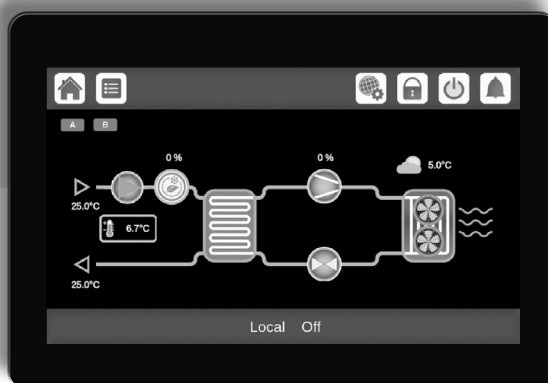




## CONTROLS MANUAL



SmartVu™ Control

30RB/RBP  
30RQ/RQP  
(R32 A2L refrigerant)

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## PREFACE

The goal of this document is to give a broad overview of the main functions of the control system used to control:

- 30RB/30RBP air-cooled liquid chillers (165 to 950 kW),
- 30RQ/RQP heat pumps (165 to 680 kW),
- 30RQP duplex heat pumps (740 to 1040 kW).

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.

**CAUTION: Heating option applies to cooling-only units fitted with a boiler and heat pumps.**

Note that this document may refer to optional components and certain functions, options or accessories may not be available for the specific unit. The cover images are solely for illustration and form no part of any offer for sale or any sale contract.

**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.**

It is possible to monitor and manage the SmartVu™ control system from either a local colour touch screen panel installed in the electrical cabinet of the machine or the web interface.

- Please note that the SmartVu™ touch screen panel has been superseded by the SmartVu™ 2.0 touch screen.
- The layout and design of the web interface may differ based on the type of the touch screen installed on the machine.

For units equipped with the legacy SmartVu™ touch screen, the organisation of pages is the same both on the touch screen and the web interface.

SmartVu™ 2.0 touch screen comes with the new web user interface design which allows for easy navigation across different functionalities of the control system.

- This document applies to both versions of the touch screen. Please refer to the relevant section of this document.

**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 refrigeration circuits are called circuit A and circuit B. Compressors in circuit A are labelled A1, A2, A3, A4, whereas compressors in circuit B are labelled B1, B2, B3, B4.

**The following abbreviations are used frequently:**

|             |                                                                                 |
|-------------|---------------------------------------------------------------------------------|
| <b>BMS</b>  | Building Management System                                                      |
| <b>BPHE</b> | Brazed Plate Heat Exchanger                                                     |
| <b>CCN</b>  | Carrier Comfort Network                                                         |
| <b>DCFC</b> | Dry Cooler Free Cooling                                                         |
| <b>DGT</b>  | Discharge Gas Temperature                                                       |
| <b>DST</b>  | Daylight Saving Time                                                            |
| <b>EHS</b>  | Electric Heater Stage                                                           |
| <b>EMEA</b> | Europe, Middle East and Africa                                                  |
| <b>EMM</b>  | Energy Management Module                                                        |
| <b>EWI</b>  | Entering Water Temperature                                                      |
| <b>EXV</b>  | Electronic Expansion Valve                                                      |
| <b>UI</b>   | User Interface                                                                  |
| <b>FC</b>   | Free Cooling                                                                    |
| <b>HR</b>   | Heat Reclaim                                                                    |
| <b>HSM</b>  | Hydronic System Manager                                                         |
| <b>LED</b>  | Light Emitting Diode                                                            |
| <b>LEN</b>  | Sensor Bus (internal communication bus linking the basic board to slave boards) |
| <b>LWT</b>  | Leaving Water Temperature                                                       |
| <b>MC</b>   | Mechanical Cooling                                                              |
| <b>MCHE</b> | Micro-Channel Heat Exchanger                                                    |
| <b>OAT</b>  | Outdoor Air Temperature                                                         |
| <b>PC</b>   | Phase Controller                                                                |
| <b>SCT</b>  | Saturated Condensing Temperature                                                |
| <b>SST</b>  | Saturated Suction Temperature                                                   |
| <b>THD</b>  | Total Harmonic Distortion                                                       |
| <b>VFD</b>  | Variable Frequency Drive                                                        |

**Operating modes:**

|                            |                                                     |
|----------------------------|-----------------------------------------------------|
| <b>Local-Off/LOFF</b>      | Operating type: Local Off                           |
| <b>Local-On/L-C</b>        | Operating type: Local On mode                       |
| <b>Local-Schedule/L-SC</b> | Operating type: Local On following a time schedule  |
| <b>Master mode/Mast</b>    | Operating type: Master unit (master/slave assembly) |
| <b>Network mode/Net</b>    | Operating type: Network                             |
| <b>Remote mode/Rem</b>     | Operating type: Remote contacts                     |

# 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, electrical components, voltages, and the installation site (elevated plinths and built-up structures).

Only qualified installation engineers and fully trained technicians are authorised to install and start the equipment.

All instructions and recommendations provided in the service guide, installation and operation manuals, as well as on tags and labels fixed to the equipment, components and other 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 safety standards and practices.**
- **Wear safety glasses and gloves.**
- **Use the proper tools to move heavy objects.**
- **Move units carefully and set them down gently.**

**CAUTION:** Only qualified service technicians should be allowed to install and service the equipment.

## 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 should be shut off before any work is begun. Shut off the main power supply at the main circuit breaker or isolator.

**IMPORTANT: The equipment uses and emits electromagnetic signals. Tests have shown that the equipment conforms to all applicable codes with respect to 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 - Control system

30RB/RBP chillers and 30RQ/RQP heat pumps are equipped with SmartVu™ Control that serves as the user interface and configuration tool for Carrier communicating devices. The advanced SmartVu™ Control comes with web connectivity.

30RB/RQ units typically use fixed speed fans and 30RBP/RQP variable speed fans. Variable speed fans reduce the unit energy use during occupied and unoccupied periods, provide condensing or evaporating pressure control and smooth fan start.

For 30RB/RBP chillers and 30RQ/RQP heat pumps, the system may control fixed speed pumps or variable speed pumps with a hydronic module.

**IMPORTANT: This document may refer to optional components and certain functions, options or accessories may not be available for the specific unit.**

## 2.2 - System functionalities

The system controls the start-up of the compressors needed to maintain the desired heat exchanger entering and leaving water temperature. It constantly manages the operation of the fans in order to maintain the correct refrigerant pressure in each circuit and monitors safety devices that protect the unit against failure and guarantee its optimal functioning.

### SmartVu™ control system:

- Allows users to control the unit via the SmartVu™ user interface
- Provides web connectivity technology
- Includes the trending functionality
- Supports Carrier Connected Services (Remote connectivity, alarm notification, remote access, performance and operation automatic reporting, technical advice)
- Supports Carrier Advanced Plant System Manager for multiple chillers/heat pumps configuration
- Provides direct BMS integration capabilities (CCN RS485, Modbus RS485 option, LON option, BACnet IP option, BACnet MS/TP option)

## 2.3 - Control panel

Navigation through the SmartVu™ control is either using the touch screen interface or by connecting to the web interface.

The legacy SmartVu™ touch screen panel has been superseded by the SmartVu™ 2.0 touch screen.

| SmartVu™ touch screen                                       | SmartVu™ 2.0 touch screen                                                             |
|-------------------------------------------------------------|---------------------------------------------------------------------------------------|
| a resistive LCD touch screen                                | a capacitive LCD screen                                                               |
| the same layout of menus on the touch screen and the web UI | new web user interface design (web UI design different from the touch screen display) |
| CEPL131228-01-R*                                            | CEPL131256-01-R*                                                                      |

\* The CEPL number can be found on the sticker on the back of the touch screen.

## 2.4 - Operating modes

The control 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 (CCN, BACnet IP, BACnet MS/TP, Modbus TCP/IP, Modbus RTU). Data communication cable is used to connect the unit to the CCN communication bus.

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

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

## 2 - CONTROL OVERVIEW

### 2.5 - Features overview

| Feature                                        | Chillers |        | Heat pumps |        |
|------------------------------------------------|----------|--------|------------|--------|
|                                                | Standard | Option | Standard   | Option |
| 4.3" touch screen (SmartVu™ / SmartVu™ 2.0)    | ✓        |        | ✓          |        |
| Web connectivity                               | ✓        |        | ✓          |        |
| E-mail transmission                            | ✓        |        | ✓          |        |
| Carrier Connect Services                       | ✓        |        | ✓          |        |
| Language packs                                 | ✓        |        | ✓          |        |
| Language pack customization                    | ✓        |        | ✓          |        |
| Metric / Imperial unit display                 | ✓        |        | ✓          |        |
| History trends                                 | ✓        |        | ✓          |        |
| BMS connection                                 | ✓        |        | ✓          |        |
| CCN communication                              | ✓        |        | ✓          |        |
| BACnet IP communication                        |          | ✓      |            | ✓      |
| BACnet MS/TP communication (SmartVu™ 2.0)      |          | ✓      |            | ✓      |
| Modbus RTU / Modbus TCP communication          |          | ✓      |            | ✓      |
| LonTalk                                        |          | ✓      |            | ✓      |
| Scroll compressor technology                   | ✓        |        | ✓          |        |
| Fixed speed fans                               | ✓        |        | ✓          |        |
| Variable speed fans                            | ✓        |        | ✓          |        |
| High static fan                                |          | ✓      |            | ✓      |
| Water exchanger heater                         | ✓        |        | ✓          |        |
| Fixed or variable speed pumps                  |          | ✓      |            | ✓      |
| Heating / Cooling control                      | ✓        |        | ✓          |        |
| Boiler heating control                         |          | ✓      |            | ✓      |
| Electric heating control                       |          |        |            | ✓      |
| Dry Cooler Free Cooling                        |          | ✓      |            | ✓      |
| Desuperheater (option 49)                      |          | ✓      |            | ✓      |
| Heat Reclaim (option 50)                       |          | ✓      |            |        |
| Heat Reclaim condenser heater (option 41C)     |          | ✓      |            |        |
| Defrost mechanism                              |          |        | ✓          |        |
| Free defrost mechanism                         |          |        | ✓          |        |
| Brine fluid                                    |          | ✓      |            |        |
| Refrigerant leak detection                     |          | ✓      |            | ✓      |
| Diagnostics                                    | ✓        |        | ✓          |        |
| Cooling Floor Optimization (option 119C)       |          |        |            | ✓      |
| Hydraulic Free Cooling (option 305A/305B/305C) |          | ✓      |            |        |
| Duplex unit option (740R-1040R)                |          |        |            | ✓      |
| Phase controller (option 159B)                 |          | ✓      |            | ✓      |
| Energy Meter (option 294)                      |          | ✓      |            | ✓      |
| Fast capacity recovery (option 295+)           |          | ✓      |            |        |
| Smart Grid Ready* (option 157D)                |          |        |            | ✓      |

\* The Smart Grid Ready label is valid only in the DACH region (Germany, Austria, Switzerland).

## 3 - HARDWARE

### 3.1 - Control boards

Each circuit is by default fitted with one SIOB/CIOB board used to manage all major inputs and outputs of the controller.

Options, such as EMM or free cooling, require the installation of additional SIOB/CIOB boards. Units with seven or eight fixed speed fans are fitted with AUX2 board. Chillers with the Heat Reclaim option come with an additional AUX1 board.

All boards communicate via an internal LEN bus.

### 3.2 - Power supply to boards

All boards are supplied from a common 24 VAC supply referred to earth.

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

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 given circuit or the unit from restarting.

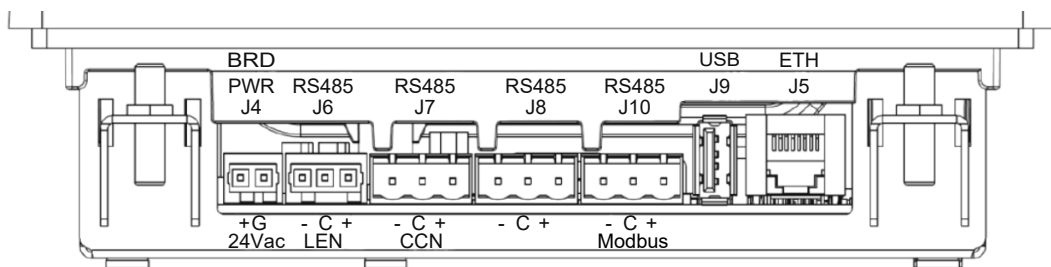
### 3.3 - Touch panel connections

Connections are located on the bottom side of the controller.

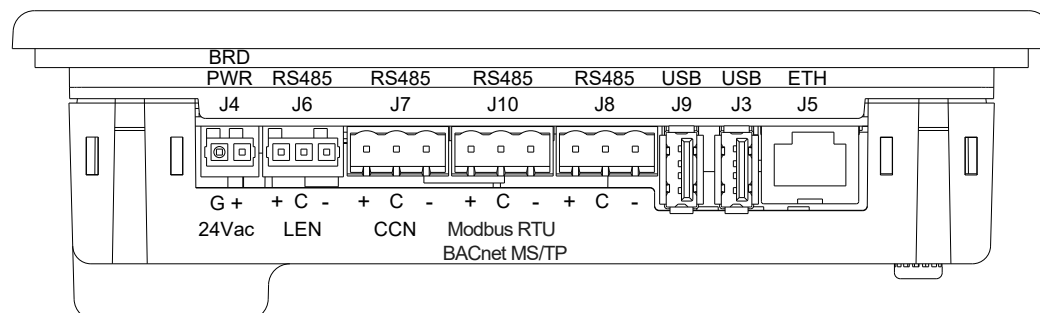
- The control offers RS485 communication protocols such as LEN, CCN (Carrier Comfort Network), Modbus RTU or BACnet MS/TP (SmartVu™ 2.0).
- One Ethernet port allows for TCP/IP communication (BACnet, Modbus TCP/IP etc.) or BMS (Building Management System) connection.

The position of connectors varies depending on the model of the touch screen. For example, J8 and J10 connectors are placed in the opposite order (left/right position).

#### 3.3.1 - Connections of SmartVu™ touch screen



#### 3.3.2 - Connections of SmartVu™ 2.0 touch screen



#### Important:

J8: This connector is used for internal communication, for example, the optional Energy Meter. This connector should not be used by the customer for any other purposes.

J10: This connector is used for Modbus (RS485) or BACnet MS/TP (RS485).

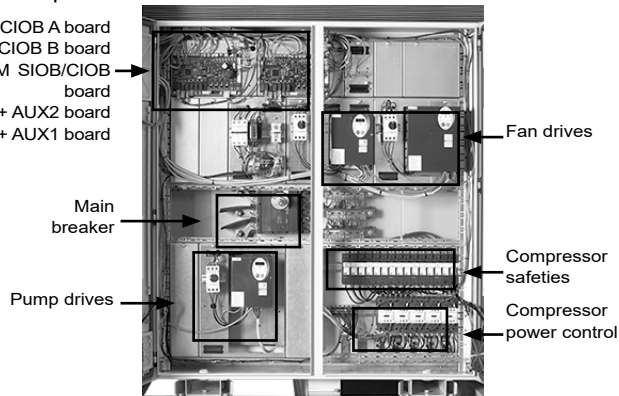
**NOTE: BACnet MS/TP option is available only on SmartVu™ 2.0.**

### 3.4 - Electrical box

The electrical box includes all boards controlling the unit and the user interface (SmartVu™).

The main board 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. The number of boards available in the electrical box depends on the number of selected options.



### 3.5 - Light emitting diodes on boards

All boards continuously check and indicate the proper operation of their electronic circuits. A light emitting diode (LED) lights on each board when it is operating properly.

- The red LED flashing for a two-second period indicates correct operation. A different rate indicates a board or a software failure.
- The green LED flashes continuously on all boards to show that the board is communicating correctly over its internal bus (LEN bus). If the green LED is not flashing, this indicates a LEN bus wiring problem or a configuration issue.

## 3 - HARDWARE

### 3.6 - Pressure transducers

Three types of transducers (high pressure, low pressure, water pressure) are used to measure various pressures in each circuit. These transducers deliver 0 to 5 VDC. They are connected to the SIOB/CIOB board.

- **Discharge pressure transducers (high pressure type)**  
These transducers measure the discharge pressure in each circuit. They are used to control condensing pressure or high pressure load shedding. Discharge pressure sensors are mounted on the discharge line piping of each circuit.
- **Suction pressure transducers (low pressure type)**  
These transducers measure the suction pressure in each circuit. They are used to control EXV, evaporating pressure (in heating mode) and monitor suction pressure safeties related to the compressor operating envelope. Suction pressure sensors are located on the common suction piping of each circuit.
- **Pump inlet/outlet water pressure transducers (water pressure type, hydronic kit option)**  
These transducers measure the hydronic kit pump water inlet/outlet water pressure and monitor the water flow. Pump inlet/outlet water pressure sensors are mounted on the optional hydronic kit.
- **Pump inlet/outlet pressure transducers (Free Cooling option, 305A/305B/305C)**  
These transducers measure the free cooling refrigerant pump inlet and outlet pressure. They are used to control pump start-up and monitor pump pressure during the free cooling cycle.
- **Pump inlet/outlet pressure transducers (Free Cooling option, 305C)**  
Two pressure transducers located at the output of the Glycol-Free BPHE (before [fc\_ewp] and after the pump [fc\_lwp]) allow for measuring the flow of the glycol-water mixture on the Free Cooling side.

### 3.7 - Temperature sensors

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

- **Water heat exchanger entering and leaving water temperature sensors**  
The water heat exchanger entering and leaving water temperature sensors are used for capacity control and safety purposes.
- **Outdoor air temperature sensor**  
This sensor measuring the outdoor air temperature is used for start-up, setpoint temperature reset and frost control.
- **Suction gas temperature sensors**  
These sensors measure the suction gas temperature. They are used for the EXV control. Suction gas temperature sensors are located at the suction side of each circuit.
- **Master/slave water sensor (optional)**  
This sensor measures the common water temperature in the master/slave system capacity control. It is installed only in the case of master/slave units.
- **Defrost temperature sensors (heat pumps)**  
These sensors are used to determine the end of the defrost cycle for a given circuit.
- **Temperature setpoint reset sensor (EMM option)**  
This sensor measures the space (room) temperature for the purpose of setpoint reset.
- **Heat Reclaim leaving water temperature sensor (HR option)**  
This factory-mounted temperature sensor is located on the BPHE condenser outlet. It measures the water temperature leaving the condenser and it is used to determine the activation of the heat recovery.

- **Heat Reclaim control water temperature sensor (HR option)**  
This water temperature sensor is used to measure the water temperature on the customer side and it is located either before or after the 3 way-valve. In case the variable-speed pump is used instead of the 3-way valve, then this sensor is located on the BPHE condenser inlet.
- **Free Cooling water temperature sensor (FC option, 305A/305B/305C)**  
The Free Cooling water temperature sensor is located at the output of Free Cooling coils and at the input of the water exchanger. This sensor is used to control the Free Cooling capacity.
- **Free Cooling glycol-water temperature sensor (FC option, 305C)**  
This sensor located at the input of the Glycol-Free BPHE is used to measure the temperature of the glycol-water mixture in Free Cooling coils (TEMP, FC\_WGT).

### 3.8 - Actuators

- **Electronic expansion valve**  
The electronic expansion valve (EXV) is used to adjust the refrigerant flow to changes in the operating conditions of the machine. The high degree of accuracy with which the piston is positioned provides precise control of the refrigerant flow and suction superheat.
- **Water flow switch**  
For units without internal pumps, the water flow switch configuration allows for the automatic control of the minimum water flow setpoint of the water flow switch. The configuration depends on the unit size and is made automatically at the start-up. If the flow switch fails, the alarm condition shuts off the unit.
- **Water heat exchanger pumps (optional)**  
The controller can regulate one or two fixed speed or variable speed water heat exchanger pumps and takes care of the automatic changeover between these pumps (see also section 6.6).
- **Four-way valve (heat pumps)**  
The control actuates the four-way valve for cooling / heating mode and defrosts session.
- **Three-way valve (HR option) \***  
The controller actuates the three-way valve to let the water flow through the Heat Reclaim condenser.
- **Variable-speed pump (HR option) \***  
The controller can regulate the variable-speed pump (0-10V) to control the Heat Reclaim condenser water flow.  
*\* The customer can connect either a 3-way valve or a variable-speed pump. These actuators are not provided by the Manufacturer!*
- **Heat Reclaim flow switch (HR option)**  
This Heat Reclaim flow switch is used to detect water flow inside the BPHE condenser. This flow switch is not provided by the Manufacturer.
- **FC valves (FC option, 305A/305B)**  
The control actuates two "Free Cooling" valves (evaporator valve and coil valve) to enable/disable the optional Free Cooling subset. In Free Cooling, with the evaporator valve closed and the coil valve open, the process water will go directly through Free Cooling coils where cooled with the low temperature ambient air (see also section 6.18).
- **FC coil pump (FC option, 305C)**  
This fixed-speed pump is located at the output of the glycol-free BPHE is used to control the closed glycol-water loop on the Free Cooling side (see also section 6.18).

## 3 - HARDWARE

### 3.9 - Terminal block connections

Connections available at the user terminal block may vary depending on the selected options. The following table summarizes the connections at the user terminal block.

**IMPORTANT: Some contacts can be accessed only when the unit operates in Remote mode.**

| Terminal block connections                   |                      |              |           |                                                                                                                                                                                                                                               |
|----------------------------------------------|----------------------|--------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                                  | Board                | Input/Output | Connector | Remarks                                                                                                                                                                                                                                       |
| On/Off switch                                | SIOB/CIOB, circuit A | DI-01        | J1        | Used for the unit on/off control (Remote mode).                                                                                                                                                                                               |
| Heat/Cool switch                             | SIOB/CIOB, circuit A | DI-04        | J1        | Used to switch between cooling and heating when the unit is in Remote mode (Heat pumps only).                                                                                                                                                 |
| Second setpoint switch                       | SIOB/CIOB, circuit A | DI-02        | J1        | Used to switch between setpoints.                                                                                                                                                                                                             |
| Demand limit switch 1                        | SIOB/CIOB, circuit A | DI-03        | J1        | Used to control demand limit. See section 3.9.3.                                                                                                                                                                                              |
| SG Ready access (SGR0_BST)                   | SIOB/CIOB, circuit A | DI-03        | J1        | Used to control SG Ready option. See section 10.                                                                                                                                                                                              |
| Alarm relay                                  | SIOB/CIOB, circuit A | DO-05        | J23       | Indicates alarms.                                                                                                                                                                                                                             |
| Running relay                                | SIOB/CIOB, circuit A | DO-06        | J22       | Used to signal a running status (at least one compressor started).                                                                                                                                                                            |
| Variable speed pump command                  | SIOB/CIOB, circuit A | AO-01        | J10       | Used to manage the customer variable speed pump (0 to 10V).                                                                                                                                                                                   |
| Lock switch                                  | SIOB/CIOB, circuit B | DI-02        | J1        | Used for the customer safety loops.                                                                                                                                                                                                           |
| Customer pump 1                              | SIOB/CIOB, circuit B | DO-05        | J23       | The control can regulate one or two single speed evaporator pumps and automatically change over between the two pumps.                                                                                                                        |
| Customer pump 2                              | SIOB/CIOB, circuit B | DO-06        | J22       | The control can regulate one or two single speed evaporator pumps and automatically change over between the two pumps.                                                                                                                        |
| <b>Optional</b>                              |                      |              |           |                                                                                                                                                                                                                                               |
| Setpoint reset control                       | SIOB/CIOB, circuit A | AI-10        | J9        | Allows the user to reset the currently selected setpoint.                                                                                                                                                                                     |
| Phase controller                             | CIOB, circuit A      | AI-11        | J45       | The phase controller (option 159B) is used to monitor the main supply of the unit: The phase controller relay output is connected to the analogue input on the CIOB board.<br><i>Note: This option is NOT compatible with the SIOB board.</i> |
| Desuperheater demand                         | SIOB/CIOB, circuit B | DI-04        | J1        | Heat recovery is allowed (option 49).                                                                                                                                                                                                         |
| Occupancy override                           | SIOB/CIOB, EMM       | DI-01        | J1        | Used to switch between occupied (closed contact) and unoccupied mode (open contact).                                                                                                                                                          |
| Demand limit switch 2                        | SIOB/CIOB, EMM       | DI-02        | J1        | Used to control demand limit. See section 3.9.3.                                                                                                                                                                                              |
| SG Ready access (SGR1_LCK)                   | SIOB/CIOB, EMM       | DI-02        | J1        | Used to control SG Ready option. See section 10.                                                                                                                                                                                              |
| Customer interlock                           | SIOB/CIOB, EMM       | DI-03        | J1        | Used for the customer safety loops.                                                                                                                                                                                                           |
| Ice done contact                             | SIOB/CIOB, EMM       | DI-04        | J1        | Used to control the setpoint according to the occupancy schedule.                                                                                                                                                                             |
| FC evaporator valve closed? (4" valve)       | SIOB/CIOB, EMM       | DI-05        | J34       | Used to control the hydraulic free cooling option (see section 3.9.5).                                                                                                                                                                        |
| FC evaporator valve opened? (4" valve)       | SIOB/CIOB, EMM       | DI-06        | J3        | Used to control the hydraulic free cooling option (see section 3.9.5).                                                                                                                                                                        |
| FC coil valve closed? (4" valve)             | SIOB/CIOB, EMM       | DI-07        | J3        | Used to control the hydraulic free cooling option (see section 3.9.5).                                                                                                                                                                        |
| FC coil valve opened? (4" valve)             | SIOB/CIOB, EMM       | DI-08        | J3        | Used to control the hydraulic free cooling option (see section 3.9.5).                                                                                                                                                                        |
| Space temperature                            | SIOB/CIOB, EMM       | AI-01        | J25-J40   | Used for reset control (option 156).                                                                                                                                                                                                          |
| FC evaporator water temperature              | SIOB/CIOB, EMM       | AI-02        | J25-J41   | Used for hydraulic free cooling control (option 305A/305B/305C).                                                                                                                                                                              |
| FC glycol water temperature                  | SIOB/CIOB, EMM       | AI-03        | J25-J41   | Used for hydraulic free cooling control (option 305C).                                                                                                                                                                                        |
| Free Cooling inlet pump pressure             | SIOB/CIOB, EMM       | AI-06        | J11       | Used for hydraulic free cooling control (option 305C).                                                                                                                                                                                        |
| Free Cooling outlet pump pressure            | SIOB/CIOB, EMM       | AI-07        | J19       | Used for hydraulic free cooling control (option 305C).                                                                                                                                                                                        |
| Capacity limit control                       | SIOB/CIOB, EMM       | AI-10        | J9        | Used for capacity limitation.                                                                                                                                                                                                                 |
| Desuperheater customer pump                  | SIOB/CIOB, EMM       | DO-01        | J2        | The control can regulate a customer pump for heat recovery. The connection has to be done between the pin DO-01 of connector J2 and the pin IN-01 of connector J4.                                                                            |
|                                              |                      | IN-01        | J4        |                                                                                                                                                                                                                                               |
| FC evaporator valve close command (3" valve) | SIOB/CIOB, EMM       | DO-01        | J2        | Used to control the hydraulic free cooling option (see section 3.9.5).                                                                                                                                                                        |
| FC evaporator valve open command (3" valve)  | SIOB/CIOB, EMM       | DO-02        | J2        | Used to control the hydraulic free cooling option (see section 3.9.5).                                                                                                                                                                        |
| FC coil valve close command (3" valve)       | SIOB/CIOB, EMM       | DO-03        | J6        | Used to control the hydraulic free cooling option (see section 3.9.5).                                                                                                                                                                        |
| FC coil valve open command (3" valve)        | SIOB/CIOB, EMM       | DO-04        | J6        | Used to control the hydraulic free cooling option (see section 3.9.5).                                                                                                                                                                        |
| Chiller in alert                             | SIOB/CIOB, EMM       | DO-05        | J23       | Indicates the alert condition.                                                                                                                                                                                                                |
| Chiller totally shutdown                     | SIOB/CIOB, EMM       | DO-06        | J22       | Indicates the unit shutdown.                                                                                                                                                                                                                  |
| Electric Heater Stage #1                     | SIOB/CIOB, EMM       | DO-07        | J7        | Used to activate electric heating stage #1.                                                                                                                                                                                                   |
| Boiler                                       | SIOB/CIOB, EMM       | DO-07        | J7        | Used to control the boiler.                                                                                                                                                                                                                   |
| Electric Heater Stage #2                     | SIOB/CIOB, EMM       | DO-08        | J7        | Used to activate electric heating stage #2.                                                                                                                                                                                                   |
| Electric Heater Stage #3                     | SIOB/CIOB, EMM       | DO-09        | J7        | Used to activate electric heating stage #3.                                                                                                                                                                                                   |
| Electric Heater Stage #4                     | SIOB/CIOB, EMM       | DO-10        | J7        | Used to activate electric heating stage #4.                                                                                                                                                                                                   |
| Chiller capacity running output (0 to 10 V)  | SIOB/CIOB, EMM       | AO-01        | J10       | Reports the capacity percentage of the unit.                                                                                                                                                                                                  |

### 3 - HARDWARE

| Terminal block connections                |          |              |           |                                                                                         |
|-------------------------------------------|----------|--------------|-----------|-----------------------------------------------------------------------------------------|
| Description                               | Board    | Input/Output | Connector | Remarks                                                                                 |
| Heat Reclaim BPHE heater                  | AUX1, HR | DO-01        | J2        | Used to activate the optional HR condenser heater.                                      |
| Heat Reclaim pump command                 | AUX1, HR | DO-02        | J2        | Used to energize the HR pump.                                                           |
| Heat Reclaim controlled water temperature | AUX1, HR | AI-01        | J6        | Used to monitor the controlled water temperature (on the customer side).                |
| Heat Reclaim leaving fluid temperature    | AUX1, HR | AI-02        | J6        | Used to monitor the HR condenser leaving water temperature.                             |
| Heat Reclaim flow switch                  | AUX1, HR | AI-03        | J7        | Used to detect if the water flows in the BPHE condenser.                                |
| Remote Heat Reclaim switch                | AUX1, HR | AI-04        | J8        | Used to enable the Heat Reclaim mode (Remote mode).<br>closed = Heat Reclaim is enabled |

#### 3.9.1 - Volt-free contact (on/off and cooling/heating)

For chillers with a boiler or heat pumps, on/off contacts and cooling/heating contacts are as follows:

| Contact                 | Off  | Cooling | Heating | Auto   |
|-------------------------|------|---------|---------|--------|
| On/Off contact          | open | closed  | closed  | open   |
| Cooling/heating contact | open | open    | closed  | closed |

**Off:** Unit is stopped  
**Cooling:** Unit is allowed to start in Cooling  
**Heating:** Unit is allowed to start in Heating (chiller with boiler control or heat pump)  
**Auto:** Unit can run in Cooling or Heating in accordance with the changeover values. If the automatic changeover is enabled (Heat/Cool Select, GENUINIT – General Parameters), the operating mode is selected based on OAT.

