - 12	I	---	---
		Special day 1 cool type	0	---	0	5	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
		Special day 1 heat type	0	---	0	3	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
	SD2:	Special day 2 day	0	---	0	31	0 - 31	I	---	---
		Special day 2 month	0	---	0	12	0 - 12	I	---	---
		Special day 2 cool type	0	---	0	5	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
		Special day 2 heat type	0	---	0	3	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
	SD3:	Special day 3 day	0	---	0	31	0 - 31	I	---	---
		Special day 3 month	0	---	0	12	0 - 12	I	---	---
		Special day 3 cool type	0	---	0	5	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
		Special day 3 heat type	0	---	0	3	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
	SD4:	Special day 4 day	0	---	0	31	0 - 31	I	---	---
		Special day 4 month	0	---	0	12	0 - 12	I	---	---
		Special day 4 cool type	0	---	0	5	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
		Special day 4 heat type	0	---	0	3	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
	SD5:	Special day 5 day	0	---	0	31	0 - 31	I	---	---
		Special day 5 month	0	---	0	12	0 - 12	I	---	---
		Special day 5 cool type	0	---	0	5	0: ---	I	---	---

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
							1: OFF			
							2: SET1			
							3: SET2			
		Special day 5 heat type	0	---	0	3	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
	SD6:	Special day 6 day	0	---	0	31	0 - 31	I	---	---
		Special day 6 month	0	---	0	12	0 - 12	I	---	---
		Special day 6 cool type	0	---	0	5	0: ---	I	---	---
							1: OFF			
							2: SET1			
							3: SET2			
		Special day 6 heat type	0	---	0	3	0: ---	I	---	---
			---	---	---	---	1: OFF	---		
			---	---	---	---	2: SET1	---		
			---	---	---	---	3: SET2	---		
Input/Output										
D01	Master analog input B1= High press.circ.1:	High pressure circuit 1	---	barg /psig	-999,9	999,9	---	A	R	1
		High pressure circuit 1 converted to temperature	---	°C/°F	-999,9	999,9	---	A	R	2
	B2= Low press.circ.1:	Low pressure circuit 1	---	barg /psig	-999,9	999,9	---	A	R	9
		Low pressure circuit 1 converted to temperature	---	°C/°F	-999,9	999,9	---	A	R	10
D02	Master analog input B1= High press.circ.1:	High pressure circuit 1	---	barg /psig	-999,9	999,9	---	A	R	1
		High pressure circuit 1 converted to temperature	---	°C/°F	-999,9	999,9	---	A	R	2
	B2= External temp.:	External temperature	---	°C/°F	-999,9	999,9	---	A	R	28
D03	Master analog input B3= Outlet water evap. temp.:	Outlet water evaporator temperature	---	°C/°F	-999,9	999,9	---	A	R	18
	B4= Inlet water evap. temp.:	Inlet water evaporator temperature	---	°C/°F	-999,9	999,9	---	A	R	17
D04	Master analog input B3= Evaporator water temp.:	Evaporator water temperature	---	°C/°F	-999,9	999,9	---	A	R	18
	B4= Out.cond.2 temp.:	Outlet water condenser 2 temperature	---	°C/°F	-999,9	999,9	---	A	R	24
D05	Master analog input B5= Out.evap.1 temp.:	Outlet water evaporator 1 temperature	---	°C/°F	-999,9	999,9	---	A	R	19
D06	Master analog input B5= Inlet cond.reg. temp.	Inlet water condenser temperature	---	°C/°F	-999,9	999,9	---	A	R	27
D07	Master analog input B5= Out.cond.1 temp.:	Outlet water condenser 1 temperature	---	°C/°F	-999,9	999,9	---	A	R	23
D08	Master analog input B6= High press.circ.2:	High pressure circuit 2	---	barg /psig	-999,9	999,9	---	A	R	3
		High pressure circuit 2 converted to temperature	---	°C/°F	-999,9	999,9	---	A	R	4
	B7= Low press.circ.2:	Low pressure circuit 2	---	barg /psig	-999,9	999,9	---	A	R	11
		Low pressure circuit 2 converted to temperature	---	°C/°F	-999,9	999,9	---	A	R	12
D09	Master analog input B8= Out.evap.2 temp.:	Outlet water evaporator 2 temperature	---	°C/°F	-999,9	999,9	---	A	R	20
D10	Master analog input B8= External temp.:	External temperature	---	°C/°F	-999,9	999,9	---	A	R	28
D11	Master analog input B9= External temp.:	External temperature	---	°C/°F	-999,9	999,9	---	A	R	28
D12	Master analog input B10= Inlet water cond. temp.	Inlet water condenser temperature	---	°C/°F	-999,9	999,9	---	A	R	27
D13	Master analog input B10= Out.cond.1 temp.:	Outlet water condenser 1 temperature	---	°C/°F	-999,9	999,9	---	A	R	23
D14	Master analog input B1= High press.circ.3:	High pressure circuit 3	---	barg /psig	-999,9	999,9	---	A	R	5
		High pressure circuit 3 converted to temperature	---	°C/°F	-999,9	999,9	---	A	R	6
	B2= Low press.circ.3:	Low pressure circuit 3	---	barg /psig	-999,9	999,9	---	A	R	13
		Low pressure circuit 3 converted to temperature	---	°C/°F	-999,9	999,9	---	A	R	14
D15	Slave analog input B4= Out.cond.4 temp.:	Outlet water condenser 4 temperature	---	°C/°F	-999,9	999,9	---	A	R	16
D16	Slave analog input B5= Out.evap. 2 temp.: or B5= Out.evap. 3 temp.:	Outlet water evaporator 2 temperature (if unit 4 circuit 2 evaporator)	---	°C/°F	-999,9	999,9	---	A	R	20
		Outlet water evaporator 3 temperature (all other cases)	---	°C/°F	-999,9	999,9	---	A	R	21
D17	Master analog input B6= High press.circ.4:	High pressure circuit 4	---	barg /psig	-999,9	999,9	---	A	R	7
		High pressure circuit 4 converted to temperature	---	°C/°F	-999,9	999,9	---	A	R	8
	B7= Low press.circ.4:	Low pressure circuit 4	---	barg /psig	-999,9	999,9	---	A	R	15
		Low pressure circuit 4 converted to temperature	---	°C/°F	-999,9	999,9	---	A	R	16
D18	Slave analog input B8= Out.evap.4 temp.:	Outlet water evaporator 4 temperature	---	°C/°F	-999,9	999,9	---	A	R	22
D19	Slave analog input B10= Out.cond. 2 temp.: or B10= Out.cond. 3 temp.:	Outlet water condensator 2 temperature (if unit 4 circuit 2 evaporator)	---	°C/°F	0	1	---	A	R	24
		Outlet water condensator 3 temperature (all other cases)						A	R	25
D20	Master digital input 01= High press.circ.1:	Digital input 1: High pressure circuit 1	0	---	0	1	0: Close	D	R	1
							1: Open			

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
	02= Evap.water flow:	Digital input 2: Evaporator water flow	0	---	0	1	0: Close 1: Open	D	R	2
D21	Master digital input 01= High press.circ.1:	Digital input 1: High pressure circuit 1	0	---	0	1	0: Close 1: Open	D	R	1
	02= Low press.circ.1:	Digital input 2: Low pressure circuit 1	0	---	0	1	0: Close 1: Open	D	R	2
D22	Master digital input 03= Remote On-Off:	Digital input 3: Remote On-Off	0	---	0	1	0: Close 1: Open	D	R	3
D23	Master digital input 03= Remote On-Off:	Digital input 3: Remote On-Off	0	---	0	1	0: Close 1: Open	D	R	3
	04= Cond.water flow:	Digital input 4: condenser water flow	0	---	0	1	0: Close 1: Open	D	R	4
D24	Master digital input 03= Remote On-Off:	Digital input 3: Remote On-Off	0	---	0	1	0: Close 1: Open	D	R	3
	04= Cooling/Heating:	Digital input 4: Change cooling-heating mode	0	---	0	1	0: Close 1: Open	D	R	4
D25	Master digital input 05= Low press.circ.1:	Digital input 5: Low pressure circuit 1	0	---	0	1	0: Close 1: Open	D	R	5
	06= Serious alarm:	Digital input 6: Serious alarm	0	---	0	1	0: Close 1: Open	D	R	6
D26	Master digital input 05= Evap.water flow:	Digital input 5: Evaporator water flow	0	---	0	1	0: Close 1: Open	D	R	5
	06= Ovrl.cmp.1 circ.1:	Digital input 6: Overload compressor 1 circuit 1	0	---	0	1	0: Close 1: Open	D	R	6
D27	Master digital input 07= Ovrl.cmp.2 circ.1:	Digital input 6: Overload compressor 2 circuit 1	0	---	0	1	0: Close 1: Open	D	R	6
	08= Serious alarm:	Digital input 8: Serious alarm	0	---	0	1	0: Close 1: Open	D	R	8
D28	Master digital input 09= High press.circ.2:	Digital input 9: High pressure circuit 2	0	---	0	1	0: Close 1: Open	D	R	9
	10= Low press.circ.2:	Digital input 10: Low pressure circuit 2	0	---	0	1	0: Close 1: Open	D	R	10
D29	Master digital input 11= Ovrl.cmp.1 circ.2:	Digital input 11: Overload compressor 1 circuit 2	0	---	0	1	0: Close 1: Open	D	R	11
	12= Ovrl.cmp.2 circ.2:	Digital input 12: Overload compressor 2 circuit 2	0	---	0	1	0: Close 1: Open	D	R	12
D30	Master digital input 13= Ovrl.evap.pump 1:	Digital input 13: Overload evaporator pump 1	0	---	0	1	0: Close 1: Open	D	R	13
D31	Master digital input 13= Ovrl.evap.pump 1:	Digital input 13: Overload evaporator pump 1	0	---	0	1	0: Close 1: Open	D	R	13
	14= Cond.water flow:	Digital input 14: Condenser water flow	0	---	0	1	0: Close 1: Open	D	R	14
D32	Master digital input 13= Ovrl.evap.pump 1:	Digital input 13: Overload evaporator pump 1	0	---	0	1	0: Close 1: Open	D	R	13
	14= Ovrl.evap.pump 2:	Digital input 14: Overload evaporator pump 2	0	---	0	1	0: Close 1: Open	D	R	14
D33	Master digital input 15= Ovrl.cmp.3 circ.1:	Digital input 15: Overload compressor 3 circuit 1	0	---	0	1	0: Close 1: Open	D	R	15
	16= Ovrl.cmp.3 circ.2:	Digital input 16: Overload compressor 3 circuit 2	0	---	0	1	0: Close 1: Open	D	R	16
D34	Master digital input 17= Cond.water flow:	Digital input 17: Condenser water flow	0	---	0	1	0: Close 1: Open	D	R	17
D35	Slave digital input 01= High press.circ.3:	Digital input 1: High pressure circuit 3	0	---	0	1	0: Close 1: Open	D	R	34
	02= Low press.circ.3:	Digital input 2: Low pressure circuit 3	0	---	0	1	0: Close 1: Open	D	R	35
D36	Slave digital input 06= Ovrl.cmp.1 circ.3:	Digital input 6: Overload compressor 1 circuit 3	0	---	0	1	0: Close 1: Open	D	R	36
	07= Ovrl.cmp.2 circ.3:	Digital input 7: Overload compressor 2 circuit 3	0	---	0	1	0: Close 1: Open	D	R	37
D37	Slave digital input 09= High press.circ.4:	Digital input 9: High pressure circuit 4	0	---	0	1	0: Close 1: Open	D	R	38
	10= Low press.circ.4:	Digital input 10: Low pressure circuit 4	0	---	0	1	0: Close 1: Open	D	R	39
D38	Slave digital input 11= Ovrl.cmp.1 circ.4:	Digital input 11: Overload compressor 1 circuit 4	0	---	0	1	0: Close 1: Open	D	R	40
	12= Ovrl.cmp.2 circ.4:	Digital input 12: Overload compressor 2 circuit 4	0	---	0	1	0: Close 1: Open	D	R	41
D39	Slave digital input 13= Ovrl.evap.pump 2:	Digital input 13: Overload evaporator pump 2	0	---	0	1	0: Close 1: Open	D	R	42
D40	Slave digital input 15= Ovrl.cmp.3 circ.3:	Digital input 15: Overload compressor 3 circuit 3	0	---	0	1	0: Close 1: Open	D	R	43
	16= Ovrl.cmp.3 circ.4:	Digital input 16: Overload compressor 3 circuit 4	0	---	0	1	0: Close 1: Open	D	R	44
D41	Master digital output 01= Evap.pump 1:	Digital output 1: Evaporator pump 1	0	---	0	1	0: Open 1: Close	D	R	18
	02= Comp.1 circ.1:	Digital output 2: Compressor 1 circuit 1	0	---	0	1	0: Open 1: Close	D	R	19
D42	Master digital output 01= Comp.1 circ.1:	Digital output 1: Compressor 1 circuit 1	0	---	0	1	0: Open 1: Close	D	R	18

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
	02= Comp.2 circ.1:	Digital output 2: Compressor 2 circuit 1	0	---	0	1	0: Open 1: Close	D	R	19
D43	Master digital output 03= Antifreeze heater:	Digital output 3: Antifreeze heater	0	---	0	1	0: Open 1: Close	D	R	20
	04= Comp.2 circ.1:	Digital output 4: Compressor 2 circuit 1	0	---	0	1	0: Open 1: Close	D	R	21
D44	Master digital output 03= Antifreeze heater:	Digital output 3: Antifreeze heater	0	---	0	1	0: Open 1: Close	D	R	20
	04= 4Way valve circ.1:	Digital output 4: 4 way valve circuit 1	0	---	0	1	0: Open 1: Close	D	R	21
D45	Master digital output 03= Comp.1 circ.2:	Digital output 3: Compressor 1 circuit 2	0	---	0	1	0: Open 1: Close	D	R	20
	04= Comp.2 circ.2:	Digital output 4: Compressor 2 circuit 2	0	---	0	1	0: Open 1: Close	D	R	21
D46	Master digital output 05= Serious alarm:	Digital output 5: Serious alarm	0	---	0	1	0: Open 1: Close	D	R	22
D47	Master digital output 05= Serious alarm: or 05= Comp.2 circ.1:	Digital output 5: Serious alarm (if pCOxs and unit CH/HP and 1 comp.) or Digital output 5: Serious alarm (if pCOxs and unit CH/HP and 2 comp.)	0	---	0	1	0: Open 1: Close	D	R	22
D48	Master digital output 05= Cond.fan group 1:	Digital output 5: Condenser fan group 1	0	---	0	1	0: Open 1: Close	D	R	22
	06= Cond.fan group 2:	Digital output 6: Condenser fan group 2	0	---	0	1	0: Open 1: Close	D	R	23
D49	Master digital output 05= Condensing pump 1:	Digital output 5: Condensing pump 1	0	---	0	1	0: Open 1: Close	D	R	22
	06= Condensing pump 2:	Digital output 6: Condensing pump 2	0	---	0	1	0: Open 1: Close	D	R	23
D50	Master digital output 07= Antifreeze heater:	Digital output 7: Antifreeze heater	0	---	0	1	0: Open 1: Close	D	R	24
	08= Serious alarm:	Digital output 8: Serious alarm	0	---	0	1	0: Open 1: Close	D	R	25
D51	Master digital output 09= Evaporator pump 1:	Digital output 9: Evaporator pump 1	0	---	0	1	0: Open 1: Close	D	R	26
D52	Master digital output 10= Liquid solenoid 1:	Digital output 10: Liquid solenoid 1	0	---	0	1	0: Open 1: Close	D	R	27
	11= Liquid solenoid 2:	Digital output 11: Liquid solenoid 2	0	---	0	1	0: Open 1: Close	D	R	28
D53	Master digital output 12= 4Way valve circ.1:	Digital output 12: 4 way valve circuit 1	0	---	0	1	0: Open 1: Close	D	R	29
	13= 4Way valve circ.2:	Digital output 13: 4 way valve circuit 2	0	---	0	1	0: Open 1: Close	D	R	30
D54	Master digital output 14= Comp.3 circ.1:	Digital output 14: Compressor 3 circuit 1	0	---	0	1	0: Open 1: Close	D	R	31
	15= Comp.3 circ.2:	Digital output 15: Compressor 3 circuit 2	0	---	0	1	0: Open 1: Close	D	R	32
D55	Master digital output 16= Evaporator pump 2:	Digital output 16: Evaporator pump 2	0	---	0	1	0: Open 1: Close	D	R	33
D56	Slave digital output 01= Comp.1 circ.3:	Digital output 1: Compressor 1 circuit 3	0	---	0	1	0: Open 1: Close	D	R	45
	02= Comp.2 circ.3:	Digital output 2: Compressor 2 circuit 3	0	---	0	1	0: Open 1: Close	D	R	46
D57	Slave digital output 03= Comp.1 circ.4:	Digital output 3: Compressor 1 circuit 4	0	---	0	1	0: Open 1: Close	D	R	47
	04= Comp.2 circ.4:	Digital output 4: Compressor 2 circuit 4	0	---	0	1	0: Open 1: Close	D	R	48
D58	Slave digital output 09= Evaporator pump 2:	Digital output 9: Evaporator pump 2	0	---	0	1	0: Open 1: Close	D	R	49
D59	Slave digital output 10= Liquid solenoid 3:	Digital output 10: Liquid solenoid 3	0	---	0	1	0: Open 1: Close	D	R	50
	11= Liquid solenoid 4:	Digital output 11: Liquid solenoid 4	0	---	0	1	0: Open 1: Close	D	R	51
D60	Slave digital output 12= 4Way valve circ.3:	Digital output 12: 4 way valve circuit 3	0	---	0	1	0: Open 1: Close	D	R	52
	13= 4Way valve circ.4:	Digital output 13: 4 way valve circuit 4	0	---	0	1	0: Open 1: Close	D	R	53
D61	Slave digital output 14= Comp.3 circ.3:	Digital output 14: Compressor 3 circuit 3	0	---	0	1	0: Open 1: Close	D	R	54
	15= Comp.3 circ.4:	Digital output 15: Compressor 3 circuit 4	0	---	0	1	0: Open 1: Close	D	R	55
D62	Master analog output Y1= Cond.fan group 1:	Analog output 1: Condenser fan 1 (0-10V)	0	---	0	1000	---	I	R	92
	Y3= Cond.fan group 1:	Analog output 3: Condenser fan 1 (PWM)	0	---	0	1000	---	I	R	94
D63	Master analog output Y1= Condensing pump:	Analog output 1: Condensing pump (0-10V)	0	---	0	1000	---	I	R	92
D64	Master analog output Y1= Cond.fan group 1:	Analog output 1: Condenser fan 1 (0-10V)	0	---	0	1000	---	I	R	92
	Y2= Cond.fan group 2:	Analog output 2: Condenser fan 2 (0-10V)	0	---	0	1000	---	I	R	93

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
E01	N°	Progressive history number	0	---	0	100	---	I	---	---
		Alarm happened hour	0	---	0	23	---	I	---	---
		Alarm happened minute	0	---	0	59	---	I	---	---
		Alarm happened day			0	31	---		---	---
		Alarm happened month	0	---	0	12	---	I	---	---
		Alarm happened year	0	---	0	99	---	I	---	---
		Alarm code and description	0	---	0	999	0: No alarm	I	---	---
							1: ALG01 Clock board fault or not connected			
							2: ALG02 Extended memory fault			
							3: ALR03 Serious alarm by DIN			
							4: ALO04 Slave offline			
							5: ALA05 High pressure circ.1 probe fault			
							6: ALA06 High pressure circ.2 probe fault			
							7: ALA07 High pressure circ.3 probe fault			
							8: ALA08 High pressure circ.4 probe fault			
							9: ALA09 Low pressure circ.1 probe fault			
							10: ALA10 Low pressure circ.2 probe fault			
							11: ALA11 Low pressure circ.3 probe fault			
							12: ALA12 Low pressure circ.4 probe fault			
							13: ALA13 Inlet water evap.temp. probe fault			
							14: ALA14 Inlet water cond.temp. probe fault			
							15: ALA15 Out.water evap.temp. probe fault			
							16: ALA16 Outlet evap.1 temp. probe fault			
							17: ALA17 Outlet evap.2 temp. probe fault			
							18: ALA18 Outlet evap.3 temp. probe fault			
							19: ALA19 Outlet evap.4 temp. probe fault			
							20: ALA20 Outlet cond.1 temp. probe fault			
							21: ALA21 Outlet cond.2 temp. probe fault			
							22: ALA22 Outlet cond.3 temp. probe fault			
							23: ALA23 Outlet cond.4 temp. probe fault			
							24: ALA24 Evaporator water temp. probe fault			
							25: ALA25 External temperature probe fault			
							26: ALT26 Compressor 1 circuit 1 Maintenace warning			
							27: ALT26 Compressor 2 circuit 1 Maintenace warning			
							28: ALT26 Compressor 3 circuit 1 Maintenace warning			
							29: ALT26 Compressor 1 circuit 2 Maintenace warning			
							30: ALT26 Compressor 2 circuit 2 Maintenace warning			
							31: ALT26 Compressor 3 circuit 2 Maintenace warning			
							32: ALT26 Compressor 1 circuit 3 Maintenace warning			
							33: ALT26 Compressor 2 circuit 3 Maintenace warning			
							34: ALT26 Compressor 3 circuit 3 Maintenace warning			
							35: ALT26 Compressor 1 circuit 4 Maintenace warning			
							36: ALT26 Compressor 2 circuit 4 Maintenace warning			
							37: ALT26 Compressor 3 circuit 4 Maintenace warning			
							38: ALT27 Condenser fan group 1 Maintenace warning			
							39: ALT27 Condenser fan group 2 Maintenace warning			
							40: ALT28 Condenser pump 1 Maintenace warning			
							41: ALT28 Condenser pump 2 Maintenace warning			
							42: ALT29 Evaporator pump 1 Maintenace warning			
							43: ALT29 Evaporator pump 2 Maintenace warning			
							44: ALC30 Compressor 1 circuit 1 overload alarm			
							45: ALC30 Compressor 2 circuit 1 overload alarm			
							46: ALC30 Compressor 3 circuit 1 overload alarm			
							47: ALC30 Compressor 1 circuit 2 overload alarm			
							48: ALC30 Compressor 2 circuit 2 overload alarm			
							49: ALC30 Compressor 3 circuit 2 overload alarm			
							50: ALC30 Compressor 1 circuit 3 overload alarm			
							51: ALC30 Compressor 2 circuit 3 overload alarm			
							52: ALC30 Compressor 3 circuit 3 overload alarm			
							53: ALC30 Compressor 1 circuit 4 overload alarm			
							54: ALC30 Compressor 2 circuit 4 overload alarm			
							55: ALC30 Compressor 3 circuit 4 overload alarm			
							56: ALW31 Force off comps.circ.1 by antifreeze			
							57: ALW31 Force off comps.circ.2 by antifreeze			
							58: ALW31 Force off comps.circ.3 by antifreeze			
							59: ALW31 Force off comps.circ.4 by antifreeze			
							60: ALW32 Stop defrost circ.1 by maximum time			
							61: ALW32 Stop defrost circ.2 by maximum time			
							62: ALW32 Stop defrost circ.3 by maximum time			
							63: ALW32 Stop defrost circ.4 by maximum time			

