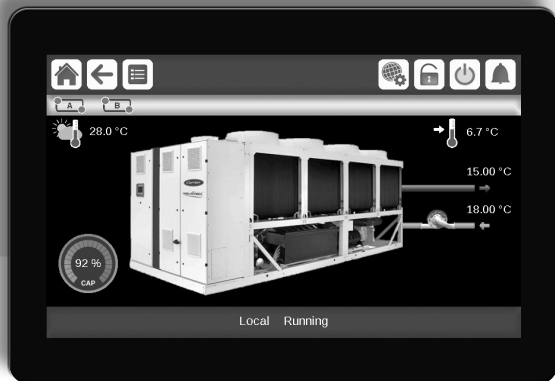




CONTROLS MANUAL



SmartVu™ Control

30KAV & 30KAV(P)
30KAV ZE

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PREFACE

The goal of this manual is to give a broad overview of the main functions of the SmartVu™ control system used to control and monitor the operation of 30KAV air-cooled chillers using screw compressor technology.

Instructions in this manual are given as a guide to good practice in the installation, start-up and operation of the control system. This document does not contain full service procedures for the correct operation of the equipment.

The support of a qualified Carrier Service Engineer is strongly recommended to ensure optimal operation of the equipment as well as the optimization of all available functionalities.

Note that this document may refer to optional components and certain functions, options or accessories may not be available for the specific unit.

IMPORTANT: All screenshots of the user interface provided in this manual include text in English. After changing the language of the system, all labels will be in the language selected by the user.

Please read all instructions prior to proceeding with any work. Pay attention to all safety warnings.

The information provided herein is solely for the purpose of allowing customers to operate and service Carrier-manufactured equipment and it is not to be reproduced, modified or used for any other purpose without the prior consent of Carrier Corporation.

ABBREVIATIONS

In this manual, the refrigerant circuits are called circuit A and circuit B. Compressor in circuit A is labelled A1 and compressor in circuit B is labelled B1.

The following abbreviations are used frequently:

BMS	Building Management System
BPHE	Brazed Plate Heat Exchanger
CCN	Carrier Comfort Network
DCFC	Dry Cooler Free Cooling
DGT	Discharge Gas Temperature
DST	Daylight Saving Time
EMM	Energy Management Module
EOL	End Of Line
EWT	Entering Water Temperature
EXV	Electronic Expansion Valve
LEN	Sensor Bus (internal communication bus linking the basic board to slave boards)
LWT	Leaving Water Temperature
SCT	Saturated Condensing Temperature
SST	Saturated Suction Temperature

1 - SAFETY CONSIDERATIONS

1.1 - Safety guidelines

Installation, start-up and servicing of equipment can be hazardous if certain factors particular to the installation are not considered: operating pressures, presence of electrical components and voltages and the installation site (elevated plinths and built-up structures).

Only properly qualified installation engineers and highly qualified installers and technicians, fully trained for the product, are authorised to install and start up the equipment safely.

During all servicing operations all instructions and recommendations which appear in the installation and service instructions for the product, as well as on tags and labels fixed to the equipment and components and accompanying parts supplied separately, must be read, understood and followed.

Failure to comply with the instructions provided by the manufacturer may result in injury or product damage.

- **Apply all standard safety codes and practices.**
- **Wear safety glasses and gloves.**
- **Use the proper tools to move heavy objects.**
- **Move units carefully and set them down gently.**

1.2 - Safety precautions

Only personnel qualified in accordance with IEC (International Electrotechnical Commission) recommendations may be permitted access to electrical components.

It is particularly recommended that all sources of electricity to the unit be shut off before any work is begun. Shut off the main power supply at the main circuit breaker or isolator.

IMPORTANT: This equipment conforms to all applicable codes regarding electromagnetic compatibility.

RISK OF ELECTROCUTION! Even when the main circuit breaker or isolator is switched off, specific circuits may still be energised as they may be connected to a separate power source.

RISK OF BURNS! Electrical currents may cause components to get hot. Handle the power cable, electrical cables and conduits, terminal box covers and motor frames with great care.

2 - CONTROL OVERVIEW

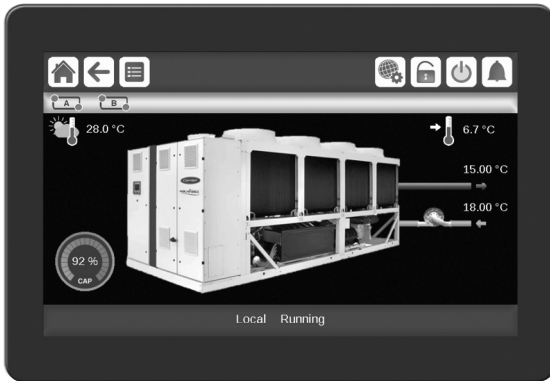
2.1 - System functionalities

The SmartVu™ system controls the start-up of the compressors needed to maintain the desired heat exchanger entering and leaving water temperature.

The control panel serves as a user interface and a configuration tool for controlling the operation of the unit. SmartVu™ constantly monitors safety devices that protect the unit against failure and guarantee its optimal functioning.

2.2 - Control panel

Navigation through the SmartVu™ control is either using the touch screen interface or by connecting to the web interface. The navigation menus are the same for both connection methods (touch screen and web browser).



NOTE: Some functions are unavailable when using the web browser interface (see also section 7.1).

2.3 - SmartVu™ components

The controller manages a number of mechanisms that allow the unit to operate effectively, including the following:

- Compressor start-up to control the water loop (screw compressor technology)
- 7" touch screen as standard (SmartVu™)
- Communication protocols (CCN, BACnet, Modbus)
- BMS connection through optional Modbus (TCP or RS485) or BACnet/IP
- Diagnostics, e-mail transmission
- Web connectivity
- Energy Management Module (optional)
- Hydronic module, variable-speed pump control (optional)
- External fixed-speed or variable-speed pump control
- Dry Cooler Free Cooling system (optional)
- Brine options (option 5, option 6 and option 8) (see also section 6.21)
- Remote unit management
- Energy optimization, power/energy monitoring
- Maintenance schedule management
- Software-protected options such as brine fluid, BACnet, Modbus, and fast capacity recovery (see also section 6.20)

2.4 - Operating modes

The control system can operate in three independent modes:

- Local mode: The unit is controlled by commands from the user interface.
- Remote mode: The unit is controlled by dry contacts.
- Network mode: The unit is controlled by network commands. Data communication cable is used to connect the unit to the RS485 communication bus or IP connection.

When the control operates autonomously (Local or Remote), it retains all of its control capabilities but does not offer any features of the Network.

IMPORTANT: Emergency stop! The Network emergency stop command stops the unit regardless of its active operating type.

3 - HARDWARE DESCRIPTION

3.1 - Control boards

Each circuit is by default fitted with one SIOB board used to manage all inputs and outputs of the controller. At the same time, Energy Management Module (EMM) and Heat Reclaim option requires an additional SIOB boards to be installed. The control also includes up to five AUX1 boards used to control refrigerant leak detection option, dry cooler free cooling option, master/slave assembly control, and internal or external pumps' control.

- All boards communicate via an internal LEN bus.
- SmartVu™ continuously monitors the information received from various pressure and temperature probes and accordingly starts the program that controls the unit.
- The unit is equipped with the SmartVu™ user interface (7-inch colour LCD touch screen).
- The electrical box includes the user interface and all boards controlling the unit, excluding DCFC board which is installed directly in the dry cooler.

3.2 - Power supply to boards

All boards are supplied from a common 24 VAC supply referred to earth. In the event of a power supply interrupt, the unit restarts automatically without the need for an external command. However, any faults active when the supply is interrupted are saved and may in certain cases prevent the unit from restarting.

CAUTION: Maintain correct polarity when connecting the power supply to the boards, otherwise the boards may be damaged.

3.3 - Pressure transducers

Two types of electronic sensors (high and low pressure) are used to measure various pressures in each circuit.

These electronic sensors deliver 0 to 5 VDC. The sensors are connected to the slave boards.

- **Suction pressure sensors (low pressure type)**
These sensors measure the suction pressure in each circuit. They are used for EXV control. Suction pressure sensors are located on the suction piping of each circuit.
- **Discharge pressure sensors (high pressure type)**
These sensors measure the discharge pressure in each circuit. They are used to control head pressure or high pressure load shedding. Discharge pressure sensors are mounted on the discharge line piping of each circuit.
- **Oil pressure sensors (high pressure type)**
These sensors measure the oil pressure of each compressor. Oil pressure sensors are located at the oil port of the compressor. The economizer pressure is subtracted from this value to arrive at the differential oil pressure.
- **Economizer pressure sensors (high pressure type)**
These sensors measure the intermediate pressure between discharge and suction pressure. They are used to control the economizer performance.

3.4 - Temperature sensors

Temperature sensors constantly measure the temperature of various components of the unit, ensuring the correct operation of the system.

- **Evaporator entering and leaving water temperature sensors**
The evaporator entering and leaving water temperature sensors are installed in the entering and leaving side water box. They are used for capacity control and safety purposes.
- **Suction gas temperature sensor**
This sensor is used to control the suction gas temperature. It is located at the suction line of the compressor.
- **Discharge gas temperature sensor**
This sensor is used to control the discharge gas temperature, and permits control of the discharge superheat temperature. It is located at the discharge line of the compressor.
- **Motor temperature sensor**
This sensor is used to control the motor temperature of each compressor.
- **Temperature setpoint reset sensor (EMM)**
This 4-20 mA space temperature sensor can be installed remotely from the unit. It is used to reset the setpoint on the unit.
- **Master/slave water sensor (optional)**
The water temperature sensor is used for master/slave assembly control.
- **Outdoor air temperature**
The outdoor air temperature sensor is used for fan control.
- **DCFC option: OAT sensor**
This sensor located on the dry cooler is used to determine whether dry cooler free cooling can be operating.
- **DCFC option: Water loop temperature and LWT sensors**
These sensors located on the dry cooler are used to control the dry cooler free cooling process (see also section 6.18).

3.5 - Actuators

- **Evaporator pumps**
The controller can regulate one or two evaporator pumps and takes care of the automatic changeover between these pumps.
- **Electronic Expansion Valve**
The electronic expansion valve (EXV) is used to adjust the refrigerant flow to changes in the operating conditions of the machine. To adjust the refrigerant flow, a piston moves constantly up or down to vary the cross-section of the refrigerant path. This piston is driven by an electronically controlled linear stepper motor. The high degree of accuracy with which the piston is positioned provides precise control of the refrigerant flow.
- **Water flow switch**
The water flow switch allows the control to ensure the minimum water flow that is necessary for the proper functioning of the unit. The configuration of its setpoint depends on the unit size and is made automatically at the start-up. If the measured water flow rate in the water loop is lower than the configured flow rate, the alarm condition shuts off the unit.

3 - HARDWARE DESCRIPTION

3.6 - Connections at the customer terminal block

3.6.1 - Terminal block connections

The following table summarizes connections at the user terminal block. Some contacts can be accessed only when the unit operates in Remote mode.

Description	Board	Connector	Remarks
Remote on/off contact	SIOB	J1-DI01; 32-33	Used for the unit on/off control if the unit is in Remote mode: open = Unit is stopped; closed = Unit is allowed to start in Cooling
Remote setpoint contact	SIOB	J1-DI02; 65-66	Used to control the setpoint
Demand limit contact	SIOB	J1-DI03; 63-64	Used to control demand limit
Heat recovery (heat reclaim)	SIOB	J1-DI04; 73-74	Used to control the water flow in the heat reclaim condenser
Customer interlock	SIOB	J1-DI05; 34-35	Used to control the unit by the customer: open = Unit is stopped and an alarm is triggered (alarm 10028)
Evaporator pump 1	SIOB	J2/J4-IN01/DO01; 90	Used to command the control of evaporator pump 1
Evaporator pump 2	SIOB	J2/J4-IN02/DO02; 90A	Used to command the control of evaporator pump 2
Alarm relay	SIOB	DO-05; 30A-31A	Indicates alarms
Running relay	SIOB	DO-06; 37-38	Indicates if the unit is ready to start or operating
Setpoint reset	SIOB	AI10 (A1A); 71-72	Used for setpoint reset control
Occupancy override	SIOB, EMM	DI-01; 77-78	Enables to switch between occupied (closed contact) and unoccupied mode (open contact), applicable to units operating in Local mode
Demand limit contact 2	SIOB, EMM	DI-02; 73A-74A	Used to control demand limit
Customer interlock (EMM option)	SIOB, EMM	DI-03; 34A-35A	Used to control the unit by the customer: closed = Unit is stopped and an alarm is triggered (alarm 10014)
Ice done contact	SIOB, EMM	DI-04; 75-76	Used for ice storage control
Unit partially shutdown	SIOB, EMM	DO-05; 30B-31B	Indicates the shutdown of one of the circuits
Unit shutdown	SIOB, EMM	DO-06; 30-31	Indicates the unit shutdown
Chiller running or ready to start	SIOB, EMM	DO-04; 37A-38A	Output closed when the chiller is ready to start or running
Compressor A running	SIOB, EMM	DO-01; 37A1-38A1	Output closed when the compressor of circuit A is running
Compressor B running	SIOB, EMM	DO-02; 37B1-38B1	Output closed when the compressor of circuit B is running
Chiller capacity	SIOB, EMM	AO-01; 79+ - 79-	Chiller total capacity
Space temperature	SIOB, EMM	AI-01; 71A-72A	Space temperature input for setpoint reset function
Capacity limit (analogue)	SIOB, EMM	AI-10; 67-68	Analogue capacity limit command

3.6.2 - Volt-free on/off contact

When the unit is under remote control, the on/off contact is operating as follows:

Contact	Off	Cooling
On/Off contact	open	closed

Off: Unit is stopped

Cooling: Unit is allowed to start in Cooling

3.6.3 - Volt-free setpoint selection contact

When the unit is under remote control, the volt-free contact is used to determine the active setpoint. This dry contact is used to switch between setpoints.

Contact	Active Setpoint	
	SP1	SP2
Setpoint selection contact	open	closed

3.6.4 - Volt-free demand limit selection contact

Up to two dry contacts can be used to limit unit capacity. Note that the second contact is available only for units with the energy management module. Capacity limitation with two contacts is as follows:

Contact	100%	Limit 1	Limit 2	Limit 3
Demand limit 1 contact (LIM_SW1)	open	closed	open	closed
Demand limit 2 contact (LIM_SW2), EMM option	open	open	closed	closed

Please note that limit thresholds can be defined via the user interface in the Setpoint menu.

3.6.5 - Ice storage (EMM)

For units with EMM option, the control includes an additional setpoint ("ice setpoint") used for ice storage control.

Contact	Cooling setpoint		
	Setpoint 1 (CSP1)	Setpoint 2 (CSP2)	Ice setpoint (ICE_STP)
Occupancy schedule	occupied	unoccupied	unoccupied
Ice done switch (EMM option)	open/closed	closed	open

3.6.6 - Customer interlock

The customer interlock available on the SIOB board and connected in serial with the electrical box thermostat can be used by the customer in order to control the state of the unit. When the interlock is open, the unit will be stopped and the alarm will be triggered (alarm 10028).

3.6.7 - Occupancy override (EMM)

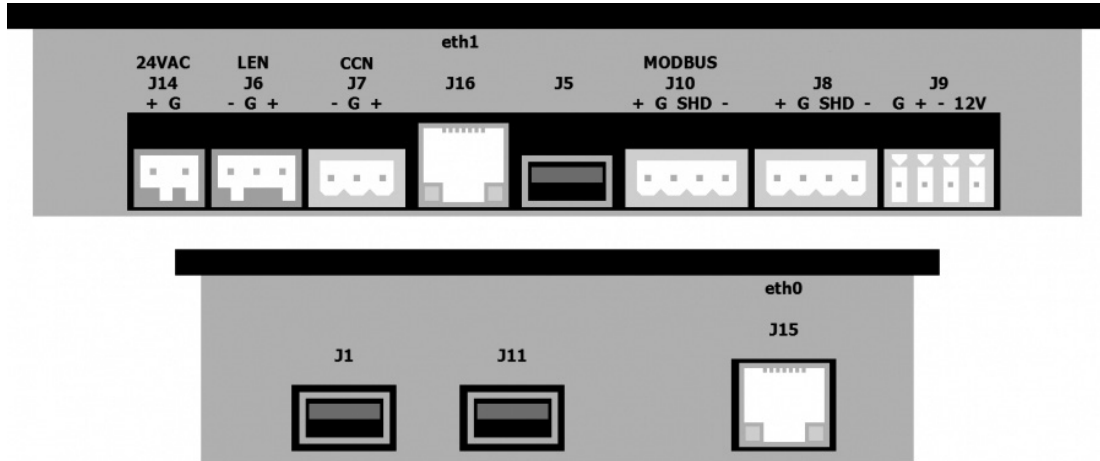
The occupancy override contact is available in case of units fitted with the optional Energy Management Module. When the unit is operating in Local mode and the contact is closed, the unit is in occupied mode. At the same time, open occupancy contact means that the unit is in unoccupied mode.

3 - HARDWARE DESCRIPTION

3.7 - Touch panel connections

Connections are located on the bottom and the right side of the controller.

- The control offers communication protocols such as LEN, CCN, Modbus, or BACnet.
- It is possible to enable and disable end-of-line resistors via the System menu (see also section 5.7).
- Two Ethernet ports allow for TCP/IP communication or BMS connection.



3 - HARDWARE DESCRIPTION

3.8 - RS485 wiring (best practice)

For RS485 ports, one of the following cables can be used:

- two twisted pairs + a shield (RECOMMENDED)
- three wires + a shield

Note that “+” and “-” are communication signals and they are from the same twisted pair.

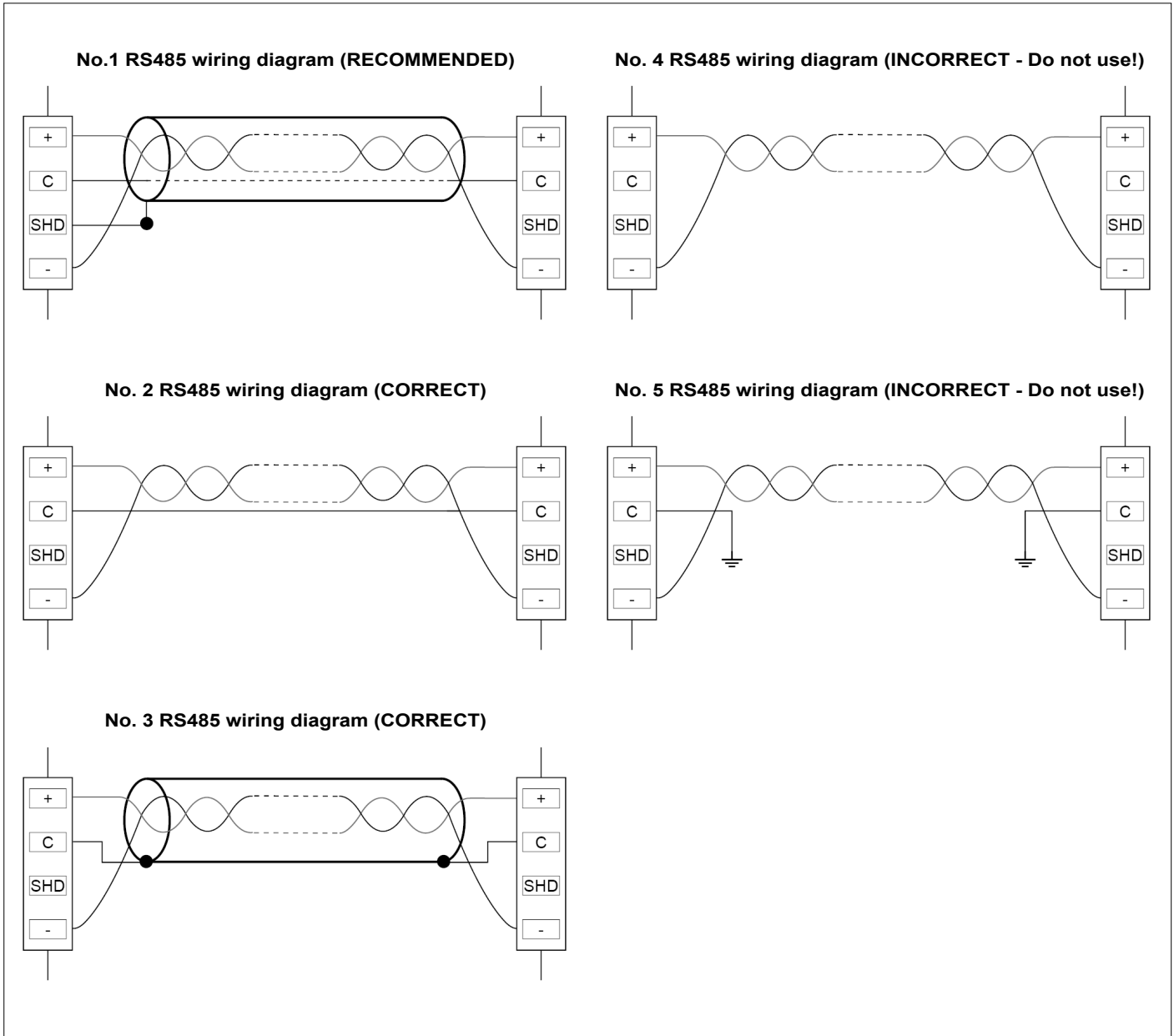
The signal ground could be a single wire or a twisted pair and it should be connected to the “C” pin of J10 (Modbus RTU) or J7 (CCN). This wire is required so that all nodes on the bus share a common ground reference connection.

If a shield is used, then the shield cable should be properly terminated and connected as short as possible at **ONLY ONE END** to the SHD connector pin (7-inch controllers).

3.8.1 - RS485 wiring: 7-inch controller

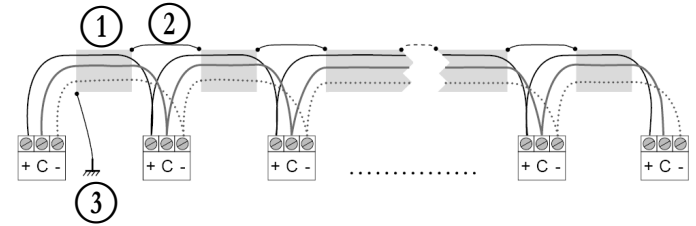
The following diagrams illustrate possible RS485 wiring schemes for 7-inch controllers.

The first wiring scheme is the best option (RECOMMENDED), but the second or the third wiring can also be used.



3.8.2 - RS485: Daisy chain configuration

The following illustration shows proper 3-wire cable with a shield in a daisy chain configuration.



- Legend**
- ① Shield
 - ② Keep shield continued
 - ③ Connect shield to earth ground only at one point

End of Line Resistor: Termination is only needed when running at bus at very high speed over long distances.

The speed of the bus and the cable distance determine whether termination is needed. It is meant to balance the bus to minimize the ringing that may be caused by fast signals and the inductance of the cabling.

At 9600 baud, termination will have little or no effect on the bus.

4 - USER INTERFACE: OVERVIEW

4.1 - Touch screen display

SmartVu™ is a 7 in. colour touch screen with quick display of alarms, current unit operating status, etc. It allows for web connectivity and custom language support (control parameters displayed in the language selected by the user).