#### 3.9.2 - Volt-free setpoint selection contact

This dry contact input is used to switch between setpoints. It is active only when the control is in Remote mode.

| Contact                    | Cooling |        |      | Heating |        |      |
|----------------------------|---------|--------|------|---------|--------|------|
|                            | Stp 1   | Stp 2  | Auto | Stp 1   | Stp 2  | Auto |
| Setpoint selection contact | open    | closed | -    | open    | closed | -    |

#### 3.9.3 - 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 | open | closed  | open    | closed  |
| Demand limit 2 contact | open | open    | closed  | closed  |

**NOTE:** For units with SG Ready option enabled, the capacity limit applied to the unit depends on the Smart Grid operating mode (see section 10.4).

#### 3.9.4 - Ice storage (EMM option)

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

| Contact            | Cooling setpoint |            |            |
|--------------------|------------------|------------|------------|
|                    | CSP1             | CSP2       | ICE_STP    |
| Occupancy schedule | occupied         | unoccupied | unoccupied |
| Ice done switch    | open/closed      | closed     | open       |

#### 3.9.5 - Hydraulic Free Cooling contacts

Two two-way valves ("FC evaporator valve" and "FC coil valve") are used to isolate or add the Free Cooling subset. Depending on the unit size, there are two types of on/off valves:

| On/Off valve | Unit size     |
|--------------|---------------|
| 3-inch valve | 170 to 410 kW |
| 4-inch valve | 450 to 950 kW |

When Free Cooling is enabled (option 305A/305B):

- FC evaporator valve = closed, FC coil valve = open.

When Free Cooling is disabled (option 305A/305B):

- FC evaporator valve = open, FC coil valve = closed.

## 3 - HARDWARE

### 3.10 - RS485 wiring (best practice)

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

- For CCN or Modbus communication which is over 300 m or in a noisy environment with Variable Frequency Drive (VFD), a cable with two twisted pairs is recommended. For example, Belden 3106A or Alpha Wire 6454.
- For applications where the length of the cable is up to 300 m and there is no Variable Frequency Drive (VFD), it is possible to use cost-effective cable solutions, for example, Belden 8772.

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 chassis ground (4.3-inch controllers).***

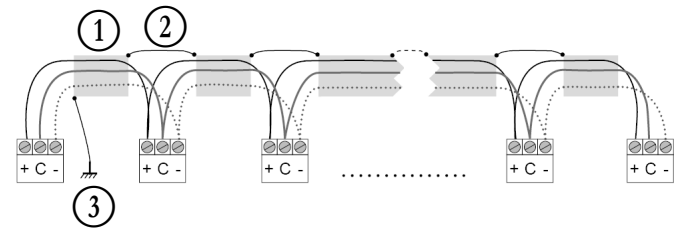
#### 3.10.1 - RS485 wiring: 4.3-inch controller

The following diagrams illustrate possible RS485 wiring schemes for 4.3-inch controllers.

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

#### 3.10.2 - RS485: Daisy chain configuration

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



##### Legend

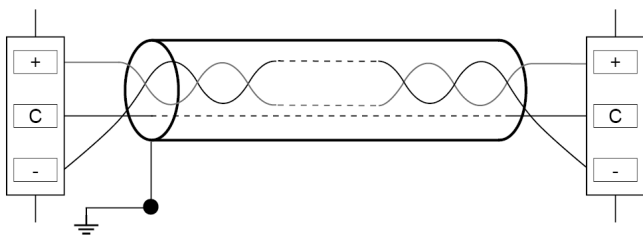
- ① Shield
- ② Keep shield continued
- ③ Connect shield to earth ground only at one point

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

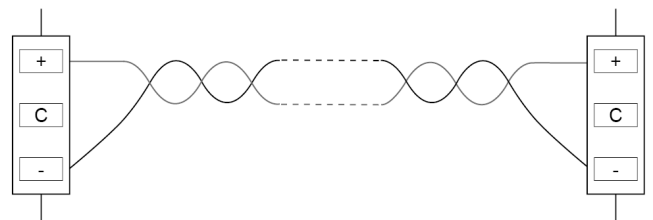
The speed of the bus and the cable distance determines whether termination is needed. It is meant to balance the bus to minimize the ringing that may be caused by fast signals and the inductance of the cabling.

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

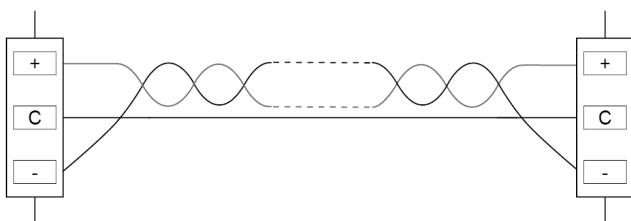
**No.1 RS485 wiring diagram (RECOMMENDED)**



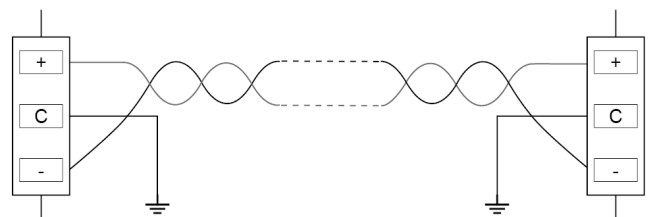
**No. 4 RS485 wiring diagram (INCORRECT - Do not use!)**



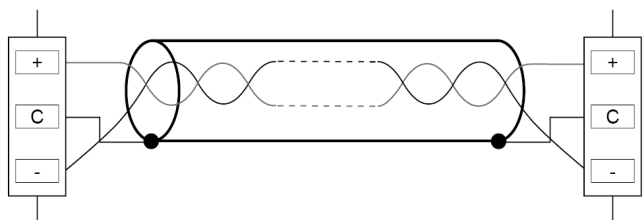
**No. 2 RS485 wiring diagram (CORRECT)**



**No. 5 RS485 wiring diagram (INCORRECT - Do not use!)**



**No. 3 RS485 wiring diagram (CORRECT)**



## 4 - USER INTERFACE: OVERVIEW

### 4.1 - Touch screen display

SmartVu™ is a 4.3 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 will go black. The control system is always active and the operating mode remains unchanged. Press anywhere on the screen and the Home screen will be displayed.

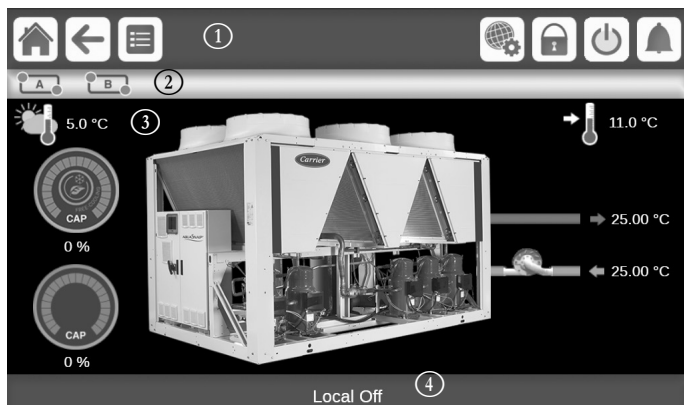
**The SmartVu™ touch screen panel has been superseded by the SmartVu™ 2.0 touch screen.** The look of the SmartVu™ display may slightly differ depending on the version of the touch screen that has been installed on the machine. For units with the SmartVu™ 2.0 touch screen, please refer to section 4.3.

### 4.2 - SmartVu™ touch screen

It is recommended to use a stylus for the navigation via the touch screen.

#### 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.



Example: Home screen (web interface)

The picture of the synoptic view presented above includes the subheader which is displayed only when the controller is accessed via the web interface (see section 7.1). 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 30RB/30RQ chillers.

#### Legend:

1. Header buttons (see section 4.4)
2. Subheader buttons
3. Synoptic view / Circuit view
4. Information message box (see section 4.5)

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

| Icon | Description                                                                                                                                                                 |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      | <b>Setpoint:</b> 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). |
|      | <b>Outdoor Air Temperature (OAT):</b> This parameter is displayed only in case of units fitted with OAT sensor.                                                             |
|      | <b>Unit capacity:</b> The gauge shows current unit capacity.                                                                                                                |
|      | <b>Free Cooling capacity:</b> The gauge shows total FC capacity (applicable to units with FC option enabled).                                                               |

| Icon | Description                                                                                                    |
|------|----------------------------------------------------------------------------------------------------------------|
|      | <b>Pump status:</b> Press the icon to go to pump parameters. The pump image is animated when the pump is "on". |
|      | <b>Leaving Water Temperature:</b> This parameter shows current leaving water temperature.                      |
|      | <b>Entering Water Temperature:</b> This parameter shows current entering water temperature.                    |

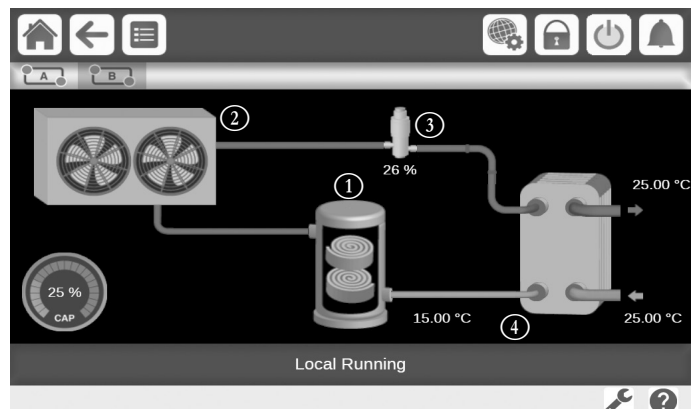
#### Circuit view

Circuit view is only available from a PC web browser.

| Button * | Description                                                                            |
|----------|----------------------------------------------------------------------------------------|
|          | <b>Circuit view:</b> 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.

\*\* Please note that the subheader buttons are only displayed from a PC browser.



| Icon | Description                                                                                                                                                                                                                                                                                                                                                                                                         |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      | <b>(1) Compressor</b> is used to squeeze the compressor refrigerant gas and turn it into high pressure gas. The image is animated when at least one scroll compressor is running in the circuit.                                                                                                                                                                                                                    |
|      | <b>(2) Condenser</b> 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.<br><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> |
|      | <b>(3) EXV</b> is used to control the flow of refrigerant into the evaporator. The circuit view displays the current position of the electronic expansion valve.<br><i>Valve position is given in %, where 0% means closed position and 100% means open position.</i>                                                                                                                                               |
|      | <b>(4) Evaporator</b> 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.                                                                                                                                                                                                     |
|      | <b>Circuit capacity:</b> The gauge shows current circuit capacity.                                                                                                                                                                                                                                                                                                                                                  |
|      | <b>Leaving Water Temperature:</b> This parameter shows current leaving water temperature.                                                                                                                                                                                                                                                                                                                           |
|      | <b>Entering Water Temperature:</b> This parameter shows current entering water temperature.                                                                                                                                                                                                                                                                                                                         |

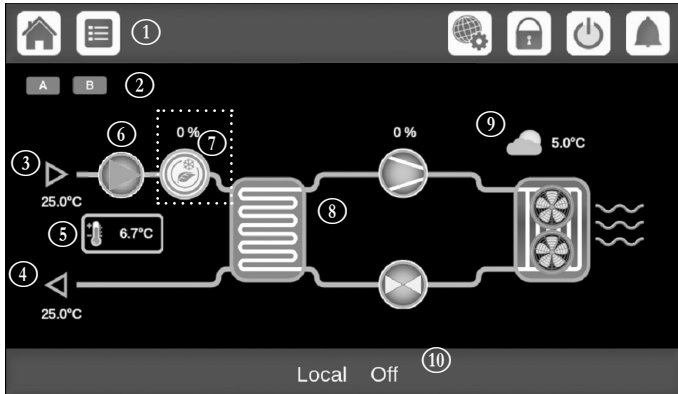
## 4 - USER INTERFACE: OVERVIEW

### 4.3 - SmartVu™ 2.0 touch screen

SmartVu™ 2.0 touch screen comes with a refreshed home screen design. You can control the touch screen with a bare finger or a suitable pen (a capacitive stylus pen). Pointed or cutting tools should not be used (e.g. screwdrivers).

#### Home screen

The home screen is the first screen displayed on the touch screen panel. This screen allows you to monitor basic information about the operation of the chiller and its working conditions.



#### Legend:

- |                                 |                              |
|---------------------------------|------------------------------|
| ① Header buttons ("header bar") | ⑥ Water pump                 |
| ② Circuit icon                  | ⑦ FC capacity                |
| ③ Entering Water Temperature    | ⑧ Refrigeration cycle        |
| ④ Leaving Water Temperature     | ⑨ Outdoor Air Temperature    |
| ⑤ Setpoint                      | ⑩ Message box ("bottom bar") |

#### ■ Circuit

For single-circuit chillers, there is only one circuit icon displayed ( **A** for circuit A).

For dual-circuit chillers, two circuit icons will be displayed ( **A** for circuit A, **B** for circuit B).

- Grey circuit icon = circuit is stopped
- Green circuit icon = circuit is running

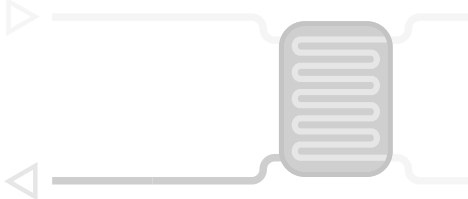
#### ■ Evaporator Entering Water Temperature (EWT)

This is the temperature of the water returned from the building ("return water temperature").



#### ■ Evaporator Leaving Water Temperature (LWT)

This is the temperature of the chilled water produced by the chiller and supplied to the building ("supply water temperature").



#### ■ Setpoint

Setpoint is used to define the desired supply water temperature (Evaporator LWT).



Logged-in users are allowed to access chiller setpoint settings directly from the home screen: Tap  to open the setpoint configuration menu.

#### ■ Water pump

A single-speed or variable-speed pump is used to circulate the working fluid through the equipment.

- Green pump icon = pump is running
- Grey pump icon = pump is stopped



Logged-in users can access pump parameters directly from the home screen: Tap  to open the pump menu.

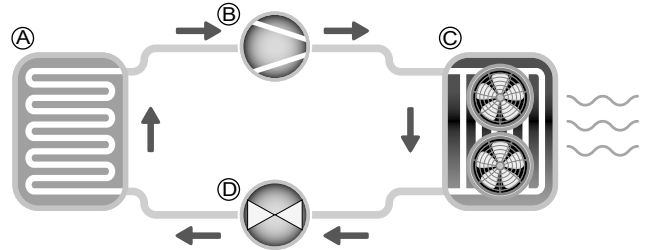
#### ■ Free Cooling capacity (optional)

This value shows Free Cooling capacity.



The "Free Cooling" capacity icon is displayed only for units with the Free Cooling option.

#### ■ Refrigeration cycle (Cooling mode)



##### A) Evaporator

- 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 vapours.

##### B) Compressor / circuit capacity

- This value shows current unit capacity.
- The compressor is used to squeeze the compressor refrigerant gas and turn it into high pressure gas.

##### C) Condenser

- Condenser is a heat exchanger used to reject the heat by cooling down the high pressure gases and taking advantage to condense the vapours into a liquid.

The number of fans given in the picture may be different from the actual number of fans installed on the unit.

##### D) Electronic Expansion Valve (EXV)

- EXV is used to control the flow of refrigerant into the evaporator.
- Valve position is given in %, where 0% means closed position and 100% means open position.

#### ■ Outdoor Air Temperature

 OAT sensor reading. The outdoor air temperature sensor used to measure and monitor the temperature helps to optimize the cooling process whenever possible.

## 4 - USER INTERFACE: OVERVIEW

### 4.4 - Header buttons



| Button                                                                               | Description                                                                                                                                    |
|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
|     | <b>Home screen:</b> Press the button to go to the Home screen.                                                                                 |
|     | <b>Previous screen:</b> Press the button to go back to the previous screen.                                                                    |
|     | <b>Main menu:</b> Press the button to go to the Main menu.                                                                                     |
|     | <b>System menu:</b> Press the button to go to the System menu.                                                                                 |
|     | <b>Login menu:</b> Used to login 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.                                                                                                                          |
|   | <b>Start/Stop menu:</b> Used to control the unit control mode.                                                                                 |
|   | Unit is currently stopped (blue icon).                                                                                                         |
|   | Unit is currently running (green icon).                                                                                                        |
|   | <b>Alarm menu:</b> Press the button to go to the Alarms menu.                                                                                  |
|   | The <b>grey</b> bell means there is currently no alarm active on the unit.                                                                     |
|   | The <b>yellow</b> ringing bell means that there is a partial alarm (one circuit affected by the alarm) or Alert (no action taken on the unit). |
|   | The <b>red</b> ringing bell means that the unit is affected by the alarm.                                                                      |

### 4.5 - 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                                | STATUS                                                                                       |
|----------------------------------------|----------------------------------------------------------------------------------------------|
| <b>SUCCESS</b>                         | Displayed when the requested action is executed.                                             |
| <b>INTERNAL COMMUNICATION FAILURE!</b> | Displayed when the main application is not running.                                          |
| <b>HIGH FORCE IN EFFECT!</b>           | Displayed when the controller rejects the "Force" command (applicable only to status menus). |
| <b>ACCESS DENIED!</b>                  | Displayed when trying to perform actions not allowed at current access level.                |

## 4 - USER INTERFACE: OVERVIEW

### 4.6 - Other buttons

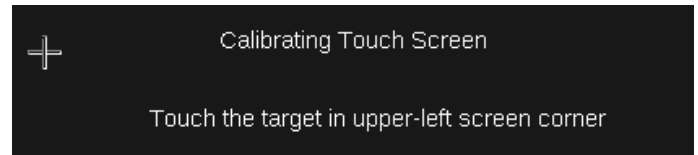
| Button                                                                                                                                                                                                                                                                              | Description                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                                                                                                                                                                                    | <b>Save button:</b> Press the button to save the modification.                      |
|                                                                                                                                                                                                    | <b>Cancel button:</b> Press the button to cancel the modification.                  |
|                                                                                                                                                                                                    | <b>Log in button:</b> Press the button to log in at specific access level.          |
|                                                                                                                                                                                                    | <b>Log off button:</b> Press the button to log off.                                 |
|                                                                                                                                                                                                    | <b>Confirm button:</b> Press the button to confirm the modification.                |
|                                                                                                                                                                                                    | <b>Cancel button:</b> Press the button to cancel the modification.                  |
|                                                                                                                                                                                                    | <b>Up button:</b> Press the button to scroll up.                                    |
|                                                                                                                                                                                                    | <b>Down button:</b> Press the button to scroll down.                                |
| <b>On SmartVu™ 2.0 touch screen:</b> Swipe up from the bottom of the screen or swipe down from the top of the screen to display and reach other items.<br>Note: You can swipe up or down only in the menu view (the top bar and the bottom bar will not respond to swipe gestures). |                                                                                     |
|                                                                                                                                                                                                  | <b>Force button:</b> Press the button to force the parameter.                       |
|                                                                                                                                                                                                  | <b>Remove Force button:</b> Press the button to remove the forced parameter.        |
|                                                                                                                                                                                                  | <b>Trending button:</b> Press the button to display trends.                         |
|                                                                                                                                                                                                  | <b>Refresh button:</b> Press the button to refresh the view.                        |
|                                                                                                                                                                                                  | <b>Zoom in button:</b> Press the button to magnify the current view.                |
|                                                                                                                                                                                                  | <b>Zoom out button:</b> Press the button to expand the current view.                |
|                                                                                                                                                                                                  | <b>Left button:</b> Press the button to go to the left.                             |
|                                                                                                                                                                                                  | <b>Rewind button:</b> Press the button to go to the left faster than normal.        |
|                                                                                                                                                                                                  | <b>Right button:</b> Press the button to go to the right.                           |
|                                                                                                                                                                                                  | <b>Fast-forward button:</b> Press the button to go to the right faster than normal. |

### 4.7 - Screen calibration

This setting applies only to the legacy SmartVu™ touch screen. 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"*



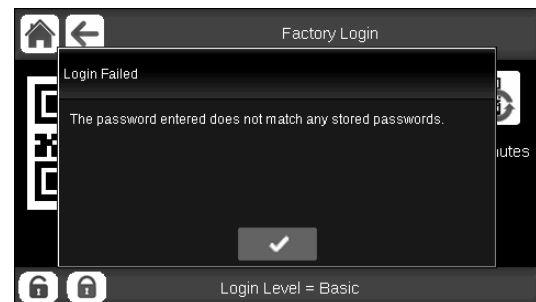
### 4.8 - Warning messages

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"*

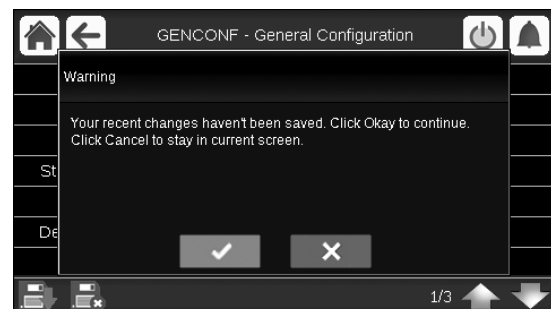


- Press **OK** and type the correct password (see section 5.8).

#### Saving modifications

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

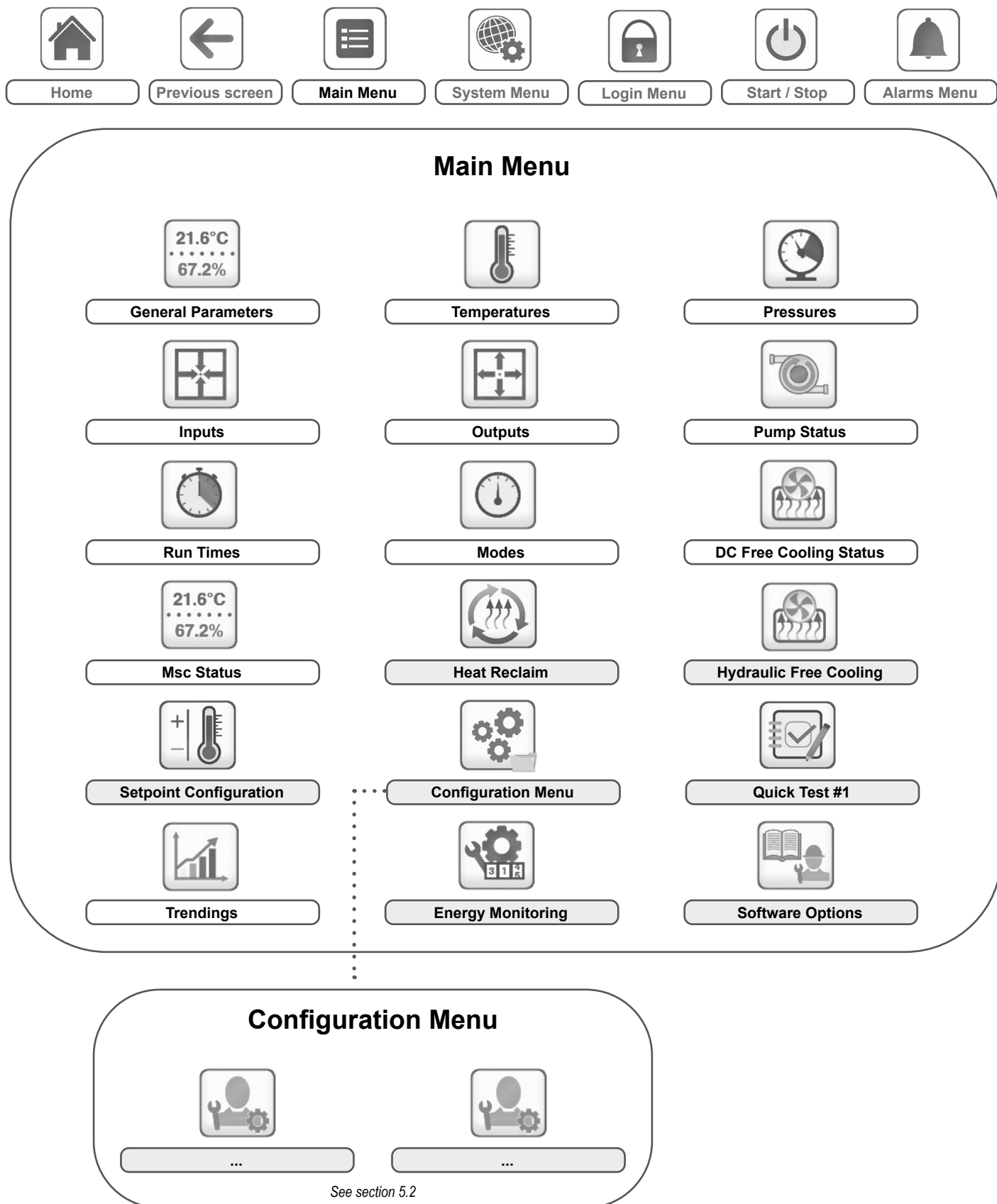
*"Your recent changes haven't been saved (...)"*



- 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 6.32.

**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

| Name      | Status                 | Unit     | Displayed text*          | Description                                                                                                                                                                               |
|-----------|------------------------|----------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTRL_TYP  | 0 to 2                 | -        | Local=0 Net.=1 Remote=2  | Operating mode:<br>0 = Local<br>1 = Network<br>2 = Remote                                                                                                                                 |
| STATUS    | -                      | -        | Run Status               | Unit running status: Off, Stopping, Delay, Running, Ready, Override, Tripout, Test, Runtest                                                                                               |
| 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                                                                                           |
| 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                                                        |
| min_left  | -                      | min      | Minutes Left for Start   | Minutes before the unit start-up                                                                                                                                                          |
| HEATCOOL  |                        | -        | Heat/Cool status         | Heating/cooling status                                                                                                                                                                    |
| HC_SEL    | 0 to 2                 | -        | Heat/Cool Select         | Heating/cooling selection                                                                                                                                                                 |
|           |                        |          | 0=Cool. 1=Heat. 2=Auto   | 0 = Cooling<br>1 = Heating<br>2 = Automatic heating/cooling control                                                                                                                       |
| SP_SEL    | 0 to 2                 | -        | Setpoint Select          | Setpoint selection                                                                                                                                                                        |
|           |                        |          | 0=Auto. 1=Spt1. 2=Spt2   | 0 = Automatic setpoint selection<br>1 = Setpoint 1 (active during occupied period)<br>2 = Setpoint 2 (active during unoccupied period)                                                    |
| SP_OCC    | no/yes                 | -        | Setpoint Occupied?       | Setpoint status:<br>0 (no) = Unoccupied<br>1 (yes) = Occupied                                                                                                                             |
| CAP_T     | 0 to 100               | -        | Unit Total Capacity      | Total unit capacity                                                                                                                                                                       |
| CAPA_T    | 0 to 100               | -        | Cir A Total Capacity     | Total capacity, circuit A                                                                                                                                                                 |
| CAPB_T    | 0 to 100               | -        | Cir B Total Capacity     | Total capacity, circuit B                                                                                                                                                                 |
| SP        | -                      | -        | Current setpoint         | Current setpoint                                                                                                                                                                          |
| CTRL_PNT  | -20 to 67<br>-4 to 153 | °C<br>°F | Control Point            | Control point: Water temperature that the unit must produce                                                                                                                               |
| CTRL_WT   | -20 to 67<br>-4 to 153 | °C<br>°F | Control Water Temp       | Controlled water temperature                                                                                                                                                              |
| OAT       | -20 to 67<br>-4 to 153 | °C<br>°F | Outdoor Air Temp         | Outdoor air temperature                                                                                                                                                                   |
| EMSTOP    | disable/enable         | -        | Emergency Stop           | Emergency stop: Used to stop the unit regardless of its active operating type                                                                                                             |
| DEM_LIM   | 0 to 100               | %        | Active Demand Limit Val  | Active demand limit value: When the unit is Network mode, the minimum value will be used compared to the status of the external limit switch contact and the demand limit switch setpoint |
| LAG_LIM   | 0 to 100               | %        | Lag Capacity Limit Value | Lag capacity limit value: Value that is forced by the master chiller (master/slave assembly)                                                                                              |
| DEMFCCLIM | 0 to 100               | %        | Active FC Dem Lim Val    | Active Free Cooling demand limit value                                                                                                                                                    |
| LAGFCCLIM | 0 to 100               | %        | Lag FC Cap Limit Value   | Lag Free Cooling capacity limit value (FC capacity limit applicable to the lag unit in the master/slave assembly)                                                                         |
| SGR_st    | 1 to 4                 | -        | Smart Grid Ready Status  | Smart Grid Ready status (operating mode):<br>1 = LOCK<br>2 = NORMAL<br>3 = BOOST<br>4 = FORCED                                                                                            |

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



### Temperatures – TEMP

| Name | Status | Unit    | Displayed text*     | Description                                                                                                                                                                            |
|------|--------|---------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EWT  | -      | °C / °F | Entering Fluid Temp | Evaporator entering water temperature: Used for capacity control                                                                                                                       |
| LWT  | -      | °C / °F | Leaving Fluid Temp  | Evaporator leaving water temperature: Used for capacity control                                                                                                                        |
| OAT  | -      | °C / °F | Outdoor Air Temp    | Outdoor air temperature: Used to determine a number of control mechanisms such as heat/cool changeover, water exchanger heater operation, defrost cycle, free cooling option, and more |

## 5 - USER INTERFACE: MENU STRUCTURE



### Temperatures – TEMP (continued)

| Name     | Status | Unit    | Displayed text*          | Description                                                                                                                                                      |
|----------|--------|---------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SCT_A    | -      | °C / °F | Saturated Cond Tmp cir A | Saturated condensing temperature, circuit A                                                                                                                      |
| SST_A    | -      | °C / °F | Saturated Suction Temp A | Saturated suction temperature, circuit A                                                                                                                         |
| SUCT_A   | -      | °C / °F | Compressor Suction Tmp A | Compressor suction temperature, circuit A                                                                                                                        |
| SH_A     | -      | °C / °F | Suction Superheat Tmp A  | Suction superheat temperature, circuit A                                                                                                                         |
| DGT_A    | -      | °C / °F | Discharge Gas Temp A     | Discharge gas temperature, circuit A                                                                                                                             |
| DGTM_A   | -      | °C / °F | Mean Disc. Gas Temp A    | Average discharge gas temperature, circuit A                                                                                                                     |
| DEFRT_A  | -      | °C / °F | Defrost Temperature A    | Defrost temperature, circuit A (heat pumps)                                                                                                                      |
| SCT_B    | -      | °C / °F | Saturated Cond Tmp cir B | Saturated condensing temperature, circuit B                                                                                                                      |
| SST_B    | -      | °C / °F | Saturated Suction Temp B | Saturated suction temperature, circuit B                                                                                                                         |
| SUCT_B   | -      | °C / °F | Compressor Suction Tmp B | Compressor suction temperature, circuit B                                                                                                                        |
| SH_B     | -      | °C / °F | Suction Superheat Tmp B  | Suction superheat temperature, circuit B                                                                                                                         |
| DGT_B    | -      | °C / °F | Discharge Gas Temp B     | Discharge gas temperature, circuit B                                                                                                                             |
| DGTM_B   | -      | °C / °F | Mean Disc. Gas Temp B    | Average discharge gas temperature, circuit B                                                                                                                     |
| DEFRT_B  | -      | °C / °F | Defrost Temperature B    | Defrost temperature, circuit B (heat pumps)                                                                                                                      |
| SPACETMP | -      | °C / °F | Optional Space Temp      | Space (room) temperature: Applies to units with Energy Management Module                                                                                         |
| CHWSTEMP | -      | °C / °F | Cold Water System Temp   | Cold water system temperature                                                                                                                                    |
| HRCtrWat | -      | °C / °F | Reclaim controlled water | Heat Reclaim control water temperature                                                                                                                           |
| HR_LWT   | -      | °C / °F | HR Leaving Fluid temp    | Heat Reclaim leaving fluid temperature                                                                                                                           |
| FC_EV_WT | -      | °C / °F | FC Evap Water Temp       | Free Cooling evaporator water temperature (option 305A / 305B / 305C): The sensor is located at the inlet of the evaporator                                      |
| FC_WGT   | -      | °C / °F | FC Glycol Water Temp     | Free Cooling glycol-water solution temperature (option 305C): This temperature sensor is located at the input of the Glycol-Free BPHE (in the glycol-water loop) |