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
							64: ALW33 Stop pump-down circ.1 by maximum time			
							65: ALW33 Stop pump-down circ.2 by maximum time			
							66: ALW33 Stop pump-down circ.3 by maximum time			
							67: ALW33 Stop pump-down circ.4 by maximum time			
							68: ALB34 Circuit 1 LP alarm by pressostat			
							69: ALB34 Circuit 2 LP alarm by pressostat			
							70: ALB34 Circuit 3 LP alarm by pressostat			
							71: ALB34 Circuit 4 LP alarm by pressostat			
							72: ALB35 Circuit 1 LP alarm by transducer			
							73: ALB35 Circuit 2 LP alarm by transducer			
							74: ALB35 Circuit 3 LP alarm by transducer			
							75: ALB35 Circuit 4 LP alarm by transducer			
							76: ALB36 Circuit 1 HP alarm by pressostat			
							77: ALB36 Circuit 2 HP alarm by pressostat			
							78: ALB36 Circuit 3 HP alarm by pressostat			
							79: ALB36 Circuit 4 HP alarm by pressostat			
							80: ALB37 Circuit 1 HP alarm by transducer			
							81: ALB37 Circuit 2 HP alarm by transducer			
							82: ALB37 Circuit 3 HP alarm by transducer			
							83: ALB37 Circuit 4 HP alarm by transducer			
							84: ALB48 Circuit 1 antifreeze alarm			
							85: ALB48 Circuit 2 antifreeze alarm			
							86: ALB48 Circuit 3 antifreeze alarm			
							87: ALB48 Circuit 4 antifreeze alarm			
							88: ALB49 Circuit 1 and 2 antifreeze alarm			
							89: ALB49 Circuit 3 and 4 antifreeze alarm			
							90: ALU50 Unit antifreeze alarm			
							91: ALB51 Circ.1 high pressure prevent warning			
							92: ALB51 Circ.1 low pressure prevent warning			
							93: ALB51 Circ.1 antifreeze prevent warning			
							94: ALB52 Circ.2 high pressure prevent warning			
							95: ALB52 Circ.2 low pressure prevent warning			
							96: ALB52 Circ.2 antifreeze prevent warning			
							97: ALB53 Circ.3 high pressure prevent warning			
							98: ALB53 Circ.3 low pressure prevent warning			
							99: ALB53 Circ.3 antifreeze prevent warning			
							100: ALB54 Circ.4 high pressure prevent warning			
							101: ALB54 Circ.4 low pressure prevent warning			
							102: ALB54 Circ.4 antifreeze prevent warning			
							103: ALB55 Circ1 and 2 antifreeze prevent warning			
							104: ALB55 Circ3 and 4 antifreeze prevent warning			
							105: ALB56 Unit antifreeze prevent warning			
							106: ALP38 Evaporator Pump 1 flow warning			
							107: ALP39 Evaporator Pump 2 flow warning			
							108: ALP40 Evaporator Pump 1 flow alarm			
							109: ALP41 Evaporator Pump 2 flow alarm			
							110: ALP42 Evaporator Pump 1 overload alarm			
							111: ALP43 Evaporator Pump 2 overload alarm			
							112: ALP44 Condenser pump 1 flow warning			
							113: ALP45 Condenser pump 2 flow warning			
							114: ALP46 Condenser pump 1 flow alarm			
							115: ALP47 Condenser pump 2 flow alarm			
	or In.evap.: or In.cond.: or Out.evap.:	Value of probe used for the thermoregulation: or Inlet avaporator temperature or Inlet condenser temperature or Outlet evaporator temperature	---	°C/°F	0	999,9	---	A	---	---
	Out.evap.: or In.evap.:	Outler evaporator temperature or Inlet evaporator temperature	---	°C/°F	0	999,9	---	A	---	---
Board switch										
F01	Unit address:	Address of the controller in a pLAN network	0	---	0	31	---	I	---	---
	pLAN status	The picture show the status of the devices connected via pLAN	0	---	---	---		---	---	---
Service										
Ga01	Language: ENGLISH ENTER to change	Show the current language and give the information to change language	0	---	0	1		---	---	---
	Show mask time:	Countdown to jump into main mask	0	s	0	999	---	I	---	---
Ga02	Disable language mask at start-up:	Disable the change language mask at start-up	0	---	0	1	0: NO 1: YES	D	---	---
	Show mask time: s	Starting value of countdown, time of permanence on change language mask	60	s	0	999	---	I		
Information										
Gb01	Carel Industries S.r.l Code: Chiller_Core Ver.:	Chiller Core software version	---	---	0	9,99	---	I	---	---
	Manual code:	Chiller Core manual code	0	---	---	---	---	---	---	---
	Bios:	Bios version and date	0	---	---	---	---	I	---	---

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
	Boot:	Boot version and date	0	---	---	---	---	I	---	---
Gb02	pCO type:	Type of pCO controller	0	---	0	8	0: pCO2	I	---	---
							1: pCO1			
							2: pCO2			
							3: pCOC			
							4: pCOXS			
							5: pCOOEM			
							6: ---			
							7: pCO3			
							8: Snode			
		Type of the controller	0	---	0	17	0: ---	I	---	---
							1: ---			
							2: ---			
							3: ---			
							4: ---			
							5: ---			
							6: ---			
							7: ---			
							8: ---			
							9: ---			
							10: Large			
							11: Medium			
							12: Small			
							13: XL N.O.			
							14: ---			
							15: ---			
							16: ---			
							17: XL N.C.			
	Total flash:	Indicates the size of the flash	0	KB	0	9999	---	I	---	---
	Ram:	Indicates the size of the RAM	0	KB	0	9999	---	I	---	---
	Built-In type:	Dispaly built-in type	0	---	0	9	0: None	I	---	---
							1: ---			
							2: PGD0			
							3: PGD1			
	Main cycle:	Main program cycle time	0	s	0	99,9	---	A	---	---
	cycle/s	number of cycle per second	0	---	0	9999	---	I	---	---
Gb03	Unit:	Unit type	1	---	0	2	0: CH	I	R/W	1
							1: CH/HP			
							2: HP			
		Physical circuit type	0	---	0	1	0:Air/Water	D	R/W	56
							1: Water/Water			
	Gas type:	Refrigerant type	0	---	0	13	0: R22	I	R/W	2
							1: R134a			
							2: R404a			
							3: R407c			
							4: R410a			
							5: R507			
							6: R290			
							7: R600			
							8: R600a			
							9: R717			
							10: R744			
							11: R728			
							12: R1270			
							13: R417a			
	Circuits:	Circuit number	0	---	0	4	---	I	R/W	3
	Compr.per circ.:	Compressor number per circuit	0	---	0	3	---	I	R/W	4
	Evaporators:	Evaporators number	0	---	0	4	---	I	R/W	5
	Condensation:	Condensing type	0	---	0	1	0: Single	D	R/W	58
							1: Separated			
Cooling/Heating										
Gc01	Unit mode:	Temporary variable for manage unit working mode	0	---	0	1	0: COOLING	I	R/W	62
							1: HEATING			
		Unit working mode	0	---	0	1	0: Cooling	D		
							1: Heating			
Working hours										
Gd01	Evaporator pump 1:	Evaporator pump 1 working hour-high part	0	h	0	999	---	I	---	---
		Evaporator pump 1 working hour-low part	0	h	0	999	---	I	---	---
	Evaporator pump 2:	Evaporator pump 2 working hour-high part	0	h	0	999	---	I	---	---
		Evaporator pump 2 working hour-low part	0	h	0	999	---	I	---	---
Gd02	Circuit 1 Compressor 1:	Compressor 1 circuit 1 working hour-high part	0	h	0	999	---	I	---	---
		Compressor 1 circuit 1 working hour-low part	0	h	0	999	---	I	---	---
	Compressor 2:	Compressor 2 circuit 1 working hour-high part	0	h	0	999	---	I	---	---
		Compressor 2 circuit 1 working hour-low part	0	h	0	999	---	I	---	---
	Compressor 3:	Compressor 3 circuit 1 working hour-high part	0	h	0	999	---	I	---	---
		Compressor 3 circuit 1 working hour-low part	0	h	0	999	---	I	---	---
Gd03	Circuit 2 Compressor 1:	Compressor 1 circuit 2 working hour-high part	0	h	0	999	---	I	---	---

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
		Compressor 1 circuit 2 working hour-low part	0	h	0	999	---	I	---	---
	Compressor 2:	Compressor 2 circuit 2 working hour-high part	0	h	0	999	---	I	---	---
		Compressor 2 circuit 2 working hour-low part	0	h	0	999	---	I	---	---
	Compressor 3:	Compressor 3 circuit 2 working hour-high part	0	h	0	999	---	I	---	---
		Compressor 3 circuit 2 working hour-low part	0	h	0	999	---	I	---	---
Gd04	Circuit 3 Compressor 1:	Compressor 1 circuit 3 working hour-high part	0	h	0	999	---	I	---	---
		Compressor 1 circuit 3 working hour-low part	0	h	0	999	---	I	---	---
	Compressor 2:	Compressor 2 circuit 3 working hour-high part	0	h	0	999	---	I	---	---
		Compressor 2 circuit 3 working hour-low part	0	h	0	999	---	I	---	---
	Compressor 3:	Compressor 3 circuit 3 working hour-high part	0	h	0	999	---	I	---	---
		Compressor 3 circuit 3 working hour-low part	0	h	0	999	---	I	---	---
Gd05	Circuit 4 Compressor 1:	Compressor 1 circuit 4 working hour-high part	0	h	0	999	---	I	---	---
		Compressor 1 circuit 4 working hour-low part	0	h	0	999	---	I	---	---
	Compressor 2:	Compressor 2 circuit 4 working hour-high part	0	h	0	999	---	I	---	---
		Compressor 2 circuit 4 working hour-low part	0	h	0	999	---	I	---	---
	Compressor 3:	Compressor 3 circuit 4 working hour-high part	0	h	0	999	---	I	---	---
		Compressor 3 circuit 4 working hour-low part	0	h	0	999	---	I	---	---
Gd06	Condenser fan Group 1:	Condenser fan 1 working hour-high part	0	h	0	999	---	I	---	---
		Condenser fan 1 working hour-low part	0	h	0	999	---	I	---	---
	Group 2:	Condenser fan 2 working hour-high part	0	h	0	999	---	I	---	---
		Condenser fan 2 working hour-low part	0	h	0	999	---	I	---	---
Gd07	Condenser pump 1:	Evaporator pump 1 working hour-high part	0	h	0	999	---	I	---	---
		Evaporator pump 1 working hour-low part	0	h	0	999	---	I	---	---
	Condenser pump 2:	Condenser pump 2 working hour-high part	0	h	0	999	---	I	---	---
		Condenser pump 2 working hour-low part	0	h	0	999	---	I	---	---
BMS Config.										
Ge01	Supervisor system Protocol:	Protocol type	0	---	0	2	0: CAREL 1: MODBUS 2: WINLOAD	I	---	---
	Speed:	Baud rate	4	---	0	4	0: 1200 1: 2400 2: 4800 3: 9600 4: 19200	I	---	---
	Ident:	Address of the controller in a supervisory system network n.1	0	---	0	207	---	I	---	---
Working hour set										
Gfa01	Evaporator pump 1 Thres.:	Max operate hours of evaporator pump 1	10	X1000h	0	99	---	I	---	---
	Reset:	Reset evaporator pump 1 hour counter	0	---	0	1	0: N 1: Y	D	---	---
	Evaporator pump 2 Thres.:	Max operate hours of evaporator pump 2	10	X1000h	0	99	---	I	---	---
	Reset:	Reset evaporator pump 2 hour counter	0	---	0	1	0: N 1: Y	D	---	---
Gfa02	Compressor 1 circuit 1 Thres.:	Max operate hours of compressor 1 circuit 1	10	X1000h	0	99	---	I	---	---
	Reset:	Reset compressor 1 circuit 1 hour counter	0	---	0	1	0: N 1: Y	D	---	---
	Compressor 2 circuit 1 Thres.:	Max operate hours of compressor 2 circuit 1	10	X1000h	0	99	---	I	---	---
	Reset:	Reset compressor 2 circuit 1 hour counter	0	---	0	1	0: N 1: Y	D	---	---
Gfa03	Compressor 3 circuit 1 Thres.:	Max operate hours of compressor 3 circuit 1	10	X1000h	0	99	---	I	---	---
	Reset:	Reset compressor 3 circuit 1 hour counter	0	---	0	1	0: N 1: Y	D	---	---
Gfa04	Compressor 1 circuit 2 Thres.:	Max operate hours of compressor 1 circuit 2	10	X1000h	0	99	---	I	---	---
	Reset:	Reset compressor 1 circuit 2 hour counter	0	---	0	1	0: N 1: Y	D	---	---
	Compressor 2 circuit 2 Thres.:	Max operate hours of compressor 2 circuit 2	10	X1000h	0	99	---	I	---	---
	Reset:	Reset compressor 2 circuit 2 hour counter	0	---	0	1	0: N 1: Y	D	---	---
Gfa05	Compressor 3 circuit 2 Thres.:	Max operate hours of compressor 3 circuit 2	10	X1000h	0	99	---	I	---	---
	Reset:	Reset compressor 3 circuit 2 hour counter	0	---	0	1	0: N 1: Y	D	---	---
Gfa06	Compressor 1 circuit 3 Thres.:	Max operate hours of compressor 1 circuit 3	10	X1000h	0	99	---	I	---	---
	Reset:	Reset compressor 3 circuit 1 hour counter	0	---	0	1	0: N 1: Y	D	---	---
	Compressor 2 circuit 3 Thres.:	Max operate hours of compressor 2 circuit 3	10	X1000h	0	99	---	I	---	---

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
	Reset:	Reset compressor 2 circuit 3 hour counter	0	---	0	1	0: N 1: Y	D	---	---
Gfa07	Compressor 3 circuit 3 Thres.:	Max operate hours of compressor 3 circuit 3	10	X1000h	0	99	---	I	---	---
	Reset:	Reset compressor 3 circuit 3 hour counter	0	---	0	1	0: N 1: Y	D	---	---
Gfa08	Compressor 1 circuit 4 Thres.:	Max operate hours of compressor 1 circuit 4	10	X1000h	0	99	---	I	---	---
	Reset:	Reset compressor 1 circuit 4 hour counter	0	---	0	1	0: N 1: Y	D	---	---
	Compressor 2 circuit 4 Thres.:	Max operate hours of compressor 2 circuit 4	10	X1000h	0	99	---	I	---	---
	Reset:	Reset compressor 2 circuit 4 hour counter	0	---	0	1	0: N 1: Y	D	---	---
Gfa09	Compressor 3 circuit 4 Thres.:	Max operate hours of compressor 3 circuit 4	10	X1000h	0	99	---	I	---	---
	Reset:	Reset compressor 3 circuit 4 hour counter	0	---	0	1	0: N 1: Y	D	---	---
Gfa10	Condenser fan group 1 Thres.:	Max operate hours of condenser fan 1	10	X1000h	0	99	---	I	---	---
	Reset:	Reset condenser fan 1 hour counter	0	---	0	1	0: N 1: Y	D	---	---
	Condenser fan group 2 Thres.:	Max operate hours of condenser fan 2	10	X1000h	0	99	---	I	---	---
	Reset:	Reset condenser fan 2 hour counter	0	---	0	1	0: N 1: Y	D	---	---
Gfa11	Condenser pump 1 Thres.:	Max operate hours of condenser pump 1	10	X1000h	0	99	---	I	---	---
	Reset:	Reset condenser pump 1 hour counter	0	---	0	1	0: N 1: Y	D	---	---
	Condenser pump 2 Thres.:	Max operate hours of condenser pump 2	10	X1000h	0	99	---	I	---	---
	Reset:	Reset condenser pump 2 hour counter	0	---	0	1	0: N	D	---	---
			---	---	---	---	1: Y	---	---	---
Probe adjustment										
Gfb01	Master probe adjust. B01:	Probe 1 offset	0	---	-9,9	9,9	---	A	---	---
	Val:	Probe 1 value	0	---	-999,9	999,9	---	I	---	---
	B02:	Probe 2 offset	0	---	-9,9	9,9	---	A	---	---
	Val:	Probe 2 value	0	---	-999,9	999,9	---	I	---	---
	B03:	Probe 3 offset	0	---	-9,9	9,9	---	A	---	---
	Val:	Probe 3 value	0	---	-999,9	999,9	---	I	---	---
	B04:	Probe 4 offset	0	---	-9,9	9,9	---	A	---	---
	Val:	Probe 4 value	0	---	-999,9	999,9	---	I	---	---
	B05:	Probe5 offset	0	---	-9,9	9,9	---	A	---	---
	Val:	Probe 5 value	0	---	-999,9	999,9	---	I	---	---
Gfb02	Master probe adjust. B06:	Probe 6 offset	0	---	-9,9	9,9	---	A	---	---
	Val:	Probe 6 value	0	---	-999,9	999,9	---	I	---	---
	B07:	Probe 7 offset	0	---	-9,9	9,9	---	A	---	---
	Val:	Probe 7 value	0	---	-999,9	999,9	---	I	---	---
	B08:	Probe 8 offset	0	---	-9,9	9,9	---	A	---	---
	Val:	Probe 8 value	0	---	-999,9	999,9	---	I	---	---
	B09:	Probe 9 offset	0	---	-9,9	9,9	---	A	---	---
	Val:	Probe 9 value	0	---	-999,9	999,9	---	I	---	---
	B10:	Probe 10 offset	0	---	-9,9	9,9	---	A	---	---
	Val:	Probe 10 value	0	---	-999,9	999,9	---	I	---	---
Gfb03	Slave probe adjust. B01:	Probe 1 offset of slave	0	---	-9,9	9,9	---	A	---	---
	Val:	Probe 1 value of slave	0	---	-999,9	999,9	---	I	---	---
	B02:	Probe 2 offset of slave	0	---	-9,9	9,9	---	A	---	---
	Val:	Probe 2 value of slave	0	---	-999,9	999,9	---	I	---	---
	B04:	Probe 4 offset of slave	0	---	-9,9	9,9	---	A	---	---
	Val:	Probe 4 value of slave	0	---	-999,9	999,9	---	I	---	---
	B05:	Probe 5 offset of slave	0	---	-9,9	9,9	---	A	---	---
	Val:	Probe 5 value of slave	0	---	-999,9	999,9	---	I	---	---
Gfb04	Slave probe adjust. B06:	Probe 6 offset of slave	0	---	-9,9	9,9	---	A	---	---
	Val:	Probe 6 value of slave	0	---	-999,9	999,9	---	I	---	---
	B07:	Probe 7 offset of slave	0	---	-9,9	9,9	---	A	---	---
	Val:	Probe 7 value of slave	0	---	-999,9	999,9	---	I	---	---
	B08:	Probe 8 offset of slave	0	---	-9,9	9,9	---	A	---	---
	Val:	Probe 8 value of slave	0	---	-999,9	999,9	---	I	---	---
	B10:	Probe 10 offset of slave	0	---	-9,9	9,9	---	A	---	---
	Val:	Probe 10 value of slave	0	---	-999,9	999,9	---	I	---	---
Thermoregulation										
Gfc01	Cooling/Heating Change cooling/heating delay:	Cool/Heat change delay time	60	s	0	999	---	I	R/W	50
	Enable cooling/heating digital input:	Enable cool/heat change by DIN	0	---	0	1	0: NO 1: YES	D	---	---

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
Gfc02	Enable switch-off unit by display:	Enable switch-off unit by keyboard	0	---	1	1	0: NO 1: YES	D	R/W	68
Gfc03	Regulation temperature probe:	Regulation temperature probe	0	---	0	1	0: INLET 1: OUTLET	D	R/W	69
Gfc04	Temperature regulation Reg.type:	Regulation type	0	---	0	2	0: PROPORTIONAL 1: PROP.+INT. 2: PID	I	R/W	51
	Cooling T.Der	Cooling derivative time	0	---	0	999	---	I	R/W	52
	Cooling T.Int	Cooling integration time	300	---	0	999	---	I	R/W	53
	Heating T.Der	Heating derivative time	0	---	0	999	---	I	R/W	54
	Heating T.Int	Heating integration time	300	---	0	999	---	I	R/W	55
Gfc05	Temperature regulation Cooling mode Differential:	Cooling differential	2	°C	0	60.0	---	A	---	---
			3	°F	0	108.0	---	A		
	Dead band:	Regulation dead band in positive mode	0	°C	0	60.0	---	A	---	---
			0	°F	0	108.0	---	A		
Gfc06	Temperature regulation Heating mode Differential:	Heating differential	4	°C	0	60.0	---	A	---	---
			7	°F	0	108.0	---	A		
	Dead band:	Regulation dead band in negative mode	0	°C	0	60.0	---	A	---	---
				°F	0	108.0	---	A		
Gfc07	Neutral zone NZ diff.:	Regulation of differential in neutral zone	2	°C	0	60.0	---	A	---	---
			3	°F	0	108.0	---	A		
	Activ.diff.:	Regulation differential for devices activation	9	°C	0	60.0	---	A	---	---
			16	°F	0	108.0	---	A		
	Deact.diff.:	Regulation differential for devices deactivation	4	°C	0	60.0	---	A	---	---
			7	°F	0	108.0	---	A		
Gfc08	Neutral zone En.force off power:	Enable force require to 0 during NZ regulation when the regulation temperature is lower a threshold	0	---	0	1	0: NO 1: YES	D	R/W	70
	Threshold force off compressor:	When regulation value pass this threshold power decreasae immediately to 0	0	°C	-99,9	99,9	---	A	---	---
			32	°F	-148.0	211,8	---	A		
Gfc09	Neutral zone Load min.time:	Minimum time for loading	120	s	0	9999	---	I	R/W	56
	Load max.time:	Maximum time for loading	600	s	0	9999	---	I	R/W	57
Gfc10	Neutral zone Unload min.time:	Minimum time for unloading	120	s	0	9999	---	I	R/W	58
	Unload max.time:	Maximum time for unloading	600	s	0	9999	---	I	R/W	59
Gfc11	Setpoint limit cooling Minimum:	Setpoint minimum limit in cooling mode	---	°C	-99.9	99.9	---	A	---	---
			---	°F	-147.8	211.8	---	A		
	Maximum:	Setpoint maximum limit in cooling mode	---	°C	-99.9	99.9	---	A	---	---
			---	°F	-147.8	211.8	---	A		
Gfc12	Setpoint limit heating Minimum:	Setpoint minimum limit in cooling mode	---	°C	-99.9	99.9	---	A	---	---
				°F	-147.8	211.8	---	A		
	Maximum:	Setpoint maximum limit in cooling mode		°C	-99.9	99.9	---	A	---	---
				°F	-147.8	211.8	---	A		
Gfc13	Compressors Load up time:	Time between comp.load	10	s	0	999	---	I	R/W	60
	Load down time:	Time between comp.download	10	s	0	999	---	I	R/W	61
Gfc14	Pump-Down Maximum time:	Maximum pump down time	60	s	0	999	---	I	R/W	63
	End thr.:	Pump down end threshold	2	barg	-999,9	999,9	---	A	R/W	65
			29	psig	-999,9	999,9	---	A		
Gfc15	Cooling compensation Max.set.:	Max.setpoint of cooling compensation	5	°C	-99.9	99.9	---	A	---	---
			41	°F	-147.8	211.8	---	A		
	Ext.set.:	Cool compensation external setpoint	25	°C	-99.9	99.9	---	A	R/W	59
			77	°F	-147.8	211.8	---	A		
	Ext.diff.:	Cool compensation external differential	10	°C	0	60.0	---	A	R/W	60
			18	°F	0	108.0	---	A		
Gfc16	Heating compensation Max.set.:	Max.setpoint of heating compensation	-5	°C	-99.9	99.9	---	A	---	---
			23	°F	-147.8	211.8	---	A		
	Ext.set.:	Heat compensation external setpoint	0	°C	-99.9	99.9	---	A	R/W	61
			32	°F	-147.8	211.8	---	A		
	Ext.diff.:	Heat compensation external differential	10	°C	0	60.0	---	A	R/W	62
			18	°F	0	108.0	---	A		
Gfc17	Evaporator pump Delay time between pump on and compressors on:	Delay between evap.pump on and comp.on	25	s	0	999	---	I	R/W	64
	Off delay time:	Evap.pump off delay time	10	s	0	999	---	I	R/W	65
Gfc18	Evaporator pump water flow check Alarm delay from pump start-up:	Evap.pumps flow alarm startup delay time	20	s	0	999	---	I	R/W	66
	Alarm running delay:	Evap.pumps flow alarm running delay time	5	s	1	999	---	I	R/W	67
Gfc19	Evaporator pump Rotation time:	Evap.pumps rotation time	100	h	0	999	---	I	R/W	68
	Overwork time:	Evap.pumps overwork time	5	s	0	999	---	I	R/W	69
Gfc20	Condenser pump Pump on if:	Pump on if	0	---	0	1	0: UNIT ON 1: COMPRESSORS REQUIRED	D	R/W	71
	Off delay time:	Cond.pump off delay time	10	s	0	999	---	I	R/W	70
Gfc21	Condenser pump water flow check Alarm delay from pump	Cond.pumps flow alarm startup delay time	20	s	0	999	---	I	R/W	71