- If the touch screen is not used for a while, the screen backlight will be turned off. The control system is always active and the operating mode remains unchanged. Press anywhere on the screen and the Home screen will be displayed.
- It is recommended to use a stylus for the navigation via the touch screen (not provided with the controller).

4.2 - Home screen (synoptic view)

The home screen is the starting point of the controller. It is also the first screen shown after starting the user interface.



Legend:

1. Header and subheader buttons (see section 4.5 and section 4.6)
2. Synoptic view / Circuit view (see section 4.3)
3. Information message box (see section 4.4)

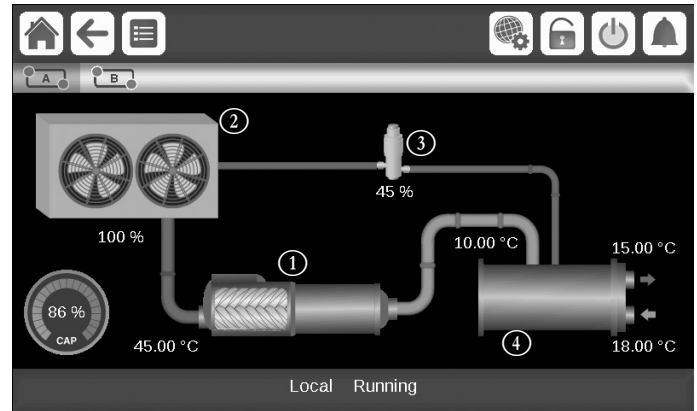
Please note that the picture of the chiller is for illustration only and it may differ from the actual look of the chiller that is available on field. The image displayed on the home screen represents the whole series of 30KAV chillers.

The home screen allows you to monitor basic information about the operation of the chiller and its working conditions.

Icon	Description
	Setpoint: This parameter is used to display the currently selected setpoint. Press the icon to modify the setpoint (possible only when logged in!, see section 5.8).
	Outdoor Air Temperature (OAT): This parameter is displayed only in case of units fitted with OAT sensor.
	Unit capacity: The gauge shows current unit capacity.
	Pump status: Press the icon to go to pump parameters. The pump image is animated when the flow switch is "on".
	Leaving Water Temperature: This parameter shows current leaving water temperature.
	Entering Water Temperature: This parameter shows current entering water temperature.

4.3 - Circuit view

The circuit view can be accessed by pressing the circuit button (see section 4.6).



Icon	Description
	(1) Compressor is used to squeeze the compressor refrigerant gas and turn it into high pressure gas. The image is animated when the screw compressor is running.
	(2) Condenser is a heat exchanger used to reject the heat by cooling down the high pressure gases and taking advantage to condense the vapors into a liquid. Condenser fans are animated when fans are running. <i>Please note that the number of fans given in the picture may be different from the actual number of fans installed on the unit. The speed of fans does not reflect its real speed.</i>
	(3) EXV is used to control the flow of refrigerant into the evaporator. The circuit view displays the current position of the electronic expansion valve. <i>Valve position is given in %, where 0% means closed position and 100% means open position.</i>
	(4) Evaporator absorbs heat from the fluid (pure water or brine), it does the opposite of the Condenser which is rejecting the heat out of the unit. Evaporator converts liquid refrigerant into vapors.
	Circuit capacity: The gauge shows current circuit capacity.
	Leaving Water Temperature: This parameter shows current leaving water temperature.
	Entering Water Temperature: This parameter shows current entering water temperature.

4.4 - Information message box

The information displayed in the status bar at the bottom of the screen includes relevant messages related to actions taken by the user.

Message	Description
SUCCESS	Displayed when the requested action is executed.
INTERNAL COMMUNICATION FAILURE!	Displayed when the main application is not running.
HIGH FORCE IN EFFECT!	Displayed when the controller rejects the "Force" command (applicable only to status menus).
ACCESS DENIED!	Displayed when trying to perform actions not allowed at current access level.

4 - USER INTERFACE: OVERVIEW

4.5 - Header buttons



Button	Description
	Home screen: Press the button to go to the Home screen.
	Previous screen: Press the button to go back to the previous screen.
	Main menu: Press the button to go to the Main menu.
	System menu: Press the button to go to the System menu.
	User Login menu: Used to log in to the controller in order to access higher configuration level.
	User is not logged in.
	Service technician access level.
	User access level.
	Factory access level.
	Start/Stop menu: Used to control the unit control mode.
	Unit is currently stopped (blue icon).
	Unit is currently running (green icon).
	Alarms menu: Press the button to go to the Alarms menu.
	The grey bell means there is currently no alarm active on the unit.
	The yellow ringing bell means that there is a partial alarm (one circuit affected by the alarm) or Alert (no action taken on the unit).
	The red ringing bell means that the unit is affected by the alarm.

4.6 - Subheader buttons

Button *	Description
	Circuit view: Press the button to go to the circuit view.
	Green lights in the corners of the circuit icon mean the circuit is currently running.
	Grey lights in the corners of the circuit icon mean the circuit is currently stopped.

* Please note that the letter inside the circuit icon stands for the circuit, i.e. "A" stands for circuit A, "B" stands for circuit B.

4 - USER INTERFACE: OVERVIEW

4.7 - Other buttons

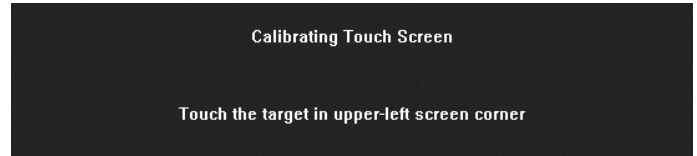
Button	Description
	Save button: Press the button to save the modification.
	Cancel button: Press the button to cancel the modification.
	Log in button: Press the button to log in at specific access level.
	Log off button: Press the button to log off.
	Confirm button: Press the button to confirm the modification.
	Cancel button: Press the button to cancel the modification.
	Up button: Press the button to scroll up.
	Down button: Press the button to scroll down.
	Force button: Press the button to force the parameter.
	Remove Force button: Press the button to remove the forced parameter.
	Trending button: Press the button to display trends.
	Refresh button: Press the button to refresh the view.
	Zoom in button: Press the button to magnify the current view.
	Zoom out button: Press the button to expand the current view.
	Left button: Press the button to go to the left.
	Rewind button: Press the button to go to the left faster than normal.
	Right button: Press the button to go to the right.
	Fast-forward button: Press the button to go the right faster than normal.

4.8 - Screen calibration

The purpose of screen calibration is to make sure that the software acts correctly upon pressing icons on the user interface.

To calibrate the screen

1. Press and hold anywhere on the screen.
2. The calibration process will start.
3. Please follow instructions displayed on the screen:
"Touch the target in (...) screen corner"



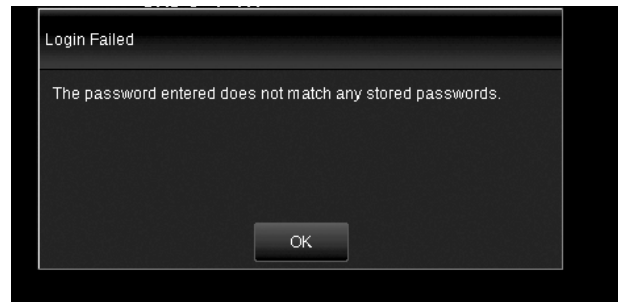
4.9 - Warning messages

Warning messages are used to inform the user that a problem occurred and the requested action cannot be completed successfully.

Login failure

If the wrong password is provided, the following warning message will be displayed:

"The password entered does not match any stored passwords"

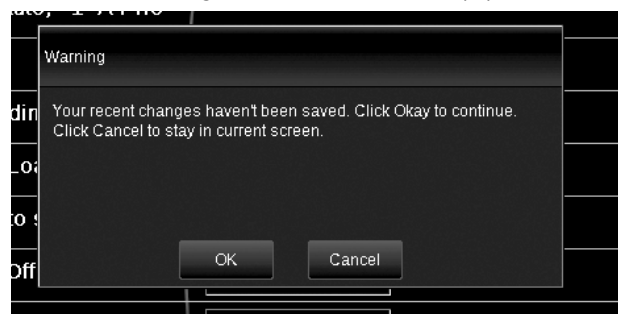


- Press **OK** and type the correct password (see section 5.8).

Saving modifications

In case a parameter has been changed, but not saved with the **Save** button, the following warning message will be displayed:

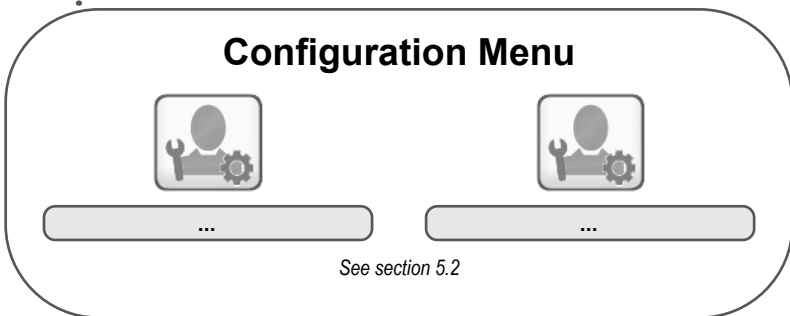
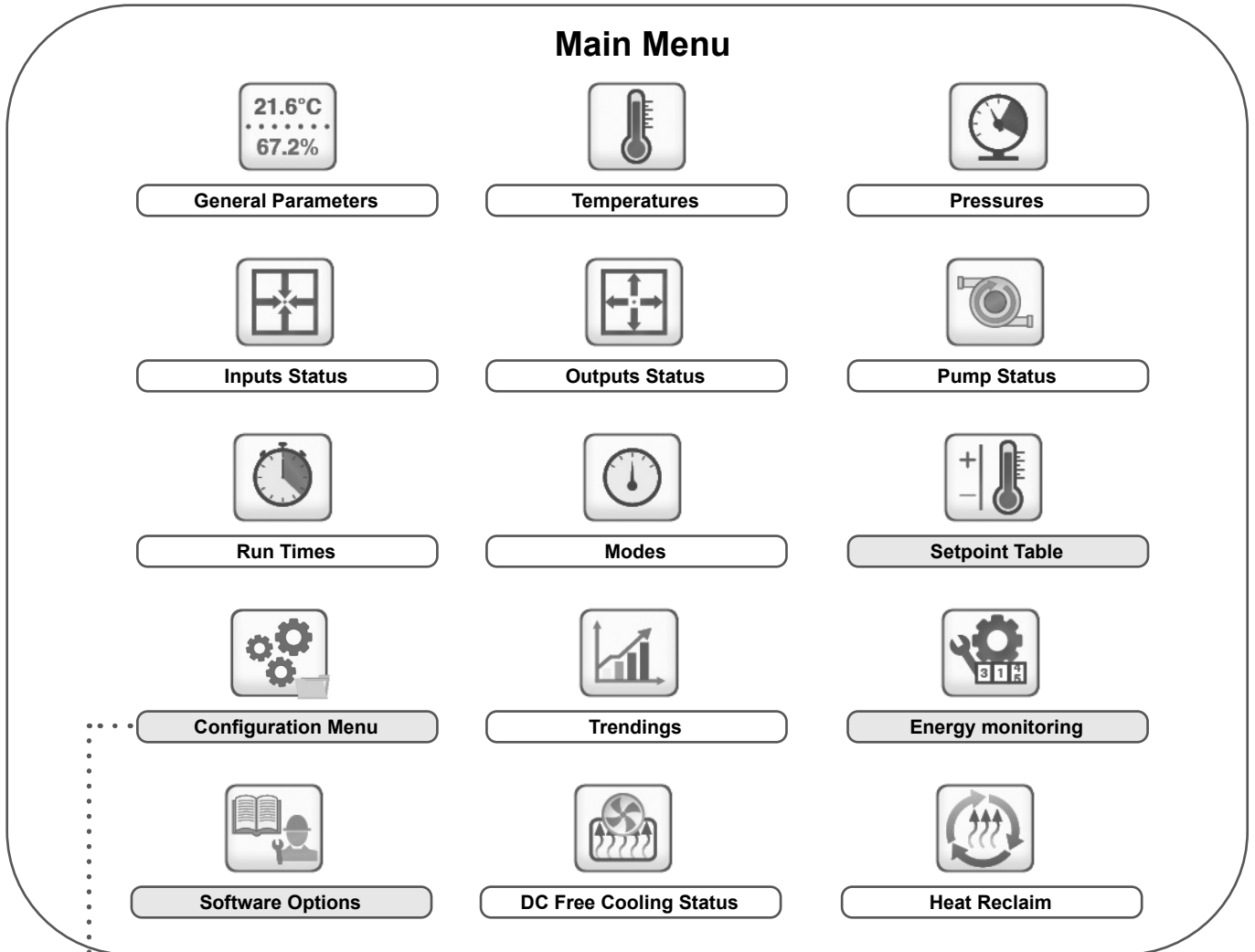
"Your recent changes haven't been saved (...)"



- Press **OK** to continue without saving the modification.
- Press **Cancel** to come back to the current screen and then save the modification with the **Save** button.

5 - USER INTERFACE: MENU STRUCTURE

5.1 - Main menu



Legend:

- Basic access (no password)
- User password required

5 - USER INTERFACE: MENU STRUCTURE

The Main menu provides access to the main control parameters, including general parameters, inputs and outputs status, etc.

- To access the menu, press the **Main menu** button located in the upper-left part of the Home screen.
- Specific unit parameters can be accessed by pressing the icon corresponding to the desired category.

NOTE: The Trendings menu is displayed in form of a graph. For more information about Trendings, see section 6.14.

CAUTION: Since specific units may not include additional features, some tables may contain parameters that cannot be configured for a given unit.



General Parameters – GENUNIT

No.	Name	Status	Unit	Displayed text*	Description
1	CTRL_TYP	0 to 2	-	Local=0 Net.=1 Remote=2	Operating mode: 0 = Local 1 = Network 2 = Remote
2	STATUS	-	-	Run Status	Off, Running, Stopping, Delay, Tripout, Ready, Override, etc.
3	CHIL_S_S	disable/enable	-	Net.: Cmd Start/Stop	Unit start/stop via Network: When the unit is in Network mode, start/stop command can be forced
4	CHIL_OCC	no/yes	-	Net.: Cmd Occupied	Unit time schedule via Network: When the unit is in Network mode, the forced value can be used instead of the real occupancy state
5	min_left	-	min	Minutes Left for Start	Minutes before the unit start-up
6	HEATCOOL	Cool		Heat/Cool status	Heating/cooling status: 30KAV are cooling-only chillers ("heating" is NOT available)
7	HC_SEL	0 to 2	-	Heat/Cool Select	Heating/cooling selection (only cooling mode is allowed)
8				0=Cool. 1=Heat. 2=Auto	0 = Cooling mode 1, 2 = Not applicable to this unit
9	SP_SEL	0 to 2	-	Setpoint Select	Setpoint selection
10				0=Auto. 1=Spt1. 2=Spt2	0 = Auto (schedule control) 1 = Setpoint 1 (active during occupied period) 2 = Setpoint 2 (active during unoccupied period)
11	SP_OCC	no/yes	-	Setpoint Occupied?	Current setpoint
12	CAP_T	-	%	Percent Total Capacity	Total unit capacity
13	CAPA_T	-	%	Cir A Total Capacity	Circuit A capacity
14	CAPB_T	-	%	Cir B Total Capacity	Circuit B capacity
15	SP	-	°C	Current Setpoint	Current setpoint
16	CTRL_PNT	-20 to 67.2	°C	Control Point	Control point: Water temperature that the unit must produce (active setpoint + reset)
17	TOT_CURR	-	A	Actual Chiller Current	Actual chiller current
18	POW_LIM	0 to 2000	kW	Chiller Power Limit	Chiller power limit
19	COOL_POW	-	kW	Cool. Power (kit hydro)	Cooling power (optional hydronic kit)
20	EMSTOP	disable/enable	-	Emergency Stop	Emergency stop: Used to stop the unit regardless of its active operating type
21	DEM_LIM	0 to 100	%	Active Demand Limit Val	Active demand limit value: When the unit is in Network mode, the minimum value will be used compared to the status of the external limit switch contact and the demand limit switch setpoint

*Depends on the selected language (English by default).



Temperatures – TEMP

No.	Name	Status	Unit	Displayed text*	Description
1	EWT	-	°C	Cooler Entering Fluid	Evaporator entering fluid temperature: Used for capacity control
2	LWT	-	°C	Cooler Leaving Fluid	Evaporator leaving fluid temperature: Used for capacity control
3	OAT	-	°C	Outdoor Air Temperature	Outdoor air temperature
4	SCT_A	-	°C	Saturated Cond Tmp cir A	Saturated condensing temperature, circuit A
5	SST_A	-	°C	Saturated Suction Temp A	Saturated suction temperature, circuit A
6	SLT_A	-	°C	Saturated Liquid Temp A	Saturated liquid temperature, circuit A
7	SUCT_A	-	°C	Compressor Suction Tmp A	Compressor suction temperature, circuit A
8	DGT_A	-	°C	Discharge Gas Temp cir A	Discharge gas temperature, circuit A
9	CP_TMP_A	-	°C	Motor Temperature cir A	Motor temperature, circuit A
10	ECO_T_A	-	°C	EXV Eco. Tmp cir A	EXV economizer temperature, circuit A
11	LIQ_T_A	-	°C	Liquid Temperature A	Liquid temperature, circuit A
12	SCT_B	-	°C	Saturated Cond Tmp cir B	Saturated condensing temperature, circuit B

5 - USER INTERFACE: MENU STRUCTURE



Temperatures – TEMP (continued)

No.	Name	Status	Unit	Displayed text*	Description
13	SST_B	-	°C	Saturated Suction Temp B	Saturated suction temperature, circuit B
14	SLT_B	-	°C	Saturated Liquid Temp B	Saturated liquid temperature, circuit B
15	SUCT_B	-	°C	Compressor Suction Tmp B	Compressor suction temperature, circuit B
16	DGT_B	-	°C	Discharge Gas Temp cir B	Discharge gas temperature, circuit B
17	CP_TMP_B	-	°C	Motor Temperature cir B	Motor temperature, circuit B
18	ECO_T_B	-	°C	EXV Eco. Tmp cir B	EXV economizer temperature, circuit B
19	LIQ_T_B	-	°C	Liquid Temperature B	Liquid temperature, circuit B
20	SPACETMP	-	°C	Optional Space Temp	Optional space temperature (EMM option)
21	CHWSTEMP	-	°C	CHWS Temperature	Master/Slave common water temperature
22	T_HEATER	-	°C	Cooler Heater Temp	Evaporator heater temperature

*Depends on the selected language (English by default).



Pressures – PRESSURE

No.	Name	Status	Unit	Displayed text*	Description
1	DP_A	-	kPa	Discharge Pressure A	Discharge pressure, circuit A
2	SP_A	-	kPa	Main Suction Pressure A	Main suction pressure, circuit A
3	OP_A	-	kPa	Oil Pressure A	Oil pressure, circuit A
4	DOP_A	-	kPa	Oil Pressure DifferenceA	Oil Pressure difference, circuit A
5	ECO_P_A	-	kPa	Economizer Pressure A	Economizer pressure, circuit A
6	LIQ_P_A	-	kPa	Liquid Pressure A	Liquid pressure, circuit A
7	DP_B	-	kPa	Discharge Pressure B	Discharge pressure, circuit B
8	SP_B	-	kPa	Main Suction Pressure B	Main suction pressure, circuit B
9	OP_B	-	kPa	Oil Pressure B	Oil pressure, circuit B
10	DOP_B	-	kPa	Oil Pressure DifferenceB	Oil Pressure difference, circuit B
11	ECO_P_B	-	kPa	Economizer Pressure B	Economizer pressure, circuit B
12	LIQ_P_B	-	kPa	Liquid Pressure B	Liquid pressure, circuit B
13	EWATPRES	-	kPa	Entering water pressure	Entering water pressure
14	LWATPRES	-	kPa	Leaving water pressure	Leaving water pressure
15	WATPRES3	-	kPa	Water pressure 3	Water pressure 3
16	WATPRES4	-	kPa	Water pressure 4	Water pressure 4

*Depends on the selected language (English by default).



Inputs Status – INPUTS

No.	Name	Status	Unit	Displayed text*	Description
1	ONOFF_SW	open/close	-	Remote On/Off Switch	Remote on/off switch
2	SETP_SW	open/close	-	Remote Setpoint Switch	Remote cooling setpoint selection switch
3	LIM_SW1	open/close	-	Limit Switch 1	Demand limit switch 1
4	LIM_SW2	open/close	-	Limit Switch 2	Demand limit switch 2 (EMM option)
5	OIL_L_A	low/high	-	Oil Level Input A	Oil level input, circuit A
6	OIL_L_B	low/high	-	Oil Level Input B	Oil level input, circuit B
7	SP_RESET	-	mA	Reset/Setpnt4-20mA Sgnl	4-20 mA signal, setpoint reset
8	LIM_ANAL	-	mA	Limit 4-20mA Signal	4-20 mA signal, capacity limit
9	leak_v	-	V	Leakage detector 1 val	Refrigerant leakage detection (optional)
10	leak_2_v	-	V	Leakage detector 2 val	Refrigerant leakage detection (optional)
11	REM_LOCK	open/close	-	Customer Interlock	Customer interlock: When the contact is closed, the unit will be stopped with no delay. The switch is provided on the customer's terminal block of the optional EMM.
12	ICE_SW	open/close	-	Ice Done Storage Switch	Ice storage end switch
13	OCC_OVSW	open/close	-	Occupied Override Switch	Occupied override switch
14	RECL_SW	open/close	-	Remote Reclaim switch	Remote reclaim switch
15	ELEC_BOX	open/close	-	Electrical box Interlock	Electrical box interlock
16	HEATR_SW	open/close	-	Cooler Heater Detector	Evaporator heater
17	bacdongl	no/yes	-	BACnet dongle	<i>Not applicable to this unit (see section 6.22)</i>

*Depends on the selected language (English by default).