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



### Pressures – PRESSURE

| Name     | Status | Unit      | Displayed text*          | Description                                           |
|----------|--------|-----------|--------------------------|-------------------------------------------------------|
| DP_A     | -      | kPa / PSI | Discharge Pressure A     | Compressor discharge pressure, circuit A              |
| SP_A     | -      | kPa / PSI | Main Suction Pressure A  | Compressor suction pressure, circuit A                |
| DP_B     | -      | kPa / PSI | Discharge Pressure B     | Compressor discharge pressure, circuit B              |
| SP_B     | -      | kPa / PSI | Main Suction Pressure B  | Compressor suction pressure, circuit B                |
| PUMP_EWP | -      | kPa / PSI | Inlet unit water press.  | Pump entering water pressure                          |
| PUMP_LWP | -      | kPa / PSI | Outlet unit water pres.  | Pump leaving water pressure                           |
| fc_ewp   | -      | kPa / PSI | FC pmp inlet water pres  | Free cooling pump inlet water pressure (option 305C)  |
| fc_lwp   | -      | kPa / PSI | FC pmp outlet water pres | Free cooling pump outlet water pressure (option 305C) |

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



### Inputs – INPUTS

| Name     | Status     | Unit | Displayed text*          | Description                                                                                                                                                          |
|----------|------------|------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ONOFF_SW | open/close | -    | Remote On/Off Switch     | Remote on/off switch                                                                                                                                                 |
| HC_SW    | open/close | -    | Remote HeatCool Switch   | Remote heating/cooling selection switch                                                                                                                              |
| SETP_SW  | open/close | -    | Remote Setpoint Switch   | Remote setpoint selection switch                                                                                                                                     |
| LIM_SW1  | open/close | -    | Limit Switch 1           | Demand limit switch 1                                                                                                                                                |
| LIM_SW2  | open/close | -    | Limit Switch 2           | Demand limit switch 2 (EMM option)                                                                                                                                   |
| LOCK_SW  | 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. |
| FLOW_SW  | open/close | -    | Flow Switch Status       | Flow switch status                                                                                                                                                   |
| DSHTR_SW | open/close | -    | Desuper heater demand    | Desuperheater status                                                                                                                                                 |
| REM_LOCK | open/close | -    | Remote Interlock Status  | Remote interlock status                                                                                                                                              |
| OCC_OVSW | open/close | -    | Occupied Override Switch | Occupied override switch                                                                                                                                             |
| ICE_SW   | open/close | -    | Ice Done Storage Switch  | Ice done storage switch                                                                                                                                              |
| ELEC_BOX | open/close | -    | Electrical Box Failure   | Electrical box failure                                                                                                                                               |
| cp_a1_f  | open/close | -    | Compressor A1 failure    | Compressor A1 failure                                                                                                                                                |
| cp_a2_f  | open/close | -    | Compressor A2 failure    | Compressor A2 failure                                                                                                                                                |
| cp_a3_f  | open/close | -    | Compressor A3 failure    | Compressor A3 failure                                                                                                                                                |

## 5 - USER INTERFACE: MENU STRUCTURE



### Inputs – INPUTS (continued)

| Name     | Status     | Unit | Displayed text*          | Description                                                                                                           |
|----------|------------|------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| cp_a4_f  | open/close | -    | Compressor A4 failure    | Compressor A4 failure                                                                                                 |
| HP_SW_A  | open/close | -    | High Pressure Switch A   | High pressure switch, circuit A                                                                                       |
| cp_b1_f  | open/close | -    | Compressor B1 failure    | Compressor B1 failure                                                                                                 |
| cp_b2_f  | open/close | -    | Compressor B2 failure    | Compressor B2 failure                                                                                                 |
| cp_b3_f  | open/close | -    | Compressor B3 failure    | Compressor B3 failure                                                                                                 |
| cp_b4_f  | open/close | -    | Compressor B4 failure    | Compressor B4 failure                                                                                                 |
| HP_SW_B  | open/close | -    | High Pressure Switch B   | High pressure switch, circuit B                                                                                       |
| leak_v1  | -          | V    | Leakage Detection 1      | Leakage detection 1                                                                                                   |
| leak_v2  | -          | V    | Leakage Detection 2      | Leakage detection 2                                                                                                   |
| SP_RESET | 4 to 20    | mA   | Setpoint Reset Signal    | Setpoint Reset Signal                                                                                                 |
| LIM_4_20 | 4 to 20    | mA   | Capacity Limit Control   | Limit 4-20mA Signal                                                                                                   |
| RECL_SW  | open/close | -    | Remote Reclaim switch    | Heat Reclaim remote switch in Remote mode:<br>open = Heat Reclaim mode disabled<br>closed = Heat Reclaim mode enabled |
| fc_ev_ci | no/yes     | -    | Is FC Evap Valve Closed? | Is Free Cooling evaporator valve closed?                                                                              |
| fc_ev_oi | no/yes     | -    | Is FC Evap Valve Opened? | Is Free Cooling evaporator valve open?                                                                                |
| fc_cv_ci | no/yes     | -    | Is FC Coil Valve Closed? | Is Free Cooling coil valve closed?                                                                                    |
| fc_cv_oi | no/yes     | -    | Is FC Coil Valve Opened? | Is Free Cooling coil valve open?                                                                                      |
| PH_CTRL  | open/close | -    | Phase Controller         | Phase controller input (option 159B)<br>Note: This option is compatible only with units fitted with CIOB board.       |
| PMP_QM   | open/close | -    | Pump Quicktest QM        | Pump quick test                                                                                                       |
| SGR0_BST | open/close | -    | SG Ready #0 (Boost)      | Smart Grid Ready control input (Boost)                                                                                |
| SGR1_LCK | open/close | -    | SG Ready #1 (Lock)       | Smart Grid Ready control input (Lock)                                                                                 |

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



### Outputs – OUTPUTS

| Name     | Status   | Unit | Displayed text*          | Description                                                                                       |
|----------|----------|------|--------------------------|---------------------------------------------------------------------------------------------------|
| CP_A1    | off/on   | -    | Compressor A1            | Compressor A1 command                                                                             |
| CP_A2    | off/on   | -    | Compressor A2            | Compressor A2 command                                                                             |
| CP_A3    | off/on   | -    | Compressor A3            | Compressor A3 command                                                                             |
| CP_A4    | off/on   | -    | Compressor A4            | Compressor A4 command                                                                             |
| FAN_A1   | off/on   | -    | Fan A1                   | Fan A1 status                                                                                     |
| FAN_A2   | off/on   | -    | Fan A2                   | Fan A2 status                                                                                     |
| FAN_A3   | off/on   | -    | Fan A3                   | Fan A3 status                                                                                     |
| FAN_A4   | off/on   | -    | Fan A4                   | Fan A4 status                                                                                     |
| FAN_A5   | off/on   | -    | Fan A5                   | Fan A5 status                                                                                     |
| FAN_A6   | off/on   | -    | Fan A6                   | Fan A6 status                                                                                     |
| FAN_ST_A | 0 to 10  | -    | Fan Staging Number Cir A | Current fan stage of circuit A                                                                    |
| VFAN_A   | -        | %    | Variable fan A command   | Variable fan A command                                                                            |
| EXV_A    | 0 to 100 | %    | EXV position Circuit A   | EXV position, circuit A                                                                           |
| RV_A     | off/on   | -    | 4-way Refrig. Valve A    | 4-way refrigerant valve, circuit A: Used to manage cooling/heating/defrost operation (heat pumps) |
| HD_HTR_A | off/on   | -    | Compressor Head Heater A | Compressor head heater, circuit A: Applies only to 30RQP units                                    |
| CO_HTR_A | off/on   | -    | Coil Heater A            | Coil Heater A, circuit A                                                                          |
| HGBP_V_A | off/on   | -    | Hot Gas Bypass Valve A   | <i>Note: This is not applicable to units located in EMEA</i>                                      |
| CP_B1    | off/on   | -    | Compressor B1            | Compressor B1 command                                                                             |
| CP_B2    | off/on   | -    | Compressor B2            | Compressor B2 command                                                                             |
| CP_B3    | off/on   | -    | Compressor B3            | Compressor B3 command                                                                             |
| CP_B4    | off/on   | -    | Compressor B4            | Compressor B4 command                                                                             |
| FAN_B1   | off/on   | -    | Fan B1                   | Fan B1 status                                                                                     |
| FAN_B2   | off/on   | -    | Fan B2                   | Fan B2 status                                                                                     |
| FAN_B3   | off/on   | -    | Fan B3                   | Fan B3 status                                                                                     |
| FAN_B4   | off/on   | -    | Fan B4                   | Fan B4 status                                                                                     |
| FAN_B5   | off/on   | -    | Fan B5                   | Fan B5 status                                                                                     |
| FAN_B6   | off/on   | -    | Fan B6                   | Fan B6 status                                                                                     |
| FAN_ST_B | 0 to 10  | -    | Fan Staging Number Cir B | Current fan stage of circuit B                                                                    |
| VFAN_B   | -        | %    | Variable fan B command   | Variable fan B command                                                                            |

## 5 - USER INTERFACE: MENU STRUCTURE



### Outputs – OUTPUTS (continued)

| Name     | Status   | Unit | Displayed text*          | Description                                                                                       |
|----------|----------|------|--------------------------|---------------------------------------------------------------------------------------------------|
| EXV_B    | 0 to 100 | %    | EXV position Circuit B   | EXV position, circuit B                                                                           |
| RV_B     | off/on   | -    | 4-way Refrig. Valve B    | 4-way refrigerant valve, circuit B: Used to manage cooling/heating/defrost operation (heat pumps) |
| HD_HTR_B | off/on   | -    | Compressor Head Heater B | Compressor head heater, circuit B                                                                 |
| CO_HTR_B | off/on   | -    | Coil Heater B            | Coil Heater, circuit B                                                                            |
| RUNNING  | off/on   | -    | Running Relay Status     | Running relay status                                                                              |
| ALARM    | off/on   | -    | Alarm Relay Status       | Alarm relay status                                                                                |
| ALERT    | off/on   | -    | Alert Relay State        | Alert relay state                                                                                 |
| SHUTDOWN | off/on   | -    | Shutdown Indicator State | Shutdown indicator state                                                                          |
| EXCH_HTR | off/on   | -    | Exchanger heater         | Evaporator heater                                                                                 |
| SET_FLOW | off/on   | -    | Flow Switch Setpoint cfg | Flow switch setpoint configuration                                                                |
| CAPT_010 | -        | V    | Chiller Capacity Running | Chiller capacity running                                                                          |
| BOILER   | off/on   | -    | Boiler Output            | Boiler output                                                                                     |
| EHS1     | off/on   | -    | Electrical Heat Stage 1  | Electrical heat stage 1                                                                           |
| EHS2     | off/on   | -    | Electrical Heat Stage 2  | Electrical heat stage 2                                                                           |
| EHS3     | off/on   | -    | Electrical Heat Stage 3  | Electrical heat stage 3                                                                           |
| EHS4     | off/on   | -    | Electrical Heat Stage 4  | Electrical heat stage 4                                                                           |
| DSH_PUMP | off/on   | -    | Desuperheater Pump       | Desuperheater pump                                                                                |
| fc_ev_cc | off/on   | -    | FC Evap Valve Close Cmd  | Free Cooling evaporator valve, closing command (option 305A/305B)                                 |
| fc_ev_oc | off/on   | -    | FC Evap Valve Open Cmd   | Free Cooling evaporator valve, opening command (option 305A/305B)                                 |
| fc_cv_cc | off/on   | -    | FC Coil Valve Close Cmd  | Free Cooling coil valve, closing command (option 305A/305B)                                       |
| fc_cv_oc | off/on   | -    | FC Coil Valve Open Cmd   | Free Cooling coil valve, opening command (option 305A/305B)                                       |
| fc_pump  | off/on   | -    | FC Coil Pump Cmd         | Free Cooling pump command (option 305C)                                                           |
| fc_htr   | off/on   | -    | FC Heater Cmd            | Free Cooling heater command (option 305C)                                                         |

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



### Pump Status – PUMPSTAT

| Name     | Status   | Unit      | Displayed text*          | Description                                                                                     |
|----------|----------|-----------|--------------------------|-------------------------------------------------------------------------------------------------|
| ROTWPUMP | no/yes   | -         | Rotate Water Pumps Now?  | Water pumps rotation                                                                            |
| PUMP_1   | off/on   | -         | Water Pump #1 Command    | Water pump 1 control                                                                            |
| PUMP_2   | off/on   | -         | Water Pump #2 Command    | Water pump 2 control                                                                            |
| wp_out   | -        | kPa / PSI | Outlet Water Pres.(cor)  | Outlet water pressure (corrected by temperature): Applies to units with the hydronic kit option |
| wp_in    | -        | kPa / PSI | Inlet Water Pres.(cor)   | Inlet water pressure (corrected by temperature): Applies to units with the hydronic kit option  |
| WP_CAL   | no/yes   | -         | Water Pres. Calibration? | Water pressure calibration                                                                      |
| wp_off   | -        | kPa / PSI | Water Pressure Offset    | Water pressure offset                                                                           |
| wp_filt  | -        | kPa / PSI | Delta Pressure Filter    | Delta pressure filter                                                                           |
| wp_min   | -        | kPa / PSI | Minimum Water Pressure   | Minimum water pressure                                                                          |
| flow     | -        | l/s / GPM | Water Flow               | Water flow rate                                                                                 |
| dt_stp   | -        | °C / °F   | Water Delta T Setpoint   | Water delta temperature setpoint                                                                |
| delta_t  | -        | °C / °F   | Current Water Delta T    | Current water delta temperature                                                                 |
| dp_stp   | -        | kPa / PSI | Water Delta P Setpoint   | Water delta pressure setpoint                                                                   |
| delta_p  | -        | kPa / PSI | Current Water Delta P    | Current water delta pressure                                                                    |
| MxDeltaP | -        | kPa / PSI | Cur. Max Water Delta P   | Maximum current water delta pressure                                                            |
| VPMP_CMD | 0 to 100 | %         | Variable speed pump cmd  | Variable speed pump command                                                                     |

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



### Run Times – RUNTIME

| Name     | Status | Unit | Displayed text*         | Description                    |
|----------|--------|------|-------------------------|--------------------------------|
| hr_mach  | -      | hour | Machine Operating Hours | Unit operating hours           |
| st_mach  | -      | -    | Machine Starts Number   | Number of unit starts          |
| hr_cp_a1 | -      | hour | Compressor A1 Hours     | Operating hours, compressor A1 |
| hr_cp_a2 | -      | hour | Compressor A2 Hours     | Operating hours, compressor A2 |
| hr_cp_a3 | -      | hour | Compressor A3 Hours     | Operating hours, compressor A3 |
| hr_cp_a4 | -      | hour | Compressor A4 Hours     | Operating hours, compressor A4 |

## 5 - USER INTERFACE: MENU STRUCTURE



### Run Times – RUNTIME (continued)

| Name     | Status | Unit | Displayed text*          | Description                                           |
|----------|--------|------|--------------------------|-------------------------------------------------------|
| hr_cp_b1 | -      | hour | Compressor B1 Hours      | Operating hours, compressor B1                        |
| hr_cp_b2 | -      | hour | Compressor B2 Hours      | Operating hours, compressor B2                        |
| hr_cp_b3 | -      | hour | Compressor B3 Hours      | Operating hours, compressor B3                        |
| hr_cp_b4 | -      | hour | Compressor B4 Hours      | Operating hours, compressor B4                        |
| st_cp_a1 | -      | -    | Compressor A1 Starts     | Number of starts, compressor A1                       |
| st_cp_a2 | -      | -    | Compressor A2 Starts     | Number of starts, compressor A2                       |
| st_cp_a3 | -      | -    | Compressor A3 Starts     | Number of starts, compressor A3                       |
| st_cp_a4 | -      | -    | Compressor A4 Starts     | Number of starts, compressor A4                       |
| st_cp_b1 | -      | -    | Compressor B1 Starts     | Number of starts, compressor B1                       |
| st_cp_b2 | -      | -    | Compressor B2 Starts     | Number of starts, compressor B2                       |
| st_cp_b3 | -      | -    | Compressor B3 Starts     | Number of starts, compressor B3                       |
| st_cp_b4 | -      | -    | Compressor B4 Starts     | Number of starts, compressor B4                       |
| hr_fana1 | -      | hour | Fan A1 Hours             | Operating hours, fan A1                               |
| hr_fana2 | -      | hour | Fan A2 Hours             | Operating hours, fan A2                               |
| hr_fana3 | -      | hour | Fan A3 Hours             | Operating hours, fan A3                               |
| hr_fana4 | -      | hour | Fan A4 Hours             | Operating hours, fan A4                               |
| hr_fana5 | -      | hour | Fan A5 Hours             | Operating hours, fan A5                               |
| hr_fana6 | -      | hour | Fan A6 Hours             | Operating hours, fan A6                               |
| hr_fana7 | -      | hour | Fan A7 Hours             | Operating hours, fan A7                               |
| hr_fana8 | -      | hour | Fan A8 Hours             | Operating hours, fan A8                               |
| hr_fanb1 | -      | hour | Fan B1 Hours             | Operating hours, fan B1                               |
| hr_fanb2 | -      | hour | Fan B2 Hours             | Operating hours, fan B2                               |
| hr_fanb3 | -      | hour | Fan B3 Hours             | Operating hours, fan B3                               |
| hr_fanb4 | -      | hour | Fan B4 Hours             | Operating hours, fan B4                               |
| hr_fanb5 | -      | hour | Fan B5 Hours             | Operating hours, fan B5                               |
| hr_fanb6 | -      | hour | Fan B6 Hours             | Operating hours, fan B6                               |
| hr_fanb7 | -      | hour | Fan B7 Hours             | Operating hours, fan B7                               |
| hr_fanb8 | -      | hour | Fan B8 Hours             | Operating hours, fan B8                               |
| hr_pump1 | -      | hour | Water Pump #1 Hours      | Operating hours, water pump 1                         |
| hr_pump2 | -      | hour | Water Pump #2 Hours      | Operating hours, water pump 2                         |
| nb_defra | -      | -    | Circuit A Defrost Number | Number of defrost sessions that occurred on circuit A |
| nb_defrb | -      | -    | Circuit B Defrost Number | Number of defrost sessions that occurred on circuit B |
| hr_fcPmp | -      | hour | Free Cooling Pump Hours  | Operating hours, free cooling pump                    |

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



### Modes – MODES

| Name     | Status | Unit | Displayed text*          | Description                                                         |
|----------|--------|------|--------------------------|---------------------------------------------------------------------|
| m_delay  | no/yes | -    | Start Up Delay In Effect | Start-up delay in effect                                            |
| m_2stpt  | no/yes | -    | Second Setpoint In Use   | Second setpoint in use: The setpoint used during unoccupied periods |
| m_reset  | no/yes | -    | Reset In Effect          | Setpoint reset active                                               |
| m_demlim | no/yes | -    | Demand limit active      | Demand limit active                                                 |
| m_rpload | no/yes | -    | Ramp Loading Active      | Ramp loading active                                                 |
| m_whtr   | no/yes | -    | Water Exchanger Heater   | Water exchanger heater active                                       |
| m_pmprot | no/yes | -    | Water Pump Rotation      | Water pump rotation                                                 |
| m_pmpper | no/yes | -    | Pump Periodic Start      | Pump periodic start                                                 |
| m_lowscA | no/yes | -    | Low Suction Circuit A    | Low suction, circuit A                                              |
| m_lowscB | no/yes | -    | Low Suction Circuit B    | Low suction, circuit B                                              |
| m_hidgta | no/yes | -    | High DGT Circuit A       | High DGT, circuit A                                                 |
| m_hidgtb | no/yes | -    | High DGT Circuit B       | High DGT, circuit B                                                 |
| m_hiprsa | no/yes | -    | High Press Override CirA | High pressure override, circuit A                                   |
| m_hiprsb | no/yes | -    | High Press Override CirB | High pressure override, circuit B                                   |
| m_dltp_a | no/yes | -    | Low Delta Press Cir A    | Low delta pressure, circuit A                                       |
| m_dltp_b | no/yes | -    | Low Delta Press Cir B    | Low delta pressure, circuit B                                       |
| m_night  | no/yes | -    | Night Low Noise Active   | Night low noise active                                              |
| m_hsm    | no/yes | -    | System Manager Active    | System Manager active                                               |
| m_slave  | no/yes | -    | Master Slave Active      | Master/slave mode active                                            |

## 5 - USER INTERFACE: MENU STRUCTURE



### Modes – MODES (continued)

| Name     | Status | Unit | Displayed text*          | Description                                                |
|----------|--------|------|--------------------------|------------------------------------------------------------|
| m_autoch | no/yes | -    | Auto Changeover Active   | Automatic changeover active                                |
| m_defr_a | no/yes | -    | Defrost Active Circuit A | Defrost mode active, circuit A (heat pumps)                |
| m_defr_b | no/yes | -    | Defrost Active Circuit B | Defrost mode active, circuit B (heat pumps)                |
| m_boiler | no/yes | -    | Boiler Active            | Boiler active                                              |
| m_ehs    | no/yes | -    | Electric Heater Active   | Electric heater active                                     |
| m_ewtck  | no/yes | -    | Heating Low EWT Lockout  | Heating low EWT lockout                                    |
| m_ice    | no/yes | -    | Ice Mode In Effect       | Ice mode active                                            |
| m_fastRe | no/yes | -    | Fast Capacity Recovery   | Fast capacity recovery mode in progress (see section 6.27) |

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



### DC Free Cooling Status – DCFC\_STA

| Name     | Status      | Unit    | Displayed text*          | Description                                           |
|----------|-------------|---------|--------------------------|-------------------------------------------------------|
| oat      | -           | °C / °F | OAT Free Cooling         | Dry Cooler Free Cooling: OAT                          |
| lwt      | -           | °C / °F | FC Leaving Water Temp    | Dry Cooler Free Cooling: Leaving water temperature    |
| wloop    | -           | °C / °F | FC Water Loop Temp       | Dry Cooler Free Cooling: Water loop temperature       |
| m_dcfc   | no/yes      | -       | Free Cooling Mode Active | Dry Cooler Free Cooling mode active                   |
| dcfc_cap | 0 to 100    | %       | FC Capacity              | Dry Cooler Free Cooling capacity                      |
| f_stage  | 0 to 10     | -       | Fix Speed Fans Stage     | Dry Cooler Free Cooling: Fan stage (fixed speed fans) |
| vf_speed | 0 to 100    | %       | Varifan Speed            | Dry Cooler Free Cooling: Fan speed (variable speed)   |
| pid_out  | 0 to 100    | %       | PID Output               | Status of PID output                                  |
| FC_HOUR  | 0 to 999999 | hour    | DCFC Operating Hours     | Dry Cooler Free Cooling: Operating hours              |
| FC_FAN1S | 0 to 999999 | -       | DCFC Fan Stage 1 Start   | DCFC / Fan stage 1: Number of starts                  |
| FC_FAN1H | 0 to 999999 | hour    | DCFC Fan Stage 1 Hours   | DCFC / Fan stage 1: Operating hours                   |
| FC_FAN2S | 0 to 999999 | -       | DCFC Fan Stage 2 Start   | DCFC / Fan stage 2: Number of starts                  |
| FC_FAN2H | 0 to 999999 | hour    | DCFC Fan Stage 2 Hours   | DCFC / Fan stage 2: Operating hours                   |
| FC_FAN3S | 0 to 999999 | -       | DCFC Fan Stage 3 Start   | DCFC / Fan stage 3: Number of starts                  |
| FC_FAN3H | 0 to 999999 | hour    | DCFC Fan Stage 3 Hours   | DCFC / Fan stage 3: Operating hours                   |
| FC_FAN4S | 0 to 999999 | -       | DCFC Fan Stage 4 Start   | DCFC / Fan stage 4: Number of starts                  |
| FC_FAN4H | 0 to 999999 | hour    | DCFC Fan Stage 4 Hours   | DCFC / Fan stage 4: Operating hours                   |
| FC_FAN5S | 0 to 999999 | -       | DCFC Fan Stage 5 Start   | DCFC / Fan stage 5: Number of starts                  |
| FC_FAN5H | 0 to 999999 | hour    | DCFC Fan Stage 5 Hours   | DCFC / Fan stage 5: Operating hours                   |
| FC_FAN6S | 0 to 999999 | -       | DCFC Fan Stage 6 Start   | DCFC / Fan stage 6: Number of starts                  |
| FC_FAN6H | 0 to 999999 | hour    | DCFC Fan Stage 6 Hours   | DCFC / Fan stage 6: Operating hours                   |
| FC_FAN7S | 0 to 999999 | -       | DCFC Fan Stage 7 Start   | DCFC / Fan stage 7: Number of starts                  |
| FC_FAN7H | 0 to 999999 | hour    | DCFC Fan Stage 7 Hours   | DCFC / Fan stage 7: Operating hours                   |
| FC_VFANS | 0 to 999999 | -       | DCFC Variable Fan Start  | DCFC / Variable speed fan: Number of starts           |
| FC_VFANH | 0 to 999999 | hour    | DCFC Variable Fan Hours  | DCFC / Variable speed fan: Operating hours            |

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



### Msc Status – MSC\_STAT

| Name     | Status | Unit | Displayed text*      | Description                                                                                                  |
|----------|--------|------|----------------------|--------------------------------------------------------------------------------------------------------------|
| m_ecopmp | no/yes | -    | Eco Pump Mode Active | Eco pump mode status: When this mode is active, the pump is stopped periodically when the unit is in Standby |

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

## 5 - USER INTERFACE: MENU STRUCTURE



### Heat Reclaim – RECLAIM

| Name     | Status     | Default | Unit    | Displayed text*          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------|------------|---------|---------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RECL_SEL | no/yes     | no      | -       | Reclaim Selection        | Enable/Disable Heat Reclaim                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| HR_stat  | 0 to 10    | 0       | -       | Reclaim Status           | Heat Reclaim status:<br>0 = Heat Reclaim mode is "off"<br>1 = Heat Reclaim mode is "on"<br>2 = Compressor must be running for 2 minutes before the Heat Reclaim mode is started<br>3 = Heat Reclaim mode is ending<br>4 = Minimum flow rate is set on<br>5 = Condenser freeze protection (alarm 10128)<br>6 = 3-way valve controlled based on PID in order to prevent boiling water conditions<br>7 = 3-way valve is in Standby mode<br>10 = 3-way valve position is forced |
| HRCtrPnt | -          | -       | °C / °F | Reclaim control point    | Heat Reclaim control point                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| HRCtrWat | -          | -       | °C / °F | Reclaim controlled water | Heat Reclaim control water temperature                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| HR_LWT   | -          | -       | °C / °F | HR Leaving Fluid temp    | Heat Reclaim leaving water temperature                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| HR_FLOW  | close/open | close   | -       | Heat Reclaim Flow switch | Heat Reclaim flow switch is used to check if the water is running inside the HR condenser                                                                                                                                                                                                                                                                                                                                                                                   |
| cmd_3WV  | 0 to 100   | 0       | %       | 3WayValve / VarPump cmd  | Heat Reclaim 3-way valve / pump command (100% = fully open)<br>open = there is water flow in the condenser and in the customer loop<br>closed = water flow depends on "Min flow 3wv position" defined in the HR_CFG table                                                                                                                                                                                                                                                   |
| out_3WV  | 0 to 10    | 0       | V       | 3WayValve / VarPump outp | Heat Reclaim 3-way valve / pump output (0-10V):<br>0V = valve is closed (standard setting)<br>Note: It is also possible to set the reversed valve signal (see also "HR reverse 3WV cmd ?" in the HR_CFG table).                                                                                                                                                                                                                                                             |
| mode_3WV | 0 to 1     | 0       | -       | 3WayValve / VarPump mode | Heat Reclaim 3-way valve / pump mode                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|          |            |         |         | 0: Low HR LWT control    | 0 = valve/pump control in low HR_LWT mode (HR_LWT < 35°C)                                                                                                                                                                                                                                                                                                                                                                                                                   |
|          |            |         |         | 1: HR water temp control | 1 = valve/pump control in normal HR_LWT mode                                                                                                                                                                                                                                                                                                                                                                                                                                |
| actiMode | 0 to 1     | 1       | -       | HR active mode (3WV/Fan) | Heat Reclaim (3-way valve / fans)                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|          |            |         |         | 0 : 3-way valve mode     | 0 = 3-way valve is controlling the HR water temperature (fans are running to improve unit efficiency)                                                                                                                                                                                                                                                                                                                                                                       |
|          |            |         |         | 1 : Fan mode             | 1 = 3-way valve is fully opened (fans are controlling the HR water temperature)                                                                                                                                                                                                                                                                                                                                                                                             |
| HR_pump  | off/on     | off     | -       | Reclaim pump command     | Heat Reclaim pump command (the on/off pump on the customer side when a 3-way valve is mounted)                                                                                                                                                                                                                                                                                                                                                                              |
| HRheater | off/on     | off     | -       | Reclaim BPHE Heater      | BPHE heater (optional): Please note that the heater is available only for HR units running on water.<br>The controller monitors the water temperature to activate the optional heater when necessary.                                                                                                                                                                                                                                                                       |