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
	start-up:									
	Alarm running delay:	Cond.pumps flow alarm running delay time	5	s	1	999	---	I	R/W	72
Gfc22	Condenser pump Rotation time:	Cond.pumps rotation time	100	h	0	999	---	I	R/W	73
	Overwork time:	Cond.pumps overwork time	5	s	0	999	---	I	R/W	74
Gfc23	Condenser fan Chiller mode Setpoint:	Condenser fan setpoint in chiller mode	13	barg	0	99.9	---	A	R/W	34
			188	psig	0	1448.6	---	A		
		Condenser fan setpoint for CH mode converted to temperature	13	°C	0	999,9	---	A	R	35
			55	°F	0	999,9	---	A		
	Differential:	Condenser fan differential in chiller mode	3	barg	0	99.9	---	A	R/W	55
			43	psig	0	1448.6	---	A		
		Condenser fan diffrential for CH mode converted to temperature	13	°C	0	999,9	---	A	R	56
			23	°F	0	999,9	---	A		
Gfc24	Condenser fan Heat pump mode Setpoint:	Condenser fan setpoint in heatpump mode	13	barg	0	99.9	---	A	R/W	36
			188	psig	0	1448.6	---	A		
		Condenser fan setpoint for HP mode converted to temperature	13	°C	0	999,9	---	A	R	37
			55	°F	0	999,9	---	A		
	Differential:	Condenser fan differential in heatpump mode	3	barg	0	99.9	---	A	R/W	57
			43	psig	0	1448.6	---	A		
		Condenser fan differential for HP mode converted to temperature	13	°C	0	999,9	---	A	R	58
			23	°F	0	999,9	---	A		
Gfc25	Condenser fan Speed up time:	Condenser fans speed-up time	10	s	0	99	---	I	R/W	75
	Start-up circuit force time:	Condenser fan force time at circuit start up	60	s	0	99	---	I	R/W	76
Gfc26	Condenser fan Minimum speed:	Condenser fan minimum speed	3.5	V	0	99,9	---	A	R/W	66
	Maximum speed:	Condenser fan maximum speed	7.5	%	0	99,9	---	A	R/W	67
Gfc27	Defrost Start setp.:	Defrost start setpoint	2	°C	-99.9	99.9	---	A	R/W	63
			35	°F	-147.8	211.8	---	A		
	End setp.:	Defrost end setpoint	28	°C	-99.9	99.9	---	A	R/W	64
			82	°F	-147.8	211.8	---	A		
Gfc28	Defrost Startup delay: s	Defrost startup delay	1800	s	1	9999	---	I	R/W	77
	Minimum time:	Defrost minimum time	0	min	0	9999	---	I	R/W	78
	Maximum time:	Defrost maximum time	5	min	1	999	---	I	R/W	79
Gfc29	Defrost Interval time:	Interval time between 2 defrost procedure	0	min	0	999	---	I	R/W	80
	Dripping time: s	Dripping time	30	s	0	999	---	I	R/W	81
	Reverse circ.time at start-end defr.:	Reverse circuit time during start-end defrost	30	s	0	999	---	I	---	---
Gfc30	Low pressure alarm Threshold:	Low pressure alarm threshold	1,5	barg	0	99.9	---	A	R/W	45
			21	psig	0	1448.6	---	A		
	Differential:	Low pressure alarm differential	0,5	barg	0	60.0	---	A	R/W	46
			7	psig	0	870.2	---	A		
Gfc31	Low pressure alarm Startup delay:	Low pressure alarm startup delay	40	s	0	999	---	I	R/W	82
	Running delay:	Low pressure alarm running delay	0	s	0	999	---	I	R/W	83
Gfc32	LP alarm reset type By pressostat:	LP by pressostat reset type	1	---	0	1	0: SEMIAUTOMATIC	D	R/W	72
							1: MANUAL			
	By transducer:	LP by transducer reset type	0	---	0	1	0: SEMIAUTOMATIC	D	R/W	73
							1: MANUAL			
Gfc33	High pressure alarm Threshold:	High pressure alarm threshold	23	barg	0	99.9	---	A	R/W	41
			333	psig	0	1448.6	---			
	Differential:	High pressure alarm differential	2	barg	0	60.0	---	A	R/W	42
			29	psig	0	870.2	---			
Gfc34	Circuit prevent Automatic increase time:	Prevent automatic increase time	10	s	0	999	---	I	R/W	84
	Count prevent number time:	Time period to check if the prevent number reach the maximum number of prevent condition happened	60	min	0	100	---	I	R/W	85
Gfc35	High pressure prevent Threshold:	High pressure prevent threshold	20	barg	0	99.9	---	A	R/W	39
			290	psig	0	1448.6	---			
	Differential:	High pressure prevent differential	2	barg	0	60.0	---	A	R/W	40
			29	psig	0	870.2	---			
Gfc36	High pressure prevent Max prevent number:	High pressure prevent number	3	---	0	5	---	I	R/W	86
	Warning delay:	High pressure prevent delay	5	s	0	999	---	I	R/W	87
Gfc37	Low pressure prevent Threshold:	Low pressure prevent threshold	2	barg	0	99.9	---	A	R/W	43
			29	psig	0	1448.6	---			
	Differential:	Low pressure prevent differential	2	barg	0	60.0	---	A	R/W	44
			29	psig	0	870.2	---			
Gfc38	Low pressure prevent Max prevent number:	Low pressure prevent number	3	---	0	5	---	I	R/W	88
	Warning delay:	Low pressure prevent delay	5	s	0	999	---	I	R/W	89
Gfc39	Antifreeze prevent Threshold:	Antifreeze prevent threshold	6	°C	-99.9	99.9	---	A	R/W	47
			42	°F	-147.8	211.8	---	A		
	Differential:	Antifreeze prevent differential	1	°C	0	60.0	---	A	R/W	48
			1,8	°F	0	108	---	A		
Gfc40	Antifreeze prevent Max prevent number:	Antifreeze prevent number	3	---	0	5	---	I	---	---

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
	Warning delay:	Antifreeze prevent delay	5	s	0	999	---	I	---	---
User DEV/Change PW1										
Gfd01	Insert new service password (PW1):	New service password	1234	---	0	9999	---	I	---	---
Gfd02	Delete data logger:	Erase history alarm data logger	NO	---	0	1	0: NO 1: YES	D	---	---
Gfd03	Load unit configuration:	Load the unit configuration saved by manufacturer	NO	---	0	1	0: NO 1: YES	D	---	---
	Last saving	Last saving date: Day	---	day	0	31	---	I	---	---
		Last saving date: Month	---	month	0	12	---	I	---	---
		Last saving date: Year	---	year	0	99	---	I	---	---
Manual management										
Gg01	Defrost:	Force defrost procedure	0	---	0	1	0: NO 1: YES	D	---	---
Gg02	Disable compressors Comp.1 circ.1:	Disable comp.1 circ.1 by user	0	---	0	1	0: NO 1: YES	D	---	---
	Comp.2 circ.1:	Disable comp.2 circ.1 by user	0	---	0	1	0: NO 1: YES	D	---	---
	Comp.3 circ.1:	Disable comp.3 circ.1 by user	0	---	0	1	0: NO 1: YES	D	---	---
Gg03	Disable compressors Comp.1 circ.2:	Disable comp.1 circ.2 by user	0	---	0	1	0: NO 1: YES	D	---	---
	Comp.2 circ.2:	Disable comp.2 circ.2 by user	0	---	0	1	0: NO 1: YES	D	---	---
	Comp.3 circ.2:	Disable comp.3 circ.2 by user	0	---	0	1	0: NO 1: YES	D	---	---
Gg04	Disable compressors Comp.1 circ.3:	Disable comp.1 circ.3 by user	0	---	0	1	0: NO 1: YES	D	---	---
	Comp.2 circ.3:	Disable comp.2 circ.3 by user	0	---	0	1	0: NO 1: YES	D	---	---
	Comp.3 circ.3:	Disable comp.3 circ.3 by user	0	---	0	1	0: NO 1: YES	D	---	---
Gg05	Disable compressors Comp.1 circ.4:	Disable comp.1 circ.4 by user	0	---	0	1	0: NO 1: YES	D	---	---
	Comp.2 circ.4:	Disable comp.2 circ.4 by user	0	---	0	1	0: NO 1: YES	D	---	---
	Comp.3 circ.4:	Disable comp.3 circ.4 by user	0	---	0	1	0: NO 1: YES	D	---	---
Gg06	Work in manual mode Comp.1 circ.1:	Enable comp.1 circ.1 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
	Comp.2 circ.1:	Enable comp.2 circ.1 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
	Comp.3 circ.1:	Enable comp.3 circ.1 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
	Liq.sol.circ.1:	Liquid solenoid valve circ.1 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
Gg07	Work in manual mode Comp.1 circ.2:	Enable comp.1 circ.2 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
	Comp.2 circ.2:	Enable comp.2 circ.2 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
	Comp.3 circ.2:	Enable comp.3 circ.2 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
	Liq.sol.circ.2:	Liquid solenoid valve circ.2 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
Gg08	Work in manual mode Comp.1 circ.3:	Enable comp.1 circ.3 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
	Comp.2 circ.3:	Enable comp.2 circ.3 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
	Comp.3 circ.3:	Enable comp.3 circ.3 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
	Liq.sol.circ.3:	Liquid solenoid valve circ.3 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
Gg09	Work in manual mode Comp.1 circ.4:	Enable comp.1 circ.4 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
	Comp.2 circ.4:	Enable comp.2 circ.4 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
	Comp.3 circ.4:	Enable comp.3 circ.4 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
	Liq.sol.circ.4:	Liquid solenoid valve circ.4 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
Gg10	Work in manual mode Evaporator pump1:	Evaporator pump1 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
	Evaporator pump2:	Evaporator pump2 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
Gg11	Work in manual mode Condensing pump1:	Condensing pump1 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
	Condensing pump2:	Condensing pump2 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
Gg12	Work in manual mode 4way valve circ.1:	4way valve circ.1 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
	4way valve circ.2:	4way valve circ.2 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
Gg13	Work in manual mode 4way valve circ.3:	4way valve circ.3 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
	4way valve circ.4:	4way valve circ.4 works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
Gg14	Work in manual mode Condenser fan 1:		0	%	0	100	---	I	---	---
	Condenser fan 2:		0	%	0	100		I	---	---
Gg15	Work in manual mode Antifreeze heater:	Antifreeze heater works in manual mode	0	---	0	1	0: NO 1: YES	D	---	---
Manufacturer										
Ha01	Unit type:	Physical circuit type	0	---	0	1	0: AIR/WATER 1: WATER/WATER	D	R/W	56
		Unit type	1	---	0	2	0: CHILLER ONLY 1: CHILLER/HEATPUMP 2: HEATPUMP ONLY	I	R/W	1
Ha02	Reverse cycle type:	Reverse cycle type	0	---	0	1	0: WATER 1: GAS	D	R/W	57
	Refrigerant type:	Refrigerant type	4	---	0	13	0: R22 1: R134a 2: R404a 3: R407c 4: R410a 5: R507 6: R290 7: R600 8: R600a 9: R717 10: R744 11: R728 12: R1270 13: R417a	I	R/W	2
Ha03	Circuit number:	Circuit number	1	---	1	4	---	I	R/W	3
	Compressor number per circuit:	Compressor number per circuit	2	---	1	3	---	I	R/W	4
Ha04	Evaporator number:	Evaporator number	1	---	1	4	---	I	R/W	5
	Condensation type:	Condensing type (show if not possible to set the condensation type)	0	---	0	1	0: Single 1: Separated	D	R/W	58
		Condensing type (show if possible to set the condensation type)	0	---	0	1	0: SINGLE 1: SEPARATED	D	R/W	58
Ha05	Devices rotation type:	Type of rotation	1	---	1	4	0: ------ 1: FIFO 2: LIFO 3: TIME 4: CUSTOM	I	R/W	6
	Equalized circuits power:	Sequence activation compressors:	0	---	0	1	0: PACKED 1: EQUALIZED	D	R/W	59
Ha06	Device power different size:	Enable different size power devices	0	---	0	1	0: NO 1: YES	D	---	---
	Device unload sequence:	Sequence of load unloader	0	---	1	2	0: -------- 1: CCpppppp 2: CpppCppp	I	R/W	7
Ha07	Pump-Down type:	PumpDown type	0	---	0	3	0: DISABLE 1: AT COMP.POWER OFF 2: AT COMP.POWER ON 3: AT COMP.POWER ON-OFF	I	R/W	8
Ha08	Evaporator pumps Number of pumps:	Number of evaporator pump	1	---	1	2	---	I	R/W	9
	Warnings limit max for flow lack:	Warnings limit evaporator pump	5	---	0	5		I	R/W	10
Ha09	Evaporator pumps Enable antiblock:	Enable antiblock evaporator pump	0	---	0	1	0: NO 1: YES	D	R/W	60
Ha10	Condenser pumps Number of pumps:	Number of condensator pump	1	---	1	2	---	I	R/W	11
	Warnings limit max for flow lack:	Warnings limit condensator pump	5	---	0	5		I	R/W	12
Ha11	Condenser pumps Enable antiblock:	Enable antiblock condensator pump	0	---	0	1	0: NO 1: YES	D	R/W	61
Ha12	Defrost type:	Defrost type	0	---	0	1	0: SEPARATED 1: SIMULTANEOUS	D	R/W	62
Ha13	Enable compensat.:	Enable setpoint compensation	0	---	0	1	0: NO 1: YES	D	R/W	63
	Conv. Press->Temp.:	Dew/Bubble point selection	0	---	0	1	0: DEW POINT 1: BUBBLE POINT	D	---	---
Ha14	Clock board:	Enable clock for pCO* without clock device on board	0	---	0	1	0: Disabled 1: Enabled	D	R/W	64
I/O Configuration										

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
Hb01	Probe config. En.high press.probe:	Enable high pressure probes	1	---	0	1	0: N 1: Y	D	---	---
	Type:	High pressure probe type	6	---	0	6	0: NTC 1: PT1000 2: 0-1V 3: 0-10V 4: 0-20mA/4-20mA 5: ON-OFF 6: 0-5V	I	---	---
	0-20mA/4-20mA:	HP 0-20mA/4-20mA selection	1	---	0	1	0: 0-20mA 1: 4-20mA	D	---	---
	Probe config. En.high press.probe:	Enable high pressure probes	1	---	0	1	0: N 1: Y	D	---	---
	Type:	High pressure probe type	6	---	0	6	0: NTC 1: PT1000 2: 0-1V 3: 0-10V 4: 0-20mA/4-20mA 5: ON-OFF 6: 0-5V	I	---	---
	0-20mA/4-20mA:	HP 0-20mA/4-20mA selection	1	---	0	1	0: 0-20mA 1: 4-20mA	D	---	---
Hb02	Probe config. High pressure probe Minimum:	HP probe min limit	0	barg	0	99,9	---	A	---	---
			0	psig	0	1448,6				
	Maximum:	HP probe max limit	34,5	barg	0	99,9	---	A	---	---
			514,8	psig	0	1448,6				
Hb03	Probe config. En.low press.probe:	Enable low pressure probes	1	---	0	1	0: N 1: Y	D	---	---
	Type:	Low pressure probe type	6	---	0	6	0: NTC 1: PT1000 2: 0-1V 3: 0-10V 4: 0-20mA/4-20mA 5: ON-OFF 6: 0-5V	I	---	---
	0-20mA/4-20mA:	LP 0-20mA/4-20mA selection	1	---	0	1	0: 0-20mA 1: 4-20mA	D	---	---
Hb04	Probe config. Low pressure probe Minimum:	LP probe min limit	0	barg	0	99,9	---	A	---	---
			0	psig	0	1448,6				
	Maximum:	LP probe max limit	34,5	barg	0	99,9	---	A	---	---
			514,8	psig	0	1448,6				
Hb05	Probe config. Enable outlet water evaporator probe:	Enable outlet water evap.reg.temp.probe	1	---	0	1	0: N 1: Y	D	---	---
	Enable inlet water evaporator probe:	Enable inlet water evap.reg.temp.probe	1	---	0	1	0: N 1: Y	D	---	---
Hb06	Probe config. Enable outlet water condenser probe:	Enable outlet water cond.temp.probes	1	---	0	1	0: N 1: Y	D	---	---
	Enable inlet water condenser probe:	Enable inlet water cond.reg.temp.probe	1	---	0	1	0: N 1: Y	D	---	---
Hb07	Probe config. Enable external temperature probe:	Enable external temp.probe	1	---	0	1	0: N 1: Y	D	---	---
Hb08	Master DIN logic 01= High press.circ.1:	DIN1 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
	02= Evap.water flow:	DIN2 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
Hb09	Master DIN logic 01= High press.circ.1:	DIN1 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
	02= Low press.circ.1:	DIN2 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
Hb10	Master DIN logic 03= Remote On-Off:	DIN3 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
Hb11	Master DIN logic 03= Remote On-Off:	DIN3 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
	04= Cond.water flow:	DIN4 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
Hb12	Master DIN logic 03= Remote On-Off:	DIN3 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
	04= Cooling/Heating:	DIN4 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
Hb13	Master DIN logic 05= Low press.circ.1:	DIN5 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
	06= Serious alarm:	DIN6 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
Hb14	Master DIN logic 05= Evap.water flow:	DIN5 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
	06= Ovrl.cmp.1 circ.1:	DIN6 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
Hb15	Master DIN logic 07= Ovrl.cmp.2 circ.1:	DIN7 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
	08= Serious alarm:	DIN8 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
Hb16	Master DIN logic 09= High press.circ.2:	DIN9 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
	10= Low press.circ.2:	DIN10 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
Hb17	Master DIN logic 11= Ovrl.cmp.1 circ.2:	DIN11 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
	12= Ovrl.cmp.2 circ.2:	DIN12 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
Hb18	Master DIN logic 13= Ovrl.evap.pump 1:	DIN13 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
Hb19	Master DIN logic 13= Ovrl.evap.pump 1:	DIN13 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
	14= Cond.water flow:	DIN14 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
Hb20	Master DIN logic 13= Ovrl.evap.pump 1:	DIN13 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
	14= Ovrl.evap.pump 2:	DIN14 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
Hb21	Master DIN logic 15= Ovrl.cmp.3 circ.1:	DIN15 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
	16= Ovrl.cmp.3 circ.2:	DIN16 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
Hb22	Master DIN logic 17= Cond.water flow:	DIN17 logic	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
Hb23	Slave DIN logic 01= High press.circ.3:	DIN1 logic of slave board	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
	02= Low press.circ.3:	DIN2 logic of slave board	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
Hb24	Slave DIN logic 06= Ovrl.cmp.1 circ.3:	DIN6 logic of slave board	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
	07= Ovrl.cmp.2 circ.3:	DIN7 logic of slave board	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
Hb25	Slave DIN logic 09= High press.circ.4:	DIN9 logic of slave board	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
	10= Low press.circ.4:	DIN10 logic of slave board	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
Hb26	Slave DIN logic 11= Ovrl.cmp.1 circ.4:	DIN11 logic of slave board	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
	12= Ovrl.cmp.2 circ.4:	DIN12 logic of slave board	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
Hb27	Slave DIN logic 13= Ovrl.evap.pump 2:	DIN13 logic of slave board	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
Hb28	Slave DIN logic 15= Ovrl.cmp.3 circ.3:	DIN15 logic of slave board	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
	16= Ovrl.cmp.3 circ.4:	DIN16 logic of slave board	0	---	0	1	0: NORMAL CLOSE 1: NORMAL OPEN	D	---	---
Hb29	Master DOUT logic 01= Evap.pump 1:	DOUT1 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
	02= Comp.1 circ.1:	DOUT2 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
Hb30	Master DOUT logic 01= Comp.1 circ.1:	DOUT1 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
	02= Comp.2 circ.1:	DOUT2 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
Hb31	Master DOUT logic 03= Antifreeze heater:	DOUT3 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
	04= Comp.2 circ.1:	DOUT4 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
Hb32	Master DOUT logic 03= Antifreeze heater:	DOUT3 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
	04= 4Way valve circ.1:	DOUT4 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
Hb33	Master DOUT logic 03= Comp.1 circ.2:	DOUT3 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
	04= Comp.2 circ.2:	DOUT4 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
Hb34	Master DOUT logic 05= Serious alarm:	DOUT5 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
	Master DOUT logic 05= Serious alarm:	DOUT5 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
Hb36	Master DOUT logic 05= Cond.fan group 1: or 05= Comp.2 circ.1:	DOUT5 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
	06= Cond.fan group 2:	DOUT6 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
Hb37	Master DOUT logic 05= Condensing pump 1:	DOUT5 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
	06= Condensing pump 2:	DOUT6 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
Hb38	Master DOUT logic 07= Antifreeze heater:	DOUT7 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
	08= Serious alarm:	DOUT8 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
Hb39	Master DOUT logic 09= Evaporator pump 1:	DOUT9 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
Hb40	Master DOUT logic 10= Liquid solenoid 1:	DOUT10 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
	11= Liquid solenoid 2:	DOUT11 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
Hb41	Master DOUT logic 12= 4Way valve circ.1:	DOUT12 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
	13= 4Way valve circ.2:	DOUT13 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
Hb42	Master DOUT logic 14= Comp.3 circ.1:	DOUT14 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
	15= Comp.3 circ.2:	DOUT15 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
Hb43	Master DOUT logic 16= Evaporator pump 2:	DOUT16 logic	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
Hb44	Slave DOUT logic 01= Comp.1 circ.3:	DOUT1 logic of slave board	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
	02= Comp.2 circ.3:	DOUT2 logic of slave board	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
Hb45	Slave DOUT logic 03= Comp.1 circ.4:	DOUT3 logic of slave board	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
	04= Comp.2 circ.4:	DOUT4 logic of slave board	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
Hb46	Slave DOUT logic 09= Evaporator pump 2:	DOUT9 logic of slave board	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
Hb47	Slave DOUT logic 10= Liquid solenoid 3:	DOUT10 logic of slave board	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
	11= Liquid solenoid 4:	DOUT11 logic of slave board	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
Hb48	Slave DOUT logic 12= 4Way valve circ.3:	DOUT12 logic of slave board	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
	13= 4Way valve circ.4:	DOUT13 logic of slave board	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
Hb49	Slave DOUT logic 14= Comp.3 circ.3:	DOUT14 logic of slave board	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
	15= Comp.3 circ.4:	DOUT15 logic of slave board	0	---	0	1	0: NORMAL OPEN 1: NORMAL CLOSE	D	---	---
Hb50	PWM Configuration Triac min:	PWM triac minimum value	0,7	%	0	999	---	I	---	---
	Triac max:	PWM triac maximum value	9,2	%	0	999	---	I	---	---
	Triac wave:	PWM triac wave	0,2	ms	0	999	---	A	---	---
Factory settings										
Hc01	Enable unit OnOff By supervisor:	Enable unit OnOff by supervisor:	0	---	0	1	0: NO 1: YES	D	---	---
	By digit input:	Enable unit OnOff by digital input:	0	---	0	1	0: NO 1: YES	D	---	---
Hc02	Date format:	Date format	1	---	1	3	0: --- 1: dd/mm/yy 2: mm/dd/yy 3: yy.mm.dd	I	R	14
Hc03	Unit measurement type:	UM changed in interface	1	---	1	2	0: --- 1: STANDARD(ßC - barg) 2: ANGLO-SAXON(ßF - psig)	I	---	---
	Enable change unit measurement by BMS:	Enable change unit of measure by BMS	0	---	0	1	0: NO 1: YES	D	---	---
Hc04	Custom rotation ON order 0:higher ÷ 15:lower	Custom rotation ON sequence: weight Dev1 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	15
		Custom rotation ON sequence: weight Dev2 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	16
		Custom rotation ON sequence: weight Dev3 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	17
		Custom rotation ON sequence: weight Dev4 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	18
		Custom rotation ON sequence: weight Dev1 Circ2 or Dev5 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	19
		Custom rotation ON sequence: weight Dev2 Circ2 or Dev6 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	20
		Custom rotation ON sequence: weight Dev3 Circ2 or Dev7 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	21
		Custom rotation ON sequence: weight Dev4 Circ2 or Dev8 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	22

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
		Custom rotation ON sequence: weight Dev1 Circ3 or Dev9 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	23
		Custom rotation ON sequence: weight Dev2 Circ3 or Dev10 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	24
		Custom rotation ON sequence: weight Dev3 Circ3 or Dev11 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	25
		Custom rotation ON sequence: weight Dev4 Circ3 or Dev12 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	26
		Custom rotation ON sequence: weight Dev1 Circ4 or Dev13 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	27
		Custom rotation ON sequence: weight Dev2 Circ4 or Dev14 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	28
		Custom rotation ON sequence: weight Dev3 Circ4 or Dev15 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	29
		Custom rotation ON sequence: weight Dev4 Circ4 or Dev16 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	30
Hc05	Custom rotation OFF order 0:higher ÷ 15:lower	Custom rotation OFF sequence: weight Dev1 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	31
		Custom rotation OFF sequence: weight Dev2 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	32
		Custom rotation OFF sequence: weight Dev3 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	33
		Custom rotation OFF sequence: weight Dev4 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	34
		Custom rotation OFF sequence: weight Dev1 Circ2 or Dev5 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	35
		Custom rotation OFF sequence: weight Dev2 Circ2 or Dev6 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	36
		Custom rotation OFF sequence: weight Dev3 Circ2 or Dev7 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	37
		Custom rotation OFF sequence: weight Dev4 Circ2 or Dev8 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	38
		Custom rotation OFF sequence: weight Dev1 Circ3 or Dev9 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	39
		Custom rotation OFF sequence: weight Dev2 Circ3 or Dev10 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	40
		Custom rotation OFF sequence: weight Dev3 Circ3 or Dev11 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	41
		Custom rotation OFF sequence: weight Dev4 Circ3 or Dev12 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	42
		Custom rotation OFF sequence: weight Dev1 Circ4 or Dev13 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	43
		Custom rotation OFF sequence: weight Dev2 Circ4 or Dev14 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	44
		Custom rotation OFF sequence: weight Dev3 Circ4 or Dev15 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	45
		Custom rotation OFF sequence: weight Dev4 Circ4 or Dev16 Circ1 (0: High; 15: Low)	0	---	0	15	---	I	R/W	46
Hc06	Compressors Min ON time:	Compressors min ON time	60	s	0	999	---	I	R/W	47
	Min OFF time:	Compressors min OFF time	360	s	0	999		I	R/W	48
	Min time between same comp.start:	Min start time between same compressor	450	s	0	999		I	R/W	49
Hc07	Enable prevent High pressure:	Enable high pressure prevent	1	---	0	1	0: NO 1: YES	D	R/W	65
	Low pressure:	Enable low pressure prevent	1	---	0	1	0: NO 1: YES	D	R/W	66
	Antifreeze:	Enable antifreeze prevent	1	---	0	1	0: NO 1: YES	D	R/W	67
Hc08	Antifreeze alarm Threshold:	Freeze alarm setpoint	3	°C	-99,9	9,9	---	A	R/W	53
			37,4	°F	-17,8	17,8	---	A		
	Differential:	Freeze alarm differential	1	°C	0	60	---	A	R/W	54
			1,8	°F	0	108	---	A		
Hc09	Antifreeze heater Setpoint:	Heater threshold	5	°C	-99,9	9,9	---	A	R/W	49
			41	°F	-17,8	17,8	---	A		
	Differential:	Heater differential	1	°C	0	60	---	A	R/W	50
			1,8	°F	0	108	---	A		
Hc10	Antifreeze force off compressors Offset from antifreeze threshold:	Force off comps.offset by antifreeze	1,5	°C	0	60	---	A	---	---
			34	°F	0	108	---	A		
	Differential:	Force off comps.differential by antifreeze	1	°C	0	60	---	A	---	---
			33	°F	0	108	---	A		
Initialization										
Hd01	Insert new manufacture password (PW2):	New manufacturer password	1234	---	0	9999	---	I	---	---
Hd02	DEFAULT INSTALLATION Erase user settings and install global default value:	Default require by manufacturer menu	0	---	0	1	0: NO 1: YES	I	---	---
Hd03	Save unit configuration:	Save current unit configuration	0	---	0	1	---	D	---	---
	Last saving:	Last saving date: Day	---	day	0	31	---	I	---	---
		Last saving date: Month	---	month	0	12	---	I	---	---
		Last saving date: Year	---	year	0	99	---	I	---	---
Input/Output Test										
He01	IO test config. Max test time:	I/O test maximum time	180	---	0	999	---	I	---	---
	Enable IO test:	Enable physical input-output test	0	---	0	1	0: NO 1: YES	D	---	---
He02	Master AIN test B1= -> 0-1000	Prove type description	0	---	0	9	0: NTC 1: PT1000 2: 0-1V	I	---	---