5 - USER INTERFACE: MENU STRUCTURE



Outputs Status – OUTPUTS

No.	Name	Status	Unit	Displayed text*	Description
1	CP_A	off/on	-	Compressor A	Compressor A status
2	OIL_SL_A	off/on	-	Oil Solenoid Output A	Oil solenoid output, circuit A
3	CAPT010A	0 to 10	V	Capacity Signal Cir A	0-10V capacity signal, circuit A
4	VFAN_A	0 to 100	%	VariFan Speed A	Variable speed fan, circuit A
5	ISO_CL_A	off/on	-	Ref Iso Valve Close A	Refrigerant isolation valve closed, circuit A
6	ISO_OP_A	off/on	-	Ref Iso Valve Open A	Refrigerant isolation valve open, circuit A
7	ISO_POSA	close/open	-	Ref Iso Valve pos. A	Refrigerant isolation valve position, circuit A
8	OIL_HT_A	off/on	-	Oil Heater Output A	Oil heater output, circuit A
9	CP_B	off/on	-	Compressor B	Compressor B status
10	OIL_SL_B	off/on	-	Oil Solenoid Output B	Oil solenoid output, circuit B
11	CAPT010B	0 to 10	V	Capacity Signal Cir B	0-10V capacity signal, circuit B
12	VFAN_B	0 to 100	%	VariFan Speed B	Variable speed fan, circuit B
13	ISO_CL_B	off/on	-	Ref Iso Valve Close B	Refrigerant isolation valve closed, circuit B
14	ISO_OP_B	off/on	-	Ref Iso Valve Open B	Refrigerant isolation valve open, circuit B
15	ISO_POSB	close/open	-	Ref Iso Valve pos. B	Refrigerant isolation valve position, circuit B
16	OIL_HT_B	off/on	-	Oil Heater Output B	Oil heater output, circuit B
17	CAPT_010	0 to 10	V	Chiller Capacity signal	Chiller capacity signal
18	ALARM	off/on	-	Alarm Relay Status	Alarm relay status on = At least one circuit is stopped because of the existing alarm(s)
19	RUNNING	off/on	-	Running Relay Status	Running relay status on = Chiller (or at least one pump) is running
20	ALERT	off/on	-	Alert Relay State	Alert relay status on = Alarm which does not stop the circuit or the unit is triggered
21	SHUTDOWN	off/on	-	Shutdown Indicator State	Shutdown indicator state on = Unit shuts down because of the existing alarm(s)
22	C_HEATER	off/on	-	Cooler Heater Output	Cooler heater output
23	ELECBFAN	off/on	-	Electrical box fan	Electrical box fan
24	ELEBFAN2	off/on	-	Electrical box fan 2	Electrical box fan 2
25	VI_CMP_A	off/on	-	VI compressor command A	Vi compressor control command A
26	VI_CMP_B	off/on	-	VI compressor command B	Vi compressor control command B
27	READY	off/on	-	Ready or Running Status	Ready or Running Status on = Chiller is running off = Chiller is stopped
28	WTANK_HT	off/on	-	Water Tank Heater	Water tank heater
29				FIX FANs	Fixed speed fans
30	f_fanOnA	0 to 12	-	Fan fspd A On number	Running fixed speed fan stages, circuit A
31	f_fanOnB	0 to 12	-	Fan fspd B On number	Running fixed speed fan stages, circuit B

*Depends on the selected language (English by default).



Pump Status – PUMPSTAT

No.	Name	Status	Unit	Displayed text*	Description
1	SET_FLOW	no/yes	-	Cooler Flow Setpoint Out	Evaporator flow setpoint output
2	CPUMP_1	off/on	-	Cooler Pump #1 Command	Evaporator pump 1 control enabled
3	CPUMP_2	off/on	-	Cooler Pump #2 Command	Evaporator pump 2 control enabled
4	ROTCPUMP	no/yes	-	Rotate Cooler Pumps ?	Evaporator pumps rotation
5	FLOW_SW	open/close	-	Cooler Flow Switch	Evaporator flow switch
6	VPMP_CMD	0 to 100	%	Variable speed pump cmd	Variable speed pump command
7	WAT_FLOW	-	l/s	Water flow (kit hydro)	Water flow (hydronic kit)
8	pmpStat	0 to 14	-	Pump Control Status	Pump control status: 0 = Pump stopped 1 = Temp. delta control 2 = Pressure delta control 3 = Constant pressure control 4 = Fixed speed control Override: 11 = Low water temperature 12 = Freeze protection 13 = Prevention of maximum flow 14 = Protection against maximum flow

5 - USER INTERFACE: MENU STRUCTURE



Pump Status – PUMPSTAT (continued)

No.	Name	Status	Unit	Displayed text*	Description
9	flowSw_s	0 to 8	-	Flow Switch Cfg status	Flow switch configuration status: 0 = First configuration step after power-on-reset OR configuration alarm reset 1 = Configuration initialisation 2 = Configuration start 3 = Configuration in progress 4 = Configuration completed, configuration check 5 = Configuration check in progress 6 = Flow switch configuration failed, alarm 10090 is set 7 = Configuration successful 8 = Configuration bypassed
10				QM	Custom unit
11	CPUMP1_E	open/close	-	Cooler Pump #1 Error	Cooler pump #1 error message: open = pump failure closed = OK (pump status)
12	CPUMP2_E	open/close	-	Cooler Pump #2 Error	Cooler pump #2 error message: open = pump failure closed = OK (pump status)

*Depends on the selected language (English by default).



Run Times – RUNTIME

No.	Name	Status	Unit	Displayed text*	Description
1	HR_MACH	-	hour	Machine Operating Hours	Unit operating hours
2	st_mach	-	-	Machine Starts Number	Number of unit starts
3	hr_cp_a1	-	hour	Compressor A1 Hours	Operating hours, compressor A1
4	st_cp_a1	-	-	Compressor A1 Starts	Number of starts, compressor A1
5	hr_cp_b1	-	hour	Compressor B1 Hours	Operating hours, compressor B1
6	st_cp_b1	-	-	Compressor B1 Starts	Number of starts, compressor B1
7	hr_cpum1	-	hour	Cooler Pump #1 Hours	Operating hours, evaporator pump 1
8	hr_cpum2	-	hour	Cooler Pump #2 Hours	Operating hours, evaporator pump 2
9	hrfana01	-	hour	Circuit A Fan #1 Hours	Operating hours, fan A1
10	hrfana02	-	hour	Circuit A Fan #2 Hours	Operating hours, fan A2
11	hrfana03	-	hour	Circuit A Fan #3 Hours	Operating hours, fan A3
12	hrfana04	-	hour	Circuit A Fan #4 Hours	Operating hours, fan A4
13	hrfana05	-	hour	Circuit A Fan #5 Hours	Operating hours, fan A5
14	hrfana06	-	hour	Circuit A Fan #6 Hours	Operating hours, fan A6
15	hrfana07	-	hour	Circuit A Fan #7 Hours	Operating hours, fan A7
16	hrfana08	-	hour	Circuit A Fan #8 Hours	Operating hours, fan A8
17	hrfana09	-	hour	Circuit A Fan #9 Hours	Operating hours, fan A9
18	hrfana10	-	hour	Circuit A Fan #10 Hours	Operating hours, fan A10
19	hrfana11	-	hour	Circuit A Fan #11 Hours	Operating hours, fan A11
20	hrfana12	-	hour	Circuit A Fan #12 Hours	Operating hours, fan A12
21	hrfana13	-	hour	Circuit A Fan #13 Hours	Operating hours, fan A13
22	hrfana14	-	hour	Circuit A Fan #14 Hours	Operating hours, fan A14
23	hrfanb01	-	hour	Circuit B Fan #1 Hours	Operating hours, fan B1
24	hrfanb02	-	hour	Circuit B Fan #2 Hours	Operating hours, fan B2
25	hrfanb03	-	hour	Circuit B Fan #3 Hours	Operating hours, fan B3
26	hrfanb04	-	hour	Circuit B Fan #4 Hours	Operating hours, fan B4
27	hrfanb05	-	hour	Circuit B Fan #5 Hours	Operating hours, fan B5
28	hrfanb06	-	hour	Circuit B Fan #6 Hours	Operating hours, fan B6
29	hrfanb07	-	hour	Circuit B Fan #7 Hours	Operating hours, fan B7
30	hrfanb08	-	hour	Circuit B Fan #8 Hours	Operating hours, fan B8
31	hrfanb09	-	hour	Circuit B Fan #9 Hours	Operating hours, fan B9
32	hrfanb10	-	hour	Circuit B Fan #10 Hours	Operating hours, fan B10
33	hrfanb11	-	hour	Circuit B Fan #11 Hours	Operating hours, fan B11
34	hrfanb12	-	hour	Circuit B Fan #12 Hours	Operating hours, fan B12
35	hrfanb13	-	hour	Circuit B Fan #13 Hours	Operating hours, fan B13
36	hrfanb14	-	hour	Circuit B Fan #14 Hours	Operating hours, fan B14

*Depends on the selected language (English by default).

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Modes – MODES

No.	Name	Status	Unit	Displayed text*	Description
1	m_delay	no/yes	-	Start Up Delay In Effect	Start-up delay in effect
2	m_2stpt	no/yes	-	Second Setpoint In Use	Second setpoint in use
3	m_reset	no/yes	-	Reset In Effect	Setpoint reset active
4	m_demlim	no/yes	-	Demand limit active	Demand limit active
5	m_pmprot	no/yes	-	Cooler Pump Rotation	Evaporator pump rotation
6	m_pmpper	no/yes	-	Pump Periodic Start	Pump periodic start active
7	m_night	no/yes	-	Night Low Noise Active	Night low noise active
8	m_slave	no/yes	-	Master Slave Active	Master/Slave mode active
9	m_autoch	no/yes	-	Auto Changeover Active	<i>Not applicable to this unit</i>
10	m_cpmpo	no/yes	-	Condenser Pump Rotation	<i>Not applicable to this unit</i>
11	m_cpmppr	no/yes	-	Cond Pump Periodic Start	<i>Not applicable to this unit</i>
12	m_ice	no/yes	-	Ice Mode In Effect	Ice mode active

*Depends on the selected language (English by default).



Setpoint Table – SETPOINT

No.	Name	Status	Default	Unit	Displayed text*	Description
1	csp1	-28.9 to 26	6.7	°C	Cooling Setpoint 1	Cooling setpoint 1 (used during occupied periods)
2	csp2	-28.9 to 26	6.7	°C	Cooling Setpoint 2	Cooling setpoint 2 (used during unoccupied periods)
3	ice_sp	-28.9 to 26	6.7	°C	Cooling Ice Setpoint	Ice storage setpoint
4	cramp_sp	0.1 to 11.1	0.5	K	Cooling Ramp Loading	Cooling ramp loading setpoint (rate at which the water temperature may change within one minute in Cooling mode)
5	hsp1	26.7 to 63	37.8	°C	Heating Setpoint 1	<i>Not applicable to this unit</i>
6	hsp2	26.7 to 63	37.8	°C	Heating Setpoint 2	<i>Not applicable to this unit</i>
7	hramp_sp	0.1 to 11.1	0.5	K	Heating Ramp Loading	<i>Not applicable to this unit</i>
8	cauto_sp	3.9 to 50	23.9	°C	Cool Changeover Setpt	<i>Not applicable to this unit</i>
9	hauto_sp	0 to 46	17.8	°C	Heat Changeover Setpt	<i>Not applicable to this unit</i>
10	vpmpdtsp	1 to 29	5	K	Varipump Delta Temp Stp	Variable speed pump, water flow based on delta T control
11	vpmpdpsp	50 to 620	200	kPa	Varipump Pressure Stp	Variable speed pump pressure setpoint
12	lim_sp1	0 to 100	100	%	Switch Limit Setpoint 1	Demand limit setpoint 1
13	lim_sp2	0 to 100	100	%	Switch Limit Setpoint 2	Demand limit setpoint 2
14	lim_sp3	0 to 100	100	%	Switch Limit Setpoint 3	Demand limit setpoint 3
15	rsp	20 to 65	50	°C	Heat Reclaim Setpoint	Heat Reclaim Setpoint

*Depends on the selected language (English by default).



Trendings – TRENDING

Name	Status	Unit	Displayed text*	Description**
ENERGY_powIn		KW	Elektrical Power input	Elektrical Power input
ENERGY_coolPowT		KW	Cooling Power Total	Cooling Power Total
ENERGY_eer			Energy Efficiency	Energy Efficiency
ENERGY_energyIn		KWH	Electrical Energy input	Electrical Energy input
ENERGY_energyOut		KWH	Cooling Energy output	Cooling Energy output
ENERGY_energyEER			Integrated EER	Integrated EER
TEMP_EWT	-	°C / °F	Cooler Entering Fluid	Evaporator entering water temperature
TEMP_LWT	-	°C / °F	Cooler Leaving Fluid	Evaporator leaving water temperature
TEMP_OAT	-	°C / °F	Outdoor Air Temp	Outdoor air temperature

*Depends on the selected language (English by default).

**The list of trending points cannot be modified. Trending points can only be enabled or disabled.

5 - USER INTERFACE: MENU STRUCTURE



Energy Monitoring – ENERGY

No.	Name	Status	Unit	Displayed text*	Description
1	coolPowT	-	kW	Cooling Power Total	Cooling power (circuit A + circuit B)
2	powIn	-	kW	Electrical Power input	Electrical power input of compressors and fans (estimated if EC fans are selected)
3	eer	-	-	Energy Efficiency	Energy efficiency (circuit A + circuit B)
4					
5	energOut	-	kWh	Cooling Energy output	Cooling energy output
6	energyIn	-	kWh	Electrical Energy input	Electrical energy input of compressors and fans (estimated if EC fans are selected)
7	energEER	-	-	Integrated EER	Integrated EER (Energy Efficiency Ratio)
8	reset_en	no/yes	-	Reset energy counter	Used to reset energy counter
9	reset_da	-	-	Last Reset Date	Last reset date
10	reset_ti	-	-	Last Reset time	Last reset time
11					
12	powPmp	-	kW	Pump Elec Power Input	Pump electric power input
13	energyP	-	kWh	Pump Elec Energy Input	Pump electric energy input
14	resetpmp	no/yes	-	Reset pump energy	Used to reset pump energy counter
15	pmp_date	-	-	Pump Last Reset Date	Last reset date (pump)
16	pmp_time	-	-	Pump Last Reset time	Last reset time (pump)

*Depends on the selected language (English by default).



Software Options – OPT_STA

No.	Name	Status	Unit	Displayed text*	Description
1	opt5	no/yes	-	OPT5: Medium Brine	Parameter set to “yes” means that Medium brine option which requires the Software Key is activated (see also section 6.20)
2	opt6	no/yes	-	OPT6: Low Brine	Parameter set to “yes” means that Low brine option which requires the Software Key is activated (see also section 6.20)
3	opt8	no/yes	-	OPT8: Light Brine	Parameter set to “yes” means that Light brine option which requires the Software Key is activated (see also section 6.20)
4	opt149	no/yes	-	OPT149: BACnet	Parameter set to “yes” means that BACnet option which requires the Software Key is activated (see also section 6.22)
5	opt295	no/yes	-	OPT295: Fast Cap Reco	Parameter set to “yes” means that Fast Capacity Recovery option which requires the Software Key is activated (see also section 6.23)
6	opt149B	no/yes	-	OPT149B: Modbus	Parameter set to “yes” means that Modbus option which requires the Software Key is activated (see also section 6.24)

*Depends on the selected language (English by default).



DC Free Cooling Status – DCFC_STA

No.	Name	Status	Unit	Displayed text*	Description
1	oat	-	°C	OAT Free Cooling	Dry Cooler Free Cooling: OAT
2	lwt	-	°C	FC Leaving Water Temp	Dry Cooler Free Cooling: Leaving water temperature
3	wloop	-	°C	FC Water Loop Temp	Dry Cooler Free Cooling: Water loop temperature
4	m_dfc	no/yes	-	Free Cooling Mode Active	Dry Cooler Free Cooling mode active
5	dcfc_cap	0 to 100	%	FC Capacity	Dry Cooler Free Cooling capacity
6	f_stage	0 to 10	-	Fix Speed Fans Stage	Dry Cooler Free Cooling: Fan stage (fixed speed fans)
7	vf_speed	0 to 100	%	Varifan Speed	Dry Cooler Free Cooling: Fan speed (variable speed)
8	pid_out	0 to 100	%	PID Output	Status of PID output
9	FC_HOUR	0 to 999999	hour	DCFC Operating Hours	Dry Cooler Free Cooling: Operating hours
10	FC_FAN1S	0 to 999999	-	DCFC Fan Stage 1 Start	DCFC / Fan stage 1: Number of starts
11	FC_FAN1H	0 to 999999	hour	DCFC Fan Stage 1 Hours	DCFC / Fan stage 1: Operating hours
12	FC_FAN2S	0 to 999999	-	DCFC Fan Stage 2 Start	DCFC / Fan stage 2: Number of starts
13	FC_FAN2H	0 to 999999	hour	DCFC Fan Stage 2 Hours	DCFC / Fan stage 2: Operating hours
14	FC_FAN3S	0 to 999999	-	DCFC Fan Stage 3 Start	DCFC / Fan stage 3: Number of starts
15	FC_FAN3H	0 to 999999	hour	DCFC Fan Stage 3 Hours	DCFC / Fan stage 3: Operating hours
16	FC_FAN4S	0 to 999999	-	DCFC Fan Stage 4 Start	DCFC / Fan stage 4: Number of starts
17	FC_FAN4H	0 to 999999	hour	DCFC Fan Stage 4 Hours	DCFC / Fan stage 4: Operating hours
18	FC_FAN5S	0 to 999999	-	DCFC Fan Stage 5 Start	DCFC / Fan stage 5: Number of starts

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DC Free Cooling Status – DCFC_STA (continued)

No.	Name	Status	Unit	Displayed text*	Description
19	FC_FAN5H	0 to 999999	hour	DCFC Fan Stage 5 Hours	DCFC / Fan stage 5: Operating hours
20	FC_FAN6S	0 to 999999	-	DCFC Fan Stage 6 Start	DCFC / Fan stage 6: Number of starts
21	FC_FAN6H	0 to 999999	hour	DCFC Fan Stage 6 Hours	DCFC / Fan stage 6: Operating hours
22	FC_FAN7S	0 to 999999	-	DCFC Fan Stage 7 Start	DCFC / Fan stage 7: Number of starts
23	FC_FAN7H	0 to 999999	hour	DCFC Fan Stage 7 Hours	DCFC / Fan stage 7: Operating hours
24	FC_VFANS	0 to 999999	-	DCFC Variable Fan Start	DCFC / Variable speed fan: Number of starts
25	FC_VFANH	0 to 999999	hour	DCFC Variable Fan Hours	DCFC / Variable speed fan: Operating hours
26	DCFC_OVR	no/yes	-	FC overrides mecha. cool.	DCFC overrides mechanical cooling
27	WLOOP_CT	no/yes	-	FC wloop used as CWT	DCFC water loop temperature reading used as chilled water temperature
28	fast_cap	no/yes	-	DCFC Fast Cap. Recovery	DCFC fast capacity recovery active

*Depends on the selected language (English by default).



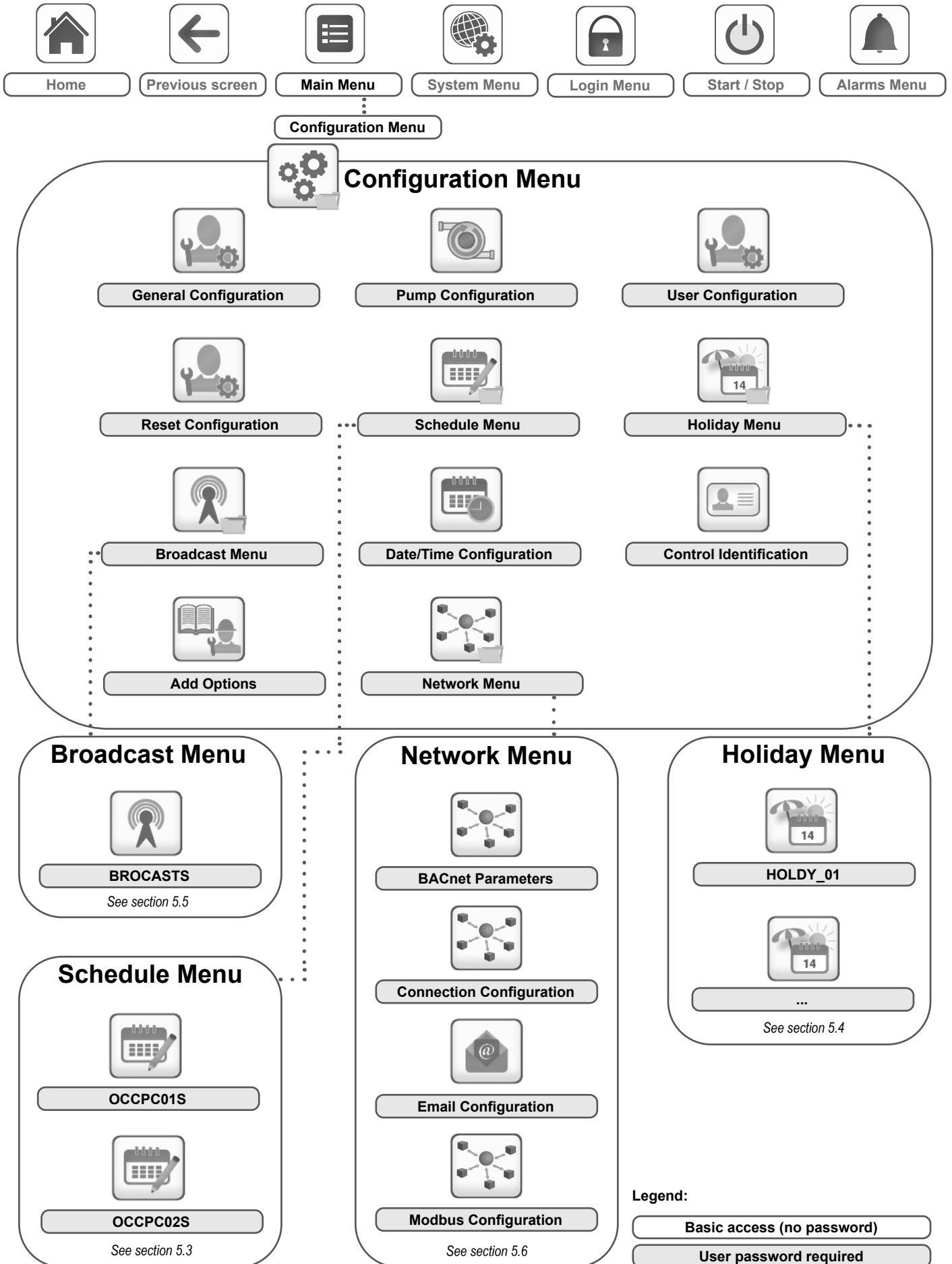
Heat Reclaim – RECLAIM

No.	Name	Status	Unit	Displayed text*	Description
1	RECL_SEL	off/on	-	Reclaim Selection	Heat Reclaim option selection
2	HR_stat	off/on	-	Reclaim Status	Heat Reclaim status: Used to defines if heat Reclaim is active or not
3	HRCtrPnt	-	°C	Reclaim control point	Heat Reclaim control point temperature
4	HRCtrWat	-	°C	Reclaim controlled water	When Heat Reclaim is active, this water temperature parameter is used to control the heat reclaim function
5	HR_EWT	-	°C	HR Entering Fluid temp	Heat Reclaim entering fluid temperature
6	HR_LWT	-	°C	HR Leaving Fluid temp	Heat Reclaim leaving fluid temperature
7	HR_FLOW	open/close	-	Heat Reclaim Flow switch	Heat Reclaim flow switch position
8	HEATER_A	off/on	-	Reclaim BPHE Heater A	Heat Reclaim BpHE heater, circuit A
9	HEATER_B	off/on	-	Reclaim BPHE Heater B	Heat Reclaim BpHE heater, circuit B
10	HRWTR_VA	off/on	-	Reclaim water valve A	Heat Reclaim water valve status, circuit A
11	HRWTR_VB	off/on	-	Reclaim water valve B	Heat Reclaim water valve status, circuit B
12	HR_3WV	0 to 100	%	Reclaim 3Way Valve cmd	Heat Reclaim 3-way valve command: Used to control the water flow towards BPHE (Brazed Plate Heat Exchanger)
13	HR3WVout	0 to 10	V	Reclaim 3Way Valve outp	Heat Reclaim 3-way valve mode output
14	act_3WV	disable/enable	-	Reclaim 3WV activated	Heat Reclaim 3-way valve: Used to control water temperature by opening / closing the 3-way valve
15	HR3WVmod	cool/heat	-	Reclaim 3Way Valve mode	Heat Reclaim 3-way valve mode
16	HR_PMP	off/on	-	Reclaim pump command	Heat Reclaim water pump command
17	HR_X_enA	disable/enable	-	Reclaim EXV A enabled	Heat Reclaim EXV status, circuit A: enabled = heat reclaim active disabled = heat reclaim not active
18	HR_X_enB	disable/enable	-	Reclaim EXV B enabled	Heat Reclaim EXV status, circuit B: enabled = heat reclaim active disabled = heat reclaim not active
19	HR_F_enA	disable/enable	-	Reclaim Fan A enabled	Heat Reclaim fan status, circuit A: enabled = heat reclaim active disabled = heat reclaim not active
20	HR_F_enB	disable/enable	-	Reclaim Fan B enabled	Heat Reclaim fan status, circuit B: enabled = heat reclaim active disabled = heat reclaim not active
21	HR_E_enA	disable/enable	-	Reclaim Eco A enabled	Heat Reclaim EXV economizer status, circuit A: enabled = heat reclaim active disabled = heat reclaim not active
22	HR_E_enB	disable/enable	-	Reclaim Eco B enabled	Heat Reclaim EXV economizer status, circuit B: enabled = heat reclaim active disabled = heat reclaim not active
23	HR_C_enA	disable/enable	-	Reclaim Cmp A enabled	Heat Reclaim compressor status, circuit A: enabled = heat reclaim active disabled = heat reclaim not active
24	HR_C_enB	disable/enable	-	Reclaim Cmp B enabled	Heat Reclaim compressor status, circuit B: enabled = heat reclaim active disabled = heat reclaim not active
25	HR_3WVen	disable/enable	-	Reclaim 3Way Valv enable	Heat Reclaim 3-way valve status: enabled = heat reclaim active disabled = heat reclaim not active

*Depends on the selected language (English by default).