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



### Hydraulic Free Cooling – HYD\_FC

| Name     | Status                             | Default | Unit | Displayed text*       | Description                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------|------------------------------------|---------|------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FC_DSBLE | no/yes                             | no      | -    | Free Cooling Disable? | Enable/disable Free Cooling (FC):<br>yes = Free Cooling disabled<br>no = Free Cooling enabled                                                                                                                                                                                                                                                                                                                                      |
| fcCapT   | -                                  | -       | %    | Total FC Capacity     | Total Free Cooling capacity (circuit A + circuit B)                                                                                                                                                                                                                                                                                                                                                                                |
| wLoopPst | Mecha Cooling / Mixed/Free Cooling | -       | -    | Water Loop Position   | Water loop position:<br>"Mecha Cooling" = when the loop is in normal position (mechanical cooling)<br>"Mixed/Free Cooling" = when the loop is in Mixed/Free Cooling position (the water is passing through FC coils)                                                                                                                                                                                                               |
| fc_ovr   | 0 to 10                            | -       | -    | FC Override           | Free Cooling overrides:<br>0 = FC not configured<br>1 = FC disabled (unit is OFF)<br>2 = FC disabled (too high OAT)<br>3 = FC disabled (FC point forced)<br>5 = FC disabled (switching between mechanical cooling and free cooling)<br>6 = FC disabled (unit in alarm)<br>7 = FC disabled (LAGFCLIM in GENUNIT is set to 0%)<br>8 = FC activated<br>9 = FC disabled (BPHE freeze protection mode)<br>10 = FC disabled (pump alarm) |
| fcCapA   | -                                  | -       | %    | FC Capacity A         | Free Cooling capacity, circuit A                                                                                                                                                                                                                                                                                                                                                                                                   |

## 5 - USER INTERFACE: MENU STRUCTURE



### Hydraulic Free Cooling – HYD\_FC (continued)

| Name     | Status     | Default | Unit    | Displayed text*          | Description                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------|------------|---------|---------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| modeCirA | 0 to 3     | 0       | -       | Mode of Circuit A        | Free Cooling mode, circuit A:<br>0 = Mechanical Cooling (MC) only<br>1 = Mixed Cooling (MC and FC at the same time)<br>2 = Controlled Free Cooling capacity (fan speed control based on water temperature)<br>3 = Full power Free cooling state (fan at maximum speed)                                                                                                                                                           |
| mcCurPwA | -          | -       | kW      | MC Current Power A       | Mechanical cooling current power, circuit A                                                                                                                                                                                                                                                                                                                                                                                      |
| fcCurPwA | -          | -       | kW      | FC Current Power A       | Free Cooling current power, circuit A                                                                                                                                                                                                                                                                                                                                                                                            |
| fcMaxPwA | -          | -       | kW      | FC Max Power A           | Free Cooling maximum power, circuit A                                                                                                                                                                                                                                                                                                                                                                                            |
| fcCapB   | -          | -       | %       | FC Capacity B            | Free Cooling capacity, circuit B                                                                                                                                                                                                                                                                                                                                                                                                 |
| modeCirB | 0 to 3     | 0       | -       | Mode of circuit B        | Free Cooling mode, circuit B:<br>0 = Mechanical Cooling (MC) only<br>1 = Mixed Cooling (MC and FC at the same time)<br>2 = Controlled Free Cooling capacity (fan speed control based on water temperature)<br>3 = Full power Free cooling state (fan at maximum speed)                                                                                                                                                           |
| mcCurPwB | -          | -       | kW      | MC Current Power B       | Mechanical cooling current power, circuit B                                                                                                                                                                                                                                                                                                                                                                                      |
| fcCurPwB | -          | -       | kW      | FC Current Power B       | Free Cooling current power, circuit B                                                                                                                                                                                                                                                                                                                                                                                            |
| fcMaxPwB | -          | -       | kW      | FC Max Power B           | Free Cooling maximum power, circuit B                                                                                                                                                                                                                                                                                                                                                                                            |
| fc_ev_rq | close/open | open    | -       | FC Evap Valve Request    | Free Cooling evaporator valve requested position (option 305A/305B)                                                                                                                                                                                                                                                                                                                                                              |
| fc_cv_rq | close/open | close   | -       | FC Coil Valve Request    | Free Cooling coil valve requested position (option 305A/305B)                                                                                                                                                                                                                                                                                                                                                                    |
| fc_ev_st | 0 to 8     | -       | -       | FC Evap Valve Status     | Free Cooling evaporator valve status (option 305A/B):<br>0 = closing<br>1 = closed<br>2 = opening<br>3 = opened<br>4 = unknown position<br>5 = testing<br>7 = inputs reading failure (alarm 10222 is triggered)<br>8 = valve blocked (alarm 10222 is triggered)                                                                                                                                                                  |
| fc_cv_st | 0 to 8     | -       | -       | FC Coil Valve Status     | Free Cooling coil valve status (option 305A/B):<br>0 = closing<br>1 = closed<br>2 = opening<br>3 = opened<br>4 = unknown position<br>5 = testing<br>7 = inputs reading failure (alarm 10220 is triggered)<br>8 = valve blocked (alarm 10220 is triggered)                                                                                                                                                                        |
|          |            |         |         | Glycol Free Option       | Free Cooling for glycol-free applications (option 305C)                                                                                                                                                                                                                                                                                                                                                                          |
| fc_pump  | off/on     | off     | -       | FC Coil Pump Cmd         | Free Cooling coil pump command:<br>on = FC mode active, anti-sticking mode<br>off = FC mode inactive                                                                                                                                                                                                                                                                                                                             |
| fcPumpOv | 0 to 6     | -       | -       | FC Coil Pump Override    | FC coil pump override:<br>0 = pump off (no free cooling demand)<br>1 = unit pump off (waiting for the chiller pump to start first)<br>2 = in operation (pump is "on" in Free Cooling)<br>3 = fan off (pump is "off" in Free Cooling and all fans are "off")<br>4 = in quick test (pump is "on" in Quick Test mode)<br>5 = failure (pump is "off" / hydronic kit alarm)<br>6 = anti sticking (pump is "on" in Anti-Sticking mode) |
| PMP_CAL  | no/yes     | no      | -       | Pump Pres. Calibration?  | Pump pressure calibration?                                                                                                                                                                                                                                                                                                                                                                                                       |
| fc_wpOut | -          | -       | kPa/PSI | FC Outlet Water Pres Cor | FC outlet water pressure (pressure correction)                                                                                                                                                                                                                                                                                                                                                                                   |
| fc_wpln  | -          | -       | kPa/PSI | FC Inlet Water Pres Cor  | FC inlet water pressure (pressure correction)                                                                                                                                                                                                                                                                                                                                                                                    |
| fc_wpOff | -          | -       | kPa/PSI | FC Water Pump Offset     | FC water pump pressure offset                                                                                                                                                                                                                                                                                                                                                                                                    |
| fc_htr   | off/on     | off     | -       | FC Heater Cmd            | FC heater requested state (freeze protection mode)                                                                                                                                                                                                                                                                                                                                                                               |

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



### Setpoint Configuration – SETPOINT

| Name   | Status**                       | Default     | Unit     | Displayed text*      | Description          |
|--------|--------------------------------|-------------|----------|----------------------|----------------------|
| csp1   | -28.9 to 26<br>-20.0 to 78.8   | 6.7<br>44.0 | °C<br>°F | Cooling Setpoint 1   | Cooling setpoint 1   |
| csp2   | -28.9 to 26.0<br>-20.0 to 78.8 | 6.7<br>44.0 | °C<br>°F | Cooling Setpoint 2   | Cooling setpoint 2   |
| ice_sp | -28.9 to 26.0<br>-20.0 to 78.8 | 6.7<br>44.0 | °C<br>°F | Cooling Ice Setpoint | Ice storage setpoint |

## 5 - USER INTERFACE: MENU STRUCTURE



### Setpoint Configuration – SETPOINT (continued)

| Name     | Status**                      | Default       | Unit     | Displayed text*         | Description                               |
|----------|-------------------------------|---------------|----------|-------------------------|-------------------------------------------|
| cramp_sp | 0.1 to 1.1<br>0.2 to 2.0      | 0.6<br>1.0    | ^C<br>^F | Cooling Ramp Loading    | Cooling ramp loading setpoint             |
| hsp1     | 20.0 to 63.0<br>68.0 to 145.4 | 37.8<br>100.0 | °C<br>°F | Heating Setpoint 1      | Heating setpoint 1                        |
| hsp2     | 20.0 to 63.0<br>68.0 to 145.4 | 37.8<br>100.0 | °C<br>°F | Heating Setpoint 2      | Heating setpoint 2                        |
| hramp_sp | 0.1 to 1.1<br>0.2 to 2.0      | 0.6<br>1.0    | ^C<br>^F | Heating Ramp Loading    | Heating ramp loading setpoint             |
| cauto_sp | 3.9 to 50<br>39.0 to 122.0    | 23.9<br>75.0  | °C<br>°F | Cool Changeover Setpt   | Cooling changeover setpoint               |
| hauto_sp | 0 to 46.1<br>32.0 to 115.0    | 17.8<br>64.0  | °C<br>°F | Heat Changeover Setpt   | Heating changeover setpoint               |
| lim_sp1  | 0 to 100                      | 100           | %        | Switch Limit Setpoint 1 | Switch limit setpoint 1                   |
| lim_sp2  | 0 to 100                      | 100           | %        | Switch Limit Setpoint 2 | Switch limit setpoint 2                   |
| lim_sp3  | 0 to 100                      | 100           | %        | Switch Limit Setpoint 3 | Switch limit setpoint 3                   |
| hr_stp   | 25.0 to 65.0<br>77.0 to 149.0 | 50.0<br>122.0 | °C<br>°F | Heat Reclaim Setpoint   | Heat reclaim setpoint                     |
| hr_deadb | 0.5 to 5.0<br>0.9 to 9.0      | 2.0<br>3.6    | ^C<br>^F | Heat Reclaim Deadband   | Heat reclaim deadband                     |
| min_sct  | 23.9 to 50.0<br>75 to 122.0   | 40.0<br>104.0 | °C<br>°F | Desuperheat Min SCT     | Minimum SCT when desuperheater is enabled |

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

\*\*The range may vary depending on the unit configuration, e.g. fluid type.



### Quick Test #1 – QCK\_TST1

| Name     | Status   | Unit | Displayed text*          | Description                                                                                                                                                                                                                       |
|----------|----------|------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          |          |      | Unit must be in Loff     | To enable the Quick Test functionality, the unit must be stopped (Local off mode).                                                                                                                                                |
| QCK_TEST | no/yes   | -    | Quick Test Enable        | This parameter is used to enable the Quick Test functionality (Quick test Enable = yes)<br>With Quick Test enabled: Forcing a specific parameter given in this table allows the user to verify if the component behaves correctly |
| Q_PUMP_1 | 0 to 2   | -    | Pump #1 Output           | Pump 1 test:<br>0 = No test<br>1 = [ON] Pump shall run for 20 seconds<br>2 = [FORCED] Pump shall run all the time (set the value to "0" to stop the pump test)                                                                    |
| Q_PUMP_2 | 0 to 2   | -    | Pump #2 Output           | Pump 2 test:<br>0 = No test<br>1 = [ON] Pump shall run for 20 seconds<br>2 = [FORCED] Pump shall run all the time (set the value to "0" to stop the pump test)                                                                    |
| Q_VPUMP1 | 0 to 100 | %    | Variable Pump Speed #1   | Variable speed pump 1 test                                                                                                                                                                                                        |
| Q_VPUMP2 | 0 to 100 | %    | Variable Pump Speed #2   | Variable speed pump 2 test                                                                                                                                                                                                        |
| Q_HEATER | off/on   | -    | Exchanger Heater Output  | Water exchanger heater test                                                                                                                                                                                                       |
| Q_ALARM  | off/on   | -    | Alarm Relay Status       | Alarm relay test                                                                                                                                                                                                                  |
| Q_RUN    | off/on   | -    | Running Relay Status     | Running relay test                                                                                                                                                                                                                |
| Q_SETFLO | off/on   | -    | Set Flow Switch          | Flow switch test                                                                                                                                                                                                                  |
| Q_RV_A   | off/on   | -    | Reverse Vlv Output Cir A | Reverse valve test, circuit A                                                                                                                                                                                                     |
| Q_FAN_A1 | off/on   | -    | Fan A1 Output            | Fan stage A1, circuit A                                                                                                                                                                                                           |
| Q_FAN_A2 | off/on   | -    | Fan A2 Output            | Fan stage A2, circuit A                                                                                                                                                                                                           |
| Q_FAN_A3 | off/on   | -    | Fan A3 Output            | Fan stage A3, circuit A                                                                                                                                                                                                           |
| Q_FAN_A4 | off/on   | -    | Fan A4 Output            | Fan stage A4, circuit A                                                                                                                                                                                                           |
| Q_FAN_A5 | off/on   | -    | Fan A5 Output            | Fan stage A5, circuit A                                                                                                                                                                                                           |
| Q_FAN_A6 | off/on   | -    | Fan A6 Output            | Fan stage A6, circuit A                                                                                                                                                                                                           |
| Q_VFAN_A | 0 to 100 | %    | Variable Fan Speed A     | Variable speed fan test, circuit A                                                                                                                                                                                                |
| Q_EXV_A  | 0 to 100 | %    | EXV Position Circuit A   | EXV position, circuit A<br>100% = EXV fully open                                                                                                                                                                                  |
| Q_HD_HTA | off/on   | -    | Compressor Head Heater A | Compressor head heater test, circuit A                                                                                                                                                                                            |
| Q_RV_B   | off/on   | -    | Reverse Vlv Output Cir B | Reverse valve test, circuit B                                                                                                                                                                                                     |
| Q_FAN_B1 | off/on   | -    | Fan B1 Output            | Fan stage B1, circuit B                                                                                                                                                                                                           |

## 5 - USER INTERFACE: MENU STRUCTURE



### Quick Test #1 – QCK\_TST1 (continued)

| Name     | Status     | Unit | Displayed text*          | Description                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------|------------|------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Q_FAN_B2 | off/on     | -    | Fan B2 Output            | Fan stage B2, circuit B                                                                                                                                                                                                                                                                                                                                                                                     |
| Q_FAN_B3 | off/on     | -    | Fan B3 Output            | Fan stage B3, circuit B                                                                                                                                                                                                                                                                                                                                                                                     |
| Q_FAN_B4 | off/on     | -    | Fan B4 Output            | Fan stage B4, circuit B                                                                                                                                                                                                                                                                                                                                                                                     |
| Q_FAN_B5 | off/on     | -    | Fan B5 Output            | Fan stage B5, circuit B                                                                                                                                                                                                                                                                                                                                                                                     |
| Q_FAN_B6 | off/on     | -    | Fan B6 Output            | Fan stage B6, circuit B                                                                                                                                                                                                                                                                                                                                                                                     |
| Q_VFAN_B | 0 to 100   | %    | Variable Fan Speed B     | Variable speed fan test, circuit B                                                                                                                                                                                                                                                                                                                                                                          |
| Q_EXV_B  | 0 to 100   | %    | EXV Position Circuit B   | EXV position, circuit B<br>100% = EXV fully open                                                                                                                                                                                                                                                                                                                                                            |
| Q_HD_HTB | off/on     | -    | Compressor Head Heater B | Compressor head heater test, circuit B                                                                                                                                                                                                                                                                                                                                                                      |
| HP_TEST  | 0 to 4     | -    | High Pressure Test       | High Pressure test: When activated, the unit will run until the High Pressure Safety Switch is open (0 = No test)                                                                                                                                                                                                                                                                                           |
|          |            |      | 1: HP test on cir A      | 1 = High Pressure test, circuit A                                                                                                                                                                                                                                                                                                                                                                           |
|          |            |      | 2: HP test on cir B      | 2 = High Pressure test, circuit B                                                                                                                                                                                                                                                                                                                                                                           |
|          |            |      | 3: N/A                   | 3 = <i>Not applicable</i>                                                                                                                                                                                                                                                                                                                                                                                   |
|          |            |      | 4: HP test on both cir   | 4 = High Pressure test on both circuits                                                                                                                                                                                                                                                                                                                                                                     |
|          |            |      | HEAT RECLAIM             | Heat Reclaim test                                                                                                                                                                                                                                                                                                                                                                                           |
| QHR_PMP  | off/on     | -    | Reclaim pump command     | Heat Reclaim pump command                                                                                                                                                                                                                                                                                                                                                                                   |
| QHR_3WV  | 0 to 100   | %    | Reclaim 3Way Valve cmd   | 3-way valve command                                                                                                                                                                                                                                                                                                                                                                                         |
| QHR_HTR  | off/on     | -    | Reclaim BPHE Heater      | Heat Reclaim BPHE heater                                                                                                                                                                                                                                                                                                                                                                                    |
|          |            |      | HYDRAULIC FREE COOLING   | Hydraulic Free Cooling (option 305A/305B/305C)                                                                                                                                                                                                                                                                                                                                                              |
| Q_FC_EV  | close/open | -    | FC Evaporator Valve      | Free Cooling evaporator valve test (option 305A/305B)<br>"FC Evaporator Valve Failure" warning (10222) will be triggered if the controller reports the valve failure. The status of the valve will be displayed in the Hydraulic Free Cooling menu (HYD_FC, fc_ev_st):<br><ul style="list-style-type: none"> <li>Inputs reading failure (status = 7)</li> <li>Blocked valve failure (status = 8)</li> </ul> |
| Q_FC_CV  | close/open | -    | FC Coil Valve            | Free Cooling coil valve test (option 305A/305B)<br>"FC Coil Valve Failure" warning (10220) will be triggered if the controller reports the valve failure. The status of the valve will be displayed in the Hydraulic Free Cooling menu (HYD_FC, fc_cv_st):<br><ul style="list-style-type: none"> <li>Inputs reading failure (status = 7)</li> <li>Blocked valve failure (status = 8)</li> </ul>             |
| Q_FC_PMP | off/on     | -    | FC Coil Pump             | Free Cooling coil pump test (option 305C)                                                                                                                                                                                                                                                                                                                                                                   |
| Q_FC_HTR | off/on     | -    | FC Heater                | Free Cooling heater test (option 305C)                                                                                                                                                                                                                                                                                                                                                                      |

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

**IMPORTANT: To enable the Quick Test functionality, the unit must be stopped (Local off mode).**



### Trendings – TRENDING

| Name            | Status   | Unit    | Displayed text*          | Description**                               |
|-----------------|----------|---------|--------------------------|---------------------------------------------|
| GENUNIT_CAPA_T  | 0 to 100 | %       | Cir A Total Capacity     | Total capacity, circuit A                   |
| GENUNIT_CAPB_T  | 0 to 100 | %       | Cir B Total Capacity     | Total capacity, circuit B                   |
| GENUNIT_CTRL_PN | -        | °C / °F | Control Point            | Control point                               |
| TEMP_OAT        | -        | °C / °F | Outdoor Air Temp         | Outdoor air temperature                     |
| TEMP_EWT        | -        | °C / °F | Cooler Entering Fluid    | Evaporator entering water temperature       |
| TEMP_LWT        | -        | °C / °F | Cooler Leaving Fluid     | Evaporator leaving water temperature        |
| TEMP_SCT_A      | -        | °C / °F | Saturated Cond Tmp cir A | Saturated condensing temperature, circuit A |
| TEMP_SCT_B      | -        | °C / °F | Saturated Cond Tmp cir B | Saturated condensing temperature, circuit B |
| TEMP_SST_A      | -        | °C / °F | Saturated Suction Temp A | Saturated suction temperature, circuit A    |
| TEMP_SST_B      | -        | °C / °F | Saturated Suction Temp B | Saturated suction temperature, circuit B    |
| TEMP_HR_CtrWat  | -        | °C / °F | Reclaim controlled water | Heat Reclaim control water temperature      |
| TEMP_HR_LWT     | -        | °C / °F | HR Leaving Fluid temp    | Heat Reclaim leaving fluid 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

| Name      | Status | Unit | Displayed text*                                 | Description                                                                                                                                                                                                                                     |
|-----------|--------|------|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|           |        |      | ENERGY METER                                    | Energy meter (option 294)                                                                                                                                                                                                                       |
| p_total   | -      | kW   | Total active power**                            | Active power (true power)                                                                                                                                                                                                                       |
| e_total   | -      | kWh  | Total Active Energy**<br>(Total input energy)   | Energy consumption since commissioning or energy meter replacement                                                                                                                                                                              |
| e_reset   | -      | kWh  | Partial Active Energy**<br>(Input energy reset) | Energy consumption since the last reset of the energy meter                                                                                                                                                                                     |
| p_max     | -      | kW   | Max active power**                              | Maximum active power demand                                                                                                                                                                                                                     |
| sglPhs_l  | -      | A    | Single phase current**                          | Current per phase                                                                                                                                                                                                                               |
| volt_L12  | -      | V    | Voltage L1-L2**                                 | Voltage (L1 – L2)                                                                                                                                                                                                                               |
| THD       | -      | %    | Total harmonic distortio**                      | Total harmonic distortion                                                                                                                                                                                                                       |
| pow_fact  | -      | -    | Power factor**                                  | Power factor                                                                                                                                                                                                                                    |
|           |        |      | COOLING MODE                                    | Cooling mode                                                                                                                                                                                                                                    |
| cPwrOut   | -      | kW   | Cooling Power Output                            | Cooling Power Output                                                                                                                                                                                                                            |
| cPwrIn    | -      | kW   | Electical Power Input                           | Electrical power input of Compressors and fans. Pumps excluded.<br>If EC fans selected: value is estimated.<br><i>Note: For units with option 294, the Energy Meter "Active Power" is displayed instead of the estimated power consumption.</i> |
| eer       | -      | -    | Energy Efficiency (EER)                         | Energy Efficiency Ratio (EER)                                                                                                                                                                                                                   |
| cEnergyOu | -      | kWh  | Cooling Energy Output                           | Cooling Energy Output                                                                                                                                                                                                                           |
| cEnergyIn | -      | kWh  | Electrical Energy Input                         | Electrical Energy Input                                                                                                                                                                                                                         |
| energEer  | -      | -    | Integrated EER                                  | Integrated EER                                                                                                                                                                                                                                  |
|           |        |      | HEATING MODE                                    | Heating mode                                                                                                                                                                                                                                    |
| hPwrOut   | -      | kW   | Heating Power Output                            | Heating Power Output                                                                                                                                                                                                                            |
| hPwrIn    | -      | kW   | Electical Power Input                           | Electrical power input of Compressors and fans. Pumps excluded.<br>If EC fans selected: value is estimated.<br><i>Note: For units with option 294, the Energy Meter "Active Power" is displayed instead of the estimated power consumption.</i> |
| cop       | -      | -    | Coef. Of Perf. (COP)                            | Coefficient of Performance (COP)                                                                                                                                                                                                                |
| hEnergyOu | -      | kWh  | Heating Energy Output                           | Heating Energy Output                                                                                                                                                                                                                           |
| hEnergyIn | -      | kWh  | Electrical Energy Input                         | Electrical Energy Input                                                                                                                                                                                                                         |
| energCOP  | -      | -    | Integrated COP                                  | Integrated COP                                                                                                                                                                                                                                  |
|           |        |      |                                                 |                                                                                                                                                                                                                                                 |
| reset_en  | no/yes | -    | Reset of Energy Counter                         | Parameter set to "yes" is used to reset the energies displayed in this table                                                                                                                                                                    |
| reset_da  |        | -    | Last Reset Date                                 | Last Reset Date                                                                                                                                                                                                                                 |
| reset_ti  |        | -    | Last Reset Time                                 | Last Reset Time                                                                                                                                                                                                                                 |

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

For units without option 294 (Energy Meter): The information in this table is indicative (based on estimates) and cannot be used as a real energy meter. This estimation does not take into account the pump consumption.

\*\*For units with option 294 (Energy Meter): These values are updated with data coming from the Energy Meter.

If the unit is not equipped with the Energy Meter, these parameters' values are set to "0".



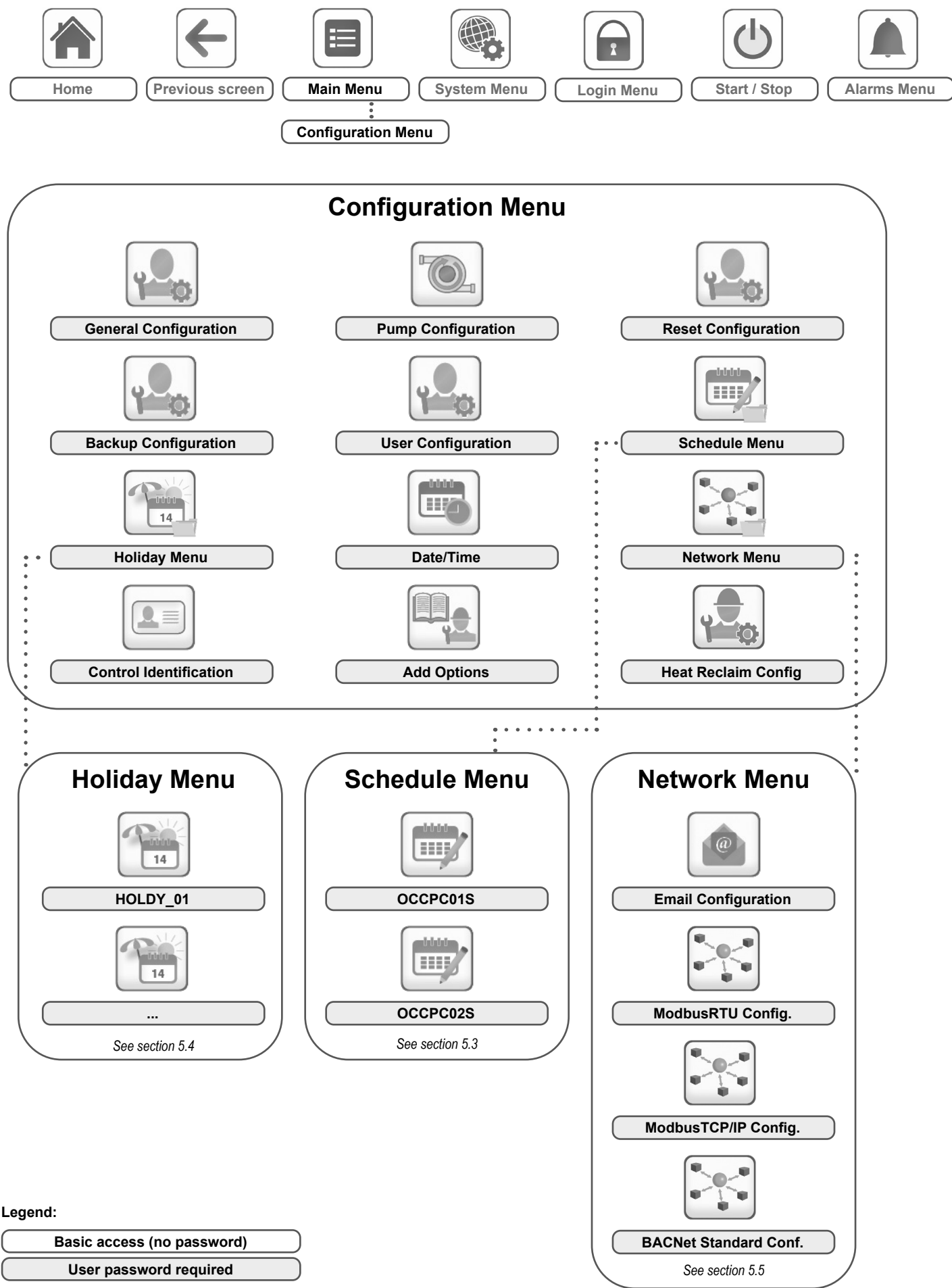
### Software Options – OPT\_STA

| Name    | Status | Unit | Displayed text*           | Description                                                                                                                                                                                |
|---------|--------|------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 6.22)                                                                    |
| opt149  | no/yes | -    | OPT149: BACnet            | Parameter set to "yes" means that BACnet option which requires the Software Key is activated (see also section 6.23)                                                                       |
| 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)                                                                       |
| opt119C | no/yes | -    | OPT119C: Cool Floor Optim | Parameter set to "yes" means that Cooling Floor Optimized option which requires the Software Key is activated (specific circuit capacity limits are applied to heat pumps in Cooling mode) |
| opt295  | no/yes | -    | OPT295: Fast Cap Reco     | Parameter set to "yes" means that Fast Capacity Recovery option which requires the Software Key is enabled (see also section 6.27)                                                         |

\*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

| Name     | Status                    | Default      | Unit     | Displayed text*                                                                  | Description                                                                                                                                                                                |
|----------|---------------------------|--------------|----------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| prio_cir | 0 to 2                    | 0            | -        | Cir Priority Sequence<br>0=Auto<br>1=A Prio<br>2=B Prio                          | Circuit priority<br>0 = Automatic circuit selection<br>1 = Circuit A priority<br>2 = Circuit B priority                                                                                    |
| seq_typ  | no/yes                    | no           | -        | Staged Loading Sequence                                                          | Staged loading sequence                                                                                                                                                                    |
| ramp_sel | no/yes                    | no           | -        | Ramp Loading Select                                                              | Ramp loading selection                                                                                                                                                                     |
| lim_sel  | 0 to 2                    | 0            | -        | Demand Limit Type Select<br>0 = None<br>1 = Switch Control<br>2 = 4-20mA Control | Demand limit selection<br>0 = None<br>1 = Switch control<br>2 = 4-20 mA control                                                                                                            |
| lim_mx   | 0 to 20                   | 0            | mA       | mA For 100% Demand Limit                                                         | 100% demand limit (mA)                                                                                                                                                                     |
| lim_ze   | 0 to 20                   | 10           | mA       | mA For 0% Demand Limit                                                           | 0% demand limit (mA)                                                                                                                                                                       |
| off_on_d | 1 to 15                   | 1            | min      | Unit Off to On Delay                                                             | Unit Off to On delay                                                                                                                                                                       |
| heat_th  | -17.0 to 0<br>1.4 to 32.0 | -17.0<br>1.4 | °C<br>°F | Heating OAT Threshold                                                            | Heating OAT threshold                                                                                                                                                                      |
| nh_start | -                         | -            | -        | Night Mode Start Hour                                                            | Night mode start hour                                                                                                                                                                      |
| nh_end   | -                         | -            | -        | Night Mode End Hour                                                              | Night mode end hour                                                                                                                                                                        |
| nh_limit | 0 to 100                  | 100          | %        | Night Capacity Limit                                                             | Night capacity limit                                                                                                                                                                       |
| ice_cnfg | no/yes                    | no           | -        | Ice Mode Enable                                                                  | Ice mode enabled (EMM)                                                                                                                                                                     |
| both_sel | no/yes                    | no           | -        | Both Command Sel (HSM)                                                           | Both command selection (HSM)                                                                                                                                                               |
| auto_sel | no/yes                    | no           | -        | Auto Changeover Select                                                           | Automatic changeover selection                                                                                                                                                             |
| ewt_opt  | no/yes                    | no           | -        | Entering Fluid Control                                                           | Entering fluid control option<br>(if selected, the system controls unit capacity based on the entering fluid temperature; otherwise the control is based on the leaving fluid temperature) |