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
							3: 0-10V			
							4: 0-20mA			
							5: On/Off			
							6: 0-5V			
							7: 4-20mA			
	Force to:	Value to force the high pressure circuit 1 probe	0	---	0	1000	---	I	---	---
	High pressure circ.1:	High pressure circuit 1	0	barg/psig	-999,9	999,9	---	A	R	1
	->	High pressure circuit 1 converted to temperature	0	°C/°F	-999,9	999,9	---	A	R	2
He03	Master AIN test B2= NTC -> 0-1000 Force to:	Value to force the external temperature probe	0	---	0	1000	---	I	---	---
	External temperature:	External temperature	0	°C/°F	-999,9	999,9		I	R	28
He04	Master AIN test B2= -> 0-1000	Prove type description	0	---	0	9	0: NTC	I	---	---
							1: PT1000			
							2: 0-1V			
							3: 0-10V			
							4: 0-20mA			
							5: On/Off			
							6: 0-5V			
							7: 4-20mA			
	Force to:	Value to force the low pressure circuit 1 probe	0	---	0	1000	---	I	---	---
	Low pressure circ.1:	Low pressure circuit 1	0	barg/psig	-999,9	999,9	---	A	R	9
	->	Low pressure circuit 1 converted to temperature	0	°C/°F	-999,9	999,9	---	A	R	10
He05	Master AIN test B3= NTC -> 0-1000 Force to:	Value to force the outlet water evaporator temperature probe	0	---	0	1000	---	I	---	---
	Outlet water evap. temperature:	Outlet water evaporator temperature	0	°C/°F	-999,9	999,9	---	I	R	18
He06	Master AIN test B3= NTC -> 0-1000 Force to:	Value to force the evaporator water temperature probe	0	---	0	1000	---	I	---	---
	Evaporator water temperature:	Evaporator water temperature	0	---	-999,9	999,9	---	I	R	18
He07	Master AIN test B4= NTC -> 0-1000 Force to:	Value to force the inlet water evaporator temperature probe	0	---	0	1000	---	I	---	---
	Inlet water evap. temperature:	Inlet water evaporator temperature	0	°C/°F	-999,9	999,9	---	I	R	17
He08	Master AIN test B4= NTC -> 0-1000 Force to:	Value to force the outlet water condensator 2 temperature probe	0	---	0	1000	---	I	---	---
	Outlet water cond.2 temperature:	Outlet water condensator 2 temperature	0	°C/°F	-999,9	999,9	---	I	R	24
He09	Master AIN test B5= NTC -> 0-1000 Force to:	Value to force the outlet water evaporator 1 temperature probe	0	---	0	1000	---	I	---	---
	Outlet water evap.1 temperature:	Outlet water evaporator 1 temperature	0	°C/°F	-999,9	999,9	---	I	R	19
He10	Master AIN test B5= NTC -> 0-1000 Force to:	Value to force the inlet water condensator temperature probe	0	---	0	1000	---	I	---	---
	Inlet water cond. temperature:	Inlet water condensator temperature	0	°C/°F	-999,9	999,9	---	I	R	27
He11	Master AIN test B5= NTC -> 0-1000 Force to:	Value to force the outlet water condensator 1 temperature probe	0	---	0	1000	---	I	---	---
	Outlet water cond.1 temperature:	Outlet water condensator 1 temperature	0	°C/°F	-999,9	999,9		I	R	23
He12	Master AIN test B6= -> 0-1000	Prove type description	0	---	0	9	0: NTC	I	---	---
							1: PT1000			
							2: 0-1V			
							3: 0-10V			
							4: 0-20mA			
							5: On/Off			
							6: 0-5V			
							7: 4-20mA			
	Force to:	Value to force the high pressure circuit 2 probe	0	---	0	1000		I	---	---
	High pressure circ.2:	High pressure circuit 2	0	barg/psig	-999,9	999,9		I	R	3
	->	High pressure circuit 2 converted to temperature	0	°C/°F	-999,9	999,9		A	R	4
He13	Master AIN test B7= -> 0-1000	Prove type description	0	---	0	9	0: NTC	I	---	---
							1: PT1000			
							2: 0-1V			
							3: 0-10V			
							4: 0-20mA			
							5: On/Off			
							6: 0-5V			
							7: 4-20mA			
	Force to:	Value to force the low pressure circuit 2 probe	0	---	0	1000	---	I	---	---
	Low pressure circ.2:	Low pressure circuit 2	0	barg/psig	-999,9	999,9	---	I	R	11
	->	Low pressure circuit 2 converted to temperature	0	°C/°F	-999,9	999,9	---	A	R	12

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
He14	Master AIN test B8= NTC -> 0-1000 Force to:	Value to force the outlet water evaporator 2 temperature probe	0	---	0	1000	---	I	---	---
	Outlet water evap.2 temperature:	Outlet water evaporator 2 temperature	0	°C/°F	-999,9	999,9	---	A	R	20
He15	Master AIN test B8= NTC -> 0-1000 Force to:	Value to force the external temperature probe	0	---	0	1000	---	I	---	---
	External temperature:	External temperature	0	°C/°F	-999,9	999,9	---	A	R	28
He16	Master AIN test B9= NTC -> 0-1000 Force to:	Value to force the external temperature probe	0	---	0	1000	---	I	---	---
	External temperature:	External temperature	0	°C/°F	-999,9	999,9	---	A	R	28
He17	Master AIN test B10= NTC -> 0-1000 Force to:	Value to force the inlet water condensator temperature probe	0	---	0	1000	---	I	---	---
	Inlet water cond. temperature:	Inlet water condensator temperature	0	°C/°F	-999,9	999,9	---	A	R	27
He18	Master AIN test B10= NTC -> 0-1000 Force to:	Value to force the outlet water condensator 1 temperature probe	0	---	0	1000	---	I	---	---
	Outlet water cond.1 temperature:	Outlet water condensator 1 temperature	0	°C/°F	-999,9	999,9		A	R	23
He19	Slave AIN test B1= -> 0-1000	Prove type description	0	---	0	9	0: NTC 1: PT1000 2: 0-1V 3: 0-10V 4: 0-20mA 5: On/Off 6: 0-5V 7: 4-20mA	I	---	---
	Force to:	Value to force the high pressure circuit 3 probe	0	---	0	1000		I	---	---
	High pressure circ.3:	High pressure circuit 3	0	barg/psig	-999,9	999,9		A	R	5
	->	High pressure circuit 3 converted to temperature	0	°C/°F	-999,9	999,9		A	R	6
He20	Slave AIN test B2= -> 0-1000	Prove type description	0	---	0	9	0: NTC 1: PT1000 2: 0-1V 3: 0-10V 4: 0-20mA 5: On/Off 6: 0-5V 7: 4-20mA	I	---	---
	Force to:	Value to force the low pressure circuit 3 probe	0	---	0	1000	---	I	---	---
	Low pressure circ.3:	Low pressure circuit 3	0	barg/psig	-999,9	999,9	---	A	R	13
	->	Low pressure circuit 3 converted to temperature	0	°C/°F	-999,9	999,9	---	A	R	14
He21	Slave AIN test B4= NTC -> 0-1000 Force to:	Value to force the outlet water condensator 4 temperature probe	0	---	0	1000	---	I	---	---
	Outlet water cond.4 temperature:	Outlet water condensator 4 temperature	0	°C/°F	-999,9	999,9	---	A	R	26
He22	Slave AIN test B5= NTC -> 0-1000 Force to:	Value to force the outlet water evaporator temperature probe	0	---	0	1000	---	I	---	---
	Outlet water evap. temperature:	Outlet water evaporator temperature	0	°C/°F	-999,9	999,9		A	R	18
He23	Slave AIN test B6= -> 0-1000	Prove type description	0	---	0	9	0: NTC 1: PT1000 2: 0-1V 3: 0-10V 4: 0-20mA 5: On/Off 6: 0-5V 7: 4-20mA	I	---	---
	Force to:	Value to force the high pressure circuit 4 probe	0	---	0	1000		I	---	---
	High pressure circ.4:	High pressure circuit 4	0	°C/°F	-999,9	999,9		A	R	7
	->	High pressure circuit 4 converted to temperature	0	°C/°F	-999,9	999,9		A	R	8
He24	Slave AIN test B7= -> 0-1000	Prove type description	0	---	0	9	0: NTC 1: PT1000 2: 0-1V 3: 0-10V 4: 0-20mA 5: On/Off 6: 0-5V 7: 4-20mA	I	---	---
	Force to:	Value to force the low pressure circuit 4 probe	0	---	0	1000	---	I	---	---
	Low pressure circ.4:	Low pressure circuit 4	0	°C/°F	-999,9	999,9	---	A	R	15
	->	Low pressure circuit 4 converted to temperature	0	°C/°F	-999,9	999,9	---	A	R	16
He25	Slave AIN test B8= NTC -> 0-1000 Force to:	Value to force the outlet water evaporator 4 temperature probe	0	---	0	1000	---	I	---	---

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
	Outlet water evap.4 temperature:	Outlet water evaporator 4 temperature	0	°C/°F	-999,9	999,9	---	A	R	22
He26	Slave AIN test B10= NTC -> 0-1000 Force to:	Value to force the outlet water condensator temperature probe	0	---	0	1000	---	I	---	---
	Outlet water cond. Temperature:	Outlet water condensator 2 temperature (if unit 4 circuit 2 evaporator)	0	°C/°F	-999,9	999,9		A	R	24
		Outlet water evaporator 3 temperature (all other cases)	0	°C/°F	-999,9	999,9		A	R	25
He27	Master DIN test 01= High press.circ.1:	Test DIN 1 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	1
	02= Evap.water flow:	Test DIN 2 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	2
He28	Master DIN test 01= High press.circ.1:	Test DIN 1 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	1
	02= Low press.circ.1:	Test DIN 2 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	2
He29	Master DIN test 03= Remote On-Off:	Test DIN 3 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	3
He30	Master DIN test 03= Remote On-Off:	Test DIN 3 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	3
	04= Cond.water flow:	Test DIN 4 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	4
He31	Master DIN test 03= Remote On-Off:	Test DIN 3 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	3
	04= Cooling/Heating:	Test DIN 4 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	4
He32	Master DIN test 05= Low press.circ.1:	Test DIN 5 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	5
	06= Serious alarm:	Test DIN 6 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	6
He33	Master DIN test 05= Evap.water flow:	Test DIN 5 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	5
	06= Ovrl.cmp.1 circ.1:	Test DIN 6 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	6
He34	Master DIN test 07= Ovrl.cmp.2 circ.1:	Test DIN 7 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	7
	08= Serious alarm:	Test DIN 8 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	8
He35	Master DIN test 09= High press.circ.2:	Test DIN 9 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	9
	10= Low press.circ.2:	Test DIN 10 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	10
He36	Master DIN test 11= Ovrl.cmp.1 circ.2:	Test DIN 11 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	11
	12= Ovrl.cmp.2 circ.2:	Test DIN 12 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	12
He37	Master DIN test 13= Ovrl.evap.pump 1:	Test DIN 13 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	13
He38	Master DIN test 13= Ovrl.evap.pump 1:	Test DIN 13 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	13
	14= Cond.water flow:	Test DIN 14 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	14
He39	Master DIN test 13= Ovrl.evap.pump 1:	Test DIN 13 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	13
	14= Ovrl.evap.pump 2:	Test DIN 14 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	14
He40	Master DIN test 15= Ovrl.cmp.3 circ.1:	Test DIN 15 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	15
	16= Ovrl.cmp.3 circ.2:	Test DIN 16 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	16
He41	Master DIN test 17= Cond.water flow:	Test DIN 17 master board	0	---	0	1	0: CLOSE 1: OPEN	D	R	17
He42	Slave DIN test 01= High press.circ.3:	Test DIN 1 slave board	0	---	0	1	0: CLOSE 1: OPEN	D	---	---
	02= Low press.circ.3:	Test DIN 2 slave board	0	---	0	1	0: CLOSE 1: OPEN	D	---	---
He43	Slave DIN test 06= Ovrl.cmp.1 circ.3:	Test DIN 6 slave board	0	---	0	1	0: CLOSE 1: OPEN	D	---	---
	07= Ovrl.cmp.2 circ.3:	Test DIN 7 slave board	0	---	0	1	0: CLOSE 1: OPEN	D	---	---
He44	Slave DIN test 09= High press.circ.4:	Test DIN 9 slave board	0	---	0	1	0: CLOSE 1: OPEN	D	---	---
	10= Low press.circ.4:	Test DIN 10 slave board	0	---	0	1	0: CLOSE 1: OPEN	D	---	---
He45	Slave DIN test 11= Ovrl.cmp.1 circ.4:	Test DIN 11 slave board	0	---	0	1	0: CLOSE 1: OPEN	D	---	---
	12= Ovrl.cmp.2 circ.4:	Test DIN 12 slave board	0	---	0	1	0: CLOSE 1: OPEN	D	---	---
He46	Slave DIN test 13= Ovrl.evap.pump 2:	Test DIN 13 slave board	0	---	0	1	0: CLOSE 1: OPEN	D	---	---

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
He47	Slave DIN test 15= Ovrl.cmp.3 circ.3:	Test DIN 15 slave board	0	---	0	1	0: CLOSE 1: OPEN	D	---	---
	16= Ovrl.cmp.3 circ.4:	Test DIN 16 slave board	0	---	0	1	0: CLOSE 1: OPEN	D	---	---
He48	Master DOUT test 01= Evap.pump 1:	Test DOUT 1 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	18
	02= Comp.1 circ.1:	Test DOUT 2 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	19
He49	Master DOUT test 01= Comp.1 circ.1:	Test DOUT 1 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	18
	02= Comp.2 circ.1:	Test DOUT 2 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	19
He50	Master DOUT test 03= Antifreeze heater:	Test DOUT 3 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	20
	04= Comp.2 circ.1:	Test DOUT 4 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	21
He51	Master DOUT test 03= Antifreeze heater:	Test DOUT 3 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	20
	04= 4Way valve circ.1:	Test DOUT 4 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	21
He52	Master DOUT test 03= Comp.1 circ.2:	Test DOUT 3 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	20
	04= Comp.2 circ.2:	Test DOUT 4 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	21
He53	Master DOUT test 05= Serious alarm:	Test DOUT 5 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	22
	Master DOUT test 05= Serious alarm: or Comp.2 circ.1:		0	---	0	1	0: OPEN 1: CLOSE	D	R	---
He55	Master DOUT test 05= Cond.fan group 1:	Test DOUT 5 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	22
	06= Cond.fan group 2:	Test DOUT 6 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	23
He56	Master DOUT test 05= Condensing pump 1:	Test DOUT 5 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	22
	06= Condensing pump 2:	Test DOUT 6 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	23
He57	Master DOUT test 07= Antifreeze heater:	Test DOUT 7 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	24
	08= Serious alarm:	Test DOUT 8 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	25
He58	Master DOUT test 09= Evaporator pump 1:	Test DOUT 9 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	26
He59	Master DOUT test 10= Liquid solenoid 1:	Test DOUT 10 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	27
	11= Liquid solenoid 2:	Test DOUT 11 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	28
He60	Master DOUT test 12= 4Way valve circ.1:	Test DOUT 12 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	29
	13= 4Way valve circ.2:	Test DOUT 13 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	30
He61	Master DOUT test 14= Comp.3 circ.1:	Test DOUT 14 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	31
	15= Comp.3 circ.2:	Test DOUT 15 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	32
He62	Master DOUT test 16= Evaporator pump 2:	Test DOUT 16 master board	0	---	0	1	0: OPEN 1: CLOSE	D	R	33
He63	Slave DOUT test 01= Comp.1 circ.3:	Test DOUT 1 slave board	0	---	0	1	0: OPEN 1: CLOSE	D	---	---
	02= Comp.2 circ.3:	Test DOUT 2 slave board	0	---	0	1	0: OPEN 1: CLOSE	D	---	---
He64	Slave DOUT test 03= Comp.1 circ.4:	Test DOUT 3 slave board	0	---	0	1	0: OPEN 1: CLOSE	D	---	---
	04= Comp.2 circ.4:	Test DOUT 4 slave board	0	---	0	1	0: OPEN 1: CLOSE	D	---	---
He65	Slave DOUT test 09= Evaporator pump 2:	Test DOUT 9 slave board	0	---	0	1	0: OPEN 1: CLOSE	D	---	---
He66	Slave DOUT test 10= Liquid solenoid 3:	Test DOUT 10 slave board	0	---	0	1	0: OPEN 1: CLOSE	D	---	---
	11= Liquid solenoid 4:	Test DOUT 11 slave board	0	---	0	1	0: OPEN 1: CLOSE	D	---	---
He67	Slave DOUT test 12= 4Way valve circ.3:	Test DOUT 12 slave board	0	---	0	1	0: OPEN 1: CLOSE	D	---	---
	13= 4Way valve circ.4:	Test DOUT 13 slave board	0	---	0	1	0: OPEN 1: CLOSE	D	---	---
He68	Slave DOUT test	Test DOUT 14 slave board	0	---	0	1	0: OPEN	D	---	---

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
	14= Comp.3 circ.3:						1: CLOSE			
	15= Comp.3 circ.4:	Test DOUT 15 slave board	0	---	0	1	0: OPEN	D	---	---
							1: CLOSE			
He69	Master AOUT test Y1= Cond.fan group 1:	Test AOUT 1 master board	0	---	0	1000	---	I	R	92
He70	Master AOUT test Y1= Condensing pump:	Test AOUT 1 master board	0	---	0	1000	---	I	R	92
He71	Master AOUT test Y1= Cond.fan group 1:	Test AOUT 1 master board	0	---	0	1000	---	I	R	92
	Y2= Cond.fan group 2:	Test AOUT 2 master board	0	---	0	1000		I	R	93
Quick menu			---	---	---	---	---	---	---	---
M01	HP1:	High pressure circuit 1	0	barg/psig	0	999,9	---	A	R	1
	->	High pressure circuit 1 converted to temperature	0	°C/°F	-999,9	999,9		A	R	2
	LP1:	Low pressure circuit 1	0	barg/psig	0	999,9		A	R	9
	->	Low pressure circuit 1 converted to temperature	0	°C/°F	-999,9	999,9		A	R	10
	Comp1:	Compressor 1 circuit 1 current status	---	---	0	14	0: Off	I	---	---
							1: Start-up		---	---
							1: Start-up		---	---
							2: On		---	---
							2: On		---	---
							3: Stage 2		---	---
							3: Stage 2		---	---
							4: Stage 3		---	---
							4: Stage 3		---	---
							5: Stage 4		---	---
							5: Stage 4		---	---
							6: Force off		---	---
							6: Force off		---	---
							7: Limit to stage 1		---	---
							7: Limit to stage 1		---	---
							8: Limit to stage 2		---	---
							8: Limit to stage 2		---	---
							9: Limit to stage 3		---	---
							9: Limit to stage 3		---	---
							10: Off by alarm		---	---
							10: Off by alarm		---	---
							11: Off		---	---
							11: Off		---	---
							12: On waiting s		---	---
							12: On waiting s		---	---
							13: Manual mode		---	---
							13: Manual mode		---	---
							14: On by pump-down		---	---
							14: On by pump-down		---	---
	Off waiting	Compressor 1 circuit 1 minimum time off count down time	---	s	0	999	---	I	---	---
	Comp2:	Compressor 2 circuit 1 current status	---	---	0	14	0: Off	I	---	---
							1: Start-up		---	---
							1: Start-up		---	---
							2: On		---	---
							2: On		---	---
							3: Stage 2		---	---
							3: Stage 2		---	---
							4: Stage 3		---	---
							4: Stage 3		---	---
							5: Stage 4		---	---
							5: Stage 4		---	---
							6: Force off		---	---
							6: Force off		---	---
							7: Limit to stage 1		---	---
							7: Limit to stage 1		---	---
							8: Limit to stage 2		---	---
							8: Limit to stage 2		---	---
							9: Limit to stage 3		---	---
							9: Limit to stage 3		---	---
							10: Off by alarm		---	---
							10: Off by alarm		---	---
							11: Off		---	---
							11: Off		---	---
							12: On waiting s		---	---
							12: On waiting s		---	---
							13: Manual mode		---	---
							13: Manual mode		---	---
							14: On by pump-down		---	---
							14: On by pump-down		---	---
	Off waiting	Compressor 2 circuit 1 minimum time off count down time	---	s	0	999	---	I	---	---
	Comp1:	Compressor 3 circuit 1 current status	---	---	0	14	0: Off	I	---	---
							1: Start-up			

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
							1: Start-up			
							2: On			
							2: On			
							3: Stage 2			
							3: Stage 2			
							4: Stage 3			
							4: Stage 3			
							5: Stage 4			
							5: Stage 4			
							6: Force off			
							6: Force off			
							7: Limit to stage 1			
							7: Limit to stage 1			
							8: Limit to stage 2			
							8: Limit to stage 2			
							9: Limit to stage 3			
							9: Limit to stage 3			
							10: Off by alarm			
							10: Off by alarm			
							11: Off			
							11: Off			
							12: On waiting s			
							12: On waiting s			
							13: Manual mode			
							13: Manual mode			
							14: On by pump-down			
							14: On by pump-down			
	Off waiting	Compressor 3 circuit 1 minimum time off count down time	---	s	0	999	---	I	---	---
M02	HP2:	High pressure circuit 2	0	barg/psig	0	999,9	---	A	R	1
	->	High pressure circuit 2converted to temperature	0	°C/°F	-999,9	999,9		A	R	2
	LP2:	Low pressure circuit 2	0	barg/psig	0	999,9		A	R	9
	->	Low pressure circuit 2 converted to temperature	0	°C/°F	-999,9	999,9		A	R	10
	Comp1:	Compressor 1 circuit 2 current status	---	---	0	14	0: Off	I	---	---
							1: Start-up		---	---
							1: Start-up		---	---
							2: On		---	---
							2: On		---	---
							3: Stage 2		---	---
							3: Stage 2		---	---
							4: Stage 3		---	---
							4: Stage 3		---	---
							5: Stage 4		---	---
							5: Stage 4		---	---
							6: Force off		---	---
							6: Force off		---	---
							7: Limit to stage 1		---	---
							7: Limit to stage 1		---	---
							8: Limit to stage 2		---	---
							8: Limit to stage 2		---	---
							9: Limit to stage 3		---	---
							9: Limit to stage 3		---	---
							10: Off by alarm		---	---
							10: Off by alarm		---	---
							11: Off		---	---
							11: Off		---	---
							12: On waiting s		---	---
							12: On waiting s		---	---
							13: Manual mode		---	---
							13: Manual mode		---	---
							14: On by pump-down		---	---
							14: On by pump-down		---	---
	Off waiting	Compressor 1 circuit 2 minimum time off count down time	---	s	0	999	---	I	---	---
	Comp2:	Compressor 2 circuit 2 current status	---	---	0	14	0: Off	I	---	---
							1: Start-up		---	---
							1: Start-up		---	---
							2: On		---	---
							2: On		---	---
							3: Stage 2		---	---
							3: Stage 2		---	---
							4: Stage 3		---	---
							4: Stage 3		---	---
							5: Stage 4		---	---
							5: Stage 4		---	---
							6: Force off		---	---
							6: Force off		---	---
							7: Limit to stage 1		---	---
							7: Limit to stage 1		---	---