5 - USER INTERFACE: MENU STRUCTURE

5.2 - Configuration menu



5 - USER INTERFACE: MENU STRUCTURE

The **Configuration menu** gives access to a number of user-modifiable parameters such as pump configuration, schedule menu, etc. The Configuration menu is password-protected.

- To access the Configuration menu, press the **Main menu** button located in the upper-left part of the Home screen, and then select **Configuration Menu**.
- Once all the necessary modifications have been made, press the **Save** button to confirm your changes or the **Cancel** button to exit the screen without making modifications.

System configuration override: In some cases it is possible to override system configuration. Note that not all parameters can be overridden by the control.

CAUTION: Since specific units may not include additional features, some tables may contain parameters that cannot be configured for a given unit.



General Configuration – GENCONF

No.	Name	Status	Default	Unit	Displayed text*	Description
1	prio_cir	0 to 2	0	-	Cir Priority Sequence	Circuit priority
2					0=Auto, 1=A Prio	0 = Automatic circuit selection 1 = Circuit A priority
3					2=B Prio	2 = Circuit B priority
4	seq_typ	no/yes	no	-	Staged Loading Sequence	Loading sequence: no = Equal loading sequence yes = Staged loading sequence
5	ramp_sel	no/yes	no	-	Ramp Loading Select	Ramp loading selection
6	transcap	30 to 80	50	%	Cap. to start 2nd cir	Capacity required in order to start the second circuit
7	off_on_d	1 to 15	1	min	Unit Off to On Delay	Unit Off to On delay
8	lim_sel	0 to 2	0	-	Demand Limit Type Select	Demand limit selection
9					0 = None	0 = None
10					1 = Switch Control	1 = Switch Control
11					2 = 4-20mA Control	2 = 4-20mA Control
12	nh_start	00:00	00:00	-	Night Mode Start Hour	Night mode start hour (compressor capacity is reduced during the night mode)
13	nh_end	00:00	00:00	-	Night Mode End Hour	Night mode end hour
14	nh_limit	0 to 100	100	%	Night Capacity Limit	Night capacity limit
15	pow_sel	no/yes	no	-	Power Limit select	<i>Not applicable to this unit</i>
16	ice_cnfg	no/yes	no	-	Ice Mode Enable	Ice mode enabled
17	pow_max	0 to 2000	2000	kW	Maximum Power Limit	<i>Not applicable to this unit</i>
18	shortcyc	no/yes	no	-	short cycle management	Short cycle management
19	ln_start	00:00	00:00	-	Low Noise Start Hour	Low noise option / Fan speed limitation (beginning of Low Noise mode)
20	ln_end	00:00	00:00	-	Low Noise End Hour	Low noise option / Fan speed limitation (end of Low Noise mode)
21	ln_limit	60 to 100	75	%	Low Noise Fan freq limit	Fan speed during the time when the Low Noise option is enabled

*Depends on the selected language (English by default).



Pump Configuration – PUMPCONF

No.	Name	Status	Default	Unit	Displayed text*	Description
1	cpumpseq	0 to 4	0	-	Cooler Pumps Sequence	Evaporator pumps' sequence
2					0 = No Pump	0 = No Pump
3					1 = One Pump Only	1 = One Pump Only
4					2 = Two Pumps Auto	2 = Two Pumps Auto (units with two pumps)
5					3 = Pump#1 Manual	3 = Pump#1 Manual
6					4 = Pump#2 Manual	4 = Pump#2 Manual
7	pump_del	24 to 3000	48	hour	Pump Auto Rotation Delay	Pump auto rotation delay (units with two pumps and 'auto control' enabled)
8	pump_per	no/yes	no	-	Pump Sticking Protection	Pump anti-sticking protection
9	pump_sby	no/yes	no	-	Stop Pump During Standby	Pump stopped during standby
10	pump_loc	no/yes	yes	-	Flow Checked If Pump Off	Water flow is checked when the pump is off
11	stopheat	no/yes	no	-	Cooler Pump Off In Heat	<i>Not applicable to this unit</i>
12	stopcool	no/yes	no	-	Cond Pump Off In Cool	<i>Not applicable to this unit</i>
13	varipump	1 to 4	1	-	VSPump regulation config	Variable speed pump regulation configuration:
14					1 = delta Temp	1 = Control variable speed pump on delta temperature
15					2 = delta Pressure	2 = Control variable speed pump on delta pressure (applicable to internal pumps only)

5 - USER INTERFACE: MENU STRUCTURE



Pump Configuration – PUMPCONF (continued)

No.	Name	Status	Default	Unit	Displayed text*	Description
16					3 = const Pressure	3 = Control variable speed pump on constant output pressure
17					4 = fix speed dual pump	4 = Fixed speed dual pump control

*Depends on the selected language (English by default).



User Configuration – USERCONF

No.	Name	Status	Default	Unit	Displayed text*	Description
1	lng_list	0 to 1	1	-	Language List	Language list selection (see also section 5.7)
2					0 = eng/spa/fre/ger/dut	Languages available on the user interface when "Language list" is set to "0"
3					chi/ita/por/rus/und	
4					1 = eng/spa/fre/ger/dut	Languages available on the user interface when "Language list" is set to "1"
5					tur/ita/por/rus/und	

*Depends on the selected language (English by default).



Reset Configuration – RESETCFG

No.	Name	Status	Default	Unit	Displayed text*	Description
1	cr_sel	0 to 4	0	-	Cooling Reset Select	Cooling reset selection
2	hr_sel	0 to 4	0	-	Heating Reset Select	<i>Not applicable to this unit</i>
3					0=None, 1=OAT	0 = None, 1 = OAT
4					2=Delta T, 4=Space Temp	2 = Delta T, 4 = Space temperature
5					3=4-20mA control	3 = 4-20mA control
6						
7					Cooling	Cooling
8	oat_crno	-10 to 51.7	-10	°C	OAT No Reset Value	OAT, no reset value
9	oat_crfu	-10 to 51.7	-10	°C	OAT Full Reset Value	OAT, full reset value
10	dt_cr_no	0 to 14	0	K	Delta T No Reset Value	Delta T, no reset value
11	dt_cr_fu	0 to 14	0	K	Delta T Full Reset Value	Delta T, max. reset value
12	v_cr_no	0 to 20	0	mA	Current No Reset Value	Current, no reset value
13	v_cr_fu	0 to 20	0	mA	Current Full Reset Value	Current, max. reset value
14	spacr_no	-10 to 51.7	-10	°C	Space T No Reset Value	Space temperature, no reset value
15	spacr_fu	-10 to 51.7	-10	°C	Space T Full Reset Value	Space temperature, max. reset value
16	cr_deg	-16.7 to 16.7	0	K	Cooling Reset Deg. Value	Maximum cooling reset value
17						
18					Heating	<i>Not applicable to this unit</i>
19	oat_hrno	-10 to 51.7	-10	°C	OAT No Reset Value	<i>Not applicable to this unit</i>
20	oat_hrfu	-10 to 51.7	-10	°C	OAT Full Reset Value	<i>Not applicable to this unit</i>
21	dt_hr_no	0 to 14	0	K	Delta T No Reset Value	<i>Not applicable to this unit</i>
22	dt_hr_fu	0 to 14	0	K	Delta T Full Reset Value	<i>Not applicable to this unit</i>
23	v_hr_no	0 to 20	0	mA	Current No Reset Value	<i>Not applicable to this unit</i>
24	v_hr_fu	0 to 20	0	mA	Current Full Reset Value	<i>Not applicable to this unit</i>
25	spahr_no	-10 to 51.7	-10	°C	Space T No Reset Value	<i>Not applicable to this unit</i>
26	spahr_fu	-10 to 51.7	-10	°C	Space T Full Reset Value	<i>Not applicable to this unit</i>
27	hr_deg	-16.7 to 16.7	0	K	Heating Reset Deg. Value	<i>Not applicable to this unit</i>

*Depends on the selected language (English by default).

5 - USER INTERFACE: MENU STRUCTURE



Date/Time Configuration – DATETIME

No.	Status	Displayed text*	Description
1	on/off	Daylight Saving Time	Information of setting the clocks forward one hour from standard time during the summer months, and back again in the fall, in order to make better use of natural daylight
2	Greenwich Mean Time (UTC)	Location	Time zone
3	YYYY/MM/DD, HH:MM:SS	Date/Time	Current date and time (must be set manually)
4	no/yes	Today is a Holiday	Information about holidays (read-only). Please note that holidays are set in the Holiday menu (see also section 5.4)
5	no/yes	Tomorrow is a Holiday	Information about the upcoming holiday period (read-only). Please note that holidays are set in the Holiday menu (see also section 5.4)

*Depends on the selected language (English by default).

NOTE: The Date/Time Configuration menu appears also in the System menu (see also section 5.7).



Control Identification – CTRLID

No.	Status	Default	Displayed text*	Description
1	0-239	0	CCN Element Number	Element number
2	0-239	1	CCN Bus Number	Bus number
3	9600 / 19200 / 38400	9600	CCN Baud Rate	Communication speed
4				
5	-	30KAV	Device Description	Unit description
6	-	-	Location Description	Location description: The number corresponds to the country
7	-	ECG-SR-20MF2010	Software Part Number	Software version
8	-	-	Serial Number	Serial number (MAC address)

*Depends on the selected language (English by default).



Add Options – ADD_OPT

No.	Displayed text*	Description
1	MAC Address	Controller MAC address: This MAC address is requested by Carrier service technician when ordering any software-protected option (see also section 6.20)
2	Please Enter Your Software Activation Key	Software Activation Key provided by Carrier service technician (see also section 6.20)
3	Unit must be Off	The unit should not be operating when installing the Software Activation Key

*Depends on the selected language (English by default).

NOTE: If you need to add an option, please contact your local carrier Service provider.

5 - USER INTERFACE: MENU STRUCTURE

5.3 - Schedule menu

The Schedule menu includes two time schedules, where the first one (OCCPC01S) is used to control the unit start/stop and the second one (OCCPC02S) is used to control the dual setpoint.

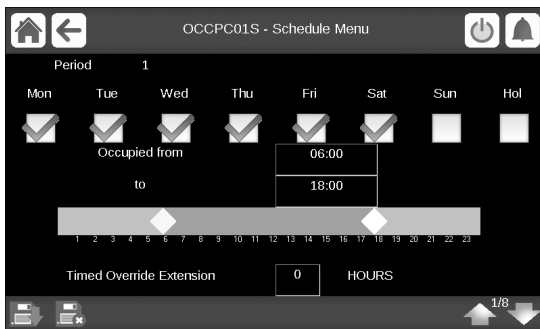


Schedule Menu – SCHEDULE

Icon	Name	Displayed text*	Description
	OCCPC01S	OCCPC01S - Schedule Menu	Unit on/off time schedule
	OCCPC02S	OCCPC02S - Schedule Menu	Unit setpoint selection time schedule

*Depends on the selected language (English by default).

Example: Setting occupancy schedule



IMPORTANT: For more information about schedule setting, please see section 6.25.

5.4 - Holiday menu

The Holiday menu allows the user to set up to 16 holiday periods, which are defined by the start month, start day, and duration.



Holiday Menu – HOLIDAY

Icon	Name	Displayed text*	Description
	HOLDY_01	HOLIDAY - HOLDY_01	Holiday period No.1 settings

	HOLDY_16	HOLIDAY - HOLDY_16	Holiday period No.16 settings

*Depends on the selected language (English by default).



HOLIDAY - HOLDY_01 (...)

No.	Name	Status	Default	Displayed text*	Description
1	HOL_MON	0-12	0	Holiday Start Month	Holiday start month
2	HOL_DAY	0-31	0	Start Day	Holiday start day
3	HOL_LEN	0-99	0	Duration (days)	Holiday duration (days)

*Depends on the selected language (English by default).

IMPORTANT: For more information about holiday setting, please see section 6.26.

5.5 - Broadcast menu

The Broadcast menu includes the BROADCASTS submenu which is **not applicable** to the SmartVu™ control for 30KAV chillers.



Broadcast Menu – BRODEFS

Icon	Name	Displayed text*	Description
	BRODEFS	BROADCASTS	Broadcast settings

*Depends on the selected language (English by default).

IMPORTANT: The BROADCASTS menu includes parameters not applicable to the SmartVu™ control! Please ignore this menu.






5 - USER INTERFACE: MENU STRUCTURE

5.6 - Network menu

The Network menu includes the Connection Config submenu which is **not applicable** to the SmartVu™ control for 30KAV chillers.



Network Menu – NETWORK

Icon	Name	Displayed text*	Description
	BACNET	BACnet Parameters	BACnet parameters
	CONNECT	Connection Config	Web server configuration
	EMAILCFG	Email Configuration	Email configuration
	MODBUSRS	ModbusRTU Config.	ModbusRTU configuration
	MODBUSIP	ModbusTCP/IP Config.	ModbusTCP/IP configuration

*Depends on the selected language (English by default).

IMPORTANT: The Connection Config menu includes parameters not applicable to the SmartVu™ control! Please ignore this menu.

NOTE: For more information about web connection functionality, please see section 7.



BACnet Parameters – BACNET

No.	Name	Status	Default	Unit	Displayed text*	Description
1	bacena	disable/enable	disable	-	BACnet Enable	BACnet Enable
2	bacunit	no/yes	yes	-	Metric Units	Metric Units
3	network	1 to 40000	1600	-	Network	Network
4	udpport	47808 to 47823	47808	-	UPD Port Number	UPD Port Number
5	bac_id	1 to 4194302	1600001	-	Device Id Manual	Device Id Manual
6	auid_opt	disable/enable	disable	-	Device Id Auto Option	Device Id Auto Option
7	balmena	disable/enable	enable	-	Alarm reporting	Alarm reporting
8	mng_occ	no/yes	no	-	BACnet Manage Occupancy	BACnet Manage Occupancy
9	netIFNam	0 to 1	1	-	IP port interface name	IP port interface name
10					0 = J15	0 = J15
11					1 = J16	1 = J16

*Depends on the selected language (English by default).

NOTE: If you need to add an option, please contact your local carrier Service provider.



Connection Configuration – CONNECT

No.	Name	Status	Default	Unit	Displayed text*	Description
1	http_en	0 to 1	0	-	Enable HTTP server	Enable the http port (for HMI web connection)
2	http_to	0 to 1440	60	-	HTTP server timeout (min)	Enable http port timeout, after this timeout, the http port is disabled again. (0 = always enabled)

*Depends on the selected language (English by default).

5 - USER INTERFACE: MENU STRUCTURE



E-mail Configuration – EMAILCFG

No.	Name	Status	Default	Unit	Displayed text*	Description
1	senderP1			-	Sender Email Part1	Sender e-mail, identifier part
2					@	@
3	senderP2			-	Sender Email Part2	Sender e-mail, identifier part
4	recip1P1			-	Recip1 Email Part1	Recipient 1,identifier part
5					@	@
6	recip1P2			-	Recip1 Email Part2	Recipient 1, domain part
7	recip2P1			-	Recip2 Email Part1	Recipient 2,identifier part
8					@	@
9	recip2P2				Recip2 Email Part2	Recipient 2, domain part
10	smtpP1	0 to 255		-	SMTP IP Addr Part1	SMTP IP address part 1
11	smtpP2	0 to 255		-	SMTP IP Addr Part2	SMTP IP address part 2
12	smtpP3	0 to 255		-	SMTP IP Addr Part3	SMTP IP address part 3
13	smtpP4	0 to 255		-	SMTP IP Addr Part4	SMTP IP address part 4
14	accP1			-	Account Email Part1	Account e-mail, identifier part
15					@	@
16	accP2			-	Account Email Part2	Account e-mail, domain part
17	accPass			-	Account Password	Account password
18	portNbr	0 to 255		-	Port Number	Port number
19	srvTim	0 to 255		sec	Server Timeout	Server timeout
20	srvAut	0 to 1		-	Server Authentication	

*Depends on the selected language (English by default).



ModbusRTU Configuration – MODBUSRS

No.	Name	Status	Default	Unit	Displayed text*	Description
1	modrt_en	no/yes	no	-	RTU Server Enable	RTU Server Enable
2	ser_UID	1 to 247	1	-	Server UID	Server UID
3	metric	no/yes	yes	-	Metric Unit	Metric Unit
4	swap_b	0 to 1	0	-	Swap Bytes	Swap Bytes
5					0 = Big Endian	0 = Big Endian
6					1 = Little Endian	1 = Little Endian
7	baudrate	0 to 2	0	-	Baudrate	Baudrate
8					0 = 9600	0 = 9600
9					1 = 19200	1 = 19200
10					2 = 38400	2 = 38400
11	parity	0 to 2	0	-	Parity	Parity
12					0 = No Parity	0 = No Parity
13					1 = Odd Parity	1 = Odd Parity
14					2 = Even Parity	2 = Even Parity
15	stop_bit	0 to 1	1	-	Stop bit	Stop bit
16					0 = One Stop Bit	0 = One Stop Bit
17					1 = Two Stop Bit	1 = Two Stop Bit
18	real_typ	0 to 1	1	-	Real type management	Real type management
19					0 = Float X10	0 = Float X10
20					1 = IEEE 754	1 = IEEE 754
21	reg32bit	0 to 1	1	-	Enable 32 bits registers	Enable 32 bits registers
22					0 = IR/HR in 16 bit mode	0 = IR/HR in 16 bit mode
23					1 = IR/HR 32 bit mode	1 = IR/HR 32 bit mode

*Depends on the selected language (English by default).

NOTE: If you need to add an option, please contact your local carrier Service provider.

5 - USER INTERFACE: MENU STRUCTURE



Modbus TCP/IP Configuration – MODBUSIP

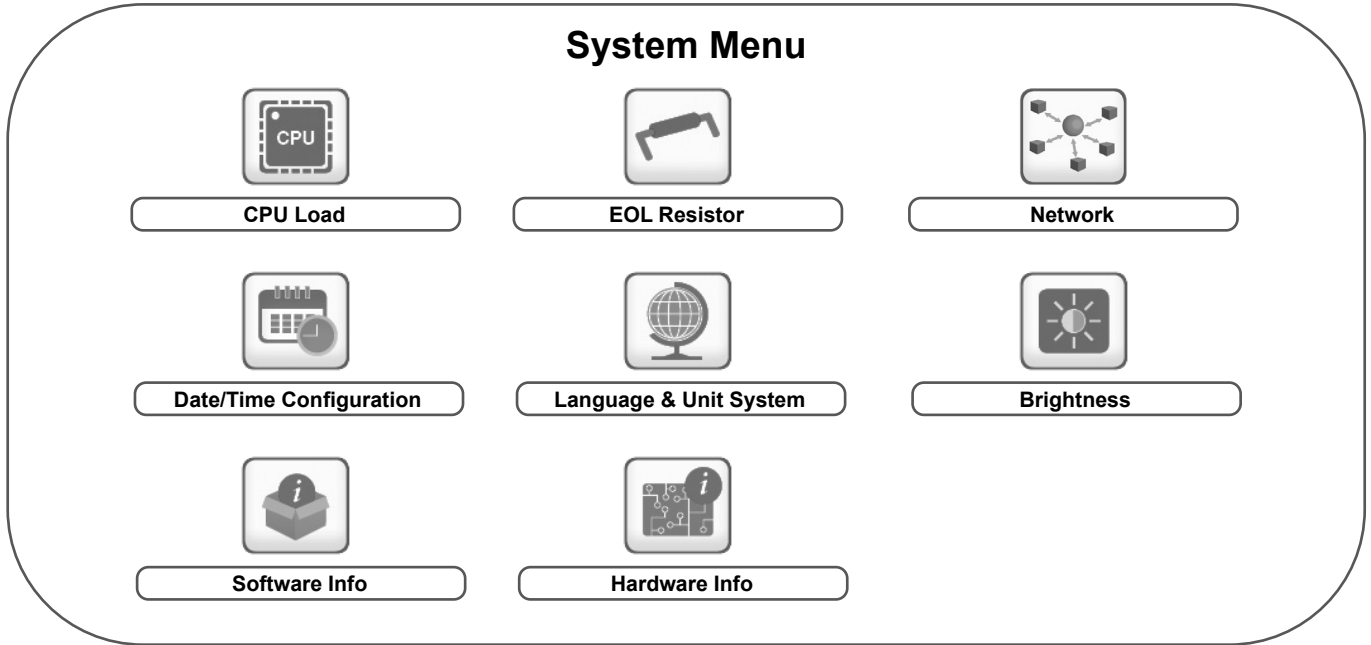
No.	Name	Status	Default	Unit	Displayed text*	Description
1	modip_en	no/yes	no	-	TCP/IP Server Enable	TCP/IP Server Enable
2	ser_UID	1 to 247	1	-	Server UID	Server UID
3	port_nbr	0 to 65535	502	-	Port Number	Port Number
4	metric	no/yes	yes	-	Metric Unit	Metric Unit
5	swap_b	0 to 1	0	-	Swap Bytes	Swap Bytes
6					0 = Big Endian	0 = Big Endian
7					1 = Little Endian	1 = Little Endian
8	real_typ	0 to 1	1	-	Real type management	Real type management
9					0 = Float X10	0 = Float X10
10					1 = IEEE 754	1 = IEEE 754
11	reg32bit	0 to 1	1	-	Enable 32 bits registers	Enable 32 bit registers
12					0 = IR/HR in 16 bit mode	0 = IR/HR in 16 bit mode
13					1 = IR/HR in 32 bit mode	1 = IR/HR in 32 bit mode
14	conifnam	0 to 1	1	-	IP port interface name	IP port interface name
15					0 = J15	0 = J15
16					1 = J16	1 = J16
17	timeout	60 to 600	120	sec	Com. timeout (s)	Com. timeout (s)
18	idle	0 to 30	10	sec	Keepalive idle delay(s)	Keepalive idle delay(s)
19	intryl	0 to 2	1	sec	Keepalive interval(s)	Keepalive interval(s)
20	probes	0 to 10	10	-	Keepalive probes nb	Keepalive probes nb

*Depends on the selected language (English by default).