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



### Pump Configuration – PUMPCONF

| Name     | Status                         | Default       | Unit       | Displayed text*                                                                                                    | Description                                                                                                                                                                                             |
|----------|--------------------------------|---------------|------------|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| pump_seq | 0 to 4                         | 0             | -          | Pumps Sequence<br>0 = No Pump<br>1 = One Pump Only<br>2 = Two Pumps Auto<br>3 = Pump#1 Manual<br>4 = Pump#2 Manual | Pumps sequence<br>0 = No pump<br>1 = One pump only (units with one pump)<br>2 = Two pumps automatic control<br>3 = Pump 1 selected (units with two pumps)<br>4 = Pump 2 selected (units with two pumps) |
| pump_del | 24 to 3000                     | 48            | hour       | Pump Auto Rotation Delay                                                                                           | Pump automatic rotation delay                                                                                                                                                                           |
| pump_per | no/yes                         | no            | -          | Pump Sticking Protection                                                                                           | Pump sticking protection                                                                                                                                                                                |
| pump_sby | no/yes                         | no            | -          | Stop Pump During Standby                                                                                           | Pump stop when the unit is in standby                                                                                                                                                                   |
| pump_loc | no/yes                         | yes           | -          | Flow Checked If Pump Off                                                                                           | Flow checked if pump is off                                                                                                                                                                             |
| flow_ctl | 1 to 3                         | 1             | -          | Flow Control Method<br>1 = Constant Speed<br>2 = Delta Temperature<br>3 = Delta Pressure                           | Flow control method<br>1 = flow control is based on fixed pump speed<br>2 = flow control is based on delta temperature<br>3 = flow control is based on delta pressure                                   |
| w_dtCspt | 3.0 to 9.0<br>5.4 to 16.02     | 5.0<br>9.0    | °C<br>°F   | Cooling Water Delta T SP                                                                                           | Cooling: Delta temperature setpoint                                                                                                                                                                     |
| w_dpCspt | 50.0 to 300.0<br>7.25 to 43.51 | 200.0<br>29.0 | kPa<br>PSI | Cooling Water Delta P SP                                                                                           | Cooling: Delta pressure setpoint                                                                                                                                                                        |
| w_dthSpt | 3.0 to 9.0<br>5.4 to 16.02     | 5.0<br>9.0    | °C<br>°F   | Heating Water Delta T SP                                                                                           | Heating: Delta temperature setpoint                                                                                                                                                                     |

## 5 - USER INTERFACE: MENU STRUCTURE



### Pump Configuration – PUMPCONF (continued)

| Name     | Status                             | Default         | Unit        | Displayed text*          | Description                                 |
|----------|------------------------------------|-----------------|-------------|--------------------------|---------------------------------------------|
| w_dpHspt | 50.0 to 300.0<br>7.25 to 43.51     | 200.0<br>29.0   | kPa<br>PSI  | Heating Water Delta P SP | Heating: Delta pressure setpoint            |
| wtr_zval | -100.0 to 10.0<br>-14.5 to 1.45    | -100.0<br>-14.5 | kPa<br>PSI  | Pressure Zero Value      | Pressure zero value                         |
| pump_min | 30 to 100                          | 60              | %           | Pump Minimum Speed       | Minimum pump speed                          |
| pump_sav | 30 to 100                          | 60              | %           | Pump Min Speed Cap=0%    | Minimum pump speed when unit capacity is 0% |
| pump_max | 30 to 100                          | 100             | %           | Pump Maximum Speed       | Maximum pump speed                          |
| MinWpThr | 70.0 to 1000.05<br>10.15 to 145.04 | 100.0<br>14.5   | kPa<br>PSIG | Min Water Press Thres    | Minimum water pressure threshold            |
| WtPmpMxP | 96.5 to 551.5<br>14.0 to 80.0      | 500.0<br>72.52  | kPa<br>PSIG | Water Pump Max Delta P   | Maximum water pump delta pressure           |

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



### Reset Configuration – RESETCFG

| Name     | Status                         | Default       | Unit     | Displayed text*                                              | Description                                                                    |
|----------|--------------------------------|---------------|----------|--------------------------------------------------------------|--------------------------------------------------------------------------------|
| cr_sel   | 0 to 4                         | 0             | -        | Cooling Reset Select                                         | Cooling reset selection                                                        |
| hr_sel   | 0 to 4                         | 0             | -        | Heating Reset Select                                         | Heating reset selection                                                        |
|          |                                |               |          | 0=None, 1=OAT, 2=Delta T<br>3=4-20mA control<br>4=Space Temp | 0 = None, 1 = OAT, 2 = Delta T<br>3 = 4-20 mA control<br>4 = Space temperature |
|          |                                |               |          | Cooling                                                      | Cooling                                                                        |
| oat_crno | -10.0 to 51.7<br>14.0 to 125.0 | -10.0<br>14.0 | °C<br>°F | OAT No Reset Value                                           | OAT, no reset value                                                            |
| oat_crfu | -10.0 to 51.7<br>14.0 to 125.0 | -10.0<br>14.0 | °C<br>°F | OAT Full Reset Value                                         | OAT, max. reset value                                                          |
| dt_cr_no | 0 to 13.9<br>0 to 25.0         | 0<br>0        | °C<br>°F | Delta T No Reset Value                                       | Delta T, no reset value                                                        |
| dt_cr_fu | 0 to 13.9<br>0 to 25.0         | 0<br>0        | °C<br>°F | Delta T Full Reset Value                                     | Delta T, max. reset value                                                      |
| l_cr_no  | 0 to 20                        | 0             | mA       | Current No Reset Value                                       | Current, no reset value                                                        |
| l_cr_fu  | 0 to 20                        | 0             | mA       | Current Full Reset Value                                     | Current, max. reset value                                                      |
| spacr_no | -10.0 to 51.7<br>14.0 to 125   | -10.0<br>14.0 | °C<br>°F | Space T No Reset Value                                       | Space temperature, no reset value                                              |
| spacr_fu | -10.0 to 51.7<br>14.0 to 125.0 | -10.0<br>14.0 | °C<br>°F | Space T Full Reset Value                                     | Space temperature, max. reset value                                            |
| cr_deg   | -16.7 to 16.7<br>-30.0 to 30.0 | 0<br>0        | °C<br>°F | Cooling Reset Deg. Value                                     | Maximum cooling reset value                                                    |
|          |                                |               |          | Heating                                                      | Heating                                                                        |
| oat_hrno | -10.0 to 51.7<br>14.0 to 125.0 | -10.0<br>14.0 | °C<br>°F | OAT No Reset Value                                           | OAT, no reset value                                                            |
| oat_hrfu | -10.0 to 51.7<br>14.0 to 125.0 | -10.0<br>14.0 | °C<br>°F | OAT Full Reset Value                                         | OAT, max. reset value                                                          |
| dt_hr_no | 0 to 13.9<br>0 to 25.0         | 0<br>0        | °C<br>°F | Delta T No Reset Value                                       | Delta T, no reset value                                                        |
| dt_hr_fu | 0 to 13.9<br>0 to 25.0         | 0<br>0        | °C<br>°F | Delta T Full Reset Value                                     | Delta T, max. reset value                                                      |
| l_hr_no  | 0 to 20                        | 0             | mA       | Current No Reset Value                                       | Current, no reset value                                                        |
| l_hr_fu  | 0 to 20                        | 0             | mA       | Current Full Reset Value                                     | Current, max. reset value                                                      |
| spahr_no | -10.0 to 51.7<br>14.0 to 125   | -10.0<br>14.0 | °C<br>°F | Space T No Reset Value                                       | Space T, no reset value                                                        |
| spahr_fu | -10.0 to 51.7<br>14.0 to 125.0 | -10.0<br>14.0 | °C<br>°F | Space T Full Reset Value                                     | Space T, max. reset value                                                      |
| hr_deg   | -16.7 to 16.7<br>-30.0 to 30.0 | 0<br>0        | °C<br>°F | Heating Reset Deg. Value                                     | Maximum heating reset value                                                    |
|          |                                |               |          | Smart Grid Ready Option                                      | Smart Grid Ready option                                                        |
| heat_sg3 | 0 to 77.8<br>0 to 140          | 0<br>0        | °C<br>°F | Boost Heat Offset                                            | Smart Grid Ready: Heating offset (BOOST mode)                                  |
| cool_sg3 | 0 to 77.8<br>0 to 140          | 0<br>0        | °C<br>°F | Boost Cool Offset                                            | Smart Grid Ready: Cooling offset (BOOST mode)                                  |

## 5 - USER INTERFACE: MENU STRUCTURE



### Reset Configuration – RESETCFG (continued)

| Name     | Status                | Default | Unit     | Displayed text*    | Description                                    |
|----------|-----------------------|---------|----------|--------------------|------------------------------------------------|
| heat_sg4 | 0 to 77.8<br>0 to 140 | 0<br>0  | °C<br>°F | Forced Heat Offset | Smart Grid Ready: Heating offset (FORCED mode) |
| cool_sg4 | 0 to 77.8<br>0 to 140 | 0<br>0  | °C<br>°F | Forced Cool Offset | Smart Grid Ready: Cooling offset (FORCED mode) |

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



### Backup Configuration – BACKUP

| Name     | Status                       | Default       | Unit     | Displayed text*          | Description                                   |
|----------|------------------------------|---------------|----------|--------------------------|-----------------------------------------------|
| boil_th  | -15.0 to 15.0<br>5.0 to 59.0 | -10.0<br>14.0 | °C<br>°F | Boiler OAT Threshold     | Boiler OAT threshold                          |
| ehs_th   | -5.0 to 21.1<br>23.0 to 70.0 | 5.0<br>41.0   | °C<br>°F | Elec Stage OAT Threshold | Electric heater stage OAT threshold           |
| ehs_pull | 0 to 60                      | 0             | min      | Electrical Pulldown Time | Electrical pulldown time                      |
| ehs_back | no/yes                       | no            | -        | Last EHS for backup      | Electric heater stage 1 (backup)              |
| ehs_defr | no/yes                       | no            | -        | Quick EHS for defrost    | Quick EHS for defrost                         |
| ehs_kp   | -20 to 20                    | 2             | -        | EHS Proportional Gain    | EHS proportional gain                         |
| ehs_ki   | -5 to 5                      | 0             | -        | EHS Integral Gain        | EHS integral gain                             |
| ehs_kd   | -20 to 20                    | 0             | -        | EHS Derivative Gain      | EHS derivative gain                           |
| ht_sgr   | -20 to 0<br>-4 to 32         | -15.0<br>5.0  | °C<br>°F | SGR Boiler OAT Thres     | Smart Grid Ready option: Boiler OAT threshold |

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



### User Configuration – USERCONF

| Name     | Status   | Default | Unit | Displayed text*         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------|----------|---------|------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| alert_r  | no/yes   | no      | -    | Alarm Relay for Alerts? | Alarm relay status. Alarm output relay is used for "alarm" + "alert"                                                                                                                                                                                                                                                                                                                                                                                                                            |
| al_rever | 0 to 1   | 0       | -    | Reversed Alarm Relay    | Alarm / Alert signals reverted<br>No (0) = standard operation<br>Yes (1) = alarm/alert/shutdown outputs are "On" even if there is no alarm/alert (alarm output unavailable)                                                                                                                                                                                                                                                                                                                     |
|          |          |         |      | PHASE CONTROLLER        | Phase controller (option 159B)                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| PhCtrAct | 0 to 2   | 0       | -    | Phase Controller Action | This parameter is used to define the action taken in case the Phase Controller detects a fault.<br>0 = Alert: No action taken on the unit (default setting).<br>1 = Alarm: The unit shuts down when the alarm is active. The alarm reset is automatic.<br>2 = Alarm: The unit shuts down when the alarm is active. The alarm must be reset manually.<br><i>Note: To prevent any unit damage due to unstable power supply conditions, it is recommended to set this parameter to "1" or "2".</i> |
| PCMinTim | 0 to 600 | 120     | sec  | PC Minimum Fault Time   | This parameter defines the minimum duration of the Phase Controller alert/alarm (alert/alarm 10054).                                                                                                                                                                                                                                                                                                                                                                                            |

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



### Date/Time – DATETIME

| Displayed text*       |                           | Status               | Description                                                                                                                             |
|-----------------------|---------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| SmartVu™ touch screen | SmartVu™ 2.0 touch screen |                      |                                                                                                                                         |
| Daylight Saving Time  | -                         | on/off               | Summer/winter time activation                                                                                                           |
| Location              | Location                  | UTC                  | Time zone<br>(SmartVu™ 2.0: Time zone setting includes DST control)                                                                     |
| Date/Time             | Date/Time                 | YYYY/MM/DD, HH:MM:SS | Current date and time (must be set manually)                                                                                            |
| Today is a Holiday    | 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)                    |
| Tomorrow is a Holiday | 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 System menu (see also section 5.6).**

## 5 - USER INTERFACE: MENU STRUCTURE



### Control Identification Menu – CTRLID

| Status               | Default         | Displayed text*      | Description                 |
|----------------------|-----------------|----------------------|-----------------------------|
| 1-239                | 1               | CCN Element Number   | Element number              |
| 0-239                | 0               | CCN Bus Number       | Bus number                  |
| 9600 / 19200 / 38400 | 9600            | CCN Baud Rate        | Communication speed         |
| -                    | 30RB            | Device Description   | Unit description            |
| -                    | -               | Location Description | Location description        |
| -                    | ECG-SR-20V4G010 | Software Version     | Software version            |
| -                    | -               | Serial Number        | Serial number (MAC address) |

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



### Add Options Menu – ADD\_OPT

| Displayed text*                            | Description                                                                                                                                                            |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MAC address                                | Controller MAC address: This MAC address is requested by your Local Carrier service representative when ordering any software-protected option (see also section 6.29) |
| Please Enter Your Software Activation Key: | Type the Software Activation Key provided by your Local Carrier service representative (see also section 6.29)                                                         |
| 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.



### Heat Reclaim Config – HR\_CFG

| Name     | Status      | Default | Unit | Displayed text*          | Description                                                                                                                                                                                                                                                                         |
|----------|-------------|---------|------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| hrVarPmp | no/yes      | no      | -    | HR variable speed pump ? | Heat Reclaim variable-speed pump selection:<br>no = 3-way valve is used<br>yes = variable speed pump is used                                                                                                                                                                        |
| hr_flui  | water/brine | water   | -    | HR condenser fluid       | Heat Reclaim condenser fluid type:<br>0 = water, 1 = brine                                                                                                                                                                                                                          |
| hr_eco   | off/on      | off     | -    | HR eco mode ?            | Heat Reclaim "Eco" mode:<br>on = fans disabled in Heat Reclaim (Heat Reclaim efficiency priority)<br>off = fans enabled in Heat Reclaim (chiller efficiency priority)                                                                                                               |
| rev_3WV  | no/yes      | no      | -    | HR reverse 3WV cmd ?     | Heat Reclaim 3-way valve reversed command:                                                                                                                                                                                                                                          |
|          |             |         |      | NO : 0V = close          | no = 0V, 3-way valve fully closed (water flow depends on "Min flow 3wv position" set in the HR_CFG table)                                                                                                                                                                           |
|          |             |         |      | YES : 0V = open          | yes = 0V, 3-way valve fully opened (there is water flow in the condenser and in the customer loop)                                                                                                                                                                                  |
| HRewtctl | no/yes      | yes     | -    | HR Control on EWT ?      | Heat Reclaim control:<br>no = HR control on water leaving the 3-way valve (if the sensor is located after the 3-way valve)<br>yes = HR control on water entering the 3-way valve (if the sensor is located before the 3-way valve)                                                  |
| kp_HR3wv | -20 to 20   | 2       | -    | PID gain prop 3w valve   | 3-way valve / pump PID proportional gain                                                                                                                                                                                                                                            |
| ki_HR3wv | -5 to 5     | 0.2     | -    | PID gain int 3w valve    | 3-way valve / pump PID integral gain                                                                                                                                                                                                                                                |
| kd_HR3wv | -20 to 20   | 0.4     | -    | PID gain deri 3w valve   | 3-way valve / pump PID derivative gain                                                                                                                                                                                                                                              |
| kp_HRFan | -20 to 20   | 5       | -    | PID gain prop fan        | Fan PID proportional gain                                                                                                                                                                                                                                                           |
| ki_HRFan | -5 to 5     | 0.5     | -    | PID gain int fan         | Fan PID integral gain                                                                                                                                                                                                                                                               |
| kd_HRFan | -20 to 20   | 0       | -    | PID gain deri fan        | Fan PID derivative gain                                                                                                                                                                                                                                                             |
| minHRpmp | 15 to 60    | 30      | %    | HR VarPump min pos       | Minimum variable-speed pump speed in Heat Reclaim                                                                                                                                                                                                                                   |
| maxHR3wv | 70 to 100   | 100     | %    | 3WayValve/VarPmp max pos | Maximum 3-way valve position (or variable-speed pump speed) in Heat Reclaim mode                                                                                                                                                                                                    |
| flowTmr  | 10 to 120   | 20      | sec  | HR delay flow switch     | Heat Reclaim flow switch delay timer (see alert 10052)                                                                                                                                                                                                                              |
| minFloEn | no/yes      | no      | -    | Min flow 3wv enable      | 3-way valve minimum flow setting:<br>no = Anti-freeze protection disabled<br>yes = Anti-freeze protection enabled. When Heat Reclaim is not active and the outside air temperature is low, the 3-way valve will be opened to its pre-configured position ("Min flow 3wv position"). |
| minFlow  | 10 to 100   | 15      | %    | Min flow 3wv position    | Minimum 3-way valve position used to ensure minimum fluid flow and prevent it from freezing                                                                                                                                                                                         |

## 5 - USER INTERFACE: MENU STRUCTURE



### Heat Reclaim Config – HR\_CFG (continued)

| Name   | Status                       | Default     | Unit     | Displayed text*   | Description                                                                                                                                                                                                                                 |
|--------|------------------------------|-------------|----------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| min_wt | -10.0 to 1.1<br>14.0 to 34.0 | 1.1<br>34.0 | °C<br>°F | HR Min water temp | Minimum water temperature in Heat Reclaim mode:<br>If the temperature drops below this setting, an alert will be raised (10128).<br>HR condenser heater will be energized (if present), HR mode will be off and the pump will be turned on. |

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

### 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.

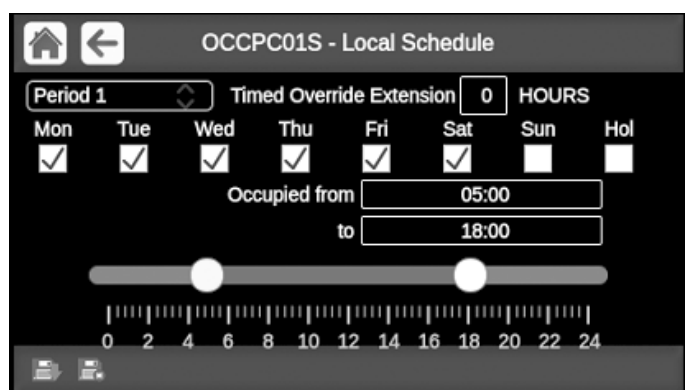


#### Schedule Menu – SCHEDULE

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

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

Example: Setting occupancy schedule (SmartVu™ 2.0)



**IMPORTANT:** For more information about schedule setting, please see section 6.30.

### 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<br>- HOLDY_01 | Holiday period No.1 settings  |
|      | ...      | ...                   | ...                           |
|      | HOLDY_16 | HOLIDAY<br>- 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 6.31.

## 5 - USER INTERFACE: MENU STRUCTURE

### 5.5 - Network menu

The Network menu allows the user to change network setting for Modbus, BACnet and define e-mail accounts used for alarm notifications (see section 8.3).



#### Network Menu – NETWORK

| Icon                                                                              | Name     | Displayed text*     | Description              |
|-----------------------------------------------------------------------------------|----------|---------------------|--------------------------|
|  | EMAILCFG | Email Configuration | Email settings           |
|  | MODBUSRS | ModbusRTU Config.   | Modbus RTU configuration |

| Icon                                                                              | Name     | Displayed text*       | Description                   |
|-----------------------------------------------------------------------------------|----------|-----------------------|-------------------------------|
|  | MODBUSIP | ModbusTCP/IP Config.  | Modbus TCP/IP configuration   |
|  | BACNET   | BACNet Standard Conf. | BACnet standard configuration |

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



#### E-mail Configuration – EMAILCFG

| Name     | Status     | Default | Unit | Displayed text*       | Description                     |
|----------|------------|---------|------|-----------------------|---------------------------------|
| senderP1 |            |         | -    | Sender E-mail Part1   | Sender e-mail, identifier part  |
|          |            |         |      | @                     | @                               |
| senderP2 |            |         | -    | Sender E-mail Part2   | Sender e-mail, domain part      |
| recip1P1 |            |         | -    | Recip1 E-mail Part1   | Recipient 1,identifier part     |
|          |            |         |      | @                     | @                               |
| recip1P2 |            |         | -    | Recip1 E-mail Part2   | Recipient 1,domain part         |
| recip2P1 |            |         | -    | Recip2 E-mail Part1   | Recipient 2,identifier part     |
|          |            |         |      | @                     | @                               |
| recip2P2 |            |         | -    | Recip2 E-mail Part2   | Recipient 2,domain part         |
| smtpP1   | 0 to 255   | 0       | -    | SMTP IP Addr Part 1   | SMTP IP address part 1          |
| smtpP2   | 0 to 255   | 0       | -    | SMTP IP Addr Part 2   | SMTP IP address part 2          |
| smtpP3   | 0 to 255   | 0       | -    | SMTP IP Addr Part 3   | SMTP IP address part 3          |
| smtpP4   | 0 to 255   | 0       | -    | SMTP IP Addr Part 4   | SMTP IP address part 4          |
| accP1    |            |         | -    | Account E-mail Part1  | Account e-mail, identifier part |
|          |            |         |      | @                     | @                               |
| accP2    |            |         | -    | Account E-mail Part2  | Account e-mail, domain part     |
| accPass  |            |         | -    | Account Password      | Account password                |
| portNbr  | 0 to 65535 | 25      | -    | Port Number           | Port number                     |
| srvTim   | 0 to 255   | 30      | sec  | Server Timeout        | Server timeout                  |
| srvAut   | 0 to 1     | 0       | -    | Server Authentication |                                 |

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

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



#### ModbusRTU Config. – MODBUSRS

| Name     | Status   | Default | Unit | Displayed text*   | Description       |
|----------|----------|---------|------|-------------------|-------------------|
| modrt_en | no/yes   | no      | -    | RTU Server Enable | RTU Server Enable |
| ser_UID  | 1 to 247 | 1       | -    | Server UID        | Server UID        |
| metric   | no/yes   | yes     | -    | Metric Unit       | Metric Unit       |
| swap_b   | 0 to 1   | 0       | -    | Swap Bytes        | Swap Bytes        |
|          |          |         |      | 0 = Big Endian    | 0 = Big Endian    |
|          |          |         |      | 1 = Little Endian | 1 = Little Endian |
| baudrate | 0 to 2   | 0       | -    | Baudrate          | Baudrate          |
|          |          |         |      | 0 = 9600          | 0 = 9600          |
|          |          |         |      | 1 = 19200         | 1 = 19200         |
|          |          |         |      | 2 = 38400         | 2 = 38400         |
| parity   | 0 to 2   | 0       | -    | Parity            | Parity            |
|          |          |         |      | 0 = No parity     | 0 = No parity     |
|          |          |         |      | 1 = Odd parity    | 1 = Odd parity    |

## 5 - USER INTERFACE: MENU STRUCTURE



### ModbusRTU Config. – MODBUSRS

| Name     | Status | Default | Unit | Displayed text*                    | Description                        |
|----------|--------|---------|------|------------------------------------|------------------------------------|
| stop_bit | 0 to 1 | 0       | -    | 2 = Even parity<br>Stop bit number | 2 = Even parity<br>Stop bit number |
|          |        |         |      | 0 = One stop bit                   | 0 = One stop bit                   |
|          |        |         |      | 1 = Two stop bit                   | 1 = Two stop bit                   |
| real_typ | 0 to 1 | 1       | -    | Real Type Management               | Real Type Management               |
|          |        |         |      | 0 = Float X10                      | 0 = Float X10                      |
|          |        |         |      | 1 = IEE 754                        | 1 = IEE 754                        |
| reg32bit | 0 to 1 | 1       | -    | Enable 32 bits registers           | Enable 32 bits registers           |
|          |        |         |      | 0 = IR/HR in 16 bit mode           | 0 = IR/HR in 16 bit mode           |
|          |        |         |      | 1 = IR/HR in 32 bit mode           | 1 = IR/HR in 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.**



### ModbusTCP/IP Config. – MODBUSIP

| Name     | Status     | Default | Unit | Displayed text*          | Description              |
|----------|------------|---------|------|--------------------------|--------------------------|
| modip_en | no/yes     | no      | -    | TCP/IP Server Enable     | TCP/IP Server Enable     |
| ser_UID  | 1 to 247   | 1       | -    | Server UID               | Server UID               |
| port_nbr | 0 to 65535 | 502     | -    | Port Number              | Port Number              |
| metric   | no/yes     | yes     | -    | Metric Unit              | Metric Unit              |
| swap_b   | 0 to 1     | 0       | -    | Swap Bytes               | Swap Bytes               |
|          |            |         |      | 0 = Big Endian           | 0 = Big Endian           |
|          |            |         |      | 1 = Little Endian        | 1 = Little Endian        |
| real_typ | 0 to 1     | 1       | -    | Real Type Management     | Real Type Management     |
|          |            |         |      | 0 = Float X10            | 0 = Float X10            |
|          |            |         |      | 1 = IEE 754              | 1 = IEE 754              |
| reg32bit | 0 to 1     | 1       | -    | Enable 32 bits registers | Enable 32 bits registers |
|          |            |         |      | 0 = IR/HR in 16 bit mode | 0 = IR/HR in 16 bit mode |
|          |            |         |      | 1 = IR/HR in 32 bit mode | 1 = IR/HR in 32 bit mode |
| conifnam | 0 to 1     | 0       | -    | IP port interface name   | IP port interface name   |
|          |            |         |      | 0 = J5 / J15             | 0 = J5 / J15             |
|          |            |         |      | 1 = J16                  | 1 = J16                  |
| timeout  | 60 to 600  | 120     | sec  | Com. timeout (s)         | Com. timeout (s)         |
| idle     | 0 to 30    | 10      | sec  | Keepalive idle delay(s)  | Keepalive idle delay(s)  |
| intrvl   | 0 to 2     | 1       | sec  | Keepalive interval(s)    | Keepalive interval(s)    |
| probes   | 0 to 10    | 10      | -    | Keepalive probes nb      | Keepalive probes number  |

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

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



### BACNet Standard Conf. – BACNET

| Name     | Status         | Default | Unit | Displayed text*         | Description                                                                                               |
|----------|----------------|---------|------|-------------------------|-----------------------------------------------------------------------------------------------------------|
| bacena   | 0 to 2         | 0       | -    | BACnet Enable           | BACnet Enable:<br>0 = Disabled<br>1 = BACnet IP<br>2 = BACnet MS/TP (Manager Subordinate / Token Passing) |
| bacunit  | no/yes         | yes     | -    | Metric Units?           | Metric Unit?                                                                                              |
| network  | 1 to 40000     | 1600    | -    | Network                 | Network                                                                                                   |
| udpport  | 47808 to 47823 | 47808   | -    | UDP Port Number         | UDP Port Number                                                                                           |
| bac_id   | 1 to 4194302   | 1600001 | -    | Device Id Manual        | Device Id Manual                                                                                          |
| auid_opt | disable/enable | disable | -    | Device Id Auto Option   | Device Id Auto Option                                                                                     |
| balmena  | disable/enable | enable  | -    | Alarm reporting         | Alarm reporting                                                                                           |
| mng_occ  | no/yes         | no      | -    | BACnet Manage Occupancy | BACnet Manage Occupancy                                                                                   |
| conifnam | 0 to 1         | 0       | -    | IP port Interface name  | IP port Interface name                                                                                    |

## 5 - USER INTERFACE: MENU STRUCTURE



### BACnet Standard Conf. – BACNET

| Name     | Status   | Default | Unit | Displayed text*      | Description                                                                                                                       |
|----------|----------|---------|------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------|
|          |          |         |      | 0 = J5 / J15         | 0 = J5 / J15                                                                                                                      |
|          |          |         |      | 1 = J16              | 1 = J16                                                                                                                           |
| mstpaddr | 1 to 127 | 1       | -    | BACnet MAC address   | BACnet MS/TP MAC address                                                                                                          |
| mstpbaud | 0 to 5   | 2       | -    | BACnet_baud_enum     | BACnet MS/TP baud rate:                                                                                                           |
|          |          |         |      | 0 = 9600             | 0 = 9600                                                                                                                          |
|          |          |         |      | 1 = 19200            | 1 = 19200                                                                                                                         |
|          |          |         |      | 2 = 38400            | 2 = 38400                                                                                                                         |
|          |          |         |      | 3 = 57600            | 3 = 57600                                                                                                                         |
|          |          |         |      | 4 = 79800            | 4 = 79800                                                                                                                         |
|          |          |         |      | 5 = 115200           | 5 = 115200                                                                                                                        |
| maxmastr | 1 to 127 | 10      | -    | mstp_max_master      | Maximum number of Manager (master) nodes in BACnet MS/TP network (master node can initiate requests only when it holds the token) |
| maxinfof | 1 to 255 | 10      | -    | mstp_max_info_frames | Maximum number of data frames (messages) the master node can trasmit before passing the token                                     |

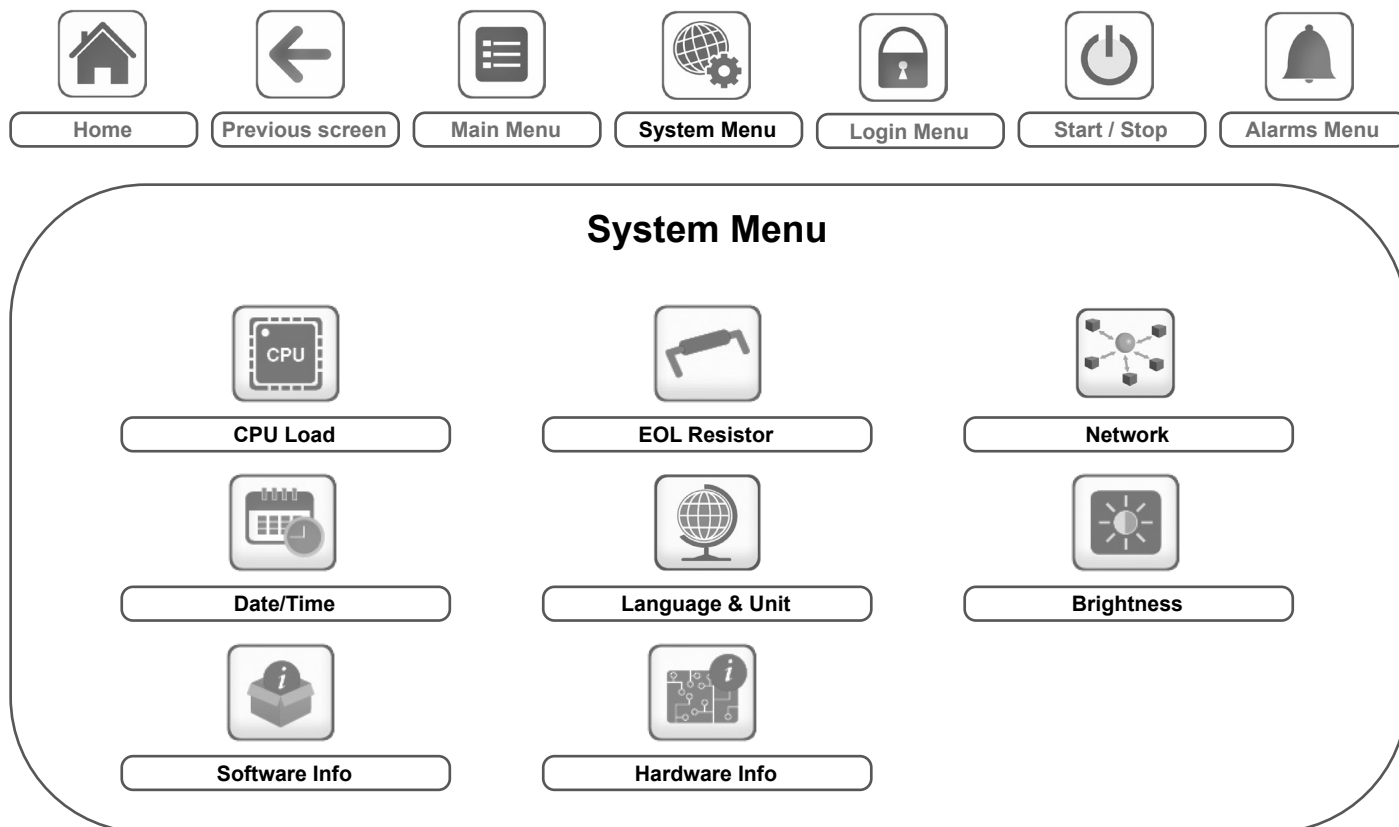
\*Depends on the selected language (English by default).