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
							8: Limit to stage 2		---	---
							8: Limit to stage 2		---	---
							9: Limit to stage 3		---	---
							9: Limit to stage 3		---	---
							10: Off by alarm		---	---
							10: Off by alarm		---	---
							11: Off		---	---
							11: Off		---	---
							12: On waiting s		---	---
							12: On waiting s		---	---
							13: Manual mode		---	---
							13: Manual mode		---	---
							14: On by pump-down		---	---
							14: On by pump-down		---	---
	Off waiting	Compressor 2 circuit 2 minimum time off count down time	---	s	0	999	---	I	---	---
	Comp1:	Compressor 3 circuit 2 current status	---	---	0	14	0: Off	I	---	---
							1: Start-up			
							1: Start-up			
							2: On			
							2: On			
							3: Stage 2			
							3: Stage 2			
							4: Stage 3			
							4: Stage 3			
							5: Stage 4			
							5: Stage 4			
							6: Force off			
							6: Force off			
							7: Limit to stage 1			
							7: Limit to stage 1			
							8: Limit to stage 2			
							8: Limit to stage 2			
							9: Limit to stage 3			
							9: Limit to stage 3			
							10: Off by alarm			
							10: Off by alarm			
							11: Off			
							11: Off			
							12: On waiting s			
							12: On waiting s			
							13: Manual mode			
							13: Manual mode			
							14: On by pump-down			
							14: On by pump-down			
	Off waiting	Compressor 3 circuit 2 minimum time off count down time	---	s	0	999	---	I	---	---
M03	HP3:	High pressure circuit 3	0	barg/psig	0	999,9	---	A	R	1
	->	High pressure circuit 3 converted to temperature	0	°C/°F	-999,9	999,9		A	R	2
	LP3:	Low pressure circuit 3	0	barg/psig	0	999,9		A	R	9
	->	Low pressure circuit 3 converted to temperature	0	°C/°F	-999,9	999,9		A	R	10
	Comp1:	Compressor 1 circuit 3 current status	---	---	0	14	0: Off	I	---	---
							1: Start-up		---	---
							1: Start-up		---	---
							2: On		---	---
							2: On		---	---
							3: Stage 2		---	---
							3: Stage 2		---	---
							4: Stage 3		---	---
							4: Stage 3		---	---
							5: Stage 4		---	---
							5: Stage 4		---	---
							6: Force off		---	---
							6: Force off		---	---
							7: Limit to stage 1		---	---
							7: Limit to stage 1		---	---
							8: Limit to stage 2		---	---
							8: Limit to stage 2		---	---
							9: Limit to stage 3		---	---
							9: Limit to stage 3		---	---
							10: Off by alarm		---	---
							10: Off by alarm		---	---
							11: Off		---	---
							11: Off		---	---
							12: On waiting s		---	---
							12: On waiting s		---	---
							13: Manual mode		---	---
							13: Manual mode		---	---
							14: On by pump-down		---	---

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
							14: On by pump-down		---	---
	Off waiting	Compressor 1 circuit 3 minimum time off count down time	---	s	0	999	---	I	---	---
	Comp2:	Compressor 2 circuit 3 current status	---	---	0	14	0: Off	I	---	---
							1: Start-up		---	---
							1: Start-up		---	---
							2: On		---	---
							2: On		---	---
							3: Stage 2		---	---
							3: Stage 2		---	---
							4: Stage 3		---	---
							4: Stage 3		---	---
							5: Stage 4		---	---
							5: Stage 4		---	---
							6: Force off		---	---
							6: Force off		---	---
							7: Limit to stage 1		---	---
							7: Limit to stage 1		---	---
							8: Limit to stage 2		---	---
							8: Limit to stage 2		---	---
							9: Limit to stage 3		---	---
							9: Limit to stage 3		---	---
							10: Off by alarm		---	---
							10: Off by alarm		---	---
							11: Off		---	---
							11: Off		---	---
							12: On waiting s		---	---
							12: On waiting s		---	---
							13: Manual mode		---	---
							13: Manual mode		---	---
							14: On by pump-down		---	---
							14: On by pump-down		---	---
	Off waiting	Compressor 2 circuit 3 minimum time off count down time	---	s	0	999	---	I	---	---
	Comp1:	Compressor 3 circuit 3 current status	---	---	0	14	0: Off	I	---	---
							1: Start-up			
							1: Start-up			
							2: On			
							2: On			
							3: Stage 2			
							3: Stage 2			
							4: Stage 3			
							4: Stage 3			
							5: Stage 4			
							5: Stage 4			
							6: Force off			
							6: Force off			
							7: Limit to stage 1			
							7: Limit to stage 1			
							8: Limit to stage 2			
							8: Limit to stage 2			
							9: Limit to stage 3			
							9: Limit to stage 3			
							10: Off by alarm			
							10: Off by alarm			
							11: Off			
							11: Off			
							12: On waiting s			
							12: On waiting s			
							13: Manual mode			
							13: Manual mode			
							14: On by pump-down			
							14: On by pump-down			
	Off waiting	Compressor 3 circuit 3 minimum time off count down time	---	s	0	999	---	I	---	---
M04	HP4:	High pressure circuit 4	0	barg/psig	0	999,9	---	A	R	1
	->	High pressure circuit 4 converted to temperature	0	°C/°F	-999,9	999,9		A	R	2
	LP4:	Low pressure circuit 4	0	barg/psig	0	999,9		A	R	9
	->	Low pressure circuit 4 converted to temperature	0	°C/°F	-999,9	999,9		A	R	10
	Comp1:	Compressor 1 circuit 4 current status	---	---	0	14	0: Off	I	---	---
							1: Start-up		---	---
							1: Start-up		---	---
							2: On		---	---
							2: On		---	---
							3: Stage 2		---	---
							3: Stage 2		---	---
							4: Stage 3		---	---
							4: Stage 3		---	---
							5: Stage 4		---	---

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
							5: Stage 4		---	---
							6: Force off		---	---
							6: Force off		---	---
							7: Limit to stage 1		---	---
							7: Limit to stage 1		---	---
							8: Limit to stage 2		---	---
							8: Limit to stage 2		---	---
							9: Limit to stage 3		---	---
							9: Limit to stage 3		---	---
							10: Off by alarm		---	---
							10: Off by alarm		---	---
							11: Off		---	---
							11: Off		---	---
							12: On waiting s		---	---
							12: On waiting s		---	---
							13: Manual mode		---	---
							13: Manual mode		---	---
							14: On by pump-down		---	---
							14: On by pump-down		---	---
	Off waiting	Compressor 1 circuit 4 minimum time off count down time	---	s	0	999	---	I	---	---
	Comp2:	Compressor 2 circuit 4 current status	---	---	0	14	0: Off	I	---	---
							1: Start-up		---	---
							1: Start-up		---	---
							2: On		---	---
							2: On		---	---
							3: Stage 2		---	---
							3: Stage 2		---	---
							4: Stage 3		---	---
							4: Stage 3		---	---
							5: Stage 4		---	---
							5: Stage 4		---	---
							6: Force off		---	---
							6: Force off		---	---
							7: Limit to stage 1		---	---
							7: Limit to stage 1		---	---
							8: Limit to stage 2		---	---
							8: Limit to stage 2		---	---
							9: Limit to stage 3		---	---
							9: Limit to stage 3		---	---
							10: Off by alarm		---	---
							10: Off by alarm		---	---
							11: Off		---	---
							11: Off		---	---
							12: On waiting s		---	---
							12: On waiting s		---	---
							13: Manual mode		---	---
							13: Manual mode		---	---
							14: On by pump-down		---	---
							14: On by pump-down		---	---
	Off waiting	Compressor 2 circuit 4 minimum time off count down time	---	s	0	999	---	I	---	---
	Comp1:	Compressor 3 circuit 4 current status	---	---	0	14	0: Off	I	---	---
							1: Start-up			
							1: Start-up			
							2: On			
							2: On			
							3: Stage 2			
							3: Stage 2			
							4: Stage 3			
							4: Stage 3			
							5: Stage 4			
							5: Stage 4			
							6: Force off			
							6: Force off			
							7: Limit to stage 1			
							7: Limit to stage 1			
							8: Limit to stage 2			
							8: Limit to stage 2			
							9: Limit to stage 3			
							9: Limit to stage 3			
							10: Off by alarm			
							10: Off by alarm			
							11: Off			
							11: Off			
							12: On waiting s			
							12: On waiting s			
							13: Manual mode			
							13: Manual mode			
							14: On by pump-down			

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
							14: On by pump-down			
	Off waiting	Compressor 3 circuit 4 minimum time off count down time	---	s	0	999	---	I	---	---
M05	Cond.fan set:	Current condenser fan setpoint (CH mode)	0	barg/psig	0	999,9	---	A	R	34
		Current condenser fan setpoint (HP mode)		barg/psig	0	999,9	---	A	R	36
	Condenser fan 1:	Condenser fan group 1	0	%	0	100	---	I	R	92
	Condenser fan 2:	Condenser fan group 2	0	%	0	100	---	I	R	93
M06	Current set:	Current setpoint	0	°C/°F	-999,9	999,9	---	A	R	33
	Regul.temp.:		0	°C/°F	-999,9	999,9		A	---	---
	Steps required:	Steps required	0	---	0	99		I	---	---
		Total steps number	0	---	0	99		I	---	---
MANUAL_MNG	Defrost:		0	---	0	1	0: NO	D	---	---
							1: YES		---	---
m_End_Default	INITIALIZATION COMPLETE switch off and back on		0	---	0	1	0: ---	D	---	---
							1: -> Master controller			
			0	---	0	1	0: ---	D	---	---
							1: -> Slave controller			
m_Main		Current day	1	---	1	31	---	I	---	---
		Current month	1	---	1	12		I		
		Current year	0	---	0	99		I		
		Current hour	0	h	0	23		I		
		Current minute	0	---	0	59		I		
	In.Evap.: or Out.Eva.: or In.Cond.:	Regulation temperature probe	---	°C/°F	-999,9	999,9	---	A	---	---
	In.Evap.: or Out.Eva.:	main probe of the unit	---	°C/°F	-999,9	999,9	---	A	---	---
	C1:	Compressor 1 circuit 1 status	0	---	0	9	Compressor ON	I	---	---
							Compressor OFF			
							Compressor forced off			
							Compressor limited			
							Compressor in alarm			
							(lampeggiante): Comp. wait for switch on			
							(lampeggiante): Comp. wait for switch off			
		Compressor 2 circuit 1 status	0	---	0	9	Compressor ON	I	---	---
							Compressor OFF			
							Compressor forced off			
							Compressor limited			
							Compressor in alarm			
							(lampeggiante): Comp. wait for switch on			
							(lampeggiante): Comp. wait for switch off			
		Compressor 3 circuit 1 status	0	---	0	9	Compressor ON	I	---	---
							Compressor OFF			
							Compressor forced off			
							Compressor limited			
							Compressor in alarm			
							(lampeggiante): Comp. wait for switch on			
							(lampeggiante): Comp. wait for switch off			
	C2:	Compressor 1 circuit 2 status	0	---	0	9	Compressor ON	I	---	---
							Compressor OFF			
							Compressor forced off			
							Compressor limited			
							Compressor in alarm			
							(lampeggiante): Comp. wait for switch on			
							(lampeggiante): Comp. wait for switch off			
		Compressor 2 circuit 2 status	0	---	0	9	Compressor ON	I	---	---
							Compressor OFF			
							Compressor forced off			
							Compressor limited			
							Compressor in alarm			
							(lampeggiante): Comp. wait for switch on			
							(lampeggiante): Comp. wait for switch off			
		Compressor 3 circuit 2 status	0	---	0	9	Compressor ON	I	---	---
							Compressor OFF			
							Compressor forced off			
							Compressor limited			
							Compressor in alarm			
							(lampeggiante): Comp. wait for switch on			
							(lampeggiante): Comp. wait for switch off			
	C3:	Compressor 1 circuit 3 status	0	---	0	9	Compressor ON	I	---	---
							Compressor OFF			
							Compressor forced off			
							Compressor limited			
							Compressor in alarm			
							(lampeggiante): Comp. wait for switch on			

Mask index	Display description	Description	Default	UOM	Min	Max	Possible value descr.	Type	Read/Write	BMS index
							(lampeggiante): Comp. wait for switch off			
		Compressor 2 circuit 3 status	0	---	0	9	Compressor ON	I	---	---
							Compressor OFF			
							Compressor forced off			
							Compressor limited			
							Compressor in alarm			
							(lampeggiante): Comp. wait for switch on			
							(lampeggiante): Comp. wait for switch off			
		Compressor 3 circuit 3 status	0	---	0	9	Compressor ON	I	---	---
							Compressor OFF			
							Compressor forced off			
							Compressor limited			
							Compressor in alarm			
							(lampeggiante): Comp. wait for switch on			
							(lampeggiante): Comp. wait for switch off			
	C4:	Compressor 1 circuit 4 status	0	---	0	9	Compressor ON	I	---	---
							Compressor OFF			
							Compressor forced off			
							Compressor limited			
							Compressor in alarm			
							(lampeggiante): Comp. wait for switch on			
							(lampeggiante): Comp. wait for switch off			
		Compressor 2 circuit 4 status	0	---	0	9	Compressor ON	I	---	---
							Compressor OFF			
							Compressor forced off			
							Compressor limited			
							Compressor in alarm			
							(lampeggiante): Comp. wait for switch on			
							(lampeggiante): Comp. wait for switch off			
		Compressor 3 circuit 4 status	0	---	0	9	Compressor ON	I	---	---
							Compressor OFF			
							Compressor forced off			
							Compressor limited			
							Compressor in alarm			
							(lampeggiante): Comp. wait for switch on			
							(lampeggiante): Comp. wait for switch off			
	Unit off by	Unit status	---	---	0	8	0: ---	I	---	---
							2: alarm			
							3: net			
							4: supervisor			
							5: scheduler			
							6: digit input			
							7: keyboard			
							8: manual mode			
Manufacturer password	Insert manufacturer password(PW2):	Manufacturer password PW2: if the password inserted is wrong then the message "Password wrong!" appear	0	---	0	9999	---	I	---	---
Service password	Insert service password (PW1):	Service password PW1: if the password inserted is wrong then the message "Password wrong!" appear	0	---	0	9999	---	I	---	---
Unit of measure confirm	PAY ATTENTION Current temperature and press.parameters will be overwritten with default values Go ahead:	Warning mask: it appear when the unit of measure changed, in order to advise the user that all the current temperature and press.parameters will be overwritten with default values	0	---	0	1	0: NO	D	---	---
							1: YES			

8. VARIABLES SENT TO THE SUPERVISOR

Chiller Core can be connected to various supervisory systems, using the following BMS communication protocols: Carel and Modbus.
A BMS serial port serial port is used for the connection.
The various connection protocols are managed using the following optional cards:

- **Carel RS485**: code PCOS004850 (see Fig. 8.a)
- **Modbus RS485**: code PCOS004850 (see Fig. 8.a)

The following figure shows the connection diagram of the BMS serial card to the pCO^3.

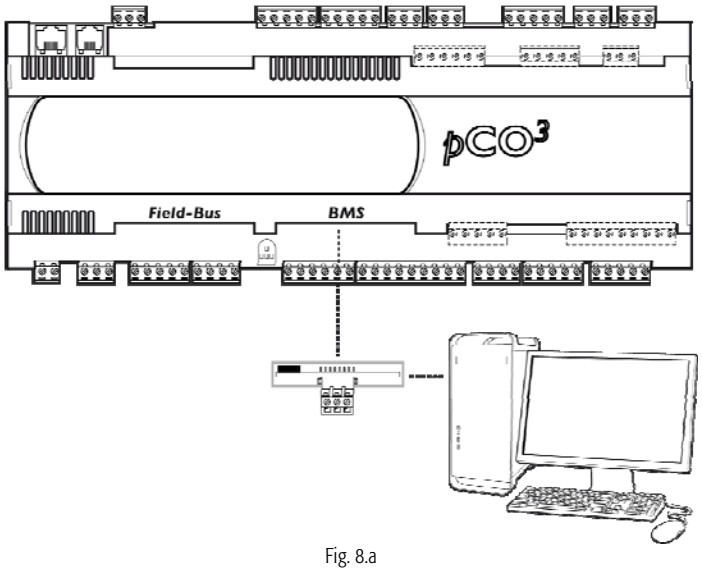


Fig. 8.a

The table below shows the variables sent to the supervisor.

Table of variables sent to the supervisor, with corresponding addresses.

8.1 Supervisor parameters table

Analog variables

Ind. CAREL	Ind. Modbus	Mask Index	Description	Def.	UOM	Min	Max	R/W	Variable name
1	1	M01, D02, He02	High pressure circuit1	---	barg/psig	-3276,8	3276,7	R/W	Ain_High_Press_Circ1
2	2	M01, D02, He02	High pressure circuit 1 converted to temperature	---	°C/°F	-3276,8	3276,7	R	High_Press_Circ1_Conv
3	3	M02, He12, D08	High pressure circuit2	---	barg/psig	-3276,8	3276,7	R	Ain_High_Press_Circ2
4	4	M02, He12, D08	High pressure circuit 2 converted to temperature	---	°C/°F	-3276,8	3276,7	R	High_Press_Circ2_Conv
5	5	M03, He19, D14	High pressure circuit3	---	barg/psig	-3276,8	3276,7	R	Ain_High_Press_Circ3
6	6	M03, He19, D14	High pressure circuit 3 converted to temperature	---	°C/°F	-3276,8	3276,7	R	High_Press_Circ3_Conv
7	7	M04, He24, D18	High pressure circuit4	---	barg/psig	-3276,8	3276,7	R	Ain_High_Press_Circ4
8	8	M04, He24, D18	High pressure circuit 4 converted to temperature	---	°C/°F	-3276,8	3276,7	R	High_Press_Circ4_Conv

9	9	M01, He04, D01	Low pressure circuit1	---	barg/psig	-3276,8	3276,7	R	Ain_Low_Press_Circ1
10	10	M01, He04, D01	Low pressure circuit 1 converted to temperature	---	°C/°F	-3276,8	3276,7	R	Low_Press_Circ1_Conv
11	11	M02, He13, D08	Low pressure circuit2	---	barg/psig	-3276,8	3276,7	R	Ain_Low_Press_Circ2
12	12	M02, He13, D08	Low pressure circuit 2 converted to temperature	---	°C/°F	-3276,8	3276,7	R	Low_Press_Circ2_Conv
13	13	M03, He20, D14	Low pressure circuit3	---	barg/psig	-3276,8	3276,7	R	Ain_Low_Press_Circ3
14	14	M03, He20, D14	Low pressure circuit 3 converted to temperature	---	°C/°F	-3276,8	3276,7	R	Low_Press_Circ3_Conv
15	15	M04, D18, He25	Low pressure circuit4	---	barg/psig	-3276,8	3276,7	R	Ain_Low_Press_Circ4
16	16	M04, D18, He25	Low pressure circuit 4 converted to temperature	---	°C/°F	-3276,8	3276,7	R	Low_Press_Circ4_Conv
17	17	D03, D04, He07	Inlet water evaporator temp.	---	°C/°F	-3276,8	3276,7	R	Ain_In_Temp_Evap
18	18	D03, He05, He23	Outlet water evaporator temp.	---	°C/°F	-3276,8	3276,7	R	Ain_Out_Temp_Evap
19	19	D05, He09	Outlet water evap.1 temp.	---	°C/°F	-3276,8	3276,7	R	Ain_Out_Temp_Evap1
20	20	D09, D16, He14	Outlet water evap.2 temp.	---	°C/°F	-3276,8	3276,7	R	Ain_Out_Temp_Evap2
21	21	D17	Outlet water evap.3 temp.	---	°C/°F	-3276,8	3276,7	R	Ain_Out_Temp_Evap3
22	22	D19, He26	Outlet water evap.4 temp.	---	°C/°F	-3276,8	3276,7	R	Ain_Out_Temp_Evap4
23	23	D07, D13, He18, He11	Outlet water cond.1 temp.	---	°C/°F	-3276,8	3276,7	R	Ain_Out_Temp_Cond1
24	24	D04, D19, He08, He27	Outlet water cond.2 temp.	---	°C/°F	-3276,8	3276,7	R	Ain_Out_Temp_Cond2
25	25	D20, He27	Outlet water cond.3 temp.	---	°C/°F	-3276,8	3276,7	R	Ain_Out_Temp_Cond3
26	26	D16, He22	Outlet water cond.4 temp.	---	°C/°F	-3276,8	3276,7	R	Ain_Out_Temp_Cond4
27	27	D06, D12, He10, He17	Inlet water condenser temp.	---	°C/°F	-3276,8	3276,7	R	Ain_In_Temp_Cond
28	28	D02, D10, D11, He03, He15, He16	External temperature	---	°C/°F	-3276,8	3276,7	R	Ain_Temp_Ext

29	29	B02	Cooling temperature setpoint1	12,0	°C	Gfc11	Gfc11	R/W	Cooling_Temp_Set1
				53,0	°F	Gfc11	Gfc11		
30	30	B02	Cooling temperature setpoint2	12,0	°C	Gfc11	Gfc11	R/W	Cooling_Temp_Set2
				53,0	°F	Gfc11	Gfc11		
31	31	B03	Heating temperature setpoint1	40,0	°C	Gfc12	Gfc12	R/W	Heating_Temp_Set1
				104,0	°F	Gfc12	Gfc12		
32	32	B03	Heating temperature setpoint2	40,0	°C	Gfc12	Gfc12	R/W	Heating_Temp_Set2
				104,0	°F	Gfc12	Gfc12		
33	33	M06, B01	Current setpoint	---	°C/°F	-999,9	999,9	R	Current_Temp_Set
34	34	Gfc23, M05	Condenser fan setpoint in chiller mode	13,0	barg	0	999,9	R/W	Fan_Press_Set_CH
				188,0	psig	0	1448,6		
35	35	Gfc23	Condenser fan setpoint for CH mode converted to temperature	---	°C	0	999,9	R	Fan_Press_Set_CH_Conv
				---	°F				
36	36	Gfc24, M05	Condenser fan setpoint in heatpump mode	13,0	barg	0	999,9	R/W	Fan_Press_Set_HP
				188,5	psig				
37	37	Gfc24	Condenser fan setpoint for HP mode converted to temperature	---	°C/°F	0	999,9	R	Fan_Press_Set_HP_Conv
38	38	M05	Current condenser fan setpoint	---	barg/psig	0	999,9	R	Fan_Setpoint
39	39	Gfc35	High pressure prevent threshold	20,0	barg	0	999,9	R/W	HP_Prev_Press_Thr
				290,1	psig				
40	40	Gfc35	High pressure prevent differential	2,0	barg	0	870,2	R/W	HP_Prev_Press_Diff
				29,0	psig				
41	41	Gfc33	High pressure alarm threshold	23,0	barg	0	999,9	R/W	HP_Al_Press_Thr
				333,6	psig				
42	42	Gfc33	High pressure alarm differential	2,0	barg	0	999,9	R/W	HP_Al_Press_Diff
				29,0	psig				
43	43	Gfc37	Low pressure prevent threshold	2,0	barg	0	999,9	R/W	LP_Prev_Press_Thr
				29,0	psig				
44	44	Gfc37	Low pressure prevent differential	2,0	barg	0	870,2	R/W	LP_Prev_Press_Diff
				29,0	psig				
45	45	Gfc30	Low pressure alarm threshold	1,5	barg	0	999,9	R/W	LP_Al_Press_Thr
				21,8	psig				
46	46	Gfc30	Low pressure alarm differential	0,5	barg	0	999,9	R/W	LP_Al_Press_Diff
				7,3	psig				
47	47	Gfc39	Antifreeze prevent threshold	6,0	°C	0	999,9	R/W	Antifreeze_Prev_Temp_Thr
				42,8	°F				
48	48	Gfc39	Antifreeze prevent differential	1,0	°C	0	108	R/W	Antifreeze_Prev_Temp_Diff
				1,8	°F				
49	49	Hc09	Heater threshold	5,0	°C	-999,9	999,9	R/W	Heater_Temp_Set
				41,0	°F				
50	50	Hc09	Heater differential	1,0	°C	0	108	R/W	Heater_Temp_Diff
				1,8	°F				
51	51	Hc10	Force off comps.offset by antifreeze	1,5	°C	0	999,9	R/W	ForceOff_Comp_Temp_Offset
				2,7	°F				
52	52	Hc10	Force off comps.differential by antifreeze	1,0	°C	0	999,9	R/W	ForceOff_Comp_Temp_Diff
				1,8	°F				
53	53	Hc08	Freeze alarm setpoint	3,0	°C	-999,9	999,9	R/W	Freeze_Al_Temp_Set
				37,4	°F				

54	54	Hc08	Freeze alarm differential	1,0	°C	0	108	R/W	Freeze_Al_Temp_Diff
				1,8	°F				
55	55	Gfc23	Condenser fan differential in chiller mode	3,0	barg	0	999,9	R/W	Fan_Press_Diff_CH
				43,5	psig				
56	56	Gfc23	Condenser fan diffrential for CH mode converted to temperature	---	°C/°F	0	999,9	R	Fan_Press_Diff_CH_Conv
57	57	Gfc24	Condenser fan differential in heatpump mode	4,0	barg	0	999,9	R/W	Fan_Press_Diff_HP
				58,0	psig				
58	58	Gfc24	Condenser fan differential for HP mode converted to temperature	---	°C/°F	0	999,9	R	Fan_Press_Diff_HP_Conv
59	59	Gfc15	Cool compensation external setpoint	25,0	°C	-999,9	999,9	R/W	Ext_Temp_Set_Cool
				77,0	°F				
60	60	Gfc15	Cool compensation external differential	10,0	°C	-999,9	999,9	R/W	Ext_Temp_Diff_Cool
				18,0	°F				
61	61	Gfc16	Heat compensation external setpoint	0,0	°C	-999,9	999,9	R/W	Ext_Temp_Set_Heat
				32,0	°F				
62	62	Gfc16	Heat compensation external differential	10,0	°C	-999,9	999,9	R/W	Ext_Temp_Diff_Heat
				18,0	°F				
63	63	Gfc27	Defrost start setpoint	2,0	°C	0	999,9	R/W	Defr_Start_Temp_Set
				35,6	°F				
64	64	Gfc27	Defrost end setpoint	28,0	°C	0	999,9	R/W	Defr_End_Temp_Set
				82,4	°F				
65	65	Gfc14	Pump down end threshold	2,0	barg	-999,9	999,9	R/W	End_PD_Press_Thr
				29,0	psig				
66	66	Gfc26	Condenser fan minimum speed	3,5	V	0	99,9	R/W	Cond_Fan_Min_Speed
67	67	Gfc26	Condenser fan maximum speed	7,5	V	0	100	R/W	Cond_Fan_Max_Speed