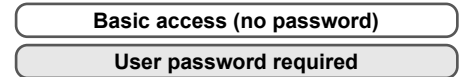
NOTE: If you need to add an option, please contact your local carrier Service provider.

5 - USER INTERFACE: MENU STRUCTURE

5.7 - System menu



Legend:



The **System menu** allows the user to verify software, hardware, or network information and change some display settings, including language, date/time, or brightness.

CAUTION: Since specific units may not include additional features, some tables may contain parameters that cannot be configured for a given unit.

- To access the System menu, press the **System menu** button located in the upper-right part of the Home screen.



CPU Load – CPULOAD

No.	Status	Default	Unit	Displayed text*	Description
1	0 to 100	-	%	CPU load	CPU utilization
2	0 to 100	-	%	RAM Memory utilization	RAM usage
3	0 to 100	-	%	FLASH Memory utilization	Flash memory usage

*Depends on the selected language (English by default).



EOL Resistor – EOLRES

No.	Status	Default	Displayed text*	Description
1	disable/enable	disable	End of Line Res. J6(LEN)	End of line resistor J6 (LEN bus)
2	disable/enable	disable	End of Line Res. J7(CCN)	End of line resistor J7 (CCN bus)
3	disable/enable	disable	End of Line Resistor J8	End of line resistor J8
4	disable/enable	disable	End of Line Resistor J10	End of line resistor J10 (Modbus)

*Depends on the selected language (English by default).

5 - USER INTERFACE: MENU STRUCTURE



Network – NETWORK

No.	Status	Default	Displayed text*	Description
1			IP Network Interface J15 (eth0):	IP Network Interface J15 (Ethernet 0):
2		xx:xx:xx:xx:xx:xx	MAC Address	MAC Address
3	-	169.254.1.1	TCP/IP Address	TCP/IP Address: Changing the IP address and mask is possible but a reboot is mandatory if Modbus TCP or BACnet IP is enabled (the reboot is required to make changes effective).
4	-	255.255.255.0	Subnet Mask	Subnet Mask
5	-	169.254.1.3	Default Gateway	Default Gateway
6	-	255.255.0.0	Gateway Mask	Gateway Mask
7	-	169.254.1.3	Domain Name Server (DNS)	Domain Name Server (DNS)
8	-	169.254.1.4		
9			IP Network Interface J16 (eth1):	IP Network Interface J16 (Ethernet 1):
10		xx:xx:xx:xx:xx:xx	MAC Address	MAC Address
11	-	192.168.100.100	TCP/IP Address	TCP/IP Address: Changing the IP address and mask is possible but a reboot is mandatory if Modbus TCP or BACnet IP is enabled (the reboot is required to make changes effective).
12	-	255.255.255.0	Subnet Mask	Subnet Mask
13	-	192.168.100.1	Default Gateway	Default Gateway
14	-	0.0.0.0	Gateway Mask	Gateway Mask
15	-	169.254.1.3	Domain Name Server (DNS)	Domain Name Server (DNS)
16	-	169.254.1.4		

*Depends on the selected language (English by default).



Date/Time Configuration – DATETIME


No.	Displayed text*	Status	Description
1	Daylight Saving Time	on/off	Information of setting the clocks forward one hour from standard time during the summer months, and back again in the fall, in order to make better use of natural daylight
2	Location	Greenwich Mean Time (UTC)	Time zone
3	Date/Time	YYYY/MM/DD, HH:MM:SS	Current date and time (must be set manually)
4	Today is a Holiday	no/yes	Information about holidays (read-only). Please note that holidays are set in the Holiday menu (see also section 5.4)
5	Tomorrow is a Holiday	no/yes	Information about the upcoming holiday period (read-only). Please note that holidays are set in the Holiday menu (see also section 5.4)

*Depends on the selected language (English by default).

NOTE: The Date/Time Configuration menu appears also in the Configuration menu (see also section 5.2).



Language & Unit System – LANGUNIT

No.	Displayed text*	Description
1	(Languages)  Example: Language List set to "0".	The set of available languages may vary depending on the selected language list ("Language list" parameter in USERCONF - User Configuration). Language list (in USERCONF menu) set to "0": English, Spanish, French, German, Dutch, Chinese, Italian, Portuguese, Russian and "undefined" (custom language). Language list (in USERCONF menu) set to "1": English, Spanish, French, German, Dutch, Turkish, Italian, Portuguese, Russian and "undefined" (custom language). Custom language: The control system allows users to add new languages to the control. To learn more about language customization, please contact your local Carrier service representative. Custom languages can be uploaded only by Carrier service representative.
2	System of measurement: US Imp/Metric	US Imp = Parameters displayed in US Imperial units Metric = Parameters displayed in metric units

*Depends on the selected language (English by default).

5 - USER INTERFACE: MENU STRUCTURE



Brightness – BRIGHTNS

No.	Status	Displayed text*	Description
1	0 to 100%	Brightness	Screen brightness

*Depends on the selected language (English by default).



Software Info – SWINFO

No.	Status	Displayed text*	Description
1	ECG-ST-20W4D110	Software Version	Software version number
2	N.NNN.N	SDK Version	SDK version number
3	NN	UI Version	User interface version
4	CARRIER	Brand	Brand

*Depends on the selected language (English by default).



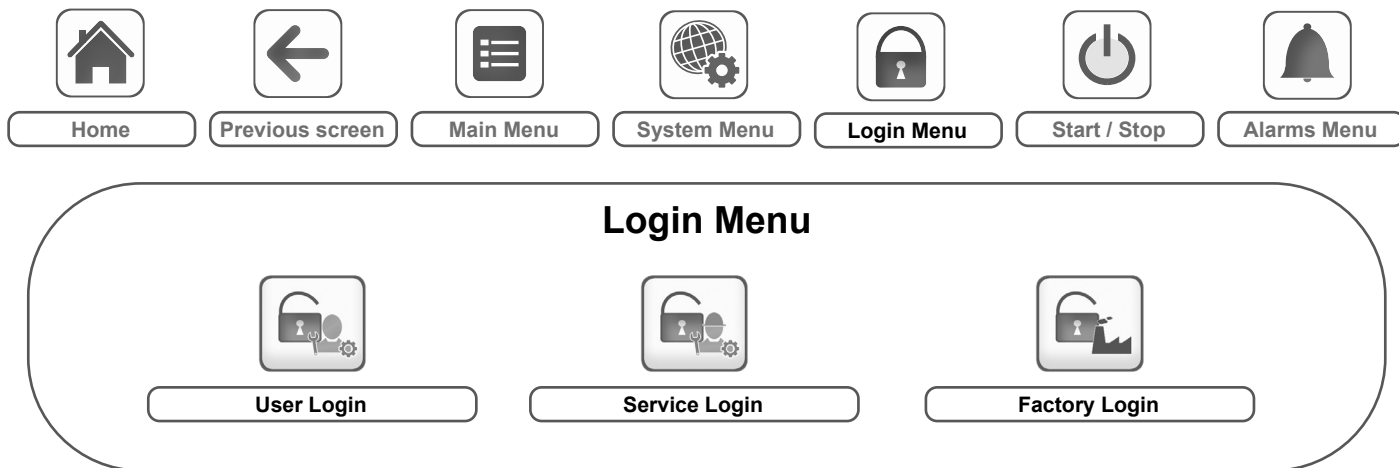
Hardware Info – HWINFO

No.	Status	Displayed text*	Description
1	-	Board Variant	Board variant
2	-	Board Revision	Board revision
3	7	Screen size	Screen size in inches

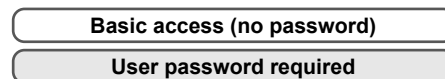
*Depends on the selected language (English by default).

5 - USER INTERFACE: MENU STRUCTURE

5.8 - User Login menu



Legend:



5.8.1 - Access control

- User Login menu provides access to three different access levels, i.e. user configuration, service configuration, and factory configuration.
- Multilevel security ensures that only authorised users are allowed to modify critical unit parameters.
- Only people qualified to manage the unit should be familiarized with the password.
- Configuration menu can be accessed only by logged-in users (user configuration level or higher).

IMPORTANT: It is strongly recommended to change the default password of the user interface to exclude the possibility of changing any parameters by an unqualified person.

5.8.2 - User login

Only logged-in users can access configurable unit parameters. By default, user password is "11".

To log in

1. Press the **User Login** button, and then select *User Login*.
2. Press the Password box.
3. Provide the password (11) and press the **Confirm** button.



4. The User Login screen appears.

5.8.3 - Service & Factory login

Service and factory login menus are dedicated to Carrier service representative and factory line. To learn more about advanced access control, please refer to the Control Service Guide (service technicians only).

5.8.4 - User password

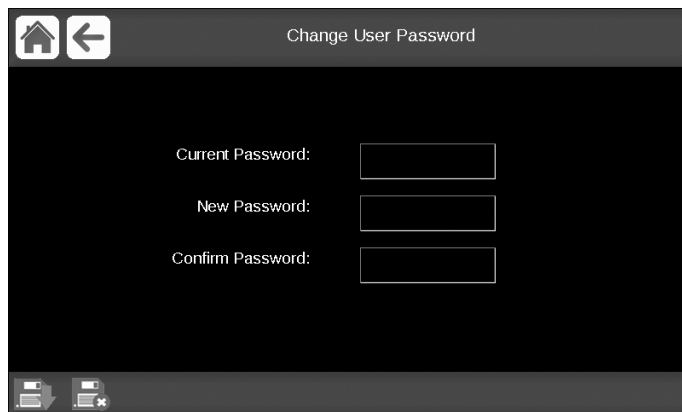
User password can be modified in the User Login menu.

To change your password

1. Press the **User Login** button, and then select *User Login*.
2. Press the **Change User Password** button.



3. The **Change User Password** screen will be displayed.
4. Please provide the current password, and then type the new password twice.



5. Press the **Save** button to confirm password update or the **Cancel** button to exit the screen without making modifications.

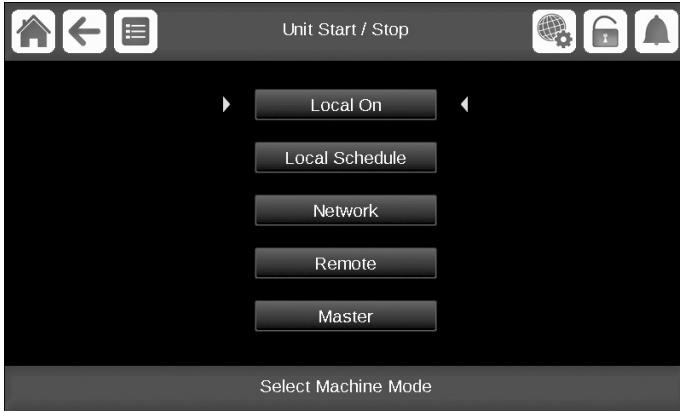
5 - USER INTERFACE: MENU STRUCTURE

5.9 - Start / Stop menu



5.9.1 - Unit operating mode

With the unit in the Local off mode: To display the list of operating modes and select the required mode, press the **Start/Stop** button in the upper-right corner of the Synoptic screen.



IMPORTANT: When entering the menu, please note that the currently selected item corresponds to the last running operating mode.

Unit start/stop screen (operating modes)	
Local On	Local On: The unit is in the local control mode and allowed to start.
Local Schedule	Local Schedule: The unit is in the local control mode and allowed to start if the period is occupied.
Network	Network: The unit is controlled by network commands and allowed to start if the period is occupied.
Remote	Remote: The unit is controlled by external commands and allowed to start if the period is occupied.
Master	Master: The unit operates as the master in the master/slave assembly and it is allowed to start if the period is occupied.

5.9.2 - Unit start

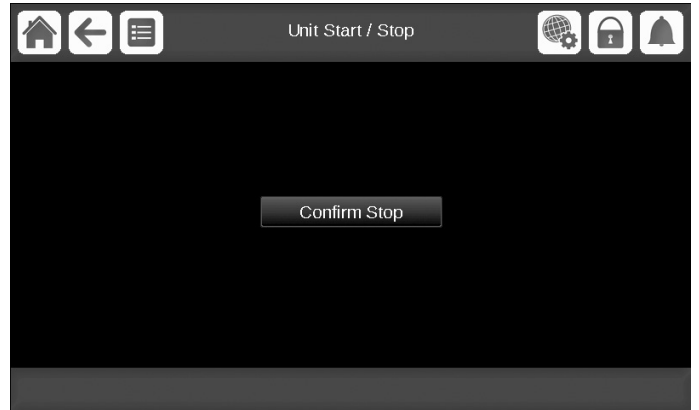
To start the unit

1. Press the **Start/Stop** button.
2. Select the required Machine Mode.
 - Local On
 - Local Schedule
 - Network
 - Remote
 - Master
3. The Home screen will be displayed.

5.9.3 - Unit stop

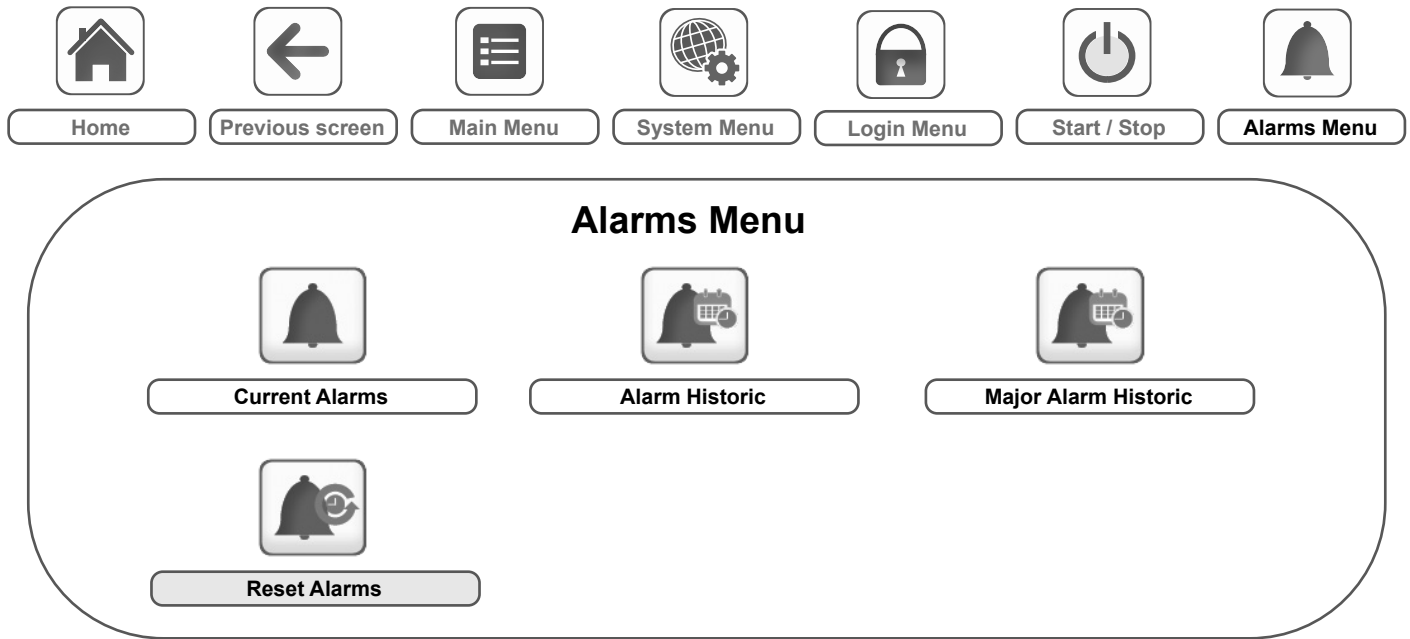
To stop the unit

1. Press the **Start/Stop** button.
2. Confirm the unit shutdown by pressing **Confirm Stop** or cancel the unit shutdown by pressing the **Back** button.



5 - USER INTERFACE: MENU STRUCTURE

5.10 - Alarms menu



Legend:

- Basic access (no password)
- User password required

The **Alarms menu** allows the user to monitor alarms that occurred on the unit as well as reset alarms that require manual reset.

- To access the Alarms menu, press the **Alarms menu** button located in the upper-right part of the Home screen.

The Alarm history is divided into two parts:

- Alarm Historic that displays up to 50 recent general alarms.
- Alarm Major Historic that displays up to 50 recent major alarms, including alarms connected with process failure, compressor failure, and VFD drives.

IMPORTANT: For more information about alarms, please go to section 8.1.



Current Alarms – CUR_ALM

No.	Name	Date	Hour	Alarm text
1	Alarm	YYYY/MM/DD	HH:MM	Alarm text (see section 8.6)
...	Alarm	YYYY/MM/DD	HH:MM	Alarm text (see section 8.6)
10	Alarm	YYYY/MM/DD	HH:MM	Alarm text (see section 8.6)

*Depends on the selected language (English by default).



Alarm Historic – ALMHIST1

No.	Name	Date	Hour	Alarm text
1	Alarm	YYYY/MM/DD	HH:MM	Alarm text (see section 8.6)
...	Alarm	YYYY/MM/DD	HH:MM	Alarm text (see section 8.6)
50	Alarm	YYYY/MM/DD	HH:MM	Alarm text (see section 8.6)

*Depends on the selected language (English by default).

5 - USER INTERFACE: MENU STRUCTURE



Major Alarm Historic – ALMHIST2

No.	Name	Date	Hour	Alarm text
1	Alarm	YYYY/MM/DD	HH:MM	Alarm text (see section 8.6)
...	Alarm	YYYY/MM/DD	HH:MM	Alarm text (see section 8.6)
50	Alarm	YYYY/MM/DD	HH:MM	Alarm text (see section 8.6)

*Depends on the selected language (English by default).



Reset Alarms – ALARMRST

No.	Name	Status	Displayed text*	Description
1	RST_ALM	no/yes	Alarm Reset	Used to reset active alarms
2	ALM	-	Alarm State	Alarm state: Normal = No alarm Partial = There is an alarm, but the unit continues to operate Shutdown = Unit shuts down
3	alarm_1c	-	Current Alarm 1	Alarm code (see section 8.6)
4	alarm_2c	-	Current Alarm 2	Alarm code (see section 8.6)
5	alarm_3c	-	Current Alarm 3	Alarm code (see section 8.6)
6	alarm_4c	-	Current Alarm 4	Alarm code (see section 8.6)
7	alarm_5c	-	Current Alarm 5	Alarm code (see section 8.6)
8	alarm_1	-	Jbus Current Alarm 1	JBus alarm code (see section 8.6)
9	alarm_2	-	Jbus Current Alarm 2	JBus alarm code (see section 8.6)
10	alarm_3	-	Jbus Current Alarm 3	JBus alarm code (see section 8.6)
11	alarm_4	-	Jbus Current Alarm 4	JBus alarm code (see section 8.6)
12	alarm_5	-	Jbus Current Alarm 5	JBus alarm code (see section 8.6)

*Depends on the selected language (English by default).

IMPORTANT:

- **JBus vs. Modbus: Data exchange services offered by Modbus and JBus protocols are the same and therefore these terms can be used interchangeably.**

6 - STANDARD CONTROL OPERATIONS AND OPTIONS

6.1 - Start / Stop control

The unit state is determined based on a number of factors, including its operating type, active overrides, open contacts, master/slave configuration, or alarms triggered due to operating conditions.

The table given below summarises the unit control type [ctrl_typ] and its running status with regard to the following parameters:

- **Operating type:** Operating type is selected using the **Start/Stop** button on the user interface.

LOFF	Local off
L-C	Local on
L-SC	Local schedule
Rem	Remote
Net	Network
Mast	Master unit

- **Start/stop force command [CHIL_S_S]:** Unit start/stop force command can be used to control the unit state in the Network operating type.
 - Command set to stop: The unit is halted.
 - Command set to start: The unit runs according to schedule 1.
- **Remote start/stop contact status [Onoff_sw]:** Start/stop contact can be used to control the unit state in the Remote operating type.
- **Master control type [ms_ctrl]:** When the unit is the master unit in a two-unit master/slave arrangement, the master unit may be set to be controlled locally, remotely or via network.
- **Start/stop schedule [chil_occ]:** Occupied or unoccupied status of the unit.
- **Network emergency stop command [EMMSTOP]:** If activated, the unit shuts down regardless of the active operating type.
- **General alarm:** The unit shuts down due to failure.

Active operating type						Parameters status						Control type	Unit state
LOFF	L-C	L-SC	Rem	Net	Mast	Start/Stop force command	Remote start/stop contact	Master control type	Start/Stop schedule	Network Emergency Shutdown	Alarm shutdown		
-	-	-	-	-	-	-	-	-	-	enabled	-	-	off
-	-	-	-	-	-	-	-	-	-	-	yes	-	off
active	-	-	-	-	-	-	-	-	-	-	-	local	off
-	-	active	-	-	-	-	-	-	unoccupied	-	-	local	off
-	-	-	active	-	-	-	open	-	-	-	-	remote	off
-	-	-	active	-	-	-	-	-	unoccupied	-	-	remote	off
-	-	-	-	active	-	disabled	-	-	-	-	-	network	off
-	-	-	-	active	-	-	-	-	unoccupied	-	-	network	off
-	-	-	-	-	active	-	-	local	unoccupied	-	-	local	off
-	-	-	-	-	active	-	open	remote	-	-	-	remote	off
-	-	-	-	-	active	-	-	remote	unoccupied	-	-	remote	off
-	-	-	-	-	active	disabled	-	network	-	-	-	network	off
-	-	-	-	-	active	-	-	network	unoccupied	-	-	network	off
-	active	-	-	-	-	-	-	-	-	disabled	no	local	on
-	-	active	-	-	-	-	-	-	occupied	disabled	no	local	on
-	-	-	active	-	-	-	closed	-	occupied	disabled	no	remote	on
-	-	-	-	active	-	enabled	-	-	occupied	disabled	no	network	on
-	-	-	-	-	active	-	-	local	occupied	disabled	no	local	on
-	-	-	-	-	active	-	closed	remote	occupied	disabled	no	remote	on
-	-	-	-	-	active	enabled	-	network	occupied	disabled	no	network	on

Start-up delay

When changing the operating type (Local/Remote/Network), the control normally undergoes the transition stage during which the unit is stopped, and then allowed to start again (start-up delay is applied).