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

**NOTE: BACnet MS/TP option is available only on SmartVu™ 2.0.**

## 5 - USER INTERFACE: MENU STRUCTURE

### 5.6 - System menu



#### Legend:

|                            |
|----------------------------|
| Basic access (no password) |
| User password required     |

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

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

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



#### CPU Load Menu – CPULOAD

| Status   | Default | Unit | Displayed text*          | Description        |
|----------|---------|------|--------------------------|--------------------|
| 0 to 100 | -       | %    | CPU load                 | CPU utilization    |
| 0 to 100 | -       | %    | RAM Memory utilization   | RAM usage          |
| 0 to 100 | -       | %    | FLASH Memory utilization | Flash memory usage |

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



#### EOL Resistor Menu – EOLRES (not used on SmartVu™ 2.0 touch screen)

| Status         | Default | Displayed text*          | Description                       |
|----------------|---------|--------------------------|-----------------------------------|
| disable/enable | disable | End of Line Res. J6(LEN) | End of line resistor J6 (LEN bus) |
| disable/enable | disable | End of Line Res. J7(CCN) | End of line resistor J7 (CCN bus) |
| disable/enable | disable | End of Line Resistor J8  | End of line resistor J8           |
| disable/enable | disable | End of Line Resistor J10 | End of line resistor J10 (Modbus) |

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

**NOTE:** This menu is not used on 4.3-inch controllers.

## 5 - USER INTERFACE: MENU STRUCTURE



### Network – NETWORK

| Displayed text*                 |                           | Status            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------|---------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SmartVu™ touch screen           | SmartVu™ 2.0 touch screen |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| IP Network Interface J5 (eth0): | Ethernet 0 (J5)           |                   | IP network interface J5 (Ethernet 0):                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| MAC Address                     | MAC Address               | xx:xx:xx:xx:xx:xx | MAC address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| -                               | DHCP                      | disabled          | DHCP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| TCP/IP Address                  | IP Address                | 169.254.1.1       | 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).                                                                                                                                                                                                                                                                                                                 |
| Subnet Mask                     | Subnet Mask               | 255.255.255.0     | Subnet mask                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Default Gateway                 | Default Gateway           | 169.254.1.3       | Default gateway                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Gateway Dest/Mask               | Gateway Dest/Mask         | 169.254.0.0/16    | Gateway mask in CIDR format<br><div><div>Gateway IP address</div><div>CIDR notation</div><div>Gateway in CIDR format</div><div>169.254.1.3</div><div>xxx.xxx.xxx.0/24</div><div>169.254.1.0/24</div><div>169.254.1.3</div><div>xxx.xxx.0.0/16</div><div>169.254.0.0/16</div><div>169.254.1.3</div><div>xxx.0.0.0/8</div><div>169.0.0.0/8</div><div>0.0.0.0</div><div>0.0.0.0/0</div><div>0.0.0.0/0</div></div><br>Note: "xxx" shown in the CIDR notation above refers to the Gateway IP address. |
| Domain Name Server (DNS)        | DNS: Primary DNS          | 169.254.1.3       | Domain name server (DNS), primary address                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| -                               | DNS: Alternate DNS        | 169.254.1.4       | Domain name server (DNS), secondary address                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

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



### Date/Time – DATETIME

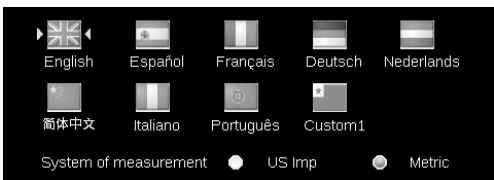
| Displayed text*       |                           | Status               | Description                                                                                                                             |
|-----------------------|---------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| SmartVu™ touch screen | SmartVu™ 2.0 touch screen |                      |                                                                                                                                         |
| Daylight Saving Time  | -                         | on/off               | Summer/winter time activation                                                                                                           |
| Location              | Location                  | UTC                  | Time zone (SmartVu™ 2.0: Time zone setting includes DST control)                                                                        |
| Date/Time             | Date/Time                 | YYYY/MM/DD, HH:MM:SS | Current date and time (must be set manually)                                                                                            |
| Today is a Holiday    | 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)                    |
| Tomorrow is a Holiday | 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 Menu – LANGUNIT

| Displayed text*                                                                    | Description                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (Languages)                                                                        | <p><b>Language list:</b><br/>English, Spanish, French, German, Dutch, Chinese, Italian, Portuguese, and Custom1</p> <p><b>Custom language:</b> 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.</p> |
|  |                                                                                                                                                                                                                                                                                                                                                                                                        |
| System of measurement: US Imp/Metric                                               | <p>US Imp = Parameters displayed in US Imperial units</p> <p>Metric = Parameters displayed in metric units</p>                                                                                                                                                                                                                                                                                         |

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

## 5 - USER INTERFACE: MENU STRUCTURE



### Brightness – BRIGHTNS

| Displayed text*       |                           | Status     | Description                                |
|-----------------------|---------------------------|------------|--------------------------------------------|
| SmartVu™ touch screen | SmartVu™ 2.0 touch screen |            |                                            |
| Brightness            | Brightness                | 0 to 100%  | Screen brightness                          |
| -                     | Theme Selection           | Dark/Light | Theme selection (Dark theme / Light theme) |

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



### Software Info – SWINFO

| Displayed text*       |                           | Status          | Description             |
|-----------------------|---------------------------|-----------------|-------------------------|
| SmartVu™ touch screen | SmartVu™ 2.0 touch screen |                 |                         |
| Software Version      | Software Version          | ECG-SR-20V4B100 | Software version number |
| SDK Version           | SDK Version               | N.NNN.N         | SDK version number      |
| -                     | App version               | NN.N            | Application version     |
| UI Version            | UI Version                | NN              | User interface version  |
| Brand                 | Brand                     | CARRIER         | Brand name              |

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



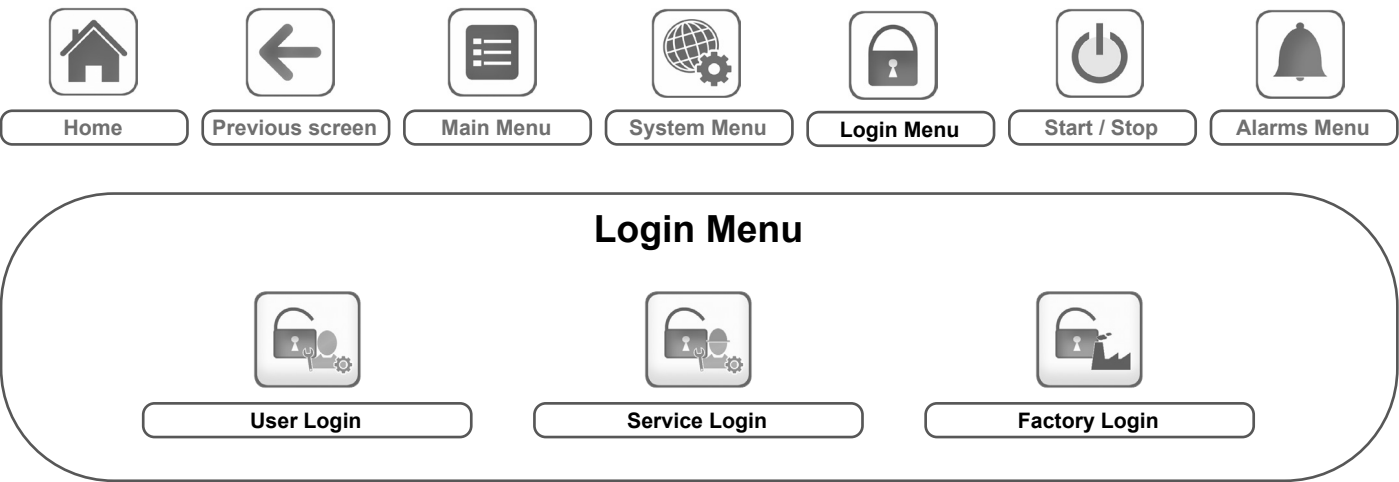
### Hardware Info Menu – HWINFO

| Status | Displayed text* | Description           |
|--------|-----------------|-----------------------|
| -      | Board Variant   | Board variant         |
| -      | Board Revision  | Board revision        |
| 43     | Screen size     | Screen size in inches |

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

# 5 - USER INTERFACE: MENU STRUCTURE

## 5.7 - Login menu



### Legend:

- Basic access (no password)
- User password required

### 5.7.1 - Access control

- 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).

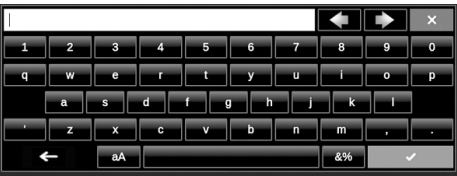
**IMPORTANT:** It is strongly recommended to change the default password of the user interface to exclude the possibility of changing any parameters by an unqualified person.

### 5.7.2 - User login

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

#### To log in

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



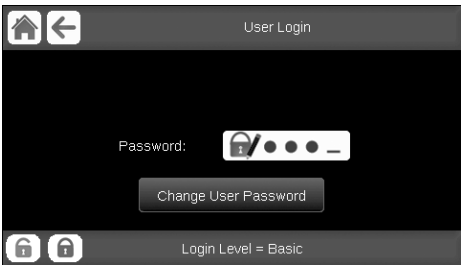
4. The User Login screen appears.

### 5.7.3 - User password

User password can be modified in the User Login menu.

#### To change your password

1. Press the **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.

### 5.7.4 - Service & Factory login

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

## 5 - USER INTERFACE: MENU STRUCTURE

### 5.8 - Start / Stop menu



#### 5.8.1 - 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. |

#### 5.8.2 - Unit start

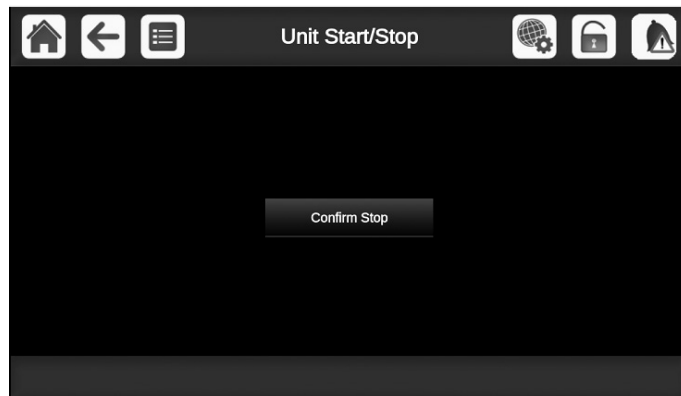
##### To start the unit

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

#### 5.8.3 - Unit stop

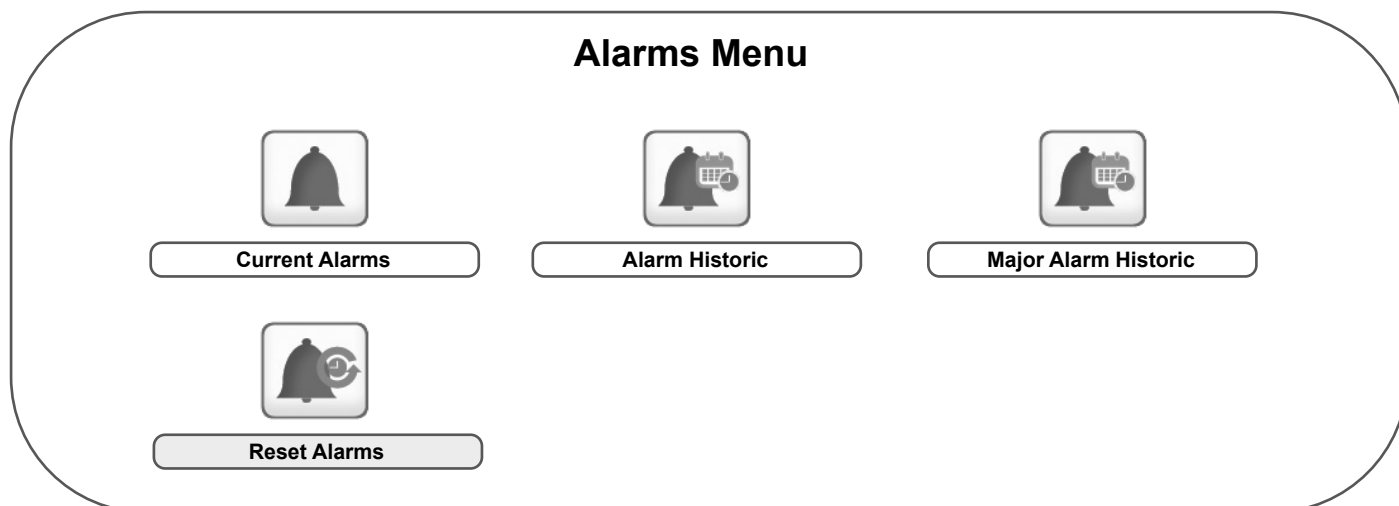
##### To stop the unit

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.

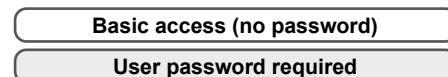


## 5 - USER INTERFACE: MENU STRUCTURE

### 5.9 - Alarms menu



Legend:



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.
- Major Alarm 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 8.6.



**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:<br>Normal = No alarm<br>Partial = There is an alarm, but the unit continues to operate<br>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 - CONTROL SYSTEM OPERATION

### 6.1 - Unit 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:** This 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]:** Chiller start/stop force command can be used to control the chiller state in the Network mode.
  - Command set to stop: The unit is halted.
  - Command set to start: The unit runs in accordance with schedule 1.
- **Remote start/stop contact status [Onoff\_sw]:** Start/stop contact status can be used to control the chiller state in the Remote operating type.
- **Master control type [ms\_ctrl]:** When the unit is the master unit in a two-chiller 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 [EMSTOP]:** 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        |                           |                     |                          |                            |               | Result       |            |
|-----------------------|--------|--------|--------|--------|--------|--------------------------|---------------------------|---------------------|--------------------------|----------------------------|---------------|--------------|------------|
| LOFF                  | L-C    | L-SC   | Rem    | Net    | MAST   | Start/stop force command | Remote start/stop contact | Master control type | Start/stop time schedule | Network emergency shutdown | General alarm | Control type | Unit state |
| -                     | -      | -      | -      | -      | -      | -                        | -                         | -                   | -                        | 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         |

**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.

### 6.2 - Smart Grid Ready (option 157D)

The Smart Grid Ready ("SG Ready") label of the heat pump allows the energy supplier to access the heat pump and manage its four energy usage control states:

- Lockout state (LOCK)
- Normal operating state (NORMAL)
- Low current surplus state (BOOST)
- High current surplus state (FORCED)

**NOTE:** The Smart Grid Ready label is valid only in the DACH region (Germany, Austria, Switzerland).

To learn more about the Smart Grid Ready option and Smart Grid operating modes, please refer to Smart Grid Installation Instructions (see Appendix 1).

**IMPORTANT:** The Smart Grid Ready functionality (option 157D) is not provided as standard. Please contact the Manufacturer to purchase this option.

## 6 - CONTROL SYSTEM OPERATION

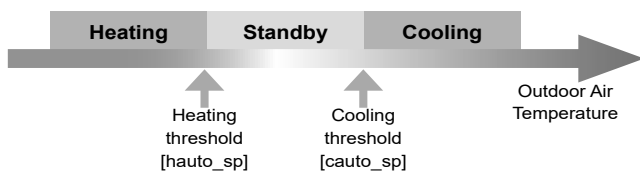
### 6.3 - Heating/Cooling/Standby

The control determines the heat/cool state of the unit. Chillers fitted with a boiler may operate in cooling or heating mode. Without a boiler, the unit remains in Cooling mode. Heat pumps may operate in cooling or heating mode.

When the chiller is in **Heating mode**, the control utilises the boiler to satisfy the heating demand. For heat pumps, the boiler is used when mechanical heating is impossible or insufficient. Additionally, when the outside air temperature is very low, electric heaters can be used as a form of supplemental heating.

When **Cooling mode** is selected, the unit will operate in the Cooling mode and, as a result, the boiler or electric heating will not be activated.

If the unit is in **Standby mode**, it does not cool or heat and compressors are stopped. The pump is running with no mechanical cooling or heating unless configured otherwise. The pump may be stopped depending on pumps configuration (PUMPCONF – Pump Configuration).



**Heating/Cooling changeover for heat pumps and chillers fitted with a boiler**

#### Operating mode control

The operating mode, i.e. cooling or heating, is determined based on the following parameters:

- Unit on/off status [status]: Unit running status.
- Control type [ctrl\_typ]: Local, Remote or Network.
- Local heat/cool selection [hc\_sel]: Heat/Cool selection when the unit is running in Local mode.
- Remote heat/cool selection [onsw\_cr]: Heat/Cool selection when the unit is running in Remote mode.
- Network heat/cool selection [HC\_SEL]: Heat/Cool selection when the unit is running in Network mode.
- Outdoor air temperature [OAT]: Heat/Cool setpoint selection when the automatic changeover has been enabled.

| Control type | Heat / Cool (Local) | Heat / Cool (Remote) | Heat / Cool (Network) | Outdoor Air Temperature           | Operating mode |
|--------------|---------------------|----------------------|-----------------------|-----------------------------------|----------------|
| local        | cool                | -                    | -                     | -                                 | cooling        |
| local        | heat                | -                    | -                     | -                                 | heating        |
| local        | auto*               | -                    | -                     | > cauto_sp + 1                    | cooling        |
| local        | auto*               | -                    | -                     | < hauto_sp - 1                    | heating        |
| local        | auto*               | -                    | -                     | hauto_sp + 1 < oat < cauto_sp - 1 | standby        |
| remote       | -                   | on_cool              | -                     | -                                 | cooling        |
| remote       | -                   | on_heat              | -                     | -                                 | heating        |
| remote       | -                   | on_auto              | -                     | > cauto_sp + 1                    | cooling        |
| remote       | -                   | on_auto              | -                     | < hauto_sp - 1                    | heating        |
| remote       | -                   | on_auto              | -                     | hauto_sp + 1 < oat < cauto_sp - 1 | standby        |
| network      | -                   | -                    | cool                  | -                                 | cooling        |
| network      | -                   | -                    | heat                  | -                                 | heating        |
| network      | -                   | -                    | auto*                 | > cauto_sp + 1                    | cooling        |
| network      | -                   | -                    | auto*                 | < hauto_sp - 1                    | heating        |
| network      | -                   | -                    | auto*                 | hauto_sp + 1 < oat < cauto_sp - 1 | standby        |

\* If auto changeover has been selected through user configuration; otherwise, by default set to "cooling".

#### Legend

cauto\_sp = cooling changeover setpoint (SETPOINT menu)

hauto\_sp = heating changeover setpoint (SETPOINT menu)

oat = outdoor air temperature

### 6.4 - Heating/Cooling selection

Heating/Cooling selection applies to chillers with the boiler and heat pumps. Heating/cooling selection can be controlled in various ways, depending on the active operating type. By default, the cooling mode is selected.

#### Heating/Cooling selection can be determined:

- Locally at the unit using the HC\_SEL item in the GENUNIT menu
- Remotely via the heating/cooling selection contact, if the unit is in the Remote mode
- Via a network command if the unit is in the Network mode

Heating/Cooling mode can be set manually by the user or automatically by the control. When heating/cooling is automatic, the outdoor air temperature determines the heat/cool/standby changeover (see the SETPOINT menu for cooling and heating mode changeover thresholds). The automatic changeover is optional and requires user configuration (GENUNIT – General Parameters).

#### To set cooling / heating / auto changeover

1. Navigate to the Main menu.
2. Select *General Parameters* (GENUNIT).
3. Set *Heat/Cool Select* [HC\_SEL].

#### Heat/Cool Select [HC\_SEL]

|   |                      |
|---|----------------------|
| 0 | Cooling              |
| 1 | Heating              |
| 2 | Automatic changeover |

#### To set cool / heat changeover setpoint

1. Navigate to the Main menu.
2. Select *Setpoint Configuration* (SETPOINT).
3. Set *Cool Changeover Setpt* [cauto\_sp] or *Heat Changeover Setpt* [hauto\_sp].

#### Cool Changeover Setpt [cauto\_sp]

|             |        |
|-------------|--------|
| 3.9 to 50°C | 23.9°C |
| 39 to 122°F | 75°F   |

#### Heat Changeover Setpt [hauto\_sp]

|             |        |
|-------------|--------|
| 0 to 46.1°C | 17.8°C |
| 32 to 115°F | 64°F   |

## 6 - CONTROL SYSTEM OPERATION

### 6.5 - Supplementary heating

30RB/RBP units may be fitted with a boiler that allows the unit to run in heating mode if required. The boiler is active only when the unit is in Heating mode.

30RQ/RQP heat pumps may be fitted with a boiler or electric heaters. The boiler is used as heating replacement when mechanical heating is not possible due to low outside air temperature. Electric heaters can be turned on to satisfy the heating demand when mechanical heating is insufficient.

#### 6.5.1 - Boiler control

Boiler is activated when the outside air temperature is below the user-configured boiler outdoor temperature threshold which is by default set to -10°C (14°F).

##### To set boiler OAT threshold

1. Navigate to the Configuration menu.
2. Select *Backup Configuration* (BACKUP).
3. Set *Boiler OAT Threshold* [boil\_th].

##### Boiler OAT Threshold [boil\_th]

|             |       |
|-------------|-------|
| -15 to 15°C | -10°C |
| 5 to 59°F   | 14°F  |

#### 6.5.2 - Electric heating control

Electric heating stages can be activated as additional heating when OAT is below the user-configured electric heating OAT threshold which is by default set to 5°C (41°F).

##### Electric heating is allowed when:

- Unit is running at 100% capacity.
- Electric pull-down time elapsed [ehs\_pull].
- OAT is below the OAT threshold [ehs\_th].

There are four electric heating stages, where the last electric heating stage is used for back-up when the unit is down due to a detected fault.

##### To set electric heating OAT threshold

1. Navigate to the Configuration menu.
2. Select *Backup Configuration* (BACKUP).
3. Set *Elec Stage OAT Threshold* [ehs\_th].

##### Elec Stage OAT Threshold [ehs\_th]

|            |      |
|------------|------|
| -5 to 21°C | 5°C  |
| 23 to 70°F | 41°F |

**IMPORTANT:** Electric heating is not allowed when the demand limit is active on the unit.

### 6.6 - Pumps control

The control system can manage one or two water exchanger pumps, determining each pump on/off state and its speed. 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 frost 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 and type of pumps available (single speed pumps or variable speed pumps).

#### 6.6.1 - Variable speed pumps control

30RB/30RBP chillers and 30RQ/RQP heat pumps may be fitted with one or two variable speed pumps.

Variable speed pumps give the possibility of saving the pumping energy cost, providing precise water flow control and improving the overall performance of the system. The frequency inverter continuously regulates the flow rate to minimise the pump power consumption at full load and part load.

##### Water flow management methods are as follows:

- Fixed speed control (the control ensures a constant pump speed based on compressor capacity).
- Water flow control based on constant water delta pressure (the control continuously acts on the pump speed to ensure a constant delta pressure).
- Water flow control based on constant delta T on the water exchanger.
  - For units with "External Variable Speed Pump" (customer pump), the control system will use a constant temperature differential (constant delta T) only for flow monitoring. The pump is controlled by a 0-10V signal (AO, CIOB/SIOB board).

**Fixed speed pumps can be either low or high pressure, whereas variable speed pumps are always high pressure pumps.**

#### 6.6.2 - Pumps configuration

The control can command internal fixed speed or variable speed pumps as well as customer pumps. Variable speed pumps may also be configured as fixed speed pumps (see also section 6.6.1).

Basic pump configuration can be performed via the Configuration menu (PUMPCONF – Pump Configuration). Only logged-in users can access the menu. The unit must be stopped.

**IMPORTANT:** Pump speed configuration can be performed only by Carrier service.

##### To set pumps sequence

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

##### Pumps Sequence [pump\_seq]

|   |                |
|---|----------------|
| 0 | No Pump        |
| 1 | One Pump Only  |
| 2 | Two Pumps Auto |
| 3 | Pump#1 Manual  |
| 4 | Pump#2 Manual  |

## 6 - CONTROL SYSTEM OPERATION

### 6.6.3 - Automatic pump selection

If two pumps are controlled and the reversing function has been selected (PUMPCONF – Pump Configuration), the control balances the pump run time to match the configured pump changeover delay.

If this delay has elapsed, the pump reversing function 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 3000h                         | 48h |

### 6.6.4 - Customer pumps configuration

Customer pumps may be configured as follows:

| Pump available          | Pumps sequence (PUMPCONF)                                    |
|-------------------------|--------------------------------------------------------------|
| No pump                 | 0 (no pump)                                                  |
| One single speed pump   | 1 (one pump only)                                            |
| Two single speed pumps  | 2 (two pumps auto)<br>3 (pump#1 manual)<br>4 (pump#2 manual) |
| One variable speed pump | 1 (one pump only)                                            |

Units with customer pumps are fitted with the flow switch, allowing for the water flow control. For more information about actuators, see Water flow switch in section 3.8.

**IMPORTANT: The variable speed pump can be set only by Carrier service.**

### 6.6.5 - Pumps protection

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

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.

Periodical pump quick start can be selected via the Configuration menu (Pump Sticking Protection, PUMPCONF – Pump Configuration).

#### To set periodical pump quick start

1. Navigate to the Configuration menu.
2. Select *Pump Configuration* (PUMPCONF).
3. Set *Pump Sticking Protection* [pump\_per].

| Pump Sticking Protection [pump_per] |     |
|-------------------------------------|-----|
| No/Yes                              | Yes |

### 6.6.6 - ECO pump mode

When the unit is in Standby mode (heating or cooling demand is satisfied), the SmartVu™ control may be configured to stop the pump periodically in order to save energy.

This option can be configured only by service technicians.

#### To verify the Eco Pump configuration

1. Navigate to the Main menu.
2. Select *Miscellaneous Status* (MSC\_STAT).
3. Verify *Eco Pump Mode Active* [m\_ecopmp].

| Eco Pump Mode Active [m_ecopmp] |     |
|---------------------------------|-----|
| No/Yes                          | Yes |

### 6.7 - Hydronic kit option

The hydronic kit option allows for continuous monitoring of the water flow rate (PUMPSTAT – Pump Status).

**The hydronic kit provides the option to measure the following parameters:**

- Inlet and outlet water pressure.
- Water exchanger flow rate.

The water flow rate is based on the pressure difference between the inlet and outlet pressures and the pressure drop curves.

#### Hydronic kit option with variable speed pumps

For units with variable speed pumps, this option allows for the automatic adjustment of the pump speed necessary to maintain the correct water flow rate. Water flow control can be based on compressor usage, constant delta pressure or constant temperature difference.

For more information on Variable speed pumps control, see also section 6.6.1.

## 6 - CONTROL SYSTEM OPERATION

### 6.8 - Control point

The control point represents the water temperature that the unit must produce. The required capacity can be decreased 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.

#### 6.8.1 - Active setpoint

Two setpoints can be selected. Depending on the current operation type, the active setpoint can be selected manually via the Main menu (GENUNIT – General Parameters), with the volt-free user contacts, with network commands (CCN or BACnet) or automatically with the setpoint time schedule (schedule 2).

The following tables summarise possible selections depending on the control operating type (Local, Remote or Network) and the following parameters:

- **Heating or Cooling operating mode [hc\_sel]:** Heat/Cool select (GENUNIT menu).
- **Setpoint selection [sp\_sel]:** Setpoint select permits selection of the active setpoint if the unit is in the Local operating type (GENUNIT menu).
- **Setpoint switch status [SETP\_SW]:** Remote Setpoint Switch (INPUTS menu).
- **Schedule 2 status [SP\_OCC]:** Schedule for setpoint selection.

#### LOCAL OPERATING TYPE

| Parameter status |                    |                           |                  |                 |                   | Active setpoint               |
|------------------|--------------------|---------------------------|------------------|-----------------|-------------------|-------------------------------|
| Heating/cooling  | Setpoint selection | Ice storage configuration | Ice done contact | Setpoint switch | Schedule 2 status |                               |
| cooling          | sp-1               | -                         | *                | *               | -                 | cooling setpoint 1 (csp1)     |
| cooling          | sp-2               | -                         | *                | *               | -                 | cooling setpoint 2 (csp2)     |
| cooling          | *                  | enabled                   | open             | closed          | -                 | cooling ice setpoint (Ice_sp) |
| cooling          | *                  | enabled                   | closed           | closed          | -                 | cooling setpoint 2 (csp2)     |
| cooling          | *                  | -                         | *                | open            | -                 | cooling setpoint 1 (csp1)     |
| cooling          | auto               | -                         | *                | *               | occupied          | cooling setpoint 1 (csp1)     |
| cooling          | auto               | -                         | *                | *               | unoccupied        | cooling setpoint 2 (csp2)     |
| cooling          | auto               | enabled                   | open             | *               | unoccupied        | cooling ice setpoint (Ice_sp) |
| heating          | sp-1               | -                         | *                | *               | -                 | heating setpoint 1 (hsp1)     |
| heating          | sp-2               | -                         | *                | *               | -                 | heating setpoint 2 (hsp2)     |
| heating          | auto               | -                         | *                | *               | occupied          | heating setpoint 1 (hsp1)     |
| heating          | auto               | -                         | *                | *               | unoccupied        | heating setpoint 2 (hsp2)     |

\*Any configuration, (-) default configuration.