Integer variables

Ind. CAREL	Ind. Modbus	Mask Index	Description	Def.	UOM	Min	Max	R/W	Variable name
1	209	Ha01, Gb03	Unit type (0: CH; 1: CH/HP; 2: HP)	1	---	0	2	R/W	Unit_Type
2	210	Ha02, Gb03	Refrigerant type (0: R22; 1: R134a; 2: R404a; 3: R407c; 4: R410a; 5: R507; 6: R290; 7: R600; 8: R600a; 9: R717; 10: R744; 11: R728; 11: R1270; 12: R417a)	4	---	0	13	R/W	Gas_Type
3	211	Ha03, Gb03	Circuit number	1	---	1	4	R/W	Circuits_Num
4	212	Ha03, Gb03	Compressor number per circuit	2	---	1	3	R/W	Comps_Num_Per_Circ
5	213	Ha04, Gb03	Evaporator number	1	---	1	4	R/W	Evaporators_Num
6	214	Ha05	Type of rotation	1	---	-32768	32767	R/W	Rotation_type
7	215	Ha06	Sequence of load unloader	0	---	-32768	32767	R/W	Devices_Unload_Sequence
8	216	Ha07	PumpDown type(0:Disable;1:At power off;2:At power on;3:At power on-off)	0	---	0	3	R/W	PumpDown_Type
9	217	Ha08	Number of evaporator pumps	5	---	1	2	R/W	N_Pumps
10	218	Ha08	Warnings limit evaporator pump	0	---	-32768	32767	R/W	N_Warnings
11	219	Ha10	Number of condensator pumps	1	---	1	2	R/W	N_Pumps
12	220	Ha10	Warnings limit condensator pump	0	---	-32768	32767	R/W	N_Warnings
13	221	Ha12	Comps.behavior when defrost start/end (0: not OFF compressor; 1: OFF comp.at start; 2: OFF comp. at end; 3: OFF comp. at start/end)	0	---	0	3	R/W	Defr_Comp_Type

14	222	Hc02	Date format (1: dd/mm/yy; 2: mm/dd/yy; 3: yy.mm.dd)	0	---	1	3	R/W	Date_Format
15	223	Hc04	Custom rotation ON sequence: weight Dev1 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_On_Ind0
16	224	Hc04	Custom rotation ON sequence: weight Dev2 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_On_Ind1
17	225	Hc04	Custom rotation ON sequence: weight Dev3 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_On_Ind2
18	226	Hc04	Custom rotation ON sequence: weight Dev4 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_On_Ind3
19	227	Hc04	Custom rotation ON sequence: weight Dev1 Circ2 or Dev5 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_On_Ind4
20	228	Hc04	Custom rotation ON sequence: weight Dev2 Circ2 or Dev6 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_On_Ind5
21	229	Hc04	Custom rotation ON sequence: weight Dev3 Circ2 or Dev7 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_On_Ind6
22	230	Hc04	Custom rotation ON sequence: weight Dev4 Circ2 or Dev8 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_On_Ind7
23	231	Hc04	Custom rotation ON sequence: weight Dev1 Circ3 or Dev9 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_On_Ind8
24	232	Hc04	Custom rotation ON sequence: weight Dev2 Circ3 or Dev10 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_On_Ind9
25	233	Hc04	Custom rotation ON sequence: weight Dev3 Circ3 or Dev11 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_On_Ind10
26	234	Hc04	Custom rotation ON sequence: weight Dev4 Circ3 or Dev12 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_On_Ind11
27	235	Hc04	Custom rotation ON sequence: weight Dev1 Circ4 or Dev13 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_On_Ind12
28	236	Hc04	Custom rotation ON sequence: weight Dev2 Circ4 or Dev14 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_On_Ind13
29	237	Hc04	Custom rotation ON sequence: weight Dev3 Circ4 or Dev15 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_On_Ind14
30	238	Hc04	Custom rotation ON sequence: weight Dev4 Circ4 or Dev16 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_On_Ind15
31	239	Hc05	Custom rotation OFF sequence: weight Dev1 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_Off_Ind0
32	240	Hc05	Custom rotation OFF sequence: weight Dev2 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_Off_Ind1
33	241	Hc05	Custom rotation OFF sequence: weight Dev3 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_Off_Ind2
34	242	Hc05	Custom rotation OFF sequence: weight Dev4 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_Off_Ind3
35	243	Hc05	Custom rotation OFF sequence: weight Dev1 Circ2 or Dev5 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_Off_Ind4
36	244	Hc05	Custom rotation OFF sequence: weight Dev2 Circ2 or Dev6 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_Off_Ind5
37	245	Hc05	Custom rotation OFF sequence: weight Dev3 Circ2 or Dev7 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_Off_Ind6
38	246	Hc05	Custom rotation OFF sequence: weight Dev4 Circ2 or Dev8 Circ1	0	---	-32768	32767	R/W	Custom_rot_Off_Ind7

			(0: High; 15: Low)						
39	247	Hc05	Custom rotation OFF sequence: weight Dev1 Circ3 or Dev9 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_Off_Ind8
40	248	Hc05	Custom rotation OFF sequence: weight Dev2 Circ3 or Dev10 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_Off_Ind9
41	249	Hc05	Custom rotation OFF sequence: weight Dev3 Circ3 or Dev11 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_Off_Ind10
42	250	Hc05	Custom rotation OFF sequence: weight Dev4 Circ3 or Dev12 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_Off_Ind11
43	251	Hc05	Custom rotation OFF sequence: weight Dev1 Circ4 or Dev13 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_Off_Ind12
44	252	Hc05	Custom rotation OFF sequence: weight Dev2 Circ4 or Dev14 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_Off_Ind13
45	253	Hc05	Custom rotation OFF sequence: weight Dev3 Circ4 or Dev15 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_Off_Ind14
46	254	Hc05	Custom rotation OFF sequence: weight Dev4 Circ4 or Dev16 Circ1 (0: High; 15: Low)	0	---	-32768	32767	R/W	Custom_rot_Off_Ind15
47	255	Hc06	Compressors min ON time	60	s	0	999	R/W	Comps_Min_Time_ON
48	256	Hc06	Compressors min OFF time	360	s	0	999	R/W	Comps_Min_Time_OFF
49	257	Hc06	Min start time between same compressor	450	s	0	999	R/W	Comps_Min_T_Start_Same
50	258	Gfc01	Cool/Heat change delay time	60	---	0	999	R/W	Delay_C_H_Change
51	259	Gfc04	Regulation type (0: proportional; 1: prop.+ int.; 2: pid)	0	---	-32768	32767	R/W	Regulation_Type
52	260	Gfc04	Cooling derivative time	300	---	-32768	32767	R/W	Der_Time_Pos
53	261	Gfc04	Cooling integration time	300	---	-32768	32767	R/W	Int_Time_Pos
54	262	Gfc04	Heating derivative time	300	---	-32768	32767	R/W	Der_Time_Neg
55	263	Gfc04	Heating integration time	300	---	-32768	32767	R/W	Int_Time_Neg
56	264	Gfc09	Minimum time for loading	120	s	0	9999	R/W	Min_Time_Load_NZ
57	265	Gfc09	Maximum time for loading	600	s	0	9999	R/W	Max_Time_Load_NZ
58	266	Gfc10	Minimum time for unloading	120	s	0	9999	R/W	Min_Time_Unload_NZ
59	267	Gfc10	Maximum time for unloading	600	s	0	9999	R/W	Max_Time_Unload_NZ
60	268	Gfc13	Time between comp.load	10	s	0	999	R/W	Load_Up_Time
61	269	Gfc13	Time between comp.download	10	s	0	999	R/W	Load_Down_Time
62	270	Gc01	Cooling/Heating change (0: cooling; 1: heating)	0	---	0	1	R/W	Cool_Heat_KeyB
63	271	Gfc14	Maximum pump down time	60	s	0	999	R/W	Max_PumpDown_Time
64	272	Gfc17	Delay between evap.pump on and comp.on	25	s	0	999	R/W	EPump_On_Delay
65	273	Gfc17	Evap.pump off delay time	10	s	0	999	R/W	EPump_Off_Delay
66	274	Gfc18	Evap.pumps flow alarm startup delay time	20	s	0	999	R/W	EPump_Flow_Startup_Delay
67	275	Gfc18	Evap.pumps flow alarm running delay time	5	s	1	999	R/W	EPump_Flow_Run_Delay
68	276	Gfc19	Evap.pumps rotation time	100	---	0	999	R/W	EPump_Rot_Time
69	277	Gfc19	Evap.pumps overwork time	5	---	0	999	R/W	EPump_Overwork_Time
70	278	Gfc20	Cond.pump off delay time	10	s	0	999	R/W	CPump_Off_Delay
71	279	Gfc21	Cond.pumps flow alarm startup delay time	20	s	0	999	R/W	CPump_Flow_Startup_Delay
72	280	Gfc21	Cond.pumps flow alarm running delay time	5	s	1	999	R/W	CPump_Flow_Run_Delay
73	281	Gfc22	Cond.pumps rotation time	100	---	0	999	R/W	CPump_Rot_Time
74	282	Gfc22	Cond.pumps overwork time	5	---	0	999	R/W	CPump_Overwork_Time
75	283	Gfc25	Cond.fans speed-up time	10	s	0	99	R/W	Speed_Up_Time

76	284	Gfc25	Liquid soleniod speed up time	60	s	0	99	R/W	Liq_Sol_Speed_Up_Time
77	285	Gfc28	Defrost startup delay	1800	---	1	9999	R/W	Defr_Startup_Delay
78	286	Gfc28	Defrost minimum time	0	---	0	999	R/W	Defr_Min_Time
79	287	Gfc28	Defrost maximum time	5	---	1	999	R/W	Defr_Max_Time
80	288	Gfc29	Defrost interval time	0	min	0	999	R/W	Defr_Interval_Time
81	289	Gfc29	Dripping time	30	s	0	999	R/W	Dripping_Time
82	290	Gfc31	Low pressure alarm startup delay	40	s	0	999	R/W	LP_Start_Delay
83	291	Gfc31	Low pressure alarm running delay	0	s	0	999	R/W	LP_Run_Delay
84	292	Gfc34	Prevent automatic increase time	10	s	0	999	R/W	Time_Auto_Incr_Prev
85	293	Gfc34	Count prevent number time	60	min	0	100	R/W	Time_Count_Prev_Number
86	294	Gfc36	High pressure prevent number	3	---	0	5	R/W	HP_Prev_Num
87	295	Gfc36	High pressure prevent delay	5	---	0	999	R/W	HP_Prev_Delay
88	296	Gfc38	Low pressure prevent number	3	---	0	5	R/W	LP_Prev_Num
89	297	Gfc38	Low pressure prevent delay	5	---	0	999	R/W	LP_Prev_Delay
90	298	Gfc40	Antifreeze prevent number	3	---	0	5	R/W	Antifreeze_Prev_Num
91	299	Gfc40	Antifreeze prevent warning delay	5	---	0	999	R/W	Antifreeze_Prev_Delay
92	300	D64	AOUT1 value of master board	0	---	0	1000	R/W	Virt_Aout1_Value
93	301	D64	AOUT2 value of master board	0	---	0	1000	R/W	Virt_Aout2_Value
94	302	D62	AOUT3 value of master board	0	---	0	1000	R/W	Virt_Aout3_Value
95	303	Gd01	Evaporator pump1 working hour-high part	0	---	0	999	R	Hour_H_Evap_Pump1
96	304	Gd01	Evaporator pump1 working hour-low part	0	---	0	999	R	Hour_L_Evap_Pump1
97	305	Gd01	Evaporator pump2 working hour-high part	0	---	0	999	R	Hour_H_Evap_Pump2
98	306	Gd01	Evaporator pump2 working hour-low part	0	---	0	999	R	Hour_L_Evap_Pump2
99	307	Gd02	Comp1 circ1 working hour-high part	0	---	0	999	R	Hour_H_Comp1_Circ1
100	308	Gd02	Comp1 circ1 working hour-low part	0	---	0	999	R	Hour_L_Comp1_Circ1
101	309	Gd02	Comp2 circ1 working hour-high part	0	---	0	999	R	Hour_H_Comp2_Circ1
102	310	Gd02	Comp2 circ1 working hour-low part	0	---	0	999	R	Hour_L_Comp2_Circ1
103	311	Gd02	Comp3 circ1 working hour-high part	0	---	0	999	R	Hour_H_Comp3_Circ1
104	312	Gd02	Comp3 circ1 working hour-low part	0	---	0	999	R	Hour_L_Comp3_Circ1
105	313	Gd03	Comp1 circ2 working hour-high part	0	---	0	999	R	Hour_H_Comp1_Circ2
106	314	Gd03	Comp1 circ2 working hour-low part	0	---	0	999	R	Hour_L_Comp1_Circ2
107	315	Gd03	Comp2 circ2 working hour-high part	0	---	0	999	R	Hour_H_Comp2_Circ2
108	316	Gd03	Comp2 circ2 working hour-low part	0	---	0	999	R	Hour_L_Comp2_Circ2
109	317	Gd03	Comp3 circ2 working hour-high part	0	---	0	999	R	Hour_H_Comp3_Circ2
110	318	Gd03	Comp3 circ2 working hour-low part	0	---	0	999	R	Hour_L_Comp3_Circ2
111	319	Gd04	Comp1 circ3 working hour-high part	0	---	0	999	R	Hour_H_Comp1_Circ3
112	320	Gd04	Comp1 circ3 working hour-low part	0	---	0	999	R	Hour_L_Comp1_Circ3
113	321	Gd04	Comp2 circ3 working hour-high part	0	---	0	999	R	Hour_H_Comp2_Circ3
114	322	Gd04	Comp2 circ3 working hour-low part	0	---	0	999	R	Hour_L_Comp2_Circ3
115	323	Gd04	Comp3 circ3 working hour-high part	0	---	0	999	R	Hour_H_Comp3_Circ3
116	324	Gd04	Comp3 circ3 working hour-low part	0	---	0	999	R	Hour_L_Comp3_Circ3
117	325	Gd05	Comp1 circ4 working hour-high	0	---	0	999	R	Hour_H_Comp1_Circ4

			part						
118	326	Gd05	Comp1 circ4 working hour-low part	0	---	0	999	R	Hour_L_Comp1_Circ4
119	327	Gd05	Comp2 circ4 working hour-high part	0	---	0	999	R	Hour_H_Comp2_Circ4
120	328	Gd05	Comp2 circ4 working hour-low part	0	---	0	999	R	Hour_L_Comp2_Circ4
121	329	Gd05	Comp3 circ4 working hour-high part	0	---	0	999	R	Hour_H_Comp3_Circ4
122	330	Gd05	Comp3 circ4 working hour-low part	0	---	0	999	R	Hour_L_Comp3_Circ4
123	331	Gd06	Condenser fan1 working hour-high part	0	---	0	999	R	Hour_H_Cond_Fan1
124	332	Gd06	Condenser fan1 working hour-low part	0	---	0	999	R	Hour_L_Cond_Fan1
125	333	Gd06	Condenser fan2 working hour-high part	0	---	0	999	R	Hour_H_Cond_Fan2
126	334	Gd06	Condenser fan2 working hour-low part	0	---	0	999	R	Hour_L_Cond_Fan2
127	335	Gd07	Condenser pump1 working hour-high part	0	---	0	999	R	Hour_H_Cond_Pump1
128	336	Gd07	Condenser pump1 working hour-low part	0	---	0	999	R	Hour_L_Cond_Pump1
129	337	Gd07	Condenser pump2 working hour-high part	0	---	0	999	R	Hour_H_Cond_Pump2
130	338	Gd07	Condenser pump2 working hour-low part	0	---	0	999	R	Hour_L_Cond_Pump2

Digital variables

Ind. CAREL	Ind. Modbus	Mask Index	Description	Def.	UOM	Min	Max	R/W	Variable name
1	1	D21	DIN1 of master board (0-Close;1-Open)	0	---	0	1	R	Din1_Status
2	2	D21	DIN2 of master board (0-Close;1-Open)	0	---	0	1	R	Din2_Status
3	3	D24	DIN3 of master board (0-Close;1-Open)	0	---	0	1	R	Din3_Status
4	4	D24	DIN4 of master board (0-Close;1-Open)	0	---	0	1	R	Din4_Status
5	5	D26	DIN5 of master board (0-Close;1-Open)	0	---	0	1	R	Din5_Status
6	6	D26	DIN6 of master board (0-Close;1-Open)	0	---	0	1	R	Din6_Status
7	7	D27	DIN7 of master board (0-Close;1-Open)	0	---	0	1	R	Din7_Status
8	8	D27	DIN8 of master board (0-Close;1-Open)	0	---	0	1	R	Din8_Status
9	9	D28	DIN9 of master board (0-Close;1-Open)	0	---	0	1	R	Din9_Status
10	10	D28	DIN10 of master board (0-Close;1-Open)	0	---	0	1	R	Din10_Status
11	11	D29	DIN11 of master board (0-Close;1-Open)	0	---	0	1	R	Din11_Status
12	12	D29	DIN12 of master board (0-Close;1-Open)	0	---	0	1	R	Din12_Status
13	13	D32	DIN13 of master board (0-Close;1-Open)	0	---	0	1	R	Din13_Status
14	14	D32	DIN14 of master board (0-Close;1-Open)	0	---	0	1	R	Din14_Status
15	15	D33	DIN15 of master board (0-Close;1-Open)	0	---	0	1	R	Din15_Status
16	16	D33	DIN16 of master board (0-Close;1-Open)	0	---	0	1	R	Din16_Status
17	17	D34	DIN17 of master board (0-Close;1-Open)	0	---	0	1	R	Din17_Status
18	18	D42	DOUT1 of master board (0-Open;1-Close)	0	---	0	1	R	Dout1_Value
19	19	D42	DOUT2 of master board (0-Open;1-Close)	0	---	0	1	R	Dout2_Value
20	20	D45	DOUT3 of master board (0-Open;1-Close)	0	---	0	1	R	Dout3_Value
21	21	D45	DOUT4 of master board (0-	0	---	0	1	R	Dout4_Value

			Open;1-Close)						
22	22	D49	DOUT5 of master board (0-Open;1-Close)	0	---	0	1	R	Dout5_Value
23	23	D49	DOUT6 of master board (0-Open;1-Close)	0	---	0	1	R	Dout6_Value
24	24	D50	DOUT7 of master board (0-Open;1-Close)	0	---	0	1	R	Dout7_Value
25	25	D50	DOUT8 of master board (0-Open;1-Close)	0	---	0	1	R	Dout8_Value
26	26	D51	DOUT9 of master board (0-Open;1-Close)	0	---	0	1	R	Dout9_Value
27	27	D52	DOUT10 of master board (0-Open;1-Close)	0	---	0	1	R	Dout10_Value
28	28	D52	DOUT11 of master board (0-Open;1-Close)	0	---	0	1	R	Dout11_Value
29	29	D53	DOUT12 of master board (0-Open;1-Close)	0	---	0	1	R	Dout12_Value
30	30	D53	DOUT13 of master board (0-Open;1-Close)	0	---	0	1	R	Dout13_Value
31	31	D54	DOUT14 of master board (0-Open;1-Close)	0	---	0	1	R	Dout14_Value
32	32	D54	DOUT15 of master board (0-Open;1-Close)	0	---	0	1	R	Dout15_Value
33	33	D55	DOUT16 of master board (0-Open;1-Close)	0	---	0	1	R	Dout16_Value
34	34	D35	DIN1 of slave board (0-Close;1-Open)	0	---	0	1	R	Din1_Status_S
35	35	D35	DIN2 of slave board (0-Close;1-Open)	0	---	0	1	R	Din2_Status_S
36	36	D36	DIN6 of slave board (0-Close;1-Open)	0	---	0	1	R	Din6_Status_S
37	37	D36	DIN7 of slave board (0-Close;1-Open)	0	---	0	1	R	Din7_Status_S
38	38	D37	DIN9 of slave board (0-Close;1-Open)	0	---	0	1	R	Din9_Status_S
39	39	D37	DIN10 of slave board (0-Close;1-Open)	0	---	0	1	R	Din10_Status_S
40	40	D38	DIN11 of slave board (0-Close;1-Open)	0	---	0	1	R	Din11_Status_S
41	41	D38	DIN12 of slave board (0-Close;1-Open)	0	---	0	1	R	Din12_Status_S
42	42	D39	DIN13 of slave board (0-Close;1-Open)	0	---	0	1	R	Din13_Status_S
43	43	D40	DIN15 of slave board (0-Close;1-Open)	0	---	0	1	R	Din15_Status_S
44	44	D40	DIN16 of slave board (0-Close;1-Open)	0	---	0	1	R	Din16_Status_S
45	45	D56	DOUT1 of slave board (0-Open;1-Close)	0	---	0	1	R	Dout1_Value_S
46	46	D56	DOUT2 of slave board (0-Open;1-Close)	0	---	0	1	R	Dout2_Value_S
47	47	D57	DOUT3 of slave board (0-Open;1-Close)	0	---	0	1	R	Dout3_Value_S
48	48	D57	DOUT4 of slave board (0-Open;1-Close)	0	---	0	1	R	Dout4_Value_S
49	49	D58	DOUT9 of slave board (0-Open;1-Close)	0	---	0	1	R	Dout9_Value_S
50	50	D59	DOUT10 of slave board (0-Open;1-Close)	0	---	0	1	R	Dout10_Value_S
51	51	D59	DOUT11 of slave board (0-Open;1-Close)	0	---	0	1	R	Dout11_Value_S
52	52	D60	DOUT12 of slave board (0-Open;1-Close)	0	---	0	1	R	Dout12_Value_S
53	53	D60	DOUT13 of slave board (0-Open;1-Close)	0	---	0	1	R	Dout13_Value_S
54	54	D61	DOUT14 of slave board (0-Open;1-Close)	0	---	0	1	R	Dout14_Value_S
55	55	D61	DOUT15 of slave board (0-Open;1-Close)	0	---	0	1	R	Dout15_Value_S
56	56	Ha01, Gb03	Physical circuit type (AW/WW)	0	---	0	1	R/W	Physical_Circ_Type
57	57	Ha02	Reverse cycle type(0-Water;1-	0	---	0	1	R/W	Reverse_Cycle_Type

			Gas)						
58	58	Ha04, Gb03	Condensing type (0-Single;1-Separated)	0	---	0	1	R/W	Cond_Type
59	59	Ha05	Sequence activation compressors (0: Packed, 1: Equalized)	0	---	0	1	R/W	Equalized_Circ_Power
60	60	Ha09	Enable antiblock evaporator pump	1	---	0	1	R/W	En_Antiblock
62	62	Ha12	Defrost type (0: Separated; 1: Simultaneous)	0	---	0	1	R/W	Defrost_Type
63	63	Ha13	Enable setpoint compensation	0	---	0	1	R/W	En_Compensation
64	64	Ha14	Enable clock for pCO* without clock device on board (0: Disabled; 1: Enabled)	0	---	0	1	R/W	En_Clock_Board
65	65	Hc07	Enable high pressure prevent	1	---	0	1	R/W	En_HP_Prev
66	66	Hc07	Enable low pressure prevent	1	---	0	1	R/W	En_LP_Prev
67	67	Hc07	Enable antifreeze prevent	1	---	0	1	R/W	En_Antifreeze_Prev
68	68	Gfc02	Enable switch-off unit by keyboard	1	---	0	1	R/W	En_Keyboard_Off
69	69	Gfc03, Main mask	Regulation temperature probe (0: inlet; 1: outlet)	0	---	0	1	R/W	Reg_Temp_Probe
70	70	Gfc08	Enable force require to 0 during NZ regulation when the regulation temperature is lower a threshold	0	---	0	1	R/W	En_Force_Off
71	71	Gfc20	Pump on if (0-Unit on; 1-Compressors required)	0	---	0	1	R/W	Pump_Work_Type
72	72	Gfc32	LP by pressostat reset type (0: Semiautomatic; 1: Manual)	1	---	0	1	R/W	Reset_Type_LP_Pressostat
73	73	Gfc32	LP by transducer reset type (0: Semiautomatic; 1: Manual)	0	---	0	1	R/W	Reset_Type_LP_Transducer
74	74	Hc01	Supervisor (BMS) On-Off. Show the state OFFbyBMS in main mask (0: Off; 1: On)	1	---	0	1	R/W	Superv_OnOff
75	75	---	Compressor1 circuit1 (0: Off; 1: On)	0	---	0	1	R	Comp1_Circ1
76	76	---	Compressor2 circuit1 (0: Off; 1: On)	0	---	0	1	R	Comp2_Circ1
77	77	---	Compressor3 circuit1 (0: Off; 1: On)	0	---	0	1	R	Comp3_Circ1
78	78	---	Compressor1 circuit2 (0: Off; 1: On)	0	---	0	1	R	Comp1_Circ2
79	79	---	Compressor2 circuit2 (0: Off; 1: On)	0	---	0	1	R	Comp2_Circ2
80	80	---	Compressor3 circuit2 (0: Off; 1: On)	0	---	0	1	R	Comp3_Circ2
81	81	---	Compressor1 circuit3 (0: Off; 1: On)	0	---	0	1	R	Comp1_Circ3
82	82	---	Compressor2 circuit3 (0: Off; 1: On)	0	---	0	1	R	Comp2_Circ3
83	83	---	Compressor3 circuit3 (0: Off; 1: On)	0	---	0	1	R	Comp3_Circ3
84	84	---	Compressor1 circuit4 (0: Off; 1: On)	0	---	0	1	R	Comp1_Circ4
85	85	---	Compressor2 circuit4 (0: Off; 1: On)	0	---	0	1	R	Comp2_Circ4
86	86	---	Compressor3 circuit4 (0: Off; 1: On)	0	---	0	1	R	Comp3_Circ4
87	87	Hc04	Change UOM by BMS (0: Standard (°C - barg/psig); Anglo-saxon (°F - psig))	0	---	0	1	R/W	Unit_Meas_Type_BMS
88	88	ALG01	Specify if clock board doesn't work or is absent (0: No alarm; 1: Alarm)	0	---	0	1	R/W	mAl_Clock
89	89	ALG02	Specify if P-Memory expansion doesn't work or is absent (0: No alarm; 1: Alarm)	0	---	0	1	R/W	mAl_Extd_Memory
90	90	ALG03	Serious alarm by DIN (0: No alarm; 1: Alarm)	0	---	0	1	R	mAl_Serious_DIN