Unit stop function

This function controls the unit compressor capacity reduction. If there is an alarm or a demand to stop, it forces the compressors to the minimum capacity before stopping them.

IMPORTANT: When the unit is stopping or there is a demand to stop the unit, compressors are stopped consecutively. In case of emergency stop, all compressors are stopped at the same time.

6 - STANDARD CONTROL OPERATIONS AND OPTIONS

6.2 - Pumps control

The SmartVu™ control can manage one or two water exchanger pumps, i.e. either two internal variable speed pumps or up to two customer pumps. Both pumps cannot run together. The pump is turned on when this option is configured and when the unit is running.

The pump is turned off when the unit is shut down due to an alarm, unless the fault is a freeze protection error. The pump can be started in particular operating conditions when the water exchanger heater is active. If the pump has failed and another pump is available, the unit is stopped and started again with the second pump. If there is no pump available, the unit shuts down.

Configuration options may differ depending on the number of pumps available. The status of the pump can be checked via the Main menu (PUMPSTAT – Pump Status).

6.2.1 - Pumps configuration

Basic pump configuration can be performed via the Configuration menu (PUMPCONF – Pump Configuration). Only logged-in users can access the menu. To modify any pump settings, the unit must be stopped. For units with two pumps, these pumps can be controlled automatically or each pump can be started manually.

NOTE: Units are also fitted with the flow switch allowing for the water flow control (see also section 3.5).

6.2.1.1 - Internal pumps configuration

30KAV units can be fitted with two internal variable speed pumps controlled by the LEN drive.

To set internal cooler pumps

1. Navigate to the Configuration menu.
2. Select *Pump Configuration* (PUMPCONF).
3. Set *Cooler Pumps Sequence* [cpumpseq].

Cooler Pumps Sequence [cpumpseq] *
0 = No Pump
1 = One Pump Only *
2 = Two Pumps Auto
3 = Pump#1 Manual
4 = Pump#2 Manual

*It is not possible to set only one variable speed pump control.

6.2.1.2 - Customer pumps configuration

30KAV units can be fitted with up to two customer fixed speed pumps or one customer variable speed pump (0-10V). For units without internal pumps, customer pumps may be configured as follows:

Pump available	Cooler Pumps Sequence
No pump	0
One single speed pump	1
One variable speed pump (0-10V)	1 (option 299)
Two single speed pumps	2 = Automatic control of two pumps 3 = Pump 1 is selected 4 = Pump 2 is selected

To set the customer cooler pump(s)

1. Navigate to the Configuration menu.
2. Select *Pump Configuration* (PUMPCONF).
3. Set *Cooler Pumps Sequence* [cpumpseq].

Cooler Pumps Sequence [cpumpseq] *
0 = No Pump
1 = One Pump Only
2 = Two Pumps Auto
3 = Pump#1 Manual
4 = Pump#2 Manual

*Values between 2 and 4 can be selected only in case of dual pumps control.

6.2.2 - Automatic pump selection

If two pumps are controlled and the automatic pump control has been selected (Cooler Pumps Sequence, PUMPCONF – Pump Configuration), the control determines which pump should be started. The control tries to limit the pump run time to the configured pump changeover delay (Pump Auto Rotation Delay, PUMPCONF – Pump Configuration). If this delay has elapsed, then pump changeover is activated.

To set pump automatic rotation delay

1. Navigate to the Configuration menu.
2. Select *Pump Configuration* (PUMPCONF).
3. Set *Pump Auto Rotation Delay* [pump_del].

Pump Auto Rotation Delay [pump_del]
24 to 3000 h
48 h

6.2.3 - Pump protection (pump anti-stick function)

The control provides the option to automatically start the pump each day at 14:00 for 2 seconds when the unit is off (pump anti-sticking).

The heater for the heat exchanger and the water pump (for units with a pump) can be energised so that it protects the heat exchanger or the water pump against any damage when the unit is shut down for a long time at low outdoor temperature.

If the unit is fitted with two pumps, the first pump is started on even days and the second pump is started on odd days. Starting the pump periodically for a few seconds extends the lifetime of the pump bearings and the tightness of the pump seal.

To set periodical pump quick start

1. Navigate to the Configuration menu.
2. Select *Pump Configuration* (PUMPCONF).
3. Set *Pump Sticking Protection* [pump_per] to “yes”.

Pump Sticking Protection [pump_per]
no/yes
yes

6.3 - Control point

The control point represents the water temperature that the unit must produce. It enables to decrease the required capacity depending on the unit load operating conditions.

control point = active setpoint + reset

The control point is calculated based on the active setpoint and the reset calculation. The forced value can be used instead of any other setpoint calculation only when the unit is in the Network operating type.

6.3.1 - Active setpoint

Two setpoints can be selected, where the first cooling setpoint is normally used during occupied periods and the second cooling setpoint is used during unoccupied periods. The third cooling setpoint is used for ice storage (ice configuration and EMM SIOB required).

Setpoint	Description
Cooling setpoint 1	Occupied period
Cooling setpoint 2	Unoccupied period
Cooling setpoint 3	Ice storage cooling setpoint

Depending on the current operation type (local/remote/network), the active setpoint can be selected manually via the Main menu in Local mode, with the volt-free user contacts in Remote mode, with network commands in Network mode (CCN or BACnet) or automatically with the setpoint time schedule (schedule 2).

6 - STANDARD CONTROL OPERATIONS AND OPTIONS

The following tables summarise the possible setpoint selections based on the control operating type (local, remote, network) and the following parameters:

- Local parameters:
 - Cooling operating mode (GENUNIT, hc_sel).
 - Setpoint selection (GENUNIT, sp_sel).
- Remote setpoint contacts:
 - Ice configuration from the user configuration menu (GENCONF, ice_cnfg must be set to "yes").
 - Ice done contact from EMM (SIOB EMM board, DI4; ICE_SW by default set to "closed").
 - Dual setpoint switch status (INPUTS, setp_sw).
- Network settings:
 - Schedule 2 status for setpoint selection (GENUNIT, SP_OCC set to "yes" or "no").

Local operating type

Parameter status						Active setpoint
hc_sel	sp_sel	ice_cnfg	ice_sw	setp_sw	sp_occ	
cool	sp-1	-	*	*	-	cooling setpoint 1
cool	sp-2	no	*	*	-	cooling setpoint 2
cool	sp-2	yes	close	*	-	cooling setpoint 2
cool	sp-2	yes	open	*	-	ice setpoint
cool	auto	-	*	*	occupied	cooling setpoint 1
cool	auto	no	*	*	unoccupied	cooling setpoint 2
cool	auto	yes	close	*	unoccupied	cooling setpoint 2
cool	auto	yes	open	*	unoccupied	ice setpoint

(*) : any configuration (-) : default configuration

Remote operating type

Parameter status						Active setpoint
hc_sel	sp_sel	ice_cnfg	ice_sw	setp_sw	sp_occ	
cool	-	-	*	open	-	cooling setpoint 1
cool	-	no	*	close	-	cooling setpoint 2
cool	-	yes	close	close	-	cooling setpoint 2
cool	-	yes	open	close	-	Ice setpoint

(*) : any configuration (-) : default configuration

Network operating type

Parameter status						Active setpoint
hc_sel	sp_sel	ice_cnfg	ice_sw	setp_sw	sp_occ	
cool	-	-	*	*	occupied	cooling setpoint 1
cool	-	no	*	*	unoccupied	cooling setpoint 2
cool	-	yes	close	*	unoccupied	cooling setpoint 2
cool	-	yes	open	*	unoccupied	ice setpoint

(*) : any configuration (-) : default configuration

NOTE: Ice storage configuration [ice_cnfg] and ice done contact [ice_sw] apply only to units with the optional energy management module.

6.3.2 - Reset

Reset means the active setpoint is modified so that less machine capacity is required. In the cooling mode the setpoint is increased and this modification is in general a reaction to a drop in the load.

The reset source can be provided by one of the following:

- Outdoor air temperature that gives a measure of the load trends for the building. When the outdoor air temperature decreases, the cooling demand decreases as well and the active setpoint will be decreased thanks to the applied reset.
- Return water temperature (heat exchanger ΔT gives an average building load). Delta T (ΔT) is the difference between leaving and entering fluid temperatures (LWT minus EWT). When the load is light, temperature difference across the exchanger will be relatively small. The reset value should be configured by the user and its configuration may differ depending on the size of the water exchanger.

- 4-20 mA reset signal provided by an active sensor connected to the input. If the reading of the 4-20 mA signal/external temperature value increases (load is lighter), then the current setpoint will be lowered.
- Space temperature reset (EMM option) which provides the reading taken from the space temperature input located on the optional EMM board.

The source of the reset can be configured in the Reset Configuration menu (RESETCFG).

In response to a change in OAT, delta T, 4-20 mA reset signal reading, or space temperature, the control point is reset to optimise unit performance.

In response to a drop in the reset source, the cooling setpoint is normally reset upwards in order to optimise unit performance.

To set Cooling Reset Select

1. Navigate to the Configuration menu.
2. Select *Reset Configuration* (RESETCFG).
3. Set *Cooling Reset Select* [cr_sel].

Cooling Reset Select [cr_sel]

0 = none

1 = OAT

2 = delta T

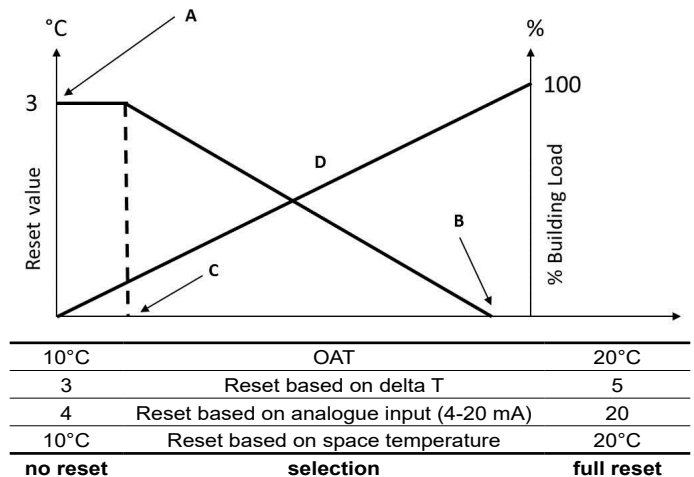
3 = 4-20mA control T

4 = Space Temp

The amount of reset is determined by linear interpolation based on the following parameters:

- A reference at which reset is zero (OAT, delta T, 4-20 mA signal, space temp. – no reset value).
- A reference at which reset is maximum (OAT, delta T, 4-20 mA signal, space temp. – full reset value).
- The maximum reset value.

Reset example in Cooling mode



Legend:

A: Maximum reset value

B: OAT / delta T / 4-20 mA / Space temperature for no reset

C: OAT / delta T / 4-20 mA / Space temperature for full reset

D: Building load

6.4 - Ramp loading

The control provides the ramp loading function used to minimise the rate at which the water temperature changes.

The minimum speed is calculated based on saturated condensing temperature and saturated suction temperature. Ramp loading sequence can be enabled by the user (Ramp Loading Select, GENCONF – General Configuration).

6 - STANDARD CONTROL OPERATIONS AND OPTIONS

6.5 - Capacity limitation

The SmartVu™ control system allows for the constant control of the unit capacity by setting its maximum allowable capacity. Capacity limitation is expressed in percentage, where a limit value of 100% means that the unit may run with its full capacity (no limitation is implemented).

The main control system enables to limit the unit capacity using one of the external orders:

- By means of user-controlled volt-free contacts. Units without the energy management module have one contact (lim_sw1). Units with the energy management module have an additional contact (lim_sw2) which permits three capacity limitation levels (see section 3.6.4). The unit capacity should not exceed the limit setpoint activated by these contacts. The limit setpoints can be modified in the SETPOINT menu.
- By lag limit set by the master unit (master/slave assembly).
- By night mode limitation control. The demand limit value in the night mode is selectable if the value is below the selected demand limit.

Demand limit can be forced when the unit is operating in Network mode.

To set Switch Limit Setpoint

1. Navigate to the Main menu.
2. Select *Setpoint Table* (SETPOINT).
3. Set *Switch Limit Setpoint 1 / 2 / 3* [lim_sp1/lim_sp2/lim_sp3].

Switch Limit Setpoint 1 [lim_sp1], Switch Limit Setpoint 2 [lim_sp2], Switch Limit Setpoint 3 [lim_sp3]

0 to 100%

To set Night Capacity limitation

1. Navigate to the Configuration menu.
2. Select *General Configuration* (GENCONF).
3. Set *Night Capacity Limit* [nh_limit].

Night Capacity Limit [nh_limit]

0 to 100%

To verify the active demand limit value

1. Navigate to the Main menu.
2. Select *General Parameters* (GENUNIT).
3. Verify *Active Demand Limit Val* [DEM_LIM].

Active Demand Limit Val [DEM_LIM]

0 to 100%

WARNING: Under specific operating conditions, the unit capacity limit can be exceeded to ensure the safety of the unit.

6.6 - Capacity control

This function adjusts the capacity using the variable speed compressor to keep the water exchanger temperature at its setpoint. The control system continuously takes account of the temperature error with respect to the setpoint, the rate of change in this error and the difference between entering and leaving water temperatures in order to determine the optimal moment at which to add or withdraw capacity.

Compressors are started and stopped in a sequence designed to equalise the number of start-ups (value weighted by their operating time). For more information about compressors sequence, see section 6.13.

6.7 - Night mode

Night mode allows users to configure the unit to operate with specific parameters in a pre-defined time period.

The night period is defined by a start time and an end time that are the same for each day of the week. During the night period the unit capacity is limited.

The Night mode settings or the maximum capacity value can be configured via the Configuration menu (GENCONF – General Configuration).

6.8 - Fan low noise mode (option 15LS)

The low noise function is used to reduce the noise level by limiting the speed of the fans during a predefined period of time.

The “low noise” mode is defined by a start time and an end time that are the same for each day of the week. Low noise settings as well as the maximum fan speed can be configured via the Configuration menu (GENCONF – General Configuration).

The “low noise” mode is different from the “low noise” option (15LS). Low noise mode and Low noise option are compatible. The configuration needs to be done carefully to avoid problems caused by too low fan speed.

6.9 - Head pressure control

The condensing pressure of each circuit is controlled by variable speed fans. The fan speed is controlled in each circuit based on the outdoor air temperature, water exchanger fluid temperature and circuit capacity.

6.10 - Refrigerant gas leak detection (option 159)

The control permits refrigerant leak detection. Two additional sensors that detect the refrigerant concentration in the air must be installed on the unit.

If one of these sensors detects an abnormal refrigerant level for more than one hour, the alarm will be triggered (alarm 10050), but the unit will continue to operate.

6.11 - Refrigerant leak detection

As standard the controller has the functionality allowing for detecting lack of refrigerant. Whenever the system detects the possible refrigerant shortage, the alarm informing about the necessity of service intervention will be triggered (10110 for circuit A and 10111 for circuit B).

The refrigerant leak detection control is based on an algorithm that monitors several operating parameters, including refrigerant pressure and temperature.

The effectiveness of the detection algorithm is not guaranteed when circuit capacity is lower than 50% and when leaving water temperature is below 7°C.

6 - STANDARD CONTROL OPERATIONS AND OPTIONS

6.12 - Circuit lead/lag selection

This function determines the lead and lag circuit on dual-circuit units. It controls the start/stop sequence of the refrigeration circuits called circuit A or circuit B.

The circuit authorised to start first is the lead circuit. Lead circuit is used first for capacity increases and at the same time should be decreased last when decreasing capacity.

The lead/lag circuits can be selected manually or automatically according to the unit configuration (GENCONF).

- **Automatic lead/lag circuit determination:** The control system determines the lead circuit to equalise the operating time of each circuit (value weighted by the number of start-ups of each circuit). As a result, the circuit with the lowest number of operating hours always starts first.
- **Manual lead/lag circuit determination:** Circuit A or B selected as the lead circuit. The selected circuit is always the leader. It is the first to start and the last to stop.

To set lead/lag circuit

1. Navigate to the Configuration menu.
2. Select *General Configuration* (GENCONF).
3. Set *Cir Priority Sequence* [prio_cir].

Cir Priority Sequence [prio_cir]

- 0 = Automatic lead/lag selection
- 1 = Circuit A priority
- 2 = Circuit B priority

6.13 - Circuit capacity loading sequence

This function determines in which order the circuit capacity is changed. Compressor loading is based on compressor control.

Two types of compressor loading sequences are available and can be configured by setting the Loading Sequence parameter [seq_typ] via the SmartVu™ user interface (GENCONF).

- **Balanced loading sequence (“seq_typ” set to “no”):** The control maintains equal capacity between both circuits as the machine loads and unloads. The lag circuit can be started when the pre-defined capacity of the lead circuit is reached, i.e. 50% by default.
- **Staged loading sequence (“seq_typ” set to “yes”):** The control loads the lead circuit completely before the lag circuit is started. When the load is decreasing, the lag circuit is unloaded first.

To set loading sequence

1. Navigate to the Configuration menu.
2. Select *General Configuration* (GENCONF).
3. Set *Staged Loading Sequence* [seq_typ].

Staged Loading Sequence [seq_typ]

- no = Equal loading sequence
- yes = Staged loading sequence

To set capacity required to start the second circuit

1. Navigate to the Configuration menu.
2. Select *General Configuration* (GENCONF).
3. Set *Cap. to start 2nd cir* [transcap].

Cap. to start 2nd cir [transcap]

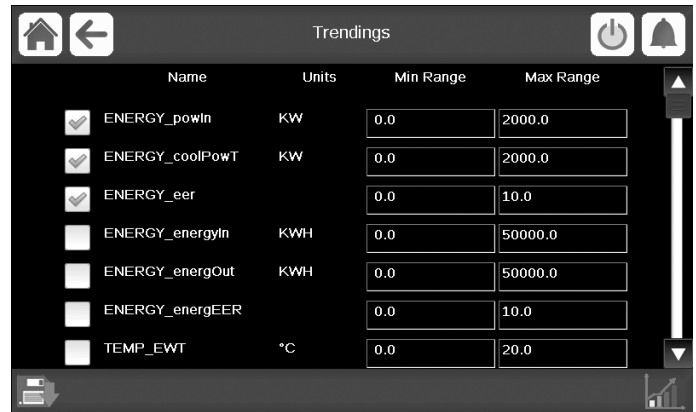
- 30 to 80%
- 50%

6.14 - Trending

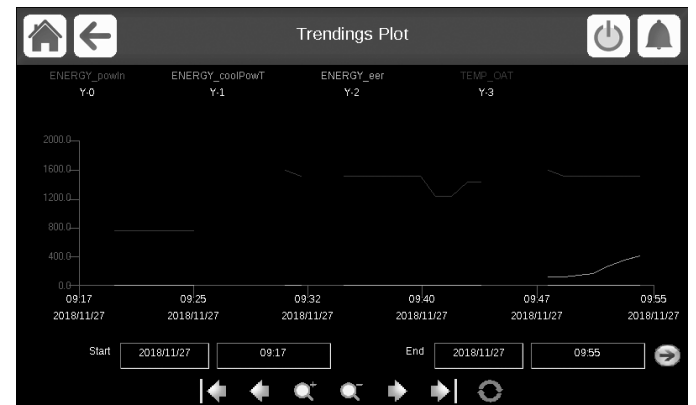
This function enables to visualise the operations of the unit and monitor a set of selected parameters.

To display trends

1. Go to the Main menu.
2. Select *Trendings* (TRENDING).
3. Select parameters to be displayed and press the **Save** button in the lower-left part of the screen.



4. Press the **Trending** button to display the graph showing trends for the set of selected parameters.



- Set the time range (start/end dates and time) and press the **Arrow** button to display the graph showing the performance of the unit within a selected period of time.
- Press to navigate across the timeline or press to go to the beginning or the end of the selected period.
- Press the **Zoom in** button to magnify the view or the **Zoom out** button to expand the viewed area.
- Press the **Refresh** button to reload data.

6 - STANDARD CONTROL OPERATIONS AND OPTIONS

6.15 - Master/Slave assembly (option 58)

Two units can be linked to create the master/slave assembly. The master unit can be controlled locally, remotely or by network commands. Master/slave assembly must be validated in order to start the master/slave chiller operation.

All control commands to the master/slave assembly (start/stop, setpoint selection, load shedding, etc.) are handled by the unit which is configured as the master. The commands are transmitted automatically to the slave unit. If the master chiller is turned off while the master/slave function is active, then the slave chiller will be stopped. Under certain circumstances, the slave unit may be started first to balance the run times of the two units.

In the event of a communication failure between the two units, each unit will return to an autonomous operating mode until the fault is cleared. If the master unit is stopped due to an alarm, the slave unit is authorised to start.

NOTE: Master/slave assembly can be configured only by Carrier service technicians.

6.16 - Energy Management Module (option 156)

The energy management module (EMM) enables to control the level of energy consumption, providing users with information such as current unit status, compressors operating status, etc.

This option requires the installation of an additional SIOB board.

Description	Connector	Remarks
Occupancy override control	DI-01, 77-78	If the contact is closed in Remote mode, the unit goes into the occupied mode
Demand limit switch 2	DI-02, 73A-74A	If the contact is closed, the second capacity limit switch is active
Customer interlock	DI-03, 34A-35A	Permits immediate unit shutdown (Remote mode only)
Ice storage	DI-04, 75-76	If the contact is closed, the unit enters the ice storage mode
Space temperature	AI-01, 71A-72A	Active setpoint reset via space temperature control
Capacity limit control	AI-10, 67-68	Active setpoint reset via unit capacity control (4-20 mA)
Compressor A	DO-01, 37A1-38A1	Output active if compressor A is operating
Compressor B	DO-02, 37B1-38B1	Output active if compressor B is operating
Chiller shutdown	DO-06, 30-31	Output closed when the unit is stopped due to an alarm
Alert	DO-05, 30B-31B	Output closed when the alert has been tripped
Chiller running or ready to start	DO-04, 37A-38A	Output closed when the chiller is ready to start or running
Unit capacity	AO-01, 78+-79-	Capacity running output (0 to 10 VDC), 0V = 0% capacity and 10V = 100% capacity

DI = Digital Input
DO = Digital Output
AI = Analogue Input
AO = Analogue Output

6.17 - HFO (30KAV-ZE)

The SmartVu™ control may also control 30KAV-ZE chillers, i.e. 30KAV air-cooled units with R-1234ze refrigerant (HFO).

30KAV-ZE chillers have a Lower Environment impact thanks to Lower GWP refrigerant when compared to units with the standard R-134a refrigerant.

6.18 - Dry Cooler Free Cooling (option 313)

30KAV units can be fitted with a dry cooler which thanks to the use of low outside air temperature facilitates the process of chilling water that is later used in the air-conditioning system ("dry cooler free cooling"). The dry cooler is used not only to assist in cooling water to meet the current cooling demand but it also allows for reducing energy consumption.

This "dry cooler free cooling" mode is enabled when the outside air temperature ("OAT Free Cooling") is below the water loop temperature and the service-configured threshold parameter.

NOTE: Dry cooler water loop temperature and free cooling OAT measured by the control are read-only values that can be verified in the DC Free Cooling Status menu (DCFC_STA).