#### REMOTE OPERATING TYPE

| Parameter status |                    |                           |                  |                 |                   | Active setpoint               |
|------------------|--------------------|---------------------------|------------------|-----------------|-------------------|-------------------------------|
| Heating/cooling  | Setpoint selection | Ice storage configuration | Ice done contact | Setpoint switch | Schedule 2 status |                               |
| cooling          | *                  | enabled                   | open             | closed          | -                 | cooling ice setpoint (Ice_sp) |
| cooling          | *                  | -                         | *                | open            | -                 | cooling setpoint 1 (csp1)     |
| cooling          | -                  | -                         | *                | open            | -                 | cooling setpoint 1 (csp1)     |
| cooling          | -                  | -                         | *                | closed          | -                 | cooling setpoint 2 (csp2)     |
| heating          | -                  | -                         | *                | open            | -                 | heating setpoint 1 (hsp1)     |
| heating          | -                  | -                         | *                | closed          | -                 | heating setpoint 2 (hsp2)     |

\*Any configuration, (-) default configuration.

#### NETWORK OPERATING TYPE

| Parameter status |                    |                           |                  |                 |                   | Active setpoint           |
|------------------|--------------------|---------------------------|------------------|-----------------|-------------------|---------------------------|
| Heating/cooling  | Setpoint selection | Ice storage configuration | Ice done contact | Setpoint switch | Schedule 2 status |                           |
| cooling          | -                  | -                         | *                | *               | occupied          | cooling setpoint 1 (csp1) |
| cooling          | -                  | -                         | *                | *               | unoccupied        | cooling setpoint 2 (csp2) |
| heating          | -                  | -                         | *                | *               | occupied          | heating setpoint 1 (hsp1) |
| heating          | -                  | -                         | *                | *               | unoccupied        | heating setpoint 2 (hsp2) |

\*Any configuration, (-) default configuration.

**IMPORTANT:** Ice storage configuration [ice\_cnfg] and ice done contact [ice\_done] apply only to units with EMM.

## 6 - CONTROL SYSTEM OPERATION

### 6.8.2 - Reset

Reset means the active setpoint is modified so that less machine capacity is required. In the cooling mode the setpoint is increased, whereas in the heating mode it is decreased.

**The reset can be based on the following possibilities:**

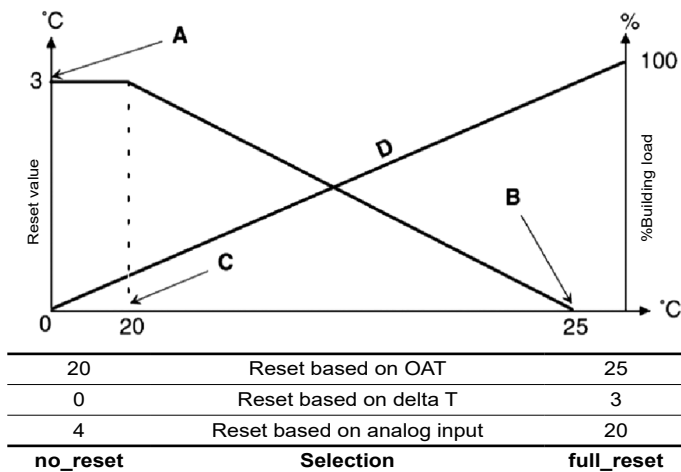
- OAT that gives the measure of the load trends for the building.
- Return water temperature ( $\Delta T$  provides the average building load).
- Space temperature (EMM option).
- Dedicated 4-20 mA input (EMM option).

The reset source and the reset parameters can be configured in the Main menu (RESETCFG – Reset Configuration). In response to a drop in the reset source (e.g. OAT), the cooling setpoint is normally reset upwards to optimise unit performance.

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

- A reference at which reset is zero (no reset value).
- A reference at which reset is maximum (full reset value).
- The maximum reset value.

**Reset example in Cooling mode:**



**Legend**

- A: Maximum reset value
- B: Reference for zero reset
- C: Reference for maximum reset
- D: Building load

### 6.9 - Capacity limitation

SmartVu™ 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 unit capacity can be limited:**

- By means of user-controlled volt-free contacts. Units without the energy management module have one contact. Units with the energy management module permit three capacity limitation levels (see also section 3.9.3). The unit capacity can never 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). If the unit is not in the Master/Slave assembly, the lag limit value is equal to 100%.
- By night mode limitation control. The demand limit value in the night mode is selectable if the value is below the selected limit.

**To set limit setpoints**

1. Navigate to the Main menu.
2. Select *Setpoint Configuration* (SETPOINT).
3. Set *Switch Limit Setpoint 1 / 2 / 3* [lim\_sp1 / 2 / 3].

| Switch Limit Setpoint 1 / 2 / 3 [lim_sp1 / 2 / 3] |      |
|---------------------------------------------------|------|
| 0 to 100%                                         | 100% |

**To verify lag limit set by the master unit**

1. Navigate to the Main menu.
2. Select *General Parameters* (GENUNIT).
3. Verify *Lag Capacity Limit Value* [LAG\_LIM].

| Lag Capacity Limit Value [LAG_LIM] |      |
|------------------------------------|------|
| 0 to 100%                          | 100% |

**To set the night mode limit**

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%                       | 100% |

Based on the limit source, the active demand limit value (DEM\_LIM) is set to the lowest possible value.

DEM\_LIM can be forced by Network.

**To verify 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%                         | - |

## 6 - CONTROL SYSTEM OPERATION

### 6.10 - Capacity control

The control adjusts the capacity to keep the water exchanger temperature at its setpoint. Compressors are started and stopped in a sequence designed to equalise the number of start-ups (value weighted by their operating time).

#### 6.10.1 - Circuit loading sequence

This function determines in which order the circuit capacity is changed. Compressor loading is managed by starting/stopping the compressors. Two types of sequencing, i.e. balanced and staged loading sequence, are available and can be configured by the user via the user interface (GENCONF – General Configuration).

**Balanced loading sequence:** The control maintains equal capacity between all circuits as the machine loads and unloads. Balanced loading sequence is the default sequence employed by the control.

**Staged loading sequence:** The control loads the lead circuit completely before the lag circuits are started. When the load is decreasing, the lag circuit is unloaded first. Staged loading sequence is active when one of the circuits is shut down due to its failure; the circuit is in capacity override mode; or the remaining circuits are shut down or fully charged.

#### To set the circuit 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/Yes                            | No |

#### 6.10.2 - Capacity for multi-circuit unit

The circuit lead/lag function determines the lead and lag circuit of the unit. This function controls the start/stop sequence of two refrigeration circuits called circuit A and 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 first when decreasing capacity. The lead/lag circuits can be selected manually or automatically (*Cir Priority Sequence*, GENCONF – General Configuration).

- **Manual lead/lag circuit determination:** Circuit A or circuit B selected as the lead circuit. The selected circuit takes priority over another circuit.
- **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.

#### To set circuit priority

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

| Cir Priority Sequence [prio_cir] |                    |
|----------------------------------|--------------------|
| 0                                | Auto               |
| 1                                | Circuit A priority |
| 2                                | Circuit B priority |

### 6.11 - Night mode

Night mode allows users to configure the unit to operate with specific parameters in a specific time period. During the night period, the unit capacity is limited. The number of operating fans is reduced (in cooling mode only).

The night period is defined by a start time and an end time that are the same for each day of the week. The Night mode settings or the maximum capacity value can be configured via the Configuration menu (GENCONF – General Configuration). Only logged-in users can modify the night mode settings.

#### To set the night mode

1. Navigate to the Configuration menu (logged-in users only).
2. Select *General Configuration* (GENCONF).
2. Set parameters corresponding to the night mode.

| Night Mode Start Hour [nh_start] |      |
|----------------------------------|------|
| 00:00 to 24:00                   |      |
| Night Mode End Hour [nh_end]     |      |
| 00:00 to 24:00                   |      |
| Night Capacity Limit [nh_limit]  |      |
| 0 to 100%                        | 100% |

### 6.12 - Coil pressure control

The coil pressure of each circuit is managed by four fans maximum. 30RB/RQ units are fitted with fixed speed fans and 30RBP/RQP units are fitted with variable speed fans providing higher part load efficiency and reduced acoustic levels.

In cooling mode, the condensing pressure is controlled independently in each circuit based on the saturated condensing temperature. The control permanently adjusts its setpoint to guarantee optimal performance and ensure anti-short-cycle protection of the fans.

In heating mode, the evaporating pressure is controlled independently on each circuit based on the saturated suction temperature. The control permanently adjusts its setpoint to guarantee optimal performance, delay and limit frost accumulation on coils.

### 6.13 - Energy management module

The optional Energy Management Module is used to control the level of energy consumption, providing users with information such as current unit status, compressors operating status, etc.

For more information about connections associated with the energy management module, see section 3.3.

## 6 - CONTROL SYSTEM OPERATION

### 6.14 - Dry Cooler Free Cooling (DCFC)

30RB/30RBP chillers and 30RQ/RQP may be fitted with a dry cooler that enables power consumption reduction which amounts to energy and cost savings.

The installation of a dry cooler allows for "free cooling" – a method of using low outdoor air temperature as an aid to chilling water that is later used in the air-conditioning system. The system is the most effective when the outdoor air temperature is below 0°C (32°F).

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).

### 6.15 - Refrigerant gas leak detection option

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 (timer set by service technicians), the alarm will be triggered, but the unit will continue to operate.

### 6.16 - Desuperheater option

30RB/RQ/RBP/RQP units may be fitted with a desuperheater that allows for better energy management. The desuperheater is used to extract the high pressure, high temperature heat from the refrigerant to "desuperheat" it to a lower pressure refrigerant. The vapour that goes into the desuperheater is not fully condensed; therefore, the refrigerant vapour must be channelled to a separate heat exchanger where the condensing process occurs.

Note that the desuperheater is enabled when the Desuperheater demand contact is closed. For units with EMM option, there is also an output used to command a desuperheater pump.

#### To set minimal condensing setpoint

1. Navigate to the Main menu.
2. Select *Setpoint Configuration* (SETPOINT).
3. Set *Desuperheat Min SCT* [min\_sct].

#### Desuperheat Min SCT [min\_sct]

|             |       |
|-------------|-------|
| 24 to 50°C  | 40°C  |
| 75 to 122°F | 104°F |

### 6.17 - Heat Reclaim (option 50)

Heat reclaim is a method of using energy that normally leaves the system in the form of the waste heat at the condenser site. Chillers 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 (BPHE) to the unit may significantly reduce unit energy consumption 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. When the Heat Reclaim mode is active, the HR condenser will generate hot water to be used in the customer hot water system.

The chiller can switch to the Heat Reclaim mode when:

- HR option has been set on ("Reclaim selection" is set to "yes" in RECLAIM table or the HR switch is closed in Remote mode)
- HR control water temperature is below the Heat Reclaim Control Point (set in RECLAIM table) with an offset of 0.5K.

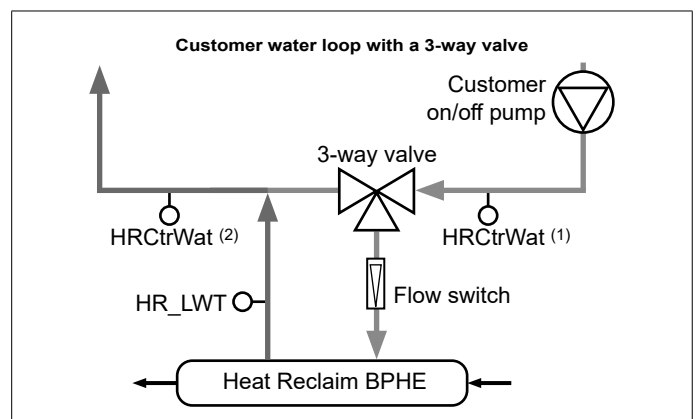
The Heat Reclaim 3-way valve controls the hot water loop based on a PID algorithm. If needed, fans' speed will be adapted to reach the Heat Reclaim setpoint. When the "Eco" mode is enabled, fans will not be used, which saves some energy.

Please note that the 3-way valve can be replaced with the variable-speed pump, also controlled with the PID algorithm. However, in that case, the Heat Reclaim control can be based only on the entering water temperature.

If in the air-cooled mode the leaving water temperature (HR\_LWT) is above 75°C (167°F), the 3-way valve or the variable-speed pump controlled by the PID algorithm will ensure minimum water flow on heat exchangers and prevent water boiling. It is therefore necessary to permanently guarantee the use or evacuation of the heat transferred to the hydraulic circuit.

When Heat Recovery is not used and the outside air temperature is low, the control provides anti-freeze protection by opening the 3-way valve to its minimum position or running the variable-speed pump at its minimum speed. This ensures minimum water flow in the heat exchanger.

For HR chillers running on water, the controller may activate the optional HR condenser heater (option 41C) to provide anti-freeze protection when necessary.



#### Legend:

HR\_LWT: Heat Reclaim Leaving Water Temperature sensor (water temperature measured on the BPHE condenser outlet).

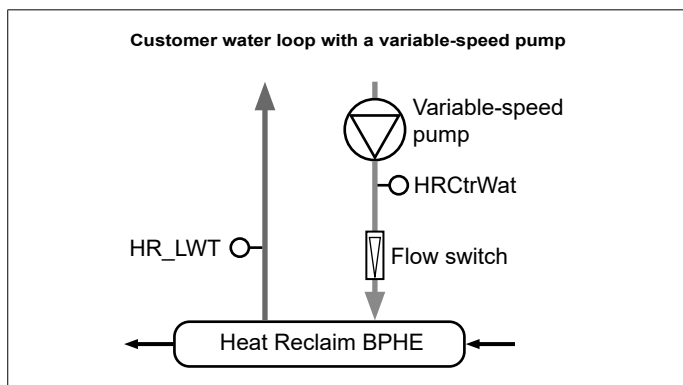
HR\_CtrWat: Heat Reclaim Control Water Temperature sensor (water temperature measured before the 3-way valve OR after the 3-way valve on the customer side).

- If the sensor is located before the 3-way valve [HR\_CtrWat (1)], then "HR Control on EWT ?" in HR\_CFG table is set to "yes".

- If the sensor is located after the 3-way valve [HR\_CtrWat (2)], then "HR Control on EWT ?" in HR\_CFG table is set to "no".

Flow Switch: Heat reclaim water flow status (used to detect if the water flows in the BPHE condenser)

## 6 - CONTROL SYSTEM OPERATION



### Legend:

HR\_LWT: Heat Reclaim Leaving Water Temperature sensor (water temperature measured on the BPHE condenser outlet).

HR\_CtrWat: Heat Reclaim Control Water Temperature sensor (water temperature measured after the variable-speed pump on the customer side). "HR Control on EWT ?" in HR\_CFG table is set to "yes".

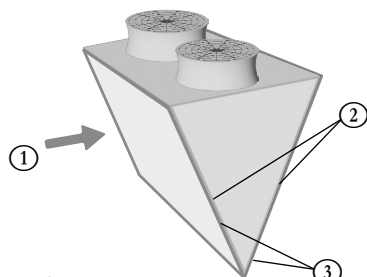
Flow Switch: Heat reclaim water flow status (used to detect if the water flows in the BPHE condenser).

### 6.18 - Free Cooling (option 305A/305B/305C)

When the OAT is low enough compared to the control setpoint, the controller allows the hydraulic Free Cooling (FC) system to cool down the customer loop by circulating glycol-water mixture in FC coils which are located in parallel to MCHE refrigerant coils.

Instead of mechanical cooling, the system is using low temperature ambient air to cool down the process water and satisfy the cooling demand. This enables the complete shutdown of compressors and results in energy saving.

#### FC coils integrated with refrigerant coils



### Legend

1. Air flow (low temperature ambient air)
2. MCHE coils
3. FC coils

The system comes with three Free Cooling options:

- Option 305A: Total Hydraulic Free Cooling (FC coils are mounted on each coil of two circuits).
- Option 305B: Partial Hydraulic Free Cooling (FC coils are mounted on coils of one circuit only).
- Option 305C: Total Hydraulic Free Cooling / Glycol-Free (FC coils are mounted on coils of two circuits).

#### 6.18.1 - Units with option 305A / 305B

Option 305A/305B is used in systems where the process water is the glycol-water mixture (fluid type = brine).

- Two 2-way valves are used to disable or enable the FC subset. The state of the valves depends on whether the Free Cooling mode is active or not.

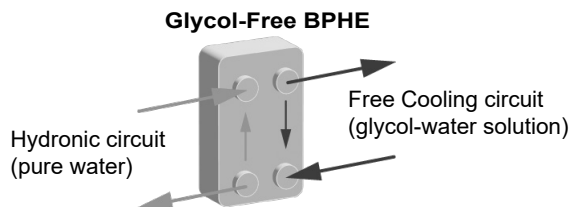
| FC mode | Evaporator valve | Coil valve |
|---------|------------------|------------|
| No      | Open             | Close      |
| Yes     | Close            | Open       |

When the Free Cooling mode is active, the process water is going directly through FC coils and then passing through the evaporator before returning to the building.

#### 6.18.2 - Units with option 305C

Option 305C is used in systems where glycol is not permitted, i.e. process water is 'pure water' (fluid type = water).

- This option comes with an additional brazed plate heat exchanger (BPHE) connected to FC coils with the glycol-water mixture running through them ("glycol-water loop"). This intermediate heat exchanger is also referred to as "Glycol-Free BPHE" as it does not require adding glycol to the process water. The glycol-water solution is only used on the Free Cooling side.



For chillers with option 305C, the process water is normally passing through the Glycol-Free BPHE and then going into the evaporator before returning to the building.

#### In the glycol-water loop:

- There is a fixed speed pump ("FC coil pump") located at the output of the Glycol-Free BPHE.

The FC coil pump can operate in one of the following modes:

- Free Cooling: The pump is "on".
- Anti-sticking protection: When the FC coil pump is stopped, the controller will start this pump each day at 14:00 for 25 seconds. Starting the pump periodically increases the lifetime of pump bearings and the tightness of the pump seal. This functionality requires service configuration (enabled by default).

- The heater is used to protect the Glycol-Free BPHE against freezing when the chiller is stopped and the outside air temperature is very low (freeze protection).

#### 6.18.3 - Free Cooling modes

Free Cooling is activated when the outside air temperature drops 2°C below the chiller EWT and the system has been already operating in Cooling mode for at least 10 minutes.

The circuit of the unit mounted with FC coils can operate in the following modes:

- Mechanical Cooling (MC) mode with compressors activated only when the FC conditions cannot be met.
- Controlled Free Cooling mode (compressors stopped on both circuits) when the FC conditions are met and sufficient to achieve the control setpoint.
- Full Free Cooling mode (compressors stopped on one circuit but not on the other) when the FC conditions are met and the other circuit has already some compressors ON. The objective is to take advantage of the total FC power of the circuit to accelerate the unloading of the compressors of the other circuit.
- Mixed mode (MC and FC at the same time) when the FC conditions are met but not sufficient enough to achieve the requested setpoint.

#### To verify the Free Cooling mode

1. Navigate to the Main menu.
2. Select *Hydraulic Free Cooling* (HYD\_FC).
3. Verify *Mode of Circuit A (B)* [modeCirA / modeCirB].

| Mode of Circuit A [modeCirA] / Mode of Circuit B [modeCirB] |
|-------------------------------------------------------------|
| 0 Mechanical Cooling                                        |
| 1 Mixed Cooling                                             |
| 2 Controlled Free Cooling                                   |
| 3 Full Free Cooling                                         |

## 6 - CONTROL SYSTEM OPERATION

### 6.19 - Defrost cycle for heat pumps

When the outside air temperature is low and the ambient humidity is high, the probability of frost forming on the surface of the outdoor coil increases. The frost covering the outdoor coil may decrease the air flow across the coil and lead to lower performance of the unit. To remove the frost from the coil, the control initiates the defrost cycle when necessary.

During the defrost cycle, the circuit is forced into the cooling mode. To prevent the water loop from cooling down, optional electric heating may be started. The defrost cycle lasts until the end of defrost temperature is achieved.

### 6.20 - Master/slave assembly

The control system allows for master/slave control of two units linked by the CCN network. The master unit can be controlled locally, remotely or by network commands (CCN), while the slave unit remains in Network mode.

All control commands to the master/slave assembly (start/stop, setpoint selection, heating/cooling operation, 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 ensure that the run times of the two units are equalised.

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.

**IMPORTANT: Master/slave assembly can be configured only by Carrier service.**

### 6.21 - Duplex unit (30RQP 740R-1040R)

30RQP 740R-1040R units are delivered as two separate modules connected in parallel.

Two water temperature sensors (one per module) are provided and connected to the water outlet ensuring an optimal control of the water loop. Duplex units are allowed to increase and decrease their own capacity at the same time.

The units are connected via the communication bus. The duplex unit modules, also referred to as the master and the slave module, are configured and addressed at commissioning.

### 6.22 - Brine (option 6)

30RB units offer a cooler fluid type selection, including standard water fluid as well as the optional brine fluid, i.e. low brine (option 6). The brine option is commonly used for low temperature applications. 30RQ heat pumps can use water only.

**NOTE: This option requires the Software Activation Key (see section 6.29).**

### 6.23 - BACnet (option 149)

The BACnet/IP or BACnet MS/TP communication protocol is used by BMS or the programmable controllers to communicate with the control.

**NOTE: This option requires the Software Activation Key (see section 6.29).**

### 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.

**NOTE: This option requires the Software Activation Key (see section 6.29).**

### 6.25 - Cooling floor optimization (option 119C)

Heat pumps with option 119C enabled will operate with lower than standard capacity limits in Cooling mode in order to save energy.

**NOTE: This option requires the Software Activation Key (see section 6.29).**

### 6.26 - Energy Meter (option 294)

An Energy Meter with a current transformer on the main power supply is used to measure the energy consumption of the unit.

It is every second that the SmartVu™ controller reads the energy consumption from the Energy Meter using the Modbus RTU protocol (SmartVu™ controller, J8 connector). The SmartVu™ controller also sets the time and the date on the Energy Meter.

The Energy Meter provides the following measurements:

| Name                        | Point name | Unit |
|-----------------------------|------------|------|
| Current per phase           | sglPhs_I   | A    |
| Active power                | p_total    | kW   |
| Power factor                | pow_fact   | -    |
| Total active energy         | e_total    | kWh  |
| Partial active energy       | e_reset    | kWh  |
| Maximum active power demand | p_max      | kW   |
| Total harmonic distortion   | THD        | %    |

The values measured by the Energy Meter are displayed in the Energy Monitoring menu (ENERGY) which also contains smart energy monitoring data (standard "Smart Energy" functionality).

For units equipped with the optional Energy Meter, all "Smart Energy" monitoring data (ENERGY table) related to the electrical power of the unit will be updated with the data coming from the Energy Meter.

If the communication between the controller and the Energy Meter is lost, then an alert will be triggered (alert 59001).

The user can reset the energy consumption readings if needed.

#### To reset the energy readings

1. Navigate to the Main menu (logged-in users only).
2. Select *Energy Monitoring* (ENERGY).
3. Set *Reset of Energy Counter* [reset\_en] to "yes".

| Reset of Energy Counter [reset_en] |     |
|------------------------------------|-----|
| No/Yes                             | Yes |

### 6.27 - Fast capacity recovery (option 295+)

The "Fast capacity recovery" function is used to restore unit capacity as quickly as possible in the event of a power outage. It also comes with a power supply module that keeps the controller powered in case the power cut occurs.

When the power comes back, the fast capacity recovery mode can be started (MODES, m\_fastRe = "yes"). The system modifies compressor loading sequence so that it would bring back the unit capacity to the level prior to the power outage faster than normal.

Please note that "Fast capacity recovery" is activated only if the power outage did not last more than 10 minutes. If the power outage lasted longer than 10 minutes, then the fast capacity recovery mode is not allowed.

**NOTE: This option requires the Software Activation Key (see section 6.29).**

## 6 - CONTROL SYSTEM OPERATION

### 6.28 - Phase controller (option 159B)

The Phase Controller is an optional device used to protect the machine by monitoring the main power supply of the unit.

This device has a normally closed relay output. The status of this output is reported in the Inputs table (INPUTS, PH\_CTRL).

The Phase Controller can detect the following faults:

- Phase Loss (PL) fault / Phase Sequence (PS) fault
- Under Voltage (UV) fault / Over Voltage (OV) fault
- Three-Phase Voltage Asymmetry (ASYM) fault
- Under Frequency (UF) fault / Over Frequency (OF) fault

In case one of the faults given above is detected, the relay output will open and the alert/alarm will be triggered (see also "phase controller alarm/alert" setting below).

#### To set the phase controller alarm/alert

1. Navigate to the Configuration menu (logged-in users only).
2. Select *User Configuration* (USERCONF).
3. Set *Phase Controller Action* [PhCtrAct].
  - This parameter is used to define the action taken on the unit in case the fault is detected by the Phase Controller.
  - To prevent unit damage due to unstable power supply conditions, it is recommended to set "Phase Controller Action" to "1" or "2".

| Phase Controller Action [PhCtrAct] |                                                                                        |
|------------------------------------|----------------------------------------------------------------------------------------|
| 0                                  | Alert: No action taken on the unit (default setting)                                   |
| 1                                  | Alarm: The unit shuts down when the alarm is active. The alarm reset is automatic.     |
| 2                                  | Alarm: The unit shuts down when the alarm is active. The alarm must be reset manually. |

Whenever the "3-Phase Control: Fault detection" alert/alarm is triggered (alarm/alert 10054), this alert/alarm will be active for the minimum time period configured by the user (USERCONF, PCMinTim). By default, it is set to be active for at least 2 minutes and the status of the relay output is ignored during this time period.

### 6.29 - Software Activation Key(s)

30RB/RQ units with SmartVu™ offer some additional options which require Software Activation Keys:

- **Cooler fluid type:**
  - Low Brine (option 6)
- **BACnet** communication (option 149)
- **Modbus** communication (option 149B)
- **Cooling Floor Optimization** (option 119C)
- **Fast capacity recovery** (option 295+)

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

#### Each option requires an individual software activation key.

To obtain the Software Activation Key, please contact your local Carrier Service representative.

#### 6.29.1 - Software options

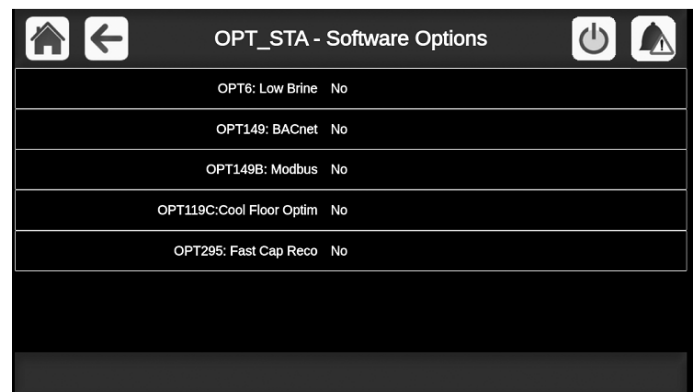
The list of available software activation keys can be verified via the Main menu.

#### 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.



**IMPORTANT:** In case the controller is replaced, the **NEW Software Activation Key(s) based on the new MAC address must be installed again (see also section 6.29.2).**

#### 6.29.2 - 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 Carrier representatives 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.

## 6 - CONTROL SYSTEM OPERATION

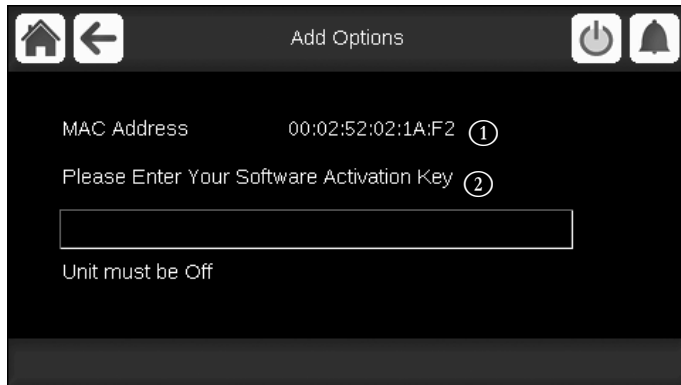
The Replacement mode ends when the Software Activation Key is installed or the period of 7 days elapsed (7 days since the first start of the compressor).

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

### 6.29.3 - Software key installation

#### To install the Software Activation Key via SmartVu™

1. Go to the Main menu.
2. Navigate to the Configuration menu (logged-in users only).
3. Select *Add Options* (ADD\_OPT).
  - When installing the Software Activation Key, please make sure that the unit is stopped.



#### Legend:

1. Controller MAC address
2. Software Activation Key

4. Enter the **Software Activation Key**.
  - If the Software Key ends with two equality signs (==), then these signs can be omitted. The Key will be accepted.
  - The Software Activation Key is case-sensitive.
5. Once the Software Activation Key is provided in the Keyboard screen, press **OK**.
6. Once the Software Activation Key is validated, the following message will be displayed: **“Software Activation Key Added”**.
7. The parameter connected with the activated functionality is set automatically and the control system will also be rebooted automatically.
  - If the Software Activation Key is incorrect, the following message will be displayed: “Software Activation Key is Invalid”.
  - If the Software Activation Key has been added before, the following message will be displayed: “Key Already Set”.

### 6.30 - 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

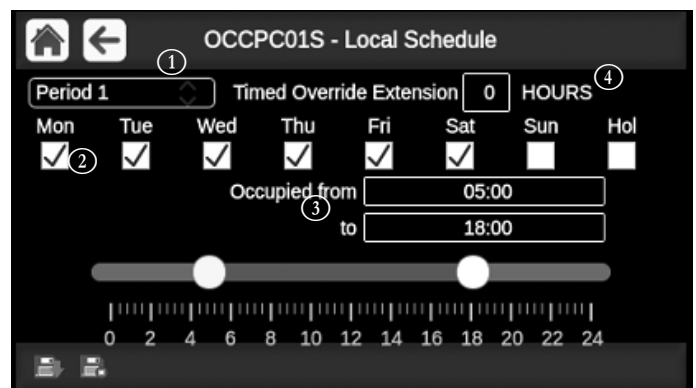
The control offers the user the possibility of setting eight occupancy periods where each occupancy period includes the following elements to be defined:

- **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.