91	91	ALO04	Specify if slave offline (0: No alarm; 1: Alarm)	0	---	0	1	R	Al_Slave_Offline
92	92	ALA05	Specify if high pressure probe circuit1 fault or not connected (0: No alarm; 1: Alarm)	0	---	0	1	R	Al_Prb_HP1
93	93	ALA06	Specify if high pressure probe circuit2 fault or not connected (0: No alarm; 1: Alarm)	0	---	0	1	R	Al_Prb_HP2
94	94	ALA07	Specify if high pressure probe circuit3 fault or not connected (0: No alarm; 1: Alarm)	0	---	0	1	R	Al_Prb_HP3
95	95	ALA08	Specify if high pressure probe circuit4 fault or not connected (0: No alarm; 1: Alarm)	0	---	0	1	R	Al_Prb_HP4
96	96	ALA09	Specify if low pressure probe circuit1 fault or not connected (0: No alarm; 1: Alarm)	0	---	0	1	R	Al_Prb_LP1
97	97	ALA10	Specify if low pressure probe circuit2 fault or not connected (0: No alarm; 1: Alarm)	0	---	0	1	R	Al_Prb_LP2
98	98	ALA11	Specify if low pressure probe circuit3 fault or not connected (0: No alarm; 1: Alarm)	0	---	0	1	R	Al_Prb_LP3
99	99	ALA12	Specify if low pressure probe circuit4 fault or not connected (0: No alarm; 1: Alarm)	0	---	0	1	R	Al_Prb_LP4
100	100	ALA13	Specify if evap.inlet probe fault or not connected (0: No alarm; 1: Alarm)	0	---	0	1	R	Al_Prb_In_Evap
101	101	ALA14	Specify if cond.inlet probe fault or not connected (0: No alarm; 1: Alarm)	1	---	0	1	R	Al_Prb_In_Cond
102	102	ALA15	Specify if evap.outlet probe fault or not connected (0: No alarm; 1: Alarm)	0	---	0	1	R	Al_Prb_Out_Evap
103	103	ALA16	Specify if evap1.outlet probe fault or not connected (0: No alarm; 1: Alarm)	0	---	0	1	R	Al_Prb_Out_Evap1
104	104	ALA17	Specify if evap2.outlet probe fault or not connected (0: No alarm; 1: Alarm)	0	---	0	1	R	Al_Prb_Out_Evap2
105	105	ALA18	Specify if evap3.outlet probe fault or not connected (0: No alarm; 1: Alarm)	0	---	0	1	R	Al_Prb_Out_Evap3
106	106	ALA19	Specify if evap4.outlet probe fault or not connected (0: No alarm; 1: Alarm)	0	---	0	1	R	Al_Prb_Out_Evap4
107	107	ALA20	Specify if cond1.outlet probe fault or not connected (0: No alarm; 1: Alarm)	0	---	0	1	R	Al_Prb_Out_Cond1
108	108	ALA21	Specify if cond2.outlet probe fault or not connected (0: No alarm; 1: Alarm)	0	---	0	1	R	Al_Prb_Out_Cond2
109	109	ALA22	Specify if cond3.outlet probe fault or not connected (0: No alarm; 1: Alarm)	0	---	0	1	R	Al_Prb_Out_Cond3
110	110	ALA23	Specify if cond4.outlet probe fault or not connected (0: No alarm; 1: Alarm)	0	---	0	1	R	Al_Prb_Out_Cond4
111	111	ALA24	Specify if evap.water temp.probe fault or not connected (0: No alarm; 1: Alarm)	0	---	0	1	R	Al_Prb_Evap_Reg
112	112	ALA25	Specify if external temp.probe fault or not connected (0: No alarm; 1: Alarm)	0	---	0	1	R	Al_Prb_Ext_Temp
113	113	ALT26	Comp1 circ1 maitenance warning	0	---	0	1	R	mAl_Hour_Comp1_Circ1
114	114	ALT26	Comp2 circ1 maitenance warning	0	---	0	1	R	mAl_Hour_Comp2_Circ1
115	115	ALT26	Comp3 circ1 maitenance warning	0	---	0	1	R	mAl_Hour_Comp3_Circ1
116	116	ALT26	Comp1 circ2 maitenance warning	0	---	0	1	R	mAl_Hour_Comp1_Circ2

117	117	ALT26	Comp2 circ2 maitenance warning	0	---	0	1	R	mAl_Hour_Comp2_Circ2
118	118	ALT26	Comp3 circ2 maitenance warning	0	---	0	1	R	mAl_Hour_Comp3_Circ2
119	119	ALT26	Comp1 circ3 maitenance warning	0	---	0	1	R	mAl_Hour_Comp1_Circ3
120	120	ALT26	Comp2 circ3 maitenance warning	0	---	0	1	R	mAl_Hour_Comp2_Circ3
121	121	ALT26	Comp3 circ3 maitenance warning	0	---	0	1	R	mAl_Hour_Comp3_Circ3
122	122	ALT26	Comp1 circ4 maitenance warning	0	---	0	1	R	mAl_Hour_Comp1_Circ4
123	123	ALT26	Comp2 circ4 maitenance warning	0	---	0	1	R	mAl_Hour_Comp2_Circ4
124	124	ALT26	Comp3 circ4 maitenance warning	0	---	0	1	R	mAl_Hour_Comp3_Circ4
125	125	ALT27	Condenser fan group1 maitenance warning	0	---	0	1	R	mAl_Hour_Cond_Fan1
126	126	ALT27	Condenser fan group2 maitenance warning	0	---	0	1	R	mAl_Hour_Cond_Fan2
127	127	ALT28	Condenser pump1 maitenance warning	0	---	0	1	R	mAl_Hour_Cond_Pump1
128	128	ALT28	Condenser pump2 maitenance warning	0	---	0	1	R	mAl_Hour_Cond_Pump2
129	129	ALT29	Evaporator pump1 maitenance warning	0	---	0	1	R	mAl_Hour_Evap_Pump1
130	130	ALT29	Evaporator pump2 maitenance warning	0	---	0	1	R	mAl_Hour_Evap_Pump2
131	131	ALC30	Overload Compressor 1 circuit 1	0	---	0	1	R	mOvrl_Comp1_Circ1
132	132	ALC30	Overload Compressor 2 circuit 1	0	---	0	1	R	mOvrl_Comp2_Circ1
133	133	ALC30	Overload Compressor 3 circuit 1	0	---	0	1	R	mOvrl_Comp3_Circ1
134	134	ALC30	Overload Compressor 1 circuit 2	0	---	0	1	R	mOvrl_Comp1_Circ2
135	135	ALC30	Overload Compressor 2 circuit 2	0	---	0	1	R	mOvrl_Comp2_Circ2
136	136	ALC30	Overload Compressor 3 circuit 2	0	---	0	1	R	mOvrl_Comp3_Circ2
137	137	ALC30	Overload Compressor 1 circuit 3	0	---	0	1	R	mOvrl_Comp1_Circ3
138	138	ALC30	Overload Compressor 2 circuit 3	0	---	0	1	R	mOvrl_Comp2_Circ3
139	139	ALC30	Overload Compressor 3 circuit 3	0	---	0	1	R	mOvrl_Comp3_Circ3
140	140	ALC30	Overload Compressor 1 circuit 4	0	---	0	1	R	mOvrl_Comp1_Circ4
141	141	ALC30	Overload Compressor 2 circuit 4	0	---	0	1	R	mOvrl_Comp2_Circ4
142	142	ALC30	Overload Compressor 3 circuit 4	0	---	0	1	R	mOvrl_Comp3_Circ4
143	143	ALW31	Force off comp.circ.1 warning by antifreeze	0	---	0	1	R	ForceOff_Circ1_Freeze
144	144	ALW31	Force off comp.circ.2 warning by antifreeze	0	---	0	1	R	ForceOff_Circ2_Freeze
145	145	ALW31	Force off comp.circ.3 warning by antifreeze	0	---	0	1	R	ForceOff_Circ3_Freeze
146	146	ALW31	Force off comp.circ.4 warning by antifreeze	0	---	0	1	R	ForceOff_Circ4_Freeze
147	147	ALW32	Circuit 1 Warning Stop defrost by max time	0	---	0	1	R	mDefrost_Warning_C1
148	148	ALW32	Circuit 2 Warning Stop defrost by max time	0	---	0	1	R	mDefrost_Warning_C2
149	149	ALW32	Circuit 3 Warning Stop defrost by max time	0	---	0	1	R	mDefrost_Warning_C3
150	150	ALW32	Circuit 4 Warning Stop defrost by max time	0	---	0	1	R	mDefrost_Warning_C4
151	151	ALW33	Circuit 1 Warning Stop PD by max time	0	---	0	1	R	mPD_Warning_Circ1
152	152	ALW33	Circuit 2 Warning Stop PD by max time	0	---	0	1	R	mPD_Warning_Circ2
153	153	ALW33	Circuit 3 Warning Stop PD by max time	0	---	0	1	R	mPD_Warning_Circ3
154	154	ALW33	Circuit 4 Warning Stop PD by max time	0	---	0	1	R	mPD_Warning_Circ4
155	155	ALB34	Circuit 1 Low pressure alarm by pressostat	0	---	0	1	R	Gen_LP_Pressostat_Circ1
156	156	ALB34	Circuit 2 Low pressure alarm by pressostat	0	---	0	1	R	Gen_LP_Pressostat_Circ2

157	157	ALB34	Circuit 3 Low pressure alarm by pressostat	0	---	0	1	R	Gen_LP_Pressostat_Circ3
158	158	ALB34	Circuit 4 Low pressure alarm by pressostat	0	---	0	1	R	Gen_LP_Pressostat_Circ4
159	159	ALB35	Circuit 1 Low pressure alarm by transducer	0	---	0	1	R	Gen_LP_Transducer_Circ1
160	160	ALB35	Circuit 2 Low pressure alarm by transducer	0	---	0	1	R	Gen_LP_Transducer_Circ2
161	161	ALB35	Circuit 3 Low pressure alarm by transducer	0	---	0	1	R	Gen_LP_Transducer_Circ3
162	162	ALB35	Circuit 4 Low pressure alarm by transducer	0	---	0	1	R	Gen_LP_Transducer_Circ4
163	163	ALB36	Circuit 1 High pressure alarm by prossostat	0	---	0	1	R	mAl_HP_Pressostat_Circ1
164	164	ALB36	Circuit 2 High pressure alarm by prossostat	0	---	0	1	R	mAl_HP_Pressostat_Circ2
165	165	ALB36	Circuit 3 High pressure alarm by prossostat	0	---	0	1	R	mAl_HP_Pressostat_Circ3
166	166	ALB36	Circuit 4 High pressure alarm by prossostat	0	---	0	1	R	mAl_HP_Pressostat_Circ4
167	167	ALB37	Circuit 1 High pressure alarm by transducer	0	---	0	1	R	mAl_HP_Transducer_Circ1
168	168	ALB37	Circuit 2 High pressure alarm by transducer	0	---	0	1	R	mAl_HP_Transducer_Circ2
169	169	ALB37	Circuit 3 High pressure alarm by transducer	0	---	0	1	R	mAl_HP_Transducer_Circ3
170	170	ALB37	Circuit 4 High pressure alarm by transducer	0	---	0	1	R	mAl_HP_Transducer_Circ4
171	171	ALB48	Antifreeze alarm Circuit 1	0	---	0	1	R	mAl_Freeze_Circ1
172	172	ALB48	Antifreeze alarm Circuit 2	0	---	0	1	R	mAl_Freeze_Circ2
173	173	ALB48	Antifreeze alarm Circuit 3	0	---	0	1	R	mAl_Freeze_Circ3
174	174	ALB48	Antifreeze alarm Circuit 4	0	---	0	1	R	mAl_Freeze_Circ4
175	175	ALB49	Circuit 1-2 Antifreeze alarm	0	---	0	1	R	mAl_Freeze_Circ1_2
176	176	ALB49	Circuit 3-4 Antifreeze alarm	0	---	0	1	R	mAl_Freeze_Circ3_4
177	177	ALU50	Unit Antifreeze alarm	0	---	0	1	R	mAl_Freeze_Unit
178	178	ALB51	Circuit 1 Warning High pressure prevent	0	---	0	1	R	HP_Prevent_Circ1
179	179	ALB51	Circuit 1 Warning Low pressure prevent	0	---	0	1	R	LP_Prevent_Circ1
180	180	ALB51	Circuit 1 Warning Antifreeze prevent	0	---	0	1	R	Antifreeze_Prevent_Circ1
181	181	ALB52	Circuit 2 Warning High pressure prevent	0	---	0	1	R	HP_Prevent_Circ2
182	182	ALB52	Circuit 2 Warning Low pressure prevent	0	---	0	1	R	LP_Prevent_Circ2
183	183	ALB52	Circuit 2 Warning Antifreeze prevent	0	---	0	1	R	Antifreeze_Prevent_Circ2
184	184	ALB53	Circuit 3 Warning High pressure prevent	0	---	0	1	R	HP_Prevent_Circ3
185	185	ALB53	Circuit 3 Warning Low pressure prevent	0	---	0	1	R	LP_Prevent_Circ3
186	186	ALB53	Circuit 3 Warning Antifreeze prevent	0	---	0	1	R	Antifreeze_Prevent_Circ3
187	187	ALB54	Circuit 4 Warning High pressure prevent	0	---	0	1	R	HP_Prevent_Circ4
188	188	ALB54	Circuit 4 Warning Low pressure prevent	0	---	0	1	R	LP_Prevent_Circ4
189	189	ALB54	Circuit 4 Warning Antifreeze prevent	0	---	0	1	R	Antifreeze_Prevent_Circ4
190	190	ALB55	Circuit 1-2 Warning Antifreeze prevent	0	---	0	1	R	Antifreeze_Prev_Circ1_2
191	191	ALB55	Circuit 3-4 Warning Antifreeze prevent	0	---	0	1	R	Antifreeze_Prev_Circ3_4
192	192	ALU56	Unit antifreeze prevent warning	0	---	0	1	R	Warning_Prev_Unit
193	193	ALP38	Evaporator Pump 1 flow warning	0	---	0	1	R	Warning_EPump1
194	194	ALP39	Evaporator Pump 2 flow warning	0	---	0	1	R	Warning_EPump2
195	195	ALP44	Condenser pump 1 flow warning	0	---	0	1	R	Warning_CPump1
196	196	ALP45	Condenser pump 2 flow warning	0	---	0	1	R	Warning_CPump2

197	197	ALP40	Evaporator pump 1 flow alarm	0	---	0	1	R	mAl_Flow_Pump_1
198	198	ALP41	Evaporator pump 2 flow alarm	0	---	0	1	R	mAl_Flow_Pump_2
199	199	ALP42	Evaporator pump 1 overload	0	---	0	1	R/W	mAl_Overload_1
200	200	ALP43	Evaporator pump 2 overload	0	---	0	1	R/W	mAl_Overload_2
201	201	ALP46	Condenser pump 1 flow alarm	0	---	0	1	R	mAl_Flow_Pump_1
202	202	ALP47	Condenser pump 2 flow alarm	0	---	0	1	R	mAl_Flow_Pump_2

9. ALARMS

9.1 Evaporator antifreeze

9.1.1 Antifreeze alarm

Evaporator antifreeze control is always active, even when the unit is Off, in both cooling and heating mode.
Antifreeze is a serious alarm therefore, depending on the ratio between refrigerant circuits / number of evaporators, when activated either the entire unit, the pair of circuits or the single circuit are shut down and the water circulating pump is activated.
The summary table is shown below:

Circuits	No. of evap.	Antifreeze probe used	Action of the alarm
1	1	Control water outlet temp.	Unit off
2	1	Control water outlet temp.	Unit off
2	2	Evap. 1 water outlet temp.	Circuit 1 off
		Evap. 2 water outlet temp.	Circuit 2 off
3	1	Control water outlet temp.	Unit off
3	3	Evap. 1 water outlet temp.	Circuit 1 off
		Evap. 2 water outlet temp.	Circuit 2 off
		Evap. 3 water outlet temp.	Circuit 3 off
4	1	Control water outlet temp.	Unit off
4	2	Evap. 1 water outlet temp.	Circuit 1 and 2 off
		Evap. 3 water outlet temp.	Circuit 3 and 4 off
4	4	Evap. 1 water outlet temp.	Circuit 1 off
		Evap. 2 water outlet temp.	Circuit 2 off
		Evap. 3 water outlet temp.	Circuit 3 off
		Evap. 4 water outlet temp.	Circuit 4 off

9.1.2 Antifreeze prevention

Antifreeze prevention is managed by the Mod_Circuit_Prevent module.
The prevention function needs to be enabled from the manufacturer menu on screen Hc07. If enabled is the prevention set point and differential can be set in the Temperature control menu on screen Gfc39, as well as the maximum number of activations per hour and the prevention activation delay on screen Gfc40.
When a prevention request is activated, the Mod_Circuit_Prevent module calls (see chapter Circuit and compressor management - Lst_Prevent_Circuit and chapter Alarm prevention) Mod_Device_Rotation to stop a compressor in the circuit in question. If the prevention condition persists, after a settable time (Gfc34) another deactivation request is sent. Mod_Device_Rotation decides which compressor must be stopped based on the type of rotation selected. All the compressors will be stopped except for 1.
If the prevention condition occurs more than a certain number of times in a set time (Gfc34), the prevention request is no longer sent, and the unit continues operating until all the compressors are deactivated (see the diagram)

Note: For details on the format of the list, see the description of Lst_Prevent_Circuit in chapter 6.5

For details, see the on-line documents on the Circuit_Prevent module.

9.1.3 Antifreeze heater

Chiller Core features a digital output for activating an antifreeze heater. The activation set point and differential can be set in the manufacturer menu on screen Hc09.

9.1.4 Interaction between antifreeze prevention alarm and heater

Below is the diagram highlighting the interactions between the actions that Chiller Core performs to prevent the unit from shutting down due to an antifreeze condition.

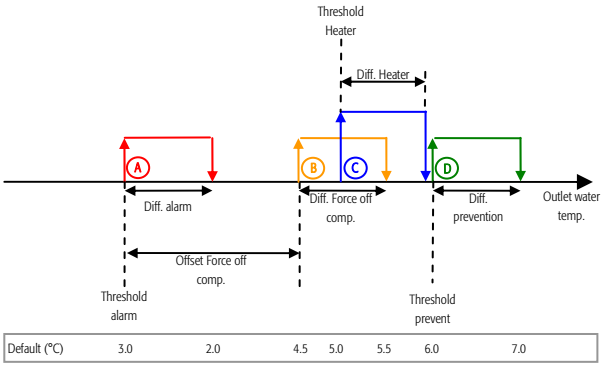


Fig.9.1.a

A) Manufacturer parameters (Hc08)
Actions:
- Antifreeze alarm (ALB48 – ALB49 – ALU50)
- Unit off
- Pump forced on

B) Manufacturer parameters (Hc10)
Actions:
- Compressor shutdown alarm
- Compressors involved forced off (ALW31)

C) Manufacturer parameters (Hc09)
Actions:
- Heater activation

D) Temperature control parameters (Gfc39)
Actions:
- Active prevention warning (ALB51 - ALB52 - ALB53 - ALB54 - ALB55 – ALU56)
- Progressive compressor shutdown

9.2 Condenser antifreeze

The condenser antifreeze is only active on water/water chiller-heat pump units with reversible refrigerant circuit, during operation in heating mode. On all other types unit, antifreeze is only active on the evaporator.
Antifreeze is a serious alarm therefore, depending on the ratio between refrigerant circuits / number of evaporators, and whether condenser control is individual or separate, when activated either the entire unit, the pair of circuits or the single circuit are shut down and the condenser water circulating pump is activated.
The summary table is shown below:

Circuits	No. of evap.	Type of cond.	Antifreeze probe used		Action of the alarm
			pCO3 Large	pCO3 average	
1	1	Individual	B10	B5	Unit off
2	1	Individual	B10	B5	Unit off
2	2	Separate	B10	N.O.	Circuit 1 off
			B4	N.O.	Circuit 2 off
3	1	Individual	B10	B5	Unit off
3	3	Separate	B10	N.O.	Circuit 1 off
			B4	N.O.	Circuit 2 off
			B10 slave	N.O.	Circuit 3 off
4	1	Individual	B10	B5	Unit off
4	2	Separate	B10	N.O.	Circuit 1 and 2 off
			B10 slave	N.O.	Circuit 3 and 4 off
4	4	Separate	B10	N.O.	Circuit 1 off
			B4	N.O.	Circuit 2 off
			B10 slave	N.O.	Circuit 3 off
			B4 slave	N.O.	Circuit 4 off

9.3 High pressure: alarm and prention

The high pressure alarm is managed by the Alarm_HighPressure_Adv macroblock. The Compressor_Alarm pages features 2 of these macroblocks, one for circuit 1-3, the other for circuit 2-4, depending on whether the software recognises the board with address 1 (master) or address 2 (slave).
The alarm can be generated as follows:

1- By pressure switch, consequently by the status of the digital input connected to the high pressure switch.
This refers to alarm ALB36, which is cumulative for all the circuits:

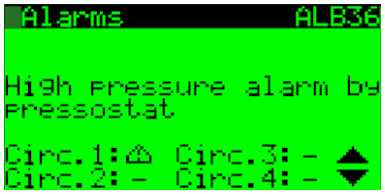


Fig. 9.3.a

In the figure it is assumed that the unit has 4 circuits and that circuit 1 has a high pressure alarm from pressure switch.

2- Based on the pressure value, and consequently the value of an analogue input, referring to a threshold and a differential (Gfc35).
This refers to alarm ALB37, which is cumulative for all the circuits:

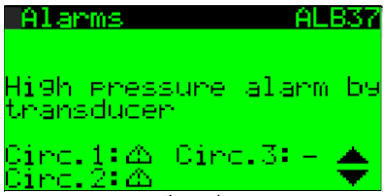


Fig. 9.3.b

In the figure it is assumed that the unit has 3 circuits and that circuits 1 and 2 have a high pressure alarm from pressure probe.

In Chiller Core, the alarm always has manual reset, however the macroblock allows automatic reset to be defined independently for the alarm from pressure switch and the alarm from transducer (see How to add a new alarm).

Chiller Core can perform a number of actions to prevent the high pressure alarm:

1) Force condenser fans on at 100%. There is a fixed offset of 3.0barg in relation to the high pressure prevention threshold. If the high pressure prevention function is disabled, then the offset refers to the high pressure alarm threshold (Gfc33 default 23.0barg).
For further details see the chapter on Condenser fans;
2) High pressure is prevented by the Mod_Circuit_Prevent module.
The prevention function needs to be enabled from the manufacturer menu on screen Hc07. If enabled, both the prevention set point and differential can be set in the temperature control menu on screen Gfc35 and the maximum number of activations per hour and the prevention activation delay can be set on screen Gfc36.
When a prevention request is activated, the Mod_Circuit_Prevent module calls (see the chapter on Circuit and compressor management Lst_Prevent_Circuit and the chapter on Alarm prevention) Mod_Device_Rotation to stop a compressor in the circuit in question. If the prevention condition persists, after a settable time (Gfc34) another deactivation request is sent. Mod_Device_Rotation decides which compressor must be stopped based on the type of rotation selected. All the compressors will be stopped except for 1.
If the prevention condition occurs more than a certain number of times in a set time (Gfc34), the prevention request is no longer sent, and the unit continues operating until the high pressure alarm from probe is activated (see diagram).