The control distinguishes between two types of fan control for a dry cooler free cooling option, where the first one embraces the use of fan staging and the second one that includes the use of variable speed fan. Mixed configuration can also be used (fixed and variable-speed fan control at the same time).

Dry cooler free cooling is normally stopped when the outside air temperature ("OAT Free Cooling") is above the water loop temperature and the service-configured threshold parameter. However, if it turns out that the cooling power of the dry cooler is not enough in order to reach the cooling setpoint, then the mechanical cooling will be started (when FC capacity is at 100%, then mechanical cooling can be started).

6.19 - Heat Reclaim (option49, option50)

Heat reclaim is a method of using energy that normally leaves the system in the form of the waste heat at the condenser site. 30KAV units with the heat reclaim option are fitted with two condensers (air-cooled condenser which is set as standard and water-cooled condenser which is used for heat reclaim).

Adding the heat reclaim condenser to the unit may significantly reduce unit energy consumption and lead to lower greenhouse generation with maximized chiller plant efficiency. Heat reclaim chiller generates high pressure refrigerant within the condenser that can be used to produce higher temperature condenser water.

30KAV chillers with SmartVu™ control have two types of heat reclaim option available, i.e. partial heat reclaim (option 49) and total heat reclaim (option 50).

- Option 50 Total heat reclaim: Total Heat rejected is recovered to heat customer hot water loop.
- Option 49 Partial heat reclaim: Partial Heat rejected (20%) is recovered to heat customer hot water loop.

The reclaim mode is active when the user select it and if the controlled water temperature is below the Heat Reclaim setpoint (Setpoint Configuration).

The Heat Reclaim 3-way valve will first control the hot water loop. If needed, the unit fans speed will be adapted to reach the Heat reclaim setpoint.

NOTE: Heat Reclaim option can be configured only by Carrier service representative.

6 - STANDARD CONTROL OPERATIONS AND OPTIONS

6.20 - Software Activation Key(s)

30KAV units with SmartVu™ offer some additional options which require Software Activation Keys:

- **Cooler fluid type:**
 - Medium brine (option 5)
 - Low brine (option 6)
 - Light brine (option 8)
- **BACnet communication** (option 149)
- **Fast capacity recovery** (option 295)
- **Modbus communication** (option 149B)

These software-protected options can be factory-installed or installed on-site by the service technician.

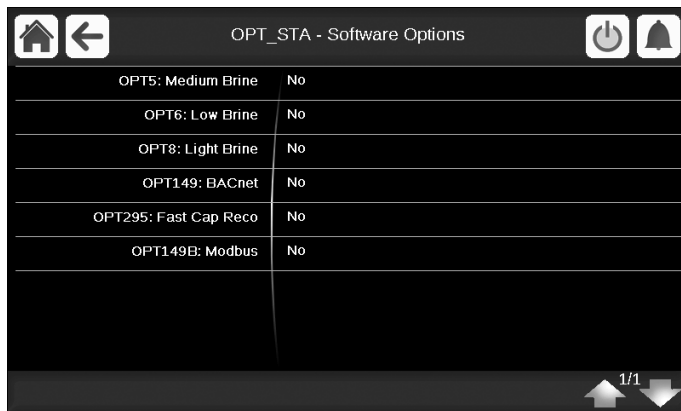
Each option requires an individual software activation key. To obtain the Software Activation Key, please contact your local Carrier service representative.

6.20.1 - Software options

The list of available software activation keys can be verified via the Main menu.

To verify available software options

1. Go to the Main menu.
2. Select *Software Options* (OPT_STA).
The menu can be accessed when logged in at user access level.
 - If the status of the option is set to “yes”, it means that the Software Activation Key for this option is installed.



Option	Status
OPT5: Medium Brine	No
OPT6: Low Brine	No
OPT8: Light Brine	No
OPT149: BACnet	No
OPT295: Fast Cap Reco	No
OPT149B: Modbus	No

IMPORTANT: In case the controller is replaced, the Software Activation Key must be installed again. See also section 6.20.2.

6.20.2 - Replacement mode

If the controller is replaced with a new one, the system will be in the Replacement mode which may last up to 7 days beginning at the first start of the compressor.

- When replacing the controller, it is necessary to install NEW Software Activation Key(s).
- Please contact your local service representative immediately to request NEW Software Activation Key(s).

In the Replacement mode:

- Software option(s) will be unlocked for a limited period of time (7 days since the first start of the compressor). Only options that have been installed on the unit before will be active in the Replacement mode!
- The list of available software options can be verified via the Main menu (OPT_STA – Software Options).
- Alarm 10122 will be triggered. If the NEW Software Activation Key is not installed during the Replacement mode, the alarm will be reset automatically and software option(s) will be blocked.

The Replacement mode ends when the Software Activation Key is installed or the period of 7 days elapsed (7 days since the first start of the compressor).

IMPORTANT: Only software options that were installed on the unit before replacing the controller will be active during the Replacement mode!

6.21 - Brine options (option 5, option 6, option 8)

30KAV chillers offer a few different cooler fluid types, including standard water fluid as well as the optional brine fluid, i.e. medium brine (option 5), low brine (option 6) and light brine (option 8). The brine option is commonly used for low temperature applications.

NOTE: This option requires the Software Activation Key (see section 6.20).

6.22 - BACnet (option 149)

The BACnet/IP communication protocol is used by the building management system or the programmable controllers to communicate with the SmartVu™ control.

NOTE: This option requires the Software Activation Key (see section 6.20).

6.23 - Fast capacity recovery (option 295)

Fast capacity recovery is an option allowing for accelerating the unit start-up and fast loading after a short power cut. For units with fast capacity recovery enabled, the loading sequence is modified so that the chiller will reach its maximum capacity much faster when compared to the standard loading sequence.

NOTE: This option requires the Software Activation Key (see section 6.20).

6.24 - Modbus (option 149B)

The Modbus communication protocol is used by the building management system or the programmable controllers to communicate with the SmartVu™ control. Modbus communication settings (Modbus RTU or Modbus TCP) can be configured only by service technicians.

NOTE: This option requires the Software Activation Key (see section 6.20).

6 - STANDARD CONTROL OPERATIONS AND OPTIONS

6.25 - Schedule setting

The control incorporates two time schedules, where the first one (OCCPC01S) is used for controlling the unit start/stop, whereas the second one (OCCPC02S) is used for controlling the dual setpoint.

The first timer program (schedule 1, OCCPC01S) provides a means to automatically switch the unit from an occupied mode to an unoccupied mode. The unit is started during occupied periods.

The second timer program (schedule 2, OCCPC02S) provides a means to automatically switch the active setpoint from an occupied setpoint to an unoccupied setpoint. Cooling setpoint 1 is used during occupied periods and cooling setpoint 2 during unoccupied periods.

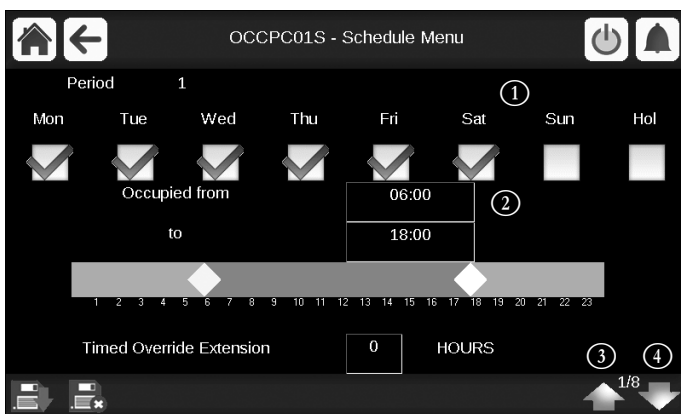
Occupancy periods

The control offers the user the possibility of setting eight occupancy periods where each occupancy period includes the following elements to be defined:

- **Day of the week:** Select the days when the period is occupied.
- **Occupancy time** ("occupied from" to "occupied to"): Set occupancy hours for the selected days.
- **Timed Override Extension:** Extend the schedule if necessary. This parameter can be used in the case of some unplanned events. Example: If the unit is normally scheduled to run between 8:00 to 18:00, but one day you want the air-conditioning system to operate longer, then set this timed override extension. If you set the parameter to "2", then the occupancy will end at 20:00.

To set the unit start/stop schedule

1. Go to the Main menu.
2. Navigate to the Configuration menu (logged-in users only) and select *Schedule Menu* (SCHEDULE).
3. Go to *OCCPC01S*.
4. Select appropriate check boxes to set the unit occupancy on specific days.
5. Define the time of occupancy.
6. When the time schedule is set, the selected period will be presented in the form of the green band on the timeline.
7. Press the **Save** button to save your changes or the **Cancel** button to exit the screen without making modifications.



Legend:

1. Selection of days for the time schedule
2. Start/end of the schedule
3. Previous time period
4. Next time period

Each program is in unoccupied mode unless a schedule time period is active.

If two periods overlap and are both active on the same day, then the occupied mode takes priority over the unoccupied period.

Example: Schedule setting (schedule 1)

Hour	MON	TUE	WED	THU	FRI	SAT	SUN	HOL
0:00	P1							
1:00	P1							
2:00	P1							
3:00								
4:00								
5:00								
6:00								
7:00	P2	P2	P3	P4	P4	P5		
8:00	P2	P2	P3	P4	P4	P5		
9:00	P2	P2	P3	P4	P4	P5		
10:00	P2	P2	P3	P4	P4	P5		
11:00	P2	P2	P3	P4	P4	P5		
12:00	P2	P2	P3	P4	P4			
13:00	P2	P2	P3	P4	P4			
14:00	P2	P2	P3	P4	P4			
15:00	P2	P2	P3	P4	P4			
16:00	P2	P2	P3	P4	P4			
17:00	P2	P2	P3					
18:00			P3					
19:00			P3					
20:00			P3					P6
21:00								
22:00								
23:00								

	Occupied
	Unoccupied

- MON:** Monday
TUE: Tuesday
WED: Wednesday
THU: Thursday
FRI: Friday
SAT: Saturday
SUN: Sunday
HOL: Holiday

Period/Schedule	Starts at	Stops at	Active on (days)
P1: Period 1	0:00	3:00	Monday
P2: Period 2	7:00	18:00	Monday + Tuesday
P3: Period 3	7:00	21:00	Wednesday
P4: Period 4	7:00	17:00	Thursday + Friday
P5: Period 5	7:00	12:00	Saturday
P6: Period 6	20:00	21:00	Holidays
P7: Period 7	Not used in this example		
P8: Period 8	Not used in this example		

6.26 - Holidays

The control allows the user to define 16 holiday periods, where each period is defined by three parameters: the month, the start day and the duration of the holiday period.

During the holiday periods, the controller will be in occupied or unoccupied mode, depending on the periods validated as holidays. Each holiday period can be modified by the user via the Configuration menu (see also section 5.4).

7 - WEB CONNECTION

7.1 - Web interface

The SmartVu™ control provides the functionality to access and control unit parameters from a web interface. To connect to the controller via the web interface, it is necessary to know the IP address of the unit.

To verify unit IP address

1. Go to the System menu.
2. Select *Network* (NETWORK).
3. Verify TCP/IP Address for "IP Network Interface J15 (eth0)" or "IP Network Interface J16 (eth1)". See also section 3.7.
 - Unit default address:
169.254.1.1 (J15, eth0)
192.168.100.100 (J16, eth1)
 - The unit IP address can be changed.

To access SmartVu™ web interface

1. Open the web browser.
2. Enter the IP address of the unit in the address bar of the web browser. Start with **https://** followed by the unit IP address.

Example: **https://169.254.1.1**

3. Press Enter.
4. The web interface will be loaded.

IMPORTANT: *Three users can be connected simultaneously with no priority between them. The last modification is always taken into account.*



Minimum web browser configuration:

- Internet Explorer (version 11 or higher)
- Mozilla Firefox (version 60 or higher)
- Google Chrome (version 65 or higher)


For security reasons the unit cannot be started / stopped via the web interface. All other operations, including monitoring unit parameters or unit configuration, can be performed via the web browser interface.

Make sure that your network is protected from malicious attacks and any other security threats. Do not provide open access without proper network security safeguards.

Carrier does not hold any responsibility or liability for damage caused by security breach.

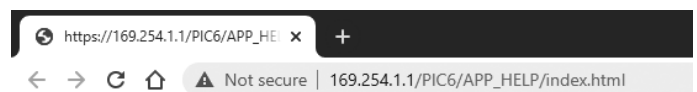
7.2 - Technical documentation

When using the SmartVu™ control via a PC web browser, you may easily access all technical documents related to the product and its components.


Once you connect to the SmartVu™ control, click the **Technical documentation** button  in order to see a list of documents related to the unit.

Technical documentation includes the following documents:

- Spare parts documentation: The list of spare parts included in the unit with reference, description and drafting.
- Misc: Documents such as electrical plans, dimension plans, unit certificates.
- PED: Pressure Equipment Directive.
- IOM: Installation operation and maintenance manual, controls installation/maintenance manual.



Document	Language	Type
BACnet User's guide	English	PDF
ModBus User's guide	English	PDF
License information	English	PDF

Click the **Help** button  to get access to BACnet user guide, Modbus user guide and Open Source Licenses used by SmartVu™.

IMPORTANT: *Please save all data (documents, drawings, diagrams, etc.), for example, on your computer. If display memory is erased or the display is replaced, all documents will be lost. Make sure that all documents are stored and may be accessed at any time.*

8 - DIAGNOSTICS

8.1 - Control diagnostics

The control system has many fault tracing aid functions, protecting the unit against risks that could result in the failure of the unit. The local interface gives quick access to monitor all unit operating conditions. If an operating fault is detected, the alarm is triggered.

In the event of an alarm:

- The bell on the SmartVu™ user interface starts ringing.



The ringing yellow bell icon indicates that there is an alarm, but the unit is still running.



The ringing red bell icon indicates that the unit is shut down due to a detected fault.

- The corresponding alarm output(s) is/are activated.
- Error code is displayed.
- Message is sent over the network.

SmartVu™ control distinguishes between two types of alarms:

- General alarms are used to indicate pumps failure, transducers faults, network connection problems, etc.
- Major alarms are used to indicate process failure.

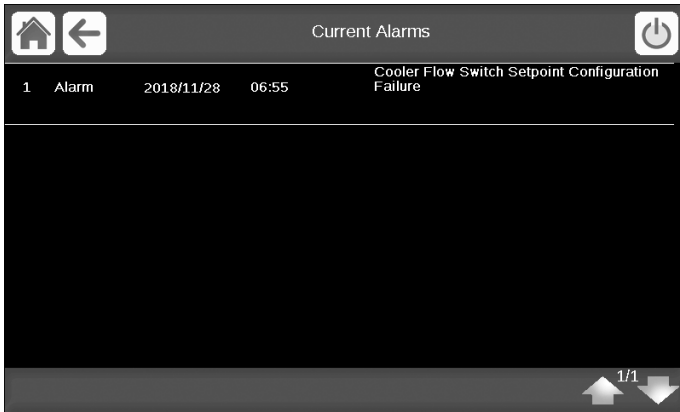
IMPORTANT: All information regarding alarms (current and past alarms) can be found in the Alarms menu (see also section 5.10).

8.2 - Displaying current alarms

The Current alarms menu may display up to 10 current alarms.

To access the list of currently active alarms

1. Press the **Alarms menu** button in the upper-right part of the screen.
2. Select *Current Alarms* (CUR_ALM).
3. The list of active alarms will be displayed.



8.3 - E-mail notifications

The control provides the option to define one or two recipients who receive e-mail notifications each time the new alarm occurs or all existing alarms have been reset.

IMPORTANT: E-mail notifications can be set only by Carrier service representative.

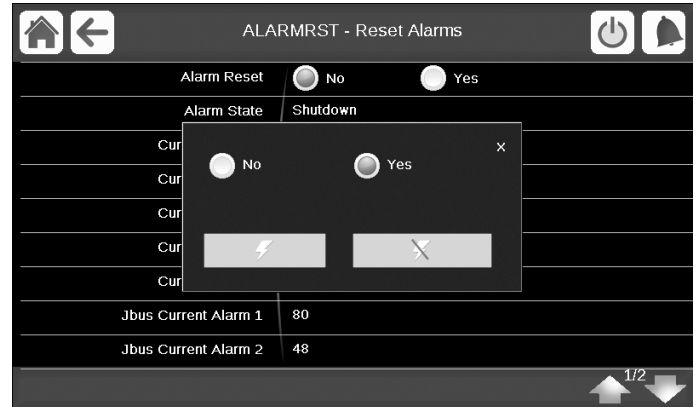
8.4 - Resetting alarms

The alarm can be reset either automatically by the control or manually through the touch panel display or the web interface.

- The Reset alarms menu displays up to 5 alarm codes which are currently active on the unit.
- Alarms can be reset without stopping the machine.
- Only logged-in users can reset the alarms on the unit.

To reset the alarm manually

1. Press the **Alarms menu** button in the upper-right part of the screen.
2. Select *Reset Alarms* (ALARMRST).
3. Set "Alarm Reset" to "Yes" and press the **Force** button.



In the event of a power supply interrupt, the unit restarts automatically without the need for an external command. However, any faults active when the supply is interrupted are saved and may in certain cases prevent a circuit or a unit from restarting. Once the cause of the alarm has been identified and corrected, it will be displayed in the alarm history.

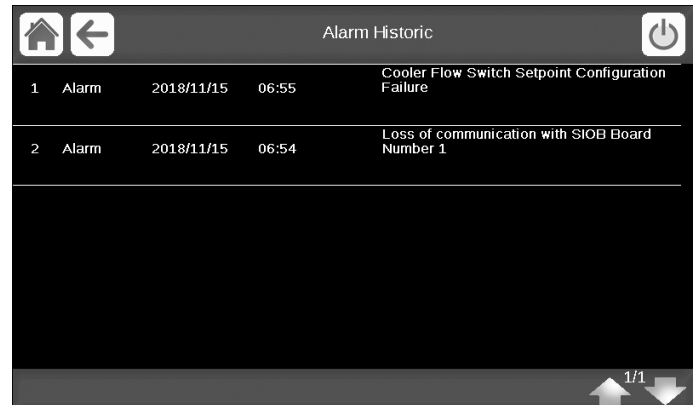
IMPORTANT: Not all alarms can be reset by the user. Some alarms are reset automatically when operating conditions return to normal.

8.5 - Alarm history

Information regarding resolved alarms is stored in the Alarm history menu which is divided into 50 recent alarms and 50 recent major alarms.

To access the alarm history

1. Press the **Alarms menu** button in the upper-right part of the screen.
2. Select *Alarm Historic* (ALMHIST1) or *Major Alarm Historic* (ALMHIST2).
3. The history of alarms will be displayed.



8 - DIAGNOSTICS

8.6 - Alarms description

The following tables include all alarms/alerts associated with the operation of the unit as well as drive alarms.

8.6.1 - Alarms

JBus code	Alarm code	Description	Reset type	Action taken	Possible cause
Thermistor failure					
1	15001	Cooler Entering Fluid Thermistor	Automatic, if thermistor reading returns to normal	Unit shuts down	Defective thermistor
2	15002	Cooler Leaving Fluid Thermistor	As above	Unit shuts down	As above
3	15010	OAT Thermistor	As above	Unit shuts down	As above
4	15023	Cooler heater feedback thermistor	As above	No action (alert)	As above
5	15011	MASTER/Slave Common Fluid Thermistor	As above	Master/Slave control is disabled, the unit returns to the stand-alone mode	As above
6	15012	Circuit A Suction Gas Thermistor	As above	Circuit A shuts down	As above
7	15013	Circuit B Suction Gas Thermistor	As above	Circuit B shuts down	As above
8	15015	Circuit A Discharge Gas Thermistor	As above	Circuit A shuts down	As above
9	15016	Circuit B Discharge Gas Thermistor	As above	Circuit B shuts down	As above
10	15018	Circuit A Condenser Subcooling Liquid Thermistor Failure	As above	Circuit A shuts down	As above
11	15019	Circuit B Condenser Subcooling Liquid Thermistor Failure	As above	Circuit B shuts down	As above
12	15033	Circuit A compressor Motor Thermistor	As above	Circuit A shuts down	As above
13	15034	Circuit B compressor Motor Thermistor	As above	Circuit B shuts down	As above
14	15024	Circuit A Economizer Gas Thermistor Failure	As above	Circuit A shuts down	As above
15	15025	Circuit B Economizer Gas Thermistor Failure	As above	Circuit B shuts down	As above
16	15021	Space Temperature Thermistor	As above	No action (alert)	As above
Transducer failure					
17	12001	Circuit A Discharge Transducer	Automatic, if sensor voltage reading returns to normal	Circuit A shuts down	Defective transducer
18	12002	Circuit B Discharge Transducer	As above	Circuit B shuts down	As above
19	12004	Circuit A Suction Transducer	When compressor is "off": Automatic, if sensor voltage reading returns to normal (3 alarms within 24 hours); otherwise, Manual When compressor is "on": Manual	Circuit A shuts down	As above
20	12005	Circuit B Suction Transducer	As above	Circuit B shuts down	As above
21	12010	Circuit A Oil Pressure Transducer	Automatic, if sensor voltage reading returns to normal	Circuit A shuts down	As above
22	12011	Circuit B Oil Pressure Transducer	As above	Circuit B shuts down	As above
23	12013	Circuit A Economizer Pressure Transducer	As above	Circuit A shuts down	As above
24	12014	Circuit B Economizer Pressure Transducer	As above	Circuit B shuts down	As above
25	12024	Water Pressure 1 transducer failure	As above	No action (alert)	Defective transducer (applicable to units fitted with the hydronic kit)
26	12025	Water Pressure 2 transducer failure	As above	No action (alert)	Defective transducer (applicable to units fitted with the hydronic kit or variable speed pumps)
27	12029	Water Pressure too low - Pump cavitation risks	Automatic, if water pressure returns to normal and the minimum pressure threshold supported by pump has not been achieved Manual, if water pressure has dropped below the minimum pressure threshold of pump.	1st scenario (automatic reset): No action (alert) 2nd scenario (manual reset): Unit shuts down	Water loop pressure too low, risk of pump cavitation
28	12031	Circuit A Condenser Subcooling Liquid Pressure Transducer	Automatic, if sensor voltage reading returns to normal	Circuit A shuts down	Defective transducer
29	12032	Circuit B Condenser Subcooling Liquid Pressure Transducer	As above	Circuit B shuts down	As above
Communication failure					
30	4901	Loss of communication with SIOB Board Number 1	Automatic, if communication is re-established	Unit shuts down	Bus installation fault, communication error
31	4902	Loss of communication with SIOB Board Number 2	As above	Circuit B shuts down	As above
32	4501	Loss of communication with Aux Board Number 1	As above	Unit shuts down	As above