Example: Schedule 1 (SmartVu™ 2.0 touch screen)



#### Legend

- ① Time period (Period 1 – Period 8)
- ② Selection of days for the time schedule (Monday - Sunday, Holiday)
- ③ Start/end of the schedule
- ④ Timed override extension (displayed only when "Period 1" is selected)

## 6 - CONTROL SYSTEM OPERATION

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 |     |     |     |     |     |     |     |     |

|                                                                                                    |            |
|----------------------------------------------------------------------------------------------------|------------|
| <div style="width: 15px; height: 15px; background-color: #cccccc; border: 1px solid black;"></div> | Occupied   |
| <div style="width: 15px; height: 15px; background-color: #ffffff; border: 1px solid black;"></div> | 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 |          |                   |

### 6.31 - 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 5.2).

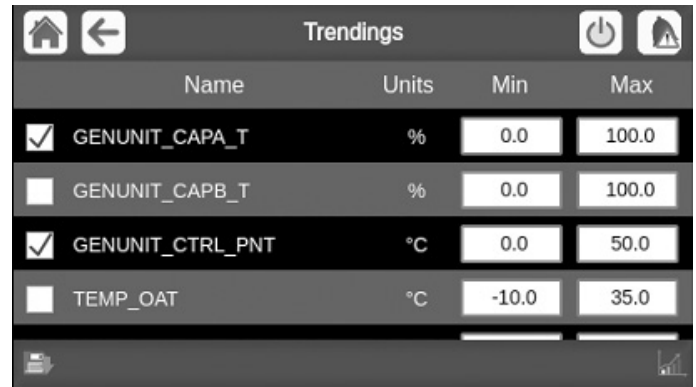
### 6.32 - Trending

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.
  - A maximum of 4 trending points can be selected.
  - On SmartVu™ 2.0 touch screen: Swipe up or swipe down to display other trending points.

Example: Trendings (SmartVu™ 2.0 touch screen)



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

Example: Trendings plot (SmartVu™ 2.0 touch screen)



- Press   to navigate across the timeline.
- Press the **Zoom in** button  to magnify the view or the **Zoom out** button  to expand the viewed area.
- Press the **Refresh** button ( on SmartVu™ touch screen or  on SmartVu™ 2.0 touch screen) to reload data.

## 7 - WEB CONNECTION

### 7.1 - Web interface

The SmartVu™ control provides the functionality to access and control unit parameters from a web interface.

**The SmartVu™ touch screen has been superseded by the SmartVu™ 2.0 touch screen** and the look of the web interface differs depending on the version of the touch screen installed on the machine (SmartVu™ / SmartVu™ 2.0).

#### Pre-requisites:

- Ethernet cable

#### Minimum web browser configuration:

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

#### SmartVu™ web interface

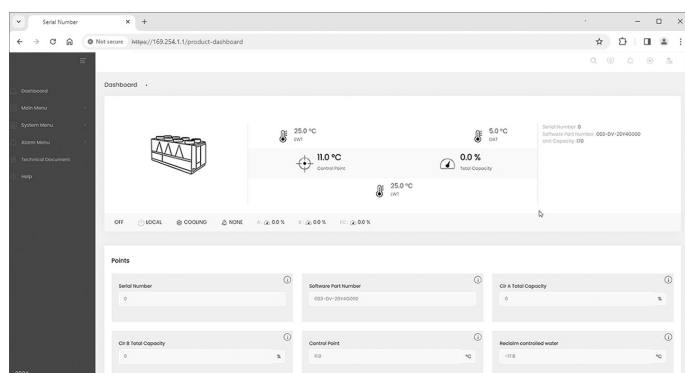
The legacy SmartVu™ web interface looks like the touch screen interface. The navigation across menus is the same regardless of the connection method.



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

#### SmartVu™ 2.0 web interface

The SmartVu™ 2.0 touch screen comes with the new user-friendly web interface (see section 7.4). The new web interface provides a much more convenient way to monitor, set up or update the control system.



### 7.2 - Connect to the web interface

To connect to the controller via the web interface, it is necessary to know the IP address of the unit. This can be verified on the touch screen (System Menu > Network > IP Network Interface).

- Unit default address: 169.254.1.1 (J5, eth0).
- The unit IP address can be changed.

#### To connect to the 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.

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.**

### 7.3 - 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.

**SmartVu™ web UI:** Click the **Technical documentation** button  at the bottom of the page in order to see a list of documents related to the unit.

**SmartVu™ 2.0 web UI:** Click "Technical Document"  in the navigation pane.

#### 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.

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

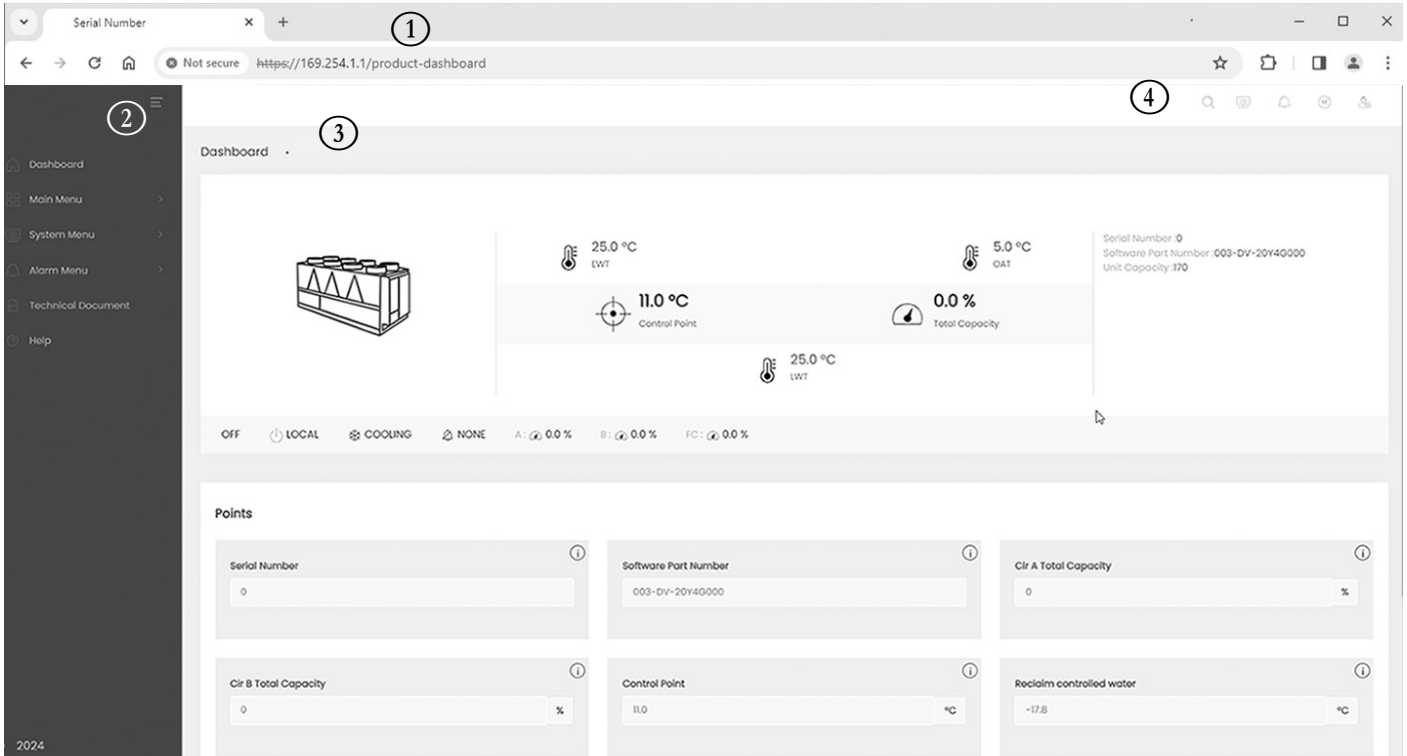
**SmartVu™ 2.0 web UI:** Click "Help"  in the navigation pane.

| Document                                                 | Language | Type |
|----------------------------------------------------------|----------|------|
| <a href="#">FC101 - Danfoss Drive Troubleshooting</a>    | English  | PDF  |
| <a href="#">ATV212 - Schneider Drive Troubleshooting</a> | English  | PDF  |
| <a href="#">BACnet User's guide</a>                      | English  | PDF  |
| <a href="#">BACnet Guide utilisateur</a>                 | French   | PDF  |
| <a href="#">ModBus User's guide</a>                      | English  | PDF  |
| <a href="#">ModBus Guide utilisateur</a>                 | French   | PDF  |
| <a href="#">Energy Meter</a>                             | English  | PDF  |
| <a href="#">License information</a>                      | English  | PDF  |

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

# 7 - WEB CONNECTION

## 7.4 - SmartVu™ 2.0 web interface

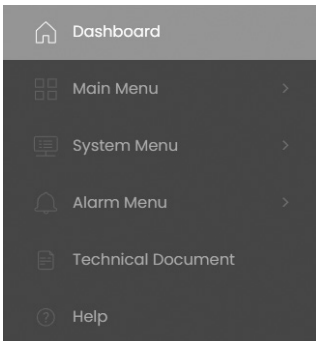


Web interface (home screen)

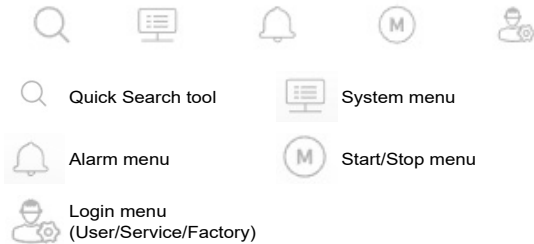
### Web interface sections

- ① Address bar: Enter the IP address of the unit.
- ② The navigation pane on the left is used to switch between menus. Click/tap  to expand/collapse the Navigation pane.
- ③ Main application window: Used to display the content of the selected menu.

Click/tap the menu icon in the navigation pane:

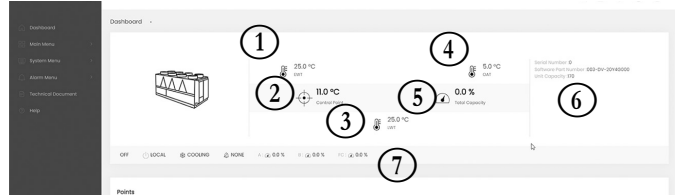


- ④ Quick access to Search, System menu, Alarm menu, Login and Start/Stop (read-only).

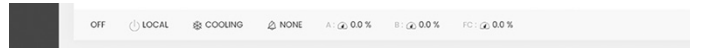


### Dashboard

The Dashboard is the first view displayed when connecting to the web interface. It gives a clear and comprehensive view of the current operations of the chiller. This view is made up of several tiles that are snapshots of data presented in textual or graphical form.



- ① Cooler EWT (Entering Water Temperature)
- ② Control point
- ③ Cooler LWT (Leaving Water Temperature))
- ④ Outside air temperature
- ⑤ Total capacity
- ⑥ Additional information:
  - Serial number
  - Software version
  - Unit capacity
- ⑦ Status bar



- Unit status: OFF / RUNNING / STOPPING / DELAY / TRIP/OUT / READY / OVERRIDE / RUN TEST / TEST
- Mode: LOCAL / REMOTE / NETWORK
- Heat/Cool selection: COOLING / HEATING
- Alarm status: ALARM / NO ALARM
- A: Circuit A capacity
- B: Circuit B capacity
- FC: Free Cooling capacity

**TIP: Hover over the image (or value) to see its description.**

## 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 5.9).**

### 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.

| 1 | Alarm 30RBP_R<br>Electrical Box Fault              | 11/03/2024 | 09:03:00 |
|---|----------------------------------------------------|------------|----------|
| 2 | Alarm 30RBP_R<br>Water Exchanger Freeze Protection | 11/03/2024 | 09:03:00 |
| 3 | Alarm 30RBP_R<br>No Factory Configuration          | 11/03/2024 | 09:03:00 |

### 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.

#### To define e-mail recipients

1. Press the **Main menu** button and navigate to the Configuration menu.
2. Go to the Network menu.
3. Select *Email Configuration* (EMAILCFG).
4. Define user e-mail(s).

### 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.

| 1 | Alarm 30RBP_R<br>Water Exchanger Freeze Protection | 08/03/2024 | 14:16:00 |
|---|----------------------------------------------------|------------|----------|
| 2 | Alarm 30RBP_R<br>No Factory Configuration          | 08/03/2024 | 14:15:00 |
| 3 | Alarm 30RBP_R<br>Electrical Box Fault              | 08/03/2024 | 14:15:00 |

## 8 - DIAGNOSTICS

### 8.6 - Alarm description

#### 8.6.1 - Alarms

| JBus code                    | Code  | Alarm description                                                                          | Reset type                                                                                        | Action taken                                                                    | Possible cause                              |
|------------------------------|-------|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------|
| <b>Thermistor failure</b>    |       |                                                                                            |                                                                                                   |                                                                                 |                                             |
| 1                            | 15001 | Water Exchanger Entering Fluid Thermistor Failure                                          | Automatic, if thermistor reading returns to normal                                                | Unit shuts down                                                                 | Defective thermistor or connection          |
| 2                            | 15002 | Water Exchanger Leaving Fluid Thermistor Failure                                           | As above                                                                                          | Unit shuts down                                                                 | As above                                    |
| 3                            | 15003 | Circuit A Defrost Thermistor                                                               | As above                                                                                          | Cooling mode: Unit continues to operate<br>Heating mode: Circuit A shuts down   | As above                                    |
| 4                            | 15004 | Circuit B Defrost Thermistor                                                               | As above                                                                                          | Cooling mode: Unit continues to operate<br>Heating mode: Circuit B shuts down   | As above                                    |
| 5                            | 15010 | OAT Thermistor Failure                                                                     | As above                                                                                          | Unit shuts down                                                                 | As above                                    |
| 6                            | 15011 | Master/Slave Common Leaving Fluid Thermistor                                               | As above                                                                                          | Master/slave operation is disabled and the unit returns to the stand-alone mode | As above                                    |
| 7                            | 15012 | Circuit A Suction Gas Thermistor                                                           | As above                                                                                          | Circuit A shuts down                                                            | As above                                    |
| 8                            | 15013 | Circuit B Suction Gas Thermistor                                                           | As above                                                                                          | Circuit B shuts down                                                            | As above                                    |
| 9                            | 15021 | Space Temperature Thermistor                                                               | As above                                                                                          | Unit continues to operate, but the setpoint reset is cancelled                  | As above                                    |
| 10                           | 15008 | Reclaim Condenser Entering Thermistor                                                      | As above                                                                                          | Heat Recovery mode is stopped, but the chiller continues to operate             | As above                                    |
| 11                           | 15009 | Reclaim Condenser Leaving Thermistor                                                       | As above                                                                                          | Heat Recovery mode is stopped, but the chiller continues to operate             | As above                                    |
| 12                           | 15058 | FC Evaporator Water Thermistor Failure                                                     | As above                                                                                          | No action (alert)                                                               | As above                                    |
| 13                           | 15059 | FC Glycol Water Thermistor Failure                                                         | As above                                                                                          | No action (alert)                                                               | As above                                    |
| 16                           | 15046 | DC Free Cooling Water Loop Thermistor Failure                                              | Automatic, if thermistor reading returns to normal                                                | Dry cooler free cooling is disabled                                             | Defective thermistor                        |
| 17                           | 15047 | DC Free Cooling Leaving Water Thermistor Failure                                           | As above                                                                                          | No action (alert)                                                               | As above                                    |
| 18                           | 15048 | DC Free Cooling OAT Sensor Failure                                                         | As above                                                                                          | Dry cooler free cooling is disabled                                             | As above                                    |
| <b>Transducer failure</b>    |       |                                                                                            |                                                                                                   |                                                                                 |                                             |
| 19                           | 12001 | Circuit A Discharge Transducer                                                             | Automatic, if sensor voltage reading returns to normal                                            | Circuit A shuts down                                                            | Defective transducer or connection          |
| 20                           | 12002 | Circuit B Discharge Transducer                                                             | As above                                                                                          | Circuit B shuts down                                                            | As above                                    |
| 21                           | 12004 | Circuit A Suction Transducer                                                               | Null voltage: Automatic (three alarms in the last 24 hours) or Manual<br>Impossible value: Manual | Circuit A shuts down                                                            | As above                                    |
| 22                           | 12005 | Circuit B Suction Transducer                                                               | As above                                                                                          | Circuit B shuts down                                                            | As above                                    |
| 23                           | 12024 | Water Exchanger Entering Fluid Transducer Failure                                          | Automatic, if sensor voltage reading returns to normal                                            | Unit shuts down, water pressure calibration erased                              | As above                                    |
| 24                           | 12025 | Water Exchanger Leaving Fluid Transducer Failure                                           | As above                                                                                          | Unit shuts down, water pressure calibration erased                              | As above                                    |
| <b>Communication failure</b> |       |                                                                                            |                                                                                                   |                                                                                 |                                             |
| 27                           | 4901  | Loss of communication with Circuit A SIOB/CIOB board                                       | Automatic, if communication is re-established                                                     | Unit shuts down                                                                 | Bus installation fault, communication error |
| 28                           | 4902  | Loss of communication with Circuit B SIOB/CIOB board                                       | As above                                                                                          | Unit shuts down                                                                 | As above                                    |
| 29                           | 4906  | Loss of communication with Energy Management SIOB/CIOB board                               | As above                                                                                          | None                                                                            | As above                                    |
| 30                           | 4501  | Loss of communication with Aux Board Number 1 (AUX2 @83, A1-A4 and B1-B4 fixed-speed fans) | As above                                                                                          | Unit shuts down                                                                 | As above                                    |
| 31                           | 4502  | Loss of communication with Aux Board Number 2 (AUX1 @86, Heat Reclaim, 0-10V fan)          | As above                                                                                          | Unit shuts down                                                                 | As above                                    |
| 33                           | 4601  | Loss of communication with DC Free Cooling Board                                           | As above                                                                                          | None                                                                            | As above                                    |
| 34                           | 4701  | Loss of communication with VFD Fan Drive 1 Circuit A                                       | As above                                                                                          | Circuit A shuts down                                                            | As above                                    |

## 8 - DIAGNOSTICS

| JBus code              | Code  | Alarm description                                              | Reset type                                                                              | Action taken                                                                                | Possible cause                                                                                              |
|------------------------|-------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| 35                     | 4702  | Loss of communication with VFD Fan Drive 2 Circuit A           | As above                                                                                | Circuit A shuts down                                                                        | As above                                                                                                    |
| 36                     | 4703  | Loss of communication with VFD Fan Drive 1 Circuit B           | As above                                                                                | Circuit B shuts down                                                                        | As above                                                                                                    |
| 37                     | 4704  | Loss of communication with VFD Fan Drive 2 Circuit B           | As above                                                                                | Circuit B shuts down                                                                        | As above                                                                                                    |
| 38                     | 4705  | Loss of communication with VFD Pump Drive Number 1             | As above                                                                                | Unit is restarted with another pump running. If no pumps are available, the unit shuts down | As above                                                                                                    |
| 39                     | 4706  | Loss of communication with VFD Pump Drive Number 2             | As above                                                                                | As above                                                                                    | As above                                                                                                    |
| <b>Process failure</b> |       |                                                                |                                                                                         |                                                                                             |                                                                                                             |
| 40                     | 10001 | Water Exchanger Freeze Protection                              | Automatic (the first alarm in the last 24 hours) or Manual                              | Unit shuts down, but the pump continues to run                                              | No water flow, defective thermistor                                                                         |
| 41                     | 10005 | Circuit A Low Saturated Suction Temperature                    | As above                                                                                | Unit shuts down                                                                             | Pressure transducer defective, EXV blocked or lack of refrigerant                                           |
| 42                     | 10006 | Circuit B Low Saturated Suction Temperature                    | As above                                                                                | Unit shuts down                                                                             | As above                                                                                                    |
| 43                     | 10008 | Circuit A High Superheat                                       | Manual                                                                                  | Circuit A shuts down                                                                        | Pressure transducer defective, temperature sensor defective, EXV blocked or lack of refrigerant             |
| 44                     | 10009 | Circuit B High Superheat                                       | Manual                                                                                  | Circuit B shuts down                                                                        | As above                                                                                                    |
| 45                     | 10011 | Circuit A Low Superheat                                        | Manual                                                                                  | Circuit A shuts down                                                                        | As above                                                                                                    |
| 46                     | 10012 | Circuit B Low Superheat                                        | Manual                                                                                  | Circuit B shuts down                                                                        | As above                                                                                                    |
| 47                     | 10014 | Customer Interlock Failure                                     | Automatic (the unit is OFF) or Manual                                                   | Unit shuts down                                                                             | Customer interlock input set on                                                                             |
| 48                     | 10016 | Compressor A1 Not Started or Pressure Increase not established | Manual                                                                                  | Compressor A1 shuts down                                                                    | Compressor breaker or fuse fault, compressor switch open                                                    |
| 49                     | 10017 | Compressor A2 Not Started or Pressure Increase not established | Manual                                                                                  | Compressor A2 shuts down                                                                    | As above                                                                                                    |
| 50                     | 10018 | Compressor A3 Not Started or Pressure Increase not established | Manual                                                                                  | Compressor A3 shuts down                                                                    | As above                                                                                                    |
| 51                     | 10019 | Compressor A4 Not Started or Pressure Increase not established | Manual                                                                                  | Compressor A4 shuts down                                                                    | As above                                                                                                    |
| 52                     | 10020 | Compressor B1 Not Started or Pressure Increase not established | Manual                                                                                  | Compressor B1 shuts down                                                                    | As above                                                                                                    |
| 53                     | 10021 | Compressor B2 Not Started or Pressure Increase not established | Manual                                                                                  | Compressor B2 shuts down                                                                    | As above                                                                                                    |
| 54                     | 10022 | Compressor B3 Not Started or Pressure Increase not established | Manual                                                                                  | Compressor B3 shuts down                                                                    | As above                                                                                                    |
| 55                     | 10023 | Compressor B4 Not Started or Pressure Increase not established | Manual                                                                                  | Compressor B4 shuts down                                                                    | As above                                                                                                    |
| 56                     | 10028 | Electrical Box Fault                                           | Automatic                                                                               | Unit shuts down                                                                             | Main power supply fault or high temperature in the control box (units with high ambient temperature option) |
| 57                     | 10030 | Master/Slave Communication Failure                             | As above                                                                                | Master/slave operation is disabled and the unit returns to the stand-alone mode             | As above                                                                                                    |
| 58                     | 10031 | Unit is in Network emergency stop                              | Automatic, if emergency stop is deactivated                                             | Unit shuts down                                                                             | Network emergency stop command                                                                              |
| 59                     | 10032 | Water Pump #1 fault                                            | Manual                                                                                  | Unit is restarted with another pump running. If no pumps are available, the unit shuts down | Evaporator flow switch or evaporator pump fault                                                             |
| 60                     | 10033 | Water Pump #2 fault                                            | Manual                                                                                  | As above                                                                                    | As above                                                                                                    |
| 61                     | 10037 | Circuit A - Repeated High Discharge Gas Overrides              | Automatic (no discharge gas override within 30 min) or Manual (the counter forced to 0) | None                                                                                        | Repetitive capacity decreases                                                                               |
| 62                     | 10038 | Circuit B - Repeated High Discharge Gas Overrides              | As above                                                                                | None                                                                                        | As above                                                                                                    |
| 63                     | 10040 | Circuit A - Repeated Low Suction Temp Overrides                | Manual (the counter forced to 0)                                                        | Circuit A shuts down                                                                        | Repetitive capacity decreases                                                                               |
| 64                     | 10041 | Circuit B - Repeated Low Suction Temp Overrides                | As above                                                                                | Circuit B shuts down                                                                        | As above                                                                                                    |

## 8 - DIAGNOSTICS

| JBus code | Code  | Alarm description                                            | Reset type                                                                                                                                          | Action taken                                                                             | Possible cause                                                                                                                                                               |
|-----------|-------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 65        | 10043 | Low Entering Water Temperature in Heating                    | Automatic (EWT returns to normal or Heating mode is disabled)                                                                                       | None                                                                                     | Low entering fluid temperature in Heating mode                                                                                                                               |
| 66        | 10051 | Water Exchanger Flow Switch Failure                          | Manual                                                                                                                                              | Unit shuts down                                                                          | Flow switch fault                                                                                                                                                            |
| 67        | 10063 | Circuit A High Pressure Switch or Elec. box pressure Failure | Manual                                                                                                                                              | Circuit A shuts down                                                                     | Switch fault                                                                                                                                                                 |
| 68        | 10064 | Circuit B High Pressure Switch or Elec. box pressure Failure | Manual                                                                                                                                              | Circuit B shuts down                                                                     | As above                                                                                                                                                                     |
| 69        | 10090 | Water Exchanger Flow Switch: Setpoint Configuration Failure  | Manual                                                                                                                                              | Unit cannot be started                                                                   | Defective or incorrectly wired flow controller                                                                                                                               |
| 70        | 10097 | Water Exchanger Temperature Sensors Swapped                  | Manual                                                                                                                                              | Unit shuts down                                                                          | Input and output temperature reversed                                                                                                                                        |
| 71        | 10050 | Refrigerant Leakage Detection                                | Automatic                                                                                                                                           | None                                                                                     | Refrigerant leak or leak detector defective                                                                                                                                  |
| 73        | 10101 | DC Free Cooling Process Failure                              | Automatic                                                                                                                                           | Dry Cooler Free Cooling is disabled                                                      | Fan fault, dirty beam, FC coils are non-purged, failure or incorrect wiring of the FC water temperature sensor                                                               |
|           | 10102 | DC Free Cooling Process Failure                              | Automatic                                                                                                                                           | Hydraulic Free Cooling is disabled                                                       |                                                                                                                                                                              |
| 74        | 10220 | FC Coils Valve Failure                                       | Automatic                                                                                                                                           | No action (alert)                                                                        | Valve stuck or connection failure                                                                                                                                            |
| 75        | 10222 | FC Evaporator Valve Failure                                  | Automatic                                                                                                                                           | No action (alert)                                                                        | Valve stuck or connection failure                                                                                                                                            |
| 76        | 10223 | FC Low Glycol Water Temperature Warning                      | Automatic (when the temperature of the glycol-water mixture [FC_WGT] is above 1°C OR neither circuit A nor circuit B is operating in FC Mixed mode) | No action (alert)                                                                        | The temperature of the glycol-water mixture [FC_WGT] is below -5°C and at least one circuit is operating in FC Mixed mode                                                    |
| 77        | 11201 | Water Loop : Pressure Too High                               | Automatic                                                                                                                                           | No action (alert)                                                                        | For units with the FC option: Water pressure above the maximum output Water Pump pressure (550 kPa)                                                                          |
| 78        | 11202 | Water Loop : Delta Pressure Error                            | Automatic, if water pressure delta returns to normal                                                                                                | Unit shuts down                                                                          | Too low or high water pressure reading                                                                                                                                       |
| 79        | 11203 | Water Loop : Pressure Too Low                                | Automatic, if water pressure reading returns to normal and the alarm occurred not more than 6 times in the last 24 hours (otherwise manual)         | Unit shuts down                                                                          | Low pump inlet pressure is below 60 kPa                                                                                                                                      |
| 80        | 11204 | Water Loop : Pump Not Started                                | Automatic                                                                                                                                           | Alarm 10032 (water pump #1 fault) or alarm 10033 (water pump #2 fault) will be triggered | Too low or high water pressure reading                                                                                                                                       |
| 81        | 11205 | Water Loop : Pressure Error During Runtest                   | Manual                                                                                                                                              | Unit shuts down                                                                          | Too low or high water pressure reading                                                                                                                                       |
| 82        | 11206 | Water Loop : Pump Overload                                   | Automatic                                                                                                                                           | None                                                                                     | Water loop pressure drop too low                                                                                                                                             |
| 83        | 11207 | Water Loop : Flow Too Low                                    | Automatic, when water flow reading returns to normal                                                                                                | Pump is stopped                                                                          | Water loop pressure drop too high                                                                                                                                            |
| 84        | 11208 | Water Loop : Pressure Sensors Crossed                        | Automatic, if water pressure reading returns to normal and the alarm occurred not more than 6 times in the last 24 hours                            | Unit shuts down                                                                          | Pressure sensors crossed                                                                                                                                                     |
| 85        | 11209 | Water Loop : Low Pressure Warning                            | Automatic, if water pressure reading returns to normal                                                                                              | None                                                                                     | Evaporator water pressure is below 100 kPa                                                                                                                                   |
| 86        | 10210 | Low Delta Pressure Operation Failure - cir A                 | Automatic (the first 3 alarms in the last 24 hours) or Manual<br>Automatic (if circuit capacity is 0%)                                              | Circuit A shuts down                                                                     | Circuit running in part load with all available compressors and low delta pressure during operation. Not enough capacity available / failed or disabled due to compressor(s) |
| 87        | 10211 | Low Delta Pressure Operation Failure - cir B                 | As above                                                                                                                                            | Circuit B shuts down                                                                     | As above                                                                                                                                                                     |
| 88        | 11210 | FC Glycol Water Loop : Pressure Too High                     | Automatic, if pressure reading returns to normal                                                                                                    | None                                                                                     | Free Cooling pump pressure is above the maximum pressure threshold (550 kPa by default)                                                                                      |

## 8 - DIAGNOSTICS

| JBus code | Code  | Alarm description                                     | Reset type                                                                                                                                                                            | Action taken                                                | Possible cause                                                                     |
|-----------|-------|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------|
| 89        | 11211 | FC Glycol Water Loop : Delta Pressure Error           | Automatic, if pressure sensor reading returns to normal                                                                                                                               | Free Cooling is stopped, but the unit continues to run      | Loss of calibration                                                                |
|           |       |                                                       | Manual                                                                                                                                                                                | Free Cooling is stopped, but the unit continues to run      | High water pressure delta reading with the water pump already stopped for 1 minute |
| 90        | 11212 | FC Glycol Water Loop : Pressure Too Low               | Automatic, if pressure sensor reading returns to the value above 100 kPa (14.5 PSI) and the alarm occurred up to 6 times in the last 24 hours (otherwise it should be reset manually) | Free Cooling is stopped, but the unit continues to run      | Free cooling pump inlet pressure is below 60 kPa (8.7 PSI)                         |
| 91        | 11213 | FC Glycol Water Loop : Pump Not Started               | Manual                                                                                                                                                                                | Free Cooling disabled                                       | Pump fault                                                                         |
| 92        | 11214 | FC Glycol Water Loop : Pressure Error During Runttest | Manual                                                                                                                                                                                | Free Cooling pump is stopped, but the unit continues to run | Too high or low pressure reading                                                   |
| 93        | 11215 | FC Glycol Water Loop : Pump Overload                  | Automatic, when the alarm conditions return to normal                                                                                                                                 | None                                                        | Water loop pressure drop too low                                                   |
| 94        | 11216 | FC Glycol Water Loop : Flow Too Low                   | Automatic, if pressure reading returns to normal and the alarm occurred not more than 6 times in the last 24 hours (otherwise manual)                                                 | Water pump is stopped, but the unit continues to run        | Water flow is below the required threshold                                         |
| 95        | 11217 | FC Glycol Water Loop : Pressure Sensors Crossed       | Automatic, if pressure reading returns to normal and the alarm occurred not more than 6 times in the last 24 hours