Below is a diagram that shows the sequence of operations and the corresponding defaults

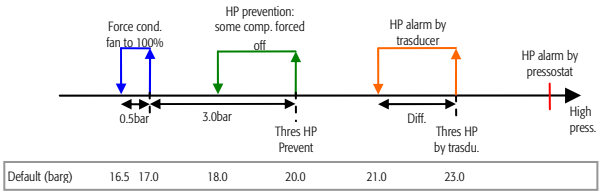


Fig. 9.3c

For details, see the on-line documents on the Alarm_HighPressure_Adv macroblock

9.4 Low pressure: alarm and prevention

The low pressure alarm is managed by the Alarm_LowPressure_Adv macroblock. The Compressor_Alarm pages features 2 of these macroblocks, one for circuit 1-3, the other for circuit 2-4, depending on whether the software recognises the board with address 1 (master) or address 2 (slave).
The alarm can be generated as follows:

1- By pressure switch, consequently by the status of the digital input connected to the low pressure switch.
This refers to alarm ALB34, which is cumulative for all the circuits:

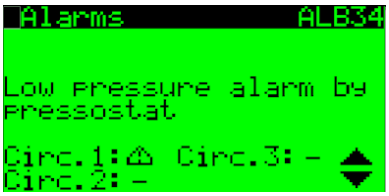


Fig. 9.4.a

In the figure it is assumed that the unit has 3 circuits and that circuit 1 has a low pressure alarm from pressure switch

2- By transducer, consequently based on the value of an analogue input, referring to a threshold and a differential (Gfc30).
This refers to alarm ALB35, which is cumulative for all the circuits:

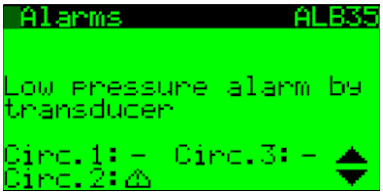


Fig. 9.4.b

In the figure it is assumed that the unit has 3 circuits and that circuit 2 has a low pressure alarm from pressure probe.

The low pressure alarm can only occur if:

- At least 1 compressor is on in the circuit. The alarm can be manually reset when all the compressors in the circuit are off.
- There is no pump-down procedure in progress
- After the delay (Gfc34) from the start of each compressor in the circuit. Consequently, when a compressor starts in the circuit, the alarm is ignored for this time. This is to prevent natural pressure drops in the refrigerant circuit when the compressor starts from causing false low pressure alarms.

For both the low pressure alarm from pressure switch and from transducer, the type of reset can be set in the temperature control menu (Gfc35): semiautomatic or manual.

Semiautomatic: The number of alarm activations per hour are counted. If activated more than 3 times in a hour, the alarm changes to manual reset. The number of activations is set in the strategy (see the red squares in the following figure), and consequently is not modifiable from the user interface.

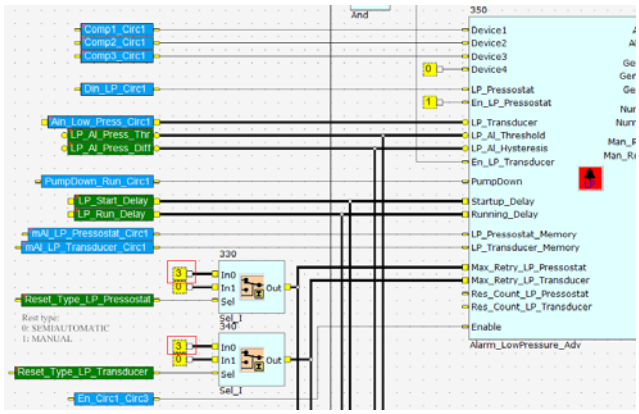


Fig. 9.4.c

The alarm is automatically reset 3 seconds - defined in the algorithm inside the macroblock - after the compressors in the circuit have stopped.
Each alarm, even those with automatic reset, are recorded in the alarm log.
Only if the alarm changes to manual reset will the digital input corresponding to the serious alarm relay be activated.

Manual: Once activated, the alarm can only be reset manually on the display.

9.4.1 Low pressure prevention

Low pressure is prevented by the Mod_Circuit_Prevent module.
The prevention function needs to be enabled from the manufacturer menu on screen Hc07. If enabled, both the prevention set point and differential can be set in the temperature control menu on screen Gfc37 and the maximum number of activations per hour and the prevention activation delay can be set on screen Gfc38.
When a prevention request is activated, the Mod_Circuit_Prevent module calls (see the chapter on Circuit and compressor management Lst_Prevent_Circuit and the chapter on Alarm prevention) Mod_Device_Rotation to stop a compressor in the circuit in question. If the prevention condition persists, after a settable time (Gfc34) another deactivation request is sent.
Mod_Device_Rotation decides which compressor must be stopped based on the type of rotation selected. All the compressors will be stopped except for 1.
If the prevention condition occurs more than a certain number of times in a set time (Gfc34), the prevention request is no longer sent, and the unit continues operating until the low pressure alarm from probe is activated (see diagram).

Below is a diagram that shows the sequence of operations and the corresponding defaults

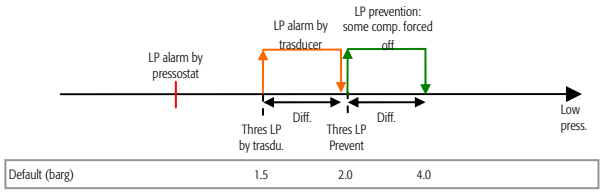


Fig. 9.4.d

For details, see the on-line documents on the Alarm_LowPressure_Adv macroblock

9.5 Manual/automatic alarm reset

Alarm reset can be manual, automatic or semiautomatic:
- Manual reset: once the causes of the alarm have been resolved, first the buzzer needs to be muted by pressing ALARM and then the actual alarm cancelled by pressing ALARM again.
- Automatic reset: when the alarm condition ends the buzzer is automatically muted and the alarm is reset.
- Semiautomatic: the number of activations in one hour is counted: if the number of activations in one hour is less than the maximum number set, reset is automatic, while over the limit reset is manual.

9.5.1 Behaviour of the alarm button and LED

The ALARM button can be pressed in two different contexts: no alarm active, or at least one alarm active.
1- If no alarm is active, the following screen is displayed:

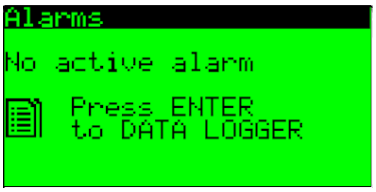


Fig. 9.5.a

This is the last screen in the loop and provides easy access to the alarm log by pressing ENTER.
2- If at least one alarm is active, the alarm screen is displayed, the first screen in order in the loop. At the bottom right there are two flashing arrows that indicate the need to press UP or DOWN in order to scroll to any other alarms: Example

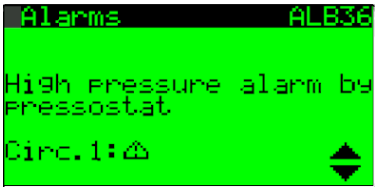


Fig. 9.5.b

Scrolling the loop of alarms with the DOWN button ends at the last screen in the loop, which has the following layout:

Fig. 9.5.c

The screen is the same as in case 1, except the message “No active alarms” is not shown, and an up arrow indicates that this is the end of the loop of alarms. In this case too, the alarm log can be accessed by pressing ENTER.

As regards the red LED under the ALARM button, this may be:
- Off: no active alarms;
- Flashing: there is at least one active alarm and the display is showing a screen that is not in the alarm loop;
- On: there is at least one active alarm and the display is showing a screen in the alarm loop.

9.5.2 How to add a new alarm

Manual reset

To add a new alarm with manual reset, add an alarm screen to the ALARM loop, associating the corresponding alarm memory and alarm status variables.

Automatic reset

To add an alarm with automatic reset, enter a normal screen in the ALARM loop and enter the alarm variable in the “EnableOn” screen property.

For all types of alarms, automatic or manual reset, the “ReferToMask” screen property must be added to the “m_Ref_Alarms” screen.

For management of the buzzer and the LED, activation and deactivation are controlled manually by the MANUAL_BUZZER_ON and MANUAL_BUZZER_OFF system variables.
The strategy features a special function dedicated to the Alarms_Mng page:
- For alarms with manual reset nothing is required, as the Global_Alarm system variable is sufficient
- For alarms with automatic reset, simply add the new alarm variable with an OR relationship with all the other alarms.

9.6 Alarm log

From the main menu, a special branch (E. Data logger) provides access to the alarm log screen.

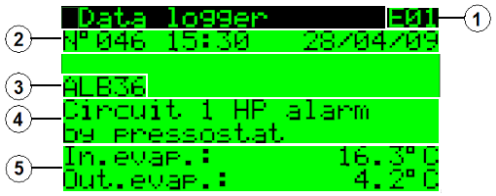


Fig. 9.6.a

The information shown on the screen relates to:

1. Index of the screen;
2. Chronological number of the event (indicates how "old" it is: NO001 is the oldest alarm) + the time and date of the alarm;
3. Code of the alarm (see chap. 9.7 Table of alarms);
4. Short description of the alarm logged;
5. Inlet and output temperature values.

Note: A maximum of 50 alarms can be logged, above this limit, new events overwrite the older ones, which are consequently deleted.

9.6.1 How to increase the maximum number of alarms logged and the type of memory

Accessing the strategy page corresponding to task-A, as shown in the figure below:

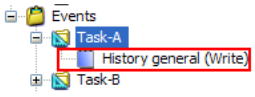


Fig. 9.6.b

both the memory (default type T memory) and the maximum number of alarms logged (default 100 events) can be defined. The following figure highlights these two parameters.

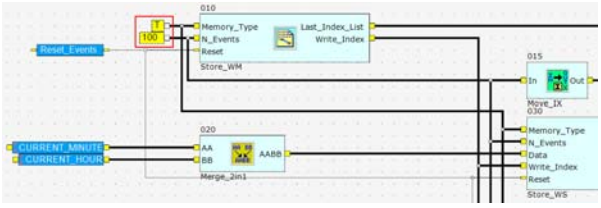


Fig. 9.6.c

Note: The log must be assigned to permanent memory, such as:

- T: Main permanent memory (non-volatile memory)
- P: Extended permanent memory (non-volatile memory)
- E: Non-volatile RAM embedded on the clock card, 52 bytes

On the pCO3 these are all always available, while on the pCOxs P and E memory are only available if the optional clock + memory card is installed, code PCO100CEF0.
When using memory, always check the limits of space and the allowable number of writes.
E.g.: Chiller Core can support a maximum limit of 510alarms in T memory. This limit decreases when new variables are added to T memory, or increases if variables are deleted.
This means that if the amount of space in T memory needs to be increased, the number of events to be stored in the log can be reduced.

9.6.2 How to add an alarm to the log

To add an alarm to the log, proceed as follows:

1) In the current management, add the part of the atoms highlighted by the red rectangle in the figure below and connect it to the rest of the algorithm, in the same way as for the previous alarms.

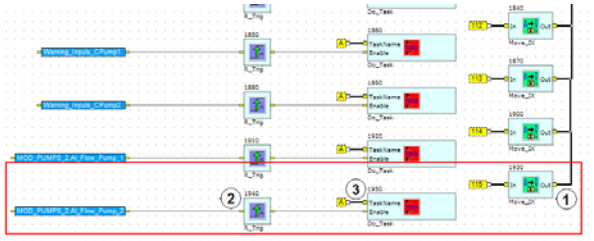


Fig. 9.6.d

3) Follow the order of execution of the blocks indicated by the numbers in the figure shown in point 2) EXACTLY.
4) Replace the alarm variable with the new alarm
5) Increase the number related to the Move_IX atom by 1: using the example in the figure shown in point 2), this increases from 115 to 116.
6) On the log screen, add the description of the new alarm.
   To do this, 3 special fields need to be edited:
   1- sf_Alarm_History_Data_1: Alarm code
   2- sf_Alarm_History_Data_2: Description, first row
   3- sf_Alarm_History_Data_3: Description, second row
   For each of these, the text needs to be entered for the value of the number relating to the Move_IX atom (see point 5), therefore following the same example, for the value 116.
   The following figure shows an example of how to update the special field sf_Alarm_History_Data_1.

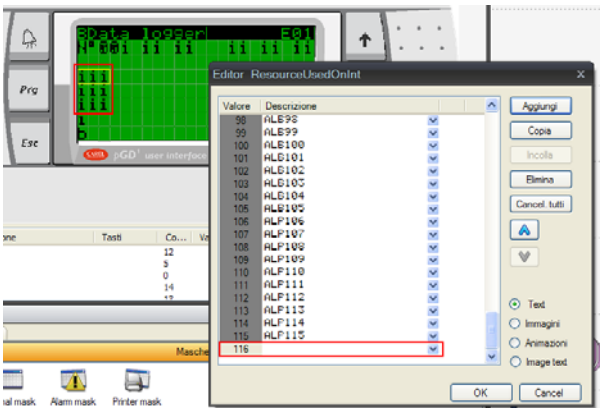


Fig. 9.6.e

9.7 Table of alarms

Code	Description on display	Reset	Delay	Alarm relay	Action
ALG01	Clock card broken or disconnected	Manual	NO	NO	NO
ALG02	Memory expansion damaged	Manual	NO	NO	NO
ALR03	Serious alarm from digital input	Manual	NO	YES	Unit OFF
ALO04	Slave offline	Auto	Start 30s Steady 20s	YES	Circ. 3-4 OFF
ALA05	High pressure probe circuit 1 broken or disconnected	Auto	10s fixed	YES	Circ. 1 comp OFF
ALA06	High pressure probe circuit 2 broken or disconnected	Auto	10s fixed	YES	Circ. 2 comp OFF
ALA07	High pressure probe circuit 3 broken or disconnected	Auto	10s fixed	YES	Circ. 3 comp OFF
ALA08	High pressure probe circuit 4 broken or disconnected	Auto	10s fixed	YES	Circ. 4 comp OFF
ALA09	Low pressure probe 1 broken or disconnected	Auto	10s fixed	YES	Circ. 1 comp OFF
ALA10	Low pressure probe 2 broken or disconnected	Auto	10s fixed	YES	Circ. 2 comp OFF
ALA11	Low pressure probe 3 broken or disconnected	Auto	10s fixed	YES	Circ. 3 comp OFF
ALA12	Low pressure probe 4 broken or disconnected	Auto	10s fixed	YES	Circ. 4 comp OFF
ALA13	Evap. water inlet temperature probe broken or disconnected	Auto	10s fixed	YES	Unit OFF
ALA14	Cond. water inlet temperature probe broken or disconnected	Auto	10s fixed	YES	Unit OFF (valid for WW in heat pump with reversible water circuit)
ALA15	Evap. water outlet temperature probe broken or disconnected	Auto	10s fixed	YES	Unit OFF
ALA16	Evap. 1 water outlet temperature probe broken or disconnected	Auto	10s fixed	YES	Circ. 1/ Circ. 1-2 OFF
ALA17	Evap. 2 water outlet temperature probe broken or disconnected	Auto	10s fixed	YES	Circ. 2/ Circ. 3-4 OFF
ALA18	Evap. 3 water outlet temperature probe broken or disconnected	Auto	10s fixed	YES	Circ. 3 comp OFF
ALA19	Evap. 4 water outlet temperature probe broken or disconnected	Auto	10s fixed	YES	Circ. 4 comp OFF
ALA20	Cond. 1 water outlet temperature probe broken or disconnected	Auto	10s fixed	YES	Unit/Circ. 1/ Circ. 1-2 OFF
ALA21	Cond. 2 water outlet temperature probe broken or disconnected	Auto	10s fixed	YES	Circ. 2
ALA22	Cond. 3 water outlet temperature probe broken or disconnected	Auto	10s fixed	YES	Circ. 3-4/Circ. 3 OFF
ALA23	Cond. 4 water outlet temperature probe broken or disconnected	Auto	10s fixed	YES	Circ. 4 OFF
ALA24	Evaporator water temperature probe broken or disconnected	Auto	10s fixed	YES	Unit OFF
ALA25	Outside temperature probe broken or disconnected	Auto	10s fixed	YES	NO
ALT26	Maintenance request, compressor 1 circuit 1	Manual	NO	NO	NO
ALT26	Maintenance request, compressor 2 circuit 1	Manual	NO	NO	NO
ALT26	Maintenance request, compressor 3 circuit 1	Manual	NO	NO	NO
ALT26	Maintenance request, compressor 1 circuit 2	Manual	NO	NO	NO
ALT26	Maintenance request, compressor 2 circuit 2	Manual	NO	NO	NO
ALT26	Maintenance request, compressor 3 circuit 2	Manual	NO	NO	NO
ALT26	Maintenance request, compressor 1 circuit 3	Manual	NO	NO	NO
ALT26	Maintenance request, compressor 2 circuit 3	Manual	NO	NO	NO

Code	Description on display	Reset	Delay	Alarm relay	Action
ALT26	Maintenance request, compressor 3 circuit 3	Manual	NO	NO	NO
ALT26	Maintenance request, compressor 1 circuit 4	Manual	NO	NO	NO
ALT26	Maintenance request, compressor 2 circuit 4	Manual	NO	NO	NO
ALT26	Maintenance request, compressor 3 circuit 4	Manual	NO	NO	NO
ALT27	Maintenance request, condenser fan group 1	Manual	NO	NO	NO
ALT27	Maintenance request, condenser fan group 2	Manual	NO	NO	NO
ALT28	Maintenance request, condenser pump 1	Manual	NO	NO	NO
ALT28	Maintenance request, condenser pump 2	Manual	NO	NO	NO
ALT29	Maintenance request, evaporator pump 1	Manual	NO	NO	NO
ALT29	Maintenance request, evaporator pump 2	Manual	NO	NO	NO
ALC30	Overload, compressor 1 circuit 1	Manual	NO	YES	Circ. 1 comp. 1 OFF
ALC30	Overload, compressor 2 circuit 1	Manual	NO	YES	Circ. 1 comp. 2 OFF
ALC30	Overload, compressor 3 circuit 1	Manual	NO	YES	Circ. 1 comp. 3 OFF
ALC30	Overload, compressor 1 circuit 2	Manual	NO	YES	Circ. 2 comp. 1 OFF
ALC30	Overload, compressor 2 circuit 2	Manual	NO	YES	Circ. 2 comp. 2 OFF
ALC30	Overload, compressor 3 circuit 2	Manual	NO	YES	Circ. 2 comp. 3 OFF
ALC30	Overload, compressor 1 circuit 3	Manual	NO	YES	Circ. 3 comp. 1 OFF
ALC30	Overload, compressor 2 circuit 3	Manual	NO	YES	Circ. 3 comp. 2 OFF
ALC30	Overload, compressor 3 circuit 3	Manual	NO	YES	Circ. 3 comp. 3 OFF
ALC30	Overload, compressor 1 circuit 4	Manual	NO	YES	Circ. 4 comp. 1 OFF
ALC30	Overload, compressor 2 circuit 4	Manual	NO	YES	Circ. 4 comp. 2 OFF
ALC30	Overload, compressor 3 circuit 4	Manual	NO	YES	Circ. 4 comp. 3 OFF
ALW31	Compressors in circuit 1 forced off for antifreeze	Auto	NO	NO	Circ. 1 Comp OFF
ALW31	Compressors in circuit 2 forced off for antifreeze	Auto	NO	NO	Circ. 2 Comp OFF
ALW31	Compressors in circuit 3 forced off for antifreeze	Auto	NO	NO	Circ. 3 Comp OFF
ALW31	Compressors in circuit 4 forced off for antifreeze	Auto	NO	NO	Circ. 4 Comp OFF
ALW32	Circuit 1 End defrost by maximum time	Manual	NO	NO	NO
ALW32	Circuit 2 End defrost by maximum time	Manual	NO	NO	NO
ALW32	Circuit 3 End defrost by maximum time	Manual	NO	NO	NO
ALW32	Circuit 4 End defrost by maximum time	Manual	NO	NO	NO
ALW33	Circuit 1 End pump-down by maximum time	Manual	NO	NO	NO
ALW33	Circuit 2 End pump-down by maximum time	Manual	NO	NO	NO
ALW33	Circuit 3 End pump-down by maximum time	Manual	NO	NO	NO
ALW33	Circuit 4 End pump-down by maximum time	Manual	NO	NO	NO
ALB34	Low pressure from pressure switch circuit 1	Semiauto / Manual	Start 40s configurable Steady 0s configurable	If manual reset	Circ. 1 comp OFF
ALB34	Low pressure from pressure switch circuit 2	Semiauto / Manual	Start 40s configurable Steady 0s configurable	If manual reset	Circ. 2 comp OFF

Code	Description on display	Reset	Delay	Alarm relay	Action
ALB34	Low pressure from pressure switch circuit 3	Semiauto / Manual	Start 40s configurable Steady 0s configurable	If manual reset	Circ. 3 comp OFF
ALB34	Low pressure from pressure switch circuit 4	Semiauto / Manual	Start 40s configurable Steady 0s configurable	If manual reset	Circ. 4 comp OFF
ALB35	Low pressure from probe circuit 1	Semiauto / Manual	Start 40s configurable Steady 0s configurable	If manual reset	Circ. 1 comp OFF
ALB35	Low pressure from probe circuit 2	Semiauto / Manual	Start 40s configurable Steady 0s configurable	If manual reset	Circ. 2 comp OFF
ALB35	Low pressure from probe circuit 3	Semiauto / Manual	Start 40s configurable Steady 0s configurable	If manual reset	Circ. 3 comp OFF
ALB35	Low pressure from probe circuit 4	Semiauto / Manual	Start 40s configurable Steady 0s configurable	If manual reset	Circ. 4 comp OFF
ALB36	High pressure from pressure switch circuit 1	Manual	NO	YES	Circ. 1 comp OFF
ALB36	High pressure from pressure switch circuit 2	Manual	NO	YES	Circ. 2 comp OFF
ALB36	High pressure from pressure switch circuit 3	Manual	NO	YES	Circ. 3 comp OFF
ALB36	High pressure from pressure switch circuit 4	Manual	NO	YES	Circ. 4 comp OFF
ALB37	High pressure from probe circuit 1	Manual	NO	YES	Circ. 1 comp OFF
ALB37	High pressure from probe circuit 2	Manual	NO	YES	Circ. 2 comp OFF
ALB37	High pressure from probe circuit 3	Manual	NO	YES	Circ. 3 comp OFF
ALB37	High pressure from probe circuit 4	Manual	NO	YES	Circ. 4 comp OFF
ALP38	No flow warning evaporator pump 1	Auto	20s configurable	NO	NO
ALP39	No flow warning pump 2 evaporator	Auto	20s configurable	NO	NO
ALC40	No flow evaporator pump 1	Manual	NO	YES	Unit OFF/NO
ALC41	No flow pump 2 evaporator	Manual	NO	YES	Unit OFF/NO
ALC42	Evaporator pump 1 overload	Manual	NO	YES	Unit OFF/NO
ALC43	Evaporator pump 2 overload	Manual	NO	YES	Unit OFF/NO
ALC44	No flow warning condenser pump 1	Auto	20s configurable	NO	NO
ALC45	No flow warning condenser pump 2	Auto	20s configurable	NO	NO
ALC46	No flow condenser pump 1	Manual	NO	YES	Unit OFF/NO
ALC47	No flow condenser pump 2	Manual	NO	YES	Unit OFF/NO
ALC48	Antifreeze alarm circuit 1	Manual	NO	YES	Circ. 1 comp OFF
ALC48	Antifreeze alarm circuit 2	Manual	NO	YES	Circ. 2 comp OFF
ALC48	Antifreeze alarm circuit 3	Manual	NO	YES	Circ. 3 comp OFF
ALC48	Antifreeze alarm circuit 4	Manual	NO	YES	Circ. 4 comp OFF
ALC49	Antifreeze alarm circuits 1-2	Manual	NO	YES	Circ. 1-2 comp OFF
ALC49	Antifreeze alarm circuits 3-4	Manual	NO	YES	Circ. 3-4 comp OFF
ALC50	Unit antifreeze alarm	Manual	NO	YES	Unit OFF

Code	Description on display	Reset	Delay	Alarm relay	Action
ALC51	High pressure prevention warning circuit 1	Auto	5s configurable	NO	Decrease capacity circ. 1
ALC51	Low pressure prevention warning circuit 1	Auto	5s configurable	NO	Decrease capacity circ. 1
ALC51	Antifreeze prevention warning circuit 1	Auto	5s configurable	NO	Decrease capacity circ. 1
ALC52	High pressure prevention warning circuit 2	Auto	5s configurable	NO	Decrease capacity circ. 2
ALC52	Low pressure prevention warning circuit 2	Auto	5s configurable	NO	Decrease capacity circ. 2
ALC52	Antifreeze prevention warning circuit 2	Auto	5s configurable	NO	Decrease capacity circ. 2
ALC53	High pressure prevention warning circuit 3	Auto	5s configurable	NO	Decrease capacity circ. 3
ALC53	Low pressure prevention warning circuit 3	Auto	5s configurable	NO	Decrease capacity circ. 3
ALC53	Antifreeze prevention warning circuit 3	Auto	5s configurable	NO	Decrease capacity circ. 3
ALC54	High pressure prevention warning circuit 4	Auto	5s configurable	NO	Decrease capacity circ. 4
ALC54	Low pressure prevention warning circuit 4	Auto	5s configurable	NO	Decrease capacity circ. 4
ALC54	Antifreeze prevention warning circuit 4	Auto	5s configurable	NO	Decrease capacity circ. 4
ALC55	Antifreeze prevention warning circuits 1-2	Auto	5s configurable	NO	Decrease capacity circ. 1&2
ALC55	Antifreeze prevention warning circuits 3-4	Auto	5s configurable	NO	Decrease capacity circ. 3&4
ALC56	Unit antifreeze prevention warning	Auto	5s configurable	NO	Decrease unit capacity

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