8 - DIAGNOSTICS

JBus code	Alarm code	Description	Reset type	Action taken	Possible cause
33	4502	Loss of communication with Aux Board Number 2	As above	Circuit A shuts down	As above
34	4503	Loss of communication with Aux Board Number 3	As above	Circuit B shuts down	As above
35	4504	Loss of communication with Aux Board Number 4	As above	No action (alert)	As above
36	4603	Loss of communication with Energy Management Board	As above	No action (alert)	As above
37	4701	Loss of communication with Drive Board Number 1	As above	Circuit A shuts down	As above
38	4702	Loss of communication with Drive Board Number 2	As above	Circuit B shuts down	As above
39	4704	Loss of communication with Drive Board Number 4	As above	Circuit A shuts down	As above
40	4705	Loss of communication with Drive Board Number 5	As above	Circuit A shuts down	As above
41	4706	Loss of communication with Drive Board Number 6	As above	Circuit A shuts down	As above
42	4707	Loss of communication with Drive Board Number 7	As above	Circuit B shuts down	As above
43	4708	Loss of communication with Drive Board Number 8	As above	Circuit B shuts down	As above
44	4709	Loss of communication with Drive Board Number 9	As above	Circuit B shuts down	As above
45	4710	Loss of communication with VFD Pump Drive Board Number 1	As above	No action (alert)	As above
46	4711	Loss of communication with VFD Pump Drive Board Number 2	As above	No action (alert)	As above
Configuration failure					
47	70nn	Illegal factory configuration Number 01 to nn	Automatic, if configuration is provided	Unit cannot be started	No factory configuration
48	80nn	No factory configuration 02: Defined unit size does not exist 03: Unit type or country incorrect configuration (FACTORY) 04: Unit size is set to 0 (FACTORY) 05: Unit Tier incorrect configuration (FACTORY) 07: Hydronic kit option unavailable for this unit size 08: No compressor drive configured 09: Wrong configuration of hydronic kit 10: Wrong selection of Drive configuration with PM motor selection (PM motor not compatible with another option)	Automatic, if configuration is corrected	Unit cannot be started	Incorrect unit configuration
49	90nn	Master/Slave configuration error	Automatic, if master/slave configuration returns to normal or the unit returns to the standalone mode	Master/Slave control cannot be started	Configuration failure, see section 8.6.2
Process failure					
50	10001	Cooler Freeze Protection	Automatic (the first alarm within 24 hours); otherwise, Manual	Unit shuts down	No water flow, defective thermistor
51	10005	Circuit A Low Suction Temperature	When the compressor is "off": Automatic (the first alarm within 24 hours) When the compressor is "on": Automatic (two alarms within 24 hours); otherwise, Manual	Circuit A shuts down	Pressure sensor defective, EXV blocked or lack of refrigerant
52	10006	Circuit B Low Suction Super Temperature	As above	Circuit B shuts down	As above
53, 54	10008, 10009	Circuit A/B High Superheat	Not applicable	-	-
55, 56	10011, 10012	Circuit A/B Low Superheat	Not applicable	-	-
57	10014	Customer Interlock failure	Automatic (the first alarm within 24 hours); otherwise, Manual	Unit shuts down	Customer interlock closed when the unit is running
58	10028	Electrical Box Thermostat or Electrical Interlock failure	Automatic, if the unit is not running and the electrical box input is closed	Unit shuts down	Electrical box input is open (This alarm is triggered by the electrical box input linked to two serial inputs in the electrical box (electrical box thermostat input and "customer" interlock); by default, this second input is closed)
59	10030	Master/Slave communication Failure	Automatic, if communication is re-established	Master/Slave control is disabled and chillers return to their standalone modes	CCN bus installation defective
60	10031	Unit is in Network emergency stop	Automatic, if operating conditions return to normal	Unit shuts down	Network emergency stop command

8 - DIAGNOSTICS

JBus code	Alarm code	Description	Reset type	Action taken	Possible cause
61	10032	Cooler pump 1 fault	Manual	Unit is restarted with another pump running. If no pump is available, the unit shuts down	Pump overheats or poor pump connection
62	10033	Cooler pump 2 fault	Manual	As above	As above
63	10037	Circ A - High condensing temperature out of map compressor	Manual	Circuit shuts down	Defective transducer
64	10038	Circ B - High condensing temperature out of map compressor	Manual	Circuit shuts down	Defective transducer
65	10050	Refrigerant Leakage Detection	Automatic, if the leakage input voltage returns to normal	No action (alert)	Refrigerant leak or leak detector defective
66	10067	Circuit A Low Oil Pressure	Automatic (3 alarms within 24 hours); otherwise, Manual	Compressor shuts down	Pressure sensor fault, defective wiring or oil filter installation fault
67	10068	Circuit B Low Oil Pressure	As above	Compressor shuts down	As above
68	10070	Circuit A Max Oil Filter Differential Pressure	Manual	Compressor shuts down	As above
69	10071	Circuit B Max Oil Filter Differential Pressure	Manual	Compressor shuts down	As above
70	10073	Condenser pump 1 fault	Not applicable	-	-
71	10074	Condenser pump 2 fault	Not applicable	-	-
72	10075	Circuit A Low Oil Level	When compressor is "off": Automatic When compressor is "on": Automatic (3 alarms within 24 hours)	Circuit A shuts down	Oil level too low or oil level detector defective
73	10076	Circuit B Low Oil Level	As above	Circuit B shuts down	As above
74	10078	Circuit A High Discharge Gas Temperature	Manual	Circuit A shuts down	Defective transducer, max. condensing temperature setpoint too low or refrigerant charge too high
75	10079	Circuit B High Discharge Gas Temperature	Manual	Circuit B shuts down	As above
76	10081	Circuit A Low economizer pressure or suction valve closed	Manual	Circuit A shuts down	Economizer pressure transducer defective, suction valve fault
77	10082	Circuit B Low economizer pressure or suction valve closed	Manual	Circuit B shuts down	As above
78	10084	Circuit A High Oil Filter Pressure Drop	Manual	No action (alert)	Oil filter should be checked
79	10085	Circuit B High Oil Filter Pressure Drop	Manual	No action (alert)	As above
80	10090	Cooler Flow Switch Setpoint Configuration Failure	Manual	Unit is not allowed to start	Defective flow controller or wiring error
81	10091	Cooler Flow Switch Failure	Automatic (the first alarm within 24 hours); otherwise, Manual	Compressors and the evaporator pump are stopped	As above
82	10097	Water Exchanger Temperature Sensors Swapped	Manual	Unit shuts down	Leaving water temperature is higher than entering water temperature
83	10106	Circuit A - saturated suction Temperature out of MAP compressor	Manual	Circuit A shuts down	Coil fouling
84	10107	Circuit B - saturated suction Temperature out of MAP compressor	Manual	Circuit B shuts down	Coil fouling
85	10110	Lack of refrigerant suspected on circuit A	Automatic, if fault conditions are no longer present (3 alarms within 24 hours); otherwise, Manual	No action (alert)	Refrigerant leak suspected. Contact Carrier Service
86	10111	Lack of refrigerant suspected on circuit B	As above	No action (alert)	As above
87	10113	Compressor frequency below min frequency threshold - Circuit A	Automatic (the first alarm within 24 hours); otherwise, Manual	Circuit A shuts down	Check drive alarms and compressor current consumption
88	10114	Compressor frequency below min frequency threshold - Circuit B	As above	Circuit B shuts down	As above
89	10116	Discharge superheat too low - Circuit A	Manual	Circuit A shuts down	EXV wiring swapped
90	10117	Discharge superheat too low - Circuit B	Manual	Circuit B shuts down	As above
91	10119	Compressor oil valve fault - circuit A	Automatic	No action (alert)	Compressor oil valve fault
92	10120	Compressor oil valve fault - circuit B	As above	No action (alert)	As above
93	11208	Cooler Water Loop : Pressure Sensors Crossed	Automatic, if flow switch is closed; Manual, if flow switch is open	Unit shuts down	Flow switch open
94	14000	Over flow in cooler hydraulic kit	Automatic, if water flow gets below the maximum flow configured	No action (alert)	Water loop pressure drop too low

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JBus code	Alarm code	Description	Reset type	Action taken	Possible cause
Service maintenance					
95	13nnn	Service maintenance alert Number nnn	Manual	No action (alert)	Preventive maintenance date has passed; servicing action required; contact Carrier Service Agency (see section 8.6.3)
VFD failure					
96	17nnn	Circuit A Compressor VFD Failure	Manual	Circuit A shuts down	See section 8.6.4
97	18nnn	Circuit B Compressor VFD Failure	Manual	Circuit B shuts down	See section 8.6.4
98	20nnn	Circuit A Fan VFD 1 Failure	Manual, except for alarm 20027 (Automatic reset)	Circuit A shuts down	See section 8.6.5
99	21nnn	Circuit A Fan VFD 2 Failure	As above	Circuit A shuts down	See section 8.6.5
100	22nnn	Circuit A Fan VFD 3 Failure	Not applicable	-	-
101	23nnn	Circuit B Fan VFD 1 Failure	Manual, except for alarm 23027 (Automatic reset)	Circuit B shuts down	See section 8.6.5
102	24nnn	Circuit B Fan VFD 2 Failure	As above	Circuit B shuts down	See section 8.6.5
103	25nnn	Circuit B Fan VFD 3 Failure	Not applicable	-	-
104	26nnn	Hydronic kit pump 1 VFD Failure	Manual, except for alarm 26027 (Automatic reset)	Unit shuts down	See section 8.6.5
105	27nnn	Hydronic kit pump 2 VFD Failure	As above	Unit shuts down	See section 8.6.5
VFD warning					
106	35nnn	Circuit A Compressor VFD Warning	Automatic	No action (alert)	See section 8.6.4
107	36nnn	Circuit B Compressor VFD Warning	Automatic	No action (alert)	See section 8.6.4
108	38nnn	Circuit A Fan VFD 1 Warning	Automatic (China only); Manual, if Danfoss drive alarm 13 or 204 is triggered	No action (alert)	See section 8.6.5
109	39nnn	Circuit A Fan VFD 2 Warning	As above	No action (alert)	See section 8.6.5
110	40nnn	Circuit A Fan VFD 3 Warning	Not applicable	-	-
111	41nnn	Circuit B Fan VFD 1 Warning	Automatic (China only); Manual, if Danfoss drive alarm 13 or 204 is triggered	No action (alert)	See section 8.6.5
112	42nnn	Circuit B Fan VFD 2 Warning	As above	No action (alert)	See section 8.6.5
113	43nnn	Circuit B Fan VFD 3 Warning	Not applicable	-	-
114	44nnn	Hydronic kit pump 1 VFD Warning	Automatic	No action (alert)	See section 8.6.5
115	45nnn	Hydronic kit pump 2 VFD Warning	Automatic	No action (alert)	See section 8.6.5
Compressor failure					
116	1101	Compressor A Motor temperature too high	Manual	Circuit A shuts down	Motor/wiring fault
117	2101	Compressor B Motor temperature too high	Manual	Circuit B shuts down	As above
118	1103	Compressor A High Pressure Switch protection	Manual	Circuit A shuts down	Coil fouled, lack of condenser flow, condenser valve blocked, fan circuit fault, high entering air or condenser water temperature
119	2103	Compressor B High Pressure Switch protection	Manual	Circuit B shuts down	As above
Software failure					
120	55001	Database module failure	Automatic	No action (alert); it is highly recommended to power cycle the Display panel	Software problem. Contact Carrier Service
121	56001	Lenscan module failure	Automatic	As above	As above
EXV failure					
122	57020	Main EXV stepper motor Failure - cir A	Manual	Circuit A shuts down	EXV motor fault
123	57021	Main EXV stepper motor Failure - cir B	Manual	Circuit B shuts down	EXV motor fault
124	57023	EXV eco stepper motor Failure - cir A	Manual	Circuit A shuts down	EXV motor fault
125	57024	EXV eco stepper motor Failure - cir B	Manual	Circuit B shuts down	EXV motor fault
Replacement mode: Software Activation Key(s) missing					
126	10122	Replacement Mode: please contact Carrier service representative to activate options	Automatic, if Software Activation Key is installed Automatic, if Software Activation Key is not provided within 7 days since the first compressor start (the alarm will be reset and software-protected options will be blocked)	Replacement Mode: Please contact Carrier service representative to obtain activation key(s) to retrieve (or activate) software options	SmartVu™ controller was replaced, but Software Activation Key is not installed
Dry Cooler Free Cooling (DCFC) failure					
127	15046	DC Free Cooling Water Loop Thermistor Failure	Automatic, if thermistor reading returns to normal	Dry cooler free cooling is disabled	Defective thermistor

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JBus code	Alarm code	Description	Reset type	Action taken	Possible cause
128	15047	DC Free Cooling Leaving Water Thermistor Failure	As above	No action (alert)	As above
129	15048	DC Free Cooling OAT Sensor Failure	As above	Dry cooler free cooling is disabled	As above
130	4601	Loss of communication with DC Free Cooling Board	Automatic, if communication is re-established	Dry cooler free cooling is disabled	Bus installation fault, communication error
131	10101	DC Free Cooling Process Failure	Automatic, if OAT is above the service-configured threshold or DC free cooling capacity is below 100%	Dry cooler free cooling is disabled	Dry cooler free cooling inefficient

Compressor failure

132	10123	Wrong compressor Type configuration cir A	Manual (the first alarm within 24 hours); otherwise, Automatic	Circuit A shuts down	Check compressor configuration only one at every power cycle
133	10124	Wrong compressor Type configuration cir B	Manual (the first alarm within 24 hours); otherwise, Automatic	Circuit B shuts down	As above

Heat Reclaim failure

134	4604	Loss of communication with SIOB Board Heat Reclaim	Automatic, if communication is re-established	The Heat recovery is disabled	Communication error
135	15008	Reclaim Condenser Entering	Automatic, if thermistor reading returns to normal	As above	Entering water temperature is too high or too low
136	15009	Reclaim Condenser Leaving Thermistor	Automatic, if thermistor reading returns to normal	As above	As above
137	10052	Heat Reclaim flow switch failure	Manual (the third alarm within 24 hours); otherwise Automatic	As above	Flow switch open
138	10128	Heat Reclaim Condenser Freeze Protection - cir A	Automatic, if conditions returns to normal	No action (alert)	Water temperature is too low
139	10129	Heat Reclaim Condenser Freeze Protection - cir B	Automatic, if conditions returns to normal	No action (alert)	As above

8.6.2 - Master/Slave configuration alarms

Code	Description
9001	Lag pump control is selected while pump configuration is missing
9002	Master unit and Slave unit have the same address
9003	No Slave unit configured
9004	Slave lag pump is selected while slave pump configuration is missing
9005	Master unit and Slave unit should have the same water control type (control based on EWT)
9006	Master unit and Slave unit have the same water control type (control based on LWT)
9007	Master lag pump control is configured while the slave lag pump control is not configured
9008	Master lag pump control is not configured while the slave lag pump control is configured
9009	Slave unit is not in Network mode
9010	Slave unit failure due to a detected alarm
9011	Master unit is not in Network mode
9012	Communication between Master unit and Slave lost
9013	Master/Slave units heat/cool selection conflict
9014	Master and Slave parallel/series selection conflict
9015	Master unit has EWT option configured in conflict with chiller in series setting
9016	Slave unit has EWT option configured in conflict with chiller in series setting

8.6.3 - Service maintenance alarms

Code	Description
13001	001: Oil filter
13002	002: Liquid line filter
13003	003: Check and replace fuses
13004	004: Check and clean the water filter
13005	005: Periodic leakage check
13006	006: Routine service visit as per IOM level 2
13007	007: Oil analysis
13008	008: Glycol level check
13009	009: Check the anti-vibration mounts

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8.6.4 - Compressor drive alarms/alerts

Compressor drive alarms or alerts are displayed based on the following formula:

- 17+X-YYY for alarms and 35+X-YYY for alerts (X stands for the number of the circuit and YYY is the alarm/alert code).

The tables below present the most common alarms associated with the variator malfunction. Please refer to the applicable Danfoss documentation for more information on other alarms.

Code	Description	Action to be taken
Drive alarms		
4	Mains phase loss	Check the VFD supply voltage and the phase balance ($\pm 3\%$)
7	Over voltage	Contact Carrier Service
8	Under voltage	Contact Carrier Service
9	Inverter overloaded	Check the VFD output current/compressor current
12	Torque limit exceeded	Check the VFD output current/compressor current
13	Overcurrent	Check the VFD output current/compressor current
14	Earth fault	Check if an earth fault exists
16	Motor short-circuit	Check if there is a short-circuit at the VFD terminals
23*	Internal fan fault	Check the internal fan rotation
29	VFD temperature too high	Space temperature too high or VFD ventilation obstructed or damaged
30	Motor phase U missing	Check wiring of phase U
31	Motor phase V missing	Check wiring of phase V
32	Motor phase W missing	Check wiring of phase W
33	Inrush fault	Current demand too high: Let the VFD cool down for 20 minutes before starting it again
34	Fieldbus communication fault	Check the connections and the shielding of the serial communication cable
36	Mains failure	Check the VFD supply voltage and the phase balance ($\pm 3\%$)
38	Internal fault	Contact Carrier Service
47	24 V supply low	Contact Carrier Service
48	1.8 V supply low	Contact Carrier Service
65	Control board over temperature	Check the space temperature and the VFD fan
67	Option configuration has changed	Contact Carrier Service
68	Emergency stop	Contact Carrier Service
80	Drive initialized to default value	Contact Carrier Service
95	Torque loss	Contact Carrier Service
243	IGBT defective	Contact Carrier Service
251**	New parts detached	Contact Carrier Service
Drive alerts		
3	No motor	Check the motor connections
4	Mains phase loss	Check the VFD supply voltage and the phase balance ($\pm 3\%$)
5	DC link voltage high	Check the VFD supply voltage and the phase balance ($\pm 3\%$)
6	DC link voltage low	Check the VFD supply voltage and the phase balance ($\pm 3\%$)
7	DC over voltage	Contact Carrier Service
8	DC under voltage	Contact Carrier Service
9	Inverter overloaded	Check the VFD output current/compressor current
12	Torque limit exceeded	Check the VFD output current/compressor current
13	Overcurrent	Check the VFD output current/compressor current
14	Earth fault	Check if an earth fault exists
23*	Internal fan fault: Compressor drive: The drive will be stopped immediately. Fan drive: The drive continues to operate.	Check the internal fan rotation
34	Fieldbus communication fault	Check the connections and the shielding of the serial communication cable
36	Mains failure	Check the VFD supply voltage and the phase balance ($\pm 3\%$)
47	24 V supply low	Contact Carrier Service
49	Motor speed limit exceeded	Contact Carrier Service
59	Current limit exceeded	Check the VFD output current/compressor current
62	Output frequency at maximum limit	Check the VFD output current/compressor current
64	Voltage limit	Supply voltage too low
65	Control board overtemperature	Check the space temperature and the VFD fan
66	Heat sink temperature low	Space temperature too low
90†	Encoder loss	Contact Carrier Service

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Code	Description	Action to be taken
95	Torque loss	Contact Carrier Service
96	Start delayed	Contact Carrier Service
97	Stop delayed	Contact Carrier Service
98	Clock fault	Contact Carrier Service
243	IGBT defective	Contact Carrier Service
247	Capacity board temperature	Contact Carrier Service

* Error 24 and 104 possible

** Error 70 or 250 possible

† Not applicable to variator size 102

8.6.5 - Fans and pumps drive alarms/alerts

Fan drive alarms or alerts are displayed based on the following formula:

- 20-YYY to 25-YYY (20=A1, 21=A2, 22=A3 and 23=B1, 24=B2, 25=B3) for alarms (YYY stands for the alarm code)
- 38-YYY to 43-YYY (38=A1, 39=A2, 40=A3, 41=B1, 42=B2, 43=B3) for alerts (YYY stands for the alert code)

Pump drive alarms or alerts are displayed based on the following formula:

- Pump drive alarms are displayed as 26-YYY for pump 1 and 27-YYY for pump 2 (YYY stands for the alarm code).
- Pump drive alerts are displayed as 44-YYY for pump 1 and 45-YYY for pump 2 (YYY stands for the alert code).

Code	Description	Code	Action to be taken
Drive alarms			
0	No error	NErr	Contact Carrier Service if more information is needed
1	Over-current during acceleration	OC1	As above
2	Over-current during deceleration	OC2	As above
3	Over-current during constant speed operation	OC3	As above
4	Over-current in load at startup	OCL	As above
5	Short circuit in arm	OCA	As above
8	Input phase failure	EPHI	As above
9	Output phase failure	EPHO	As above
10	Overvoltage during acceleration	OP1	As above
11	Overvoltage during deceleration	OP2	As above
12	Overvoltage during constant speed operation	OP3	As above
13	Over-LOAD in inverter	OL1	As above
14	Over-LOAD in motor	OL2	As above
16	Overheat trip	OH	As above
17	Emergency stop	E	As above
18	EEPROM fault 1 (writing operation)	EEP1	As above
19	EEPROM fault 2 (reading operation)	EEP2	As above
20	EEPROM fault 3 (other)	EEP3	As above
-	Speed ref alarm	Err1	As above
21	RAM fault	Err2	As above
22	ROM fault	Err3	As above
23	CPU fault	Err4	As above
24	Communication error trip	Err5	As above
26	Current detector fault	Err7	As above
27	Optional circuit board type error	Err8	As above
28	Graphic keypad communication error	Err9	As above
29	Small-current trip	UC	As above
30	Trip due to under voltage in main circuit	UP1	As above
32	Over-torque trip	Ot	As above
34	Ground fault trip (hardware detection)	EF2	As above
37	Overcurrent flowing in element during acceleration	OC1P	As above
38	Overcurrent flowing in element during deceleration	OC2P	As above
39	Overcurrent flowing in element during operation	OC3P	As above

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Code	Description	Code	Action to be taken
41	Inverter type error	EtYP	As above
46	External thermal input	OH2	As above
47	VIA cable break	SOUt	As above
50	Break in an analogue signal cable	E-18	As above
51	CPU fault	E-19	As above
52	Excess torque boost	E-20	As above
53	CPU fault	E-21	As above
84	Auto-tuning error	Etn1	As above
72	Closed damper 1 fault	Fd1	As above
73	Closed damper 2 fault	Fd2	As above
-	Download transfer fault	CFI2	As above
Drive alerts			
1	Overcurrent	-	Contact Carrier Service if more information is needed
2	Drive overload	-	As above
3	Motor overload	-	As above
4	Overheat	-	As above
5	Overvoltage	-	As above
6	Main circuit undervoltage	-	As above
7	Reserved	-	As above
8	Undercurrent	-	As above
9	Over-torque	-	As above
10	Reserved	-	As above
11	Cumulative operation hours reached	-	As above
12	Reserved	-	As above
13	Reserved	-	As above
14	Main circuit undervoltage alarm the same as MS-relay status	-	As above
15	At the time of the instant blackout, Forced deceleration/stop	-	As above
16	An automatic stop during the lower limit frequency continuance	-	As above
17	PTC thermistor alarm	-	As above
22	Overload alarm	-	As above
23	Underload alarm	-	As above

9 - MAINTENANCE

In order to ensure the optimal operation of the equipment as well as the optimization of all the available functionalities, it is recommended to activate a Maintenance Contract with your local Carrier Service Agency.

The contract will ensure your Carrier equipment is regularly inspected by Carrier Service specialists, so that any malfunction is detected and corrected quickly, and no serious damage can occur to your equipment.

The Carrier Service Maintenance Contract represents not only the best way to ensure the maximum operating life of your equipment, but also, through the expertise of Carrier qualified personnel, the optimal tool to manage your system in a cost-effective manner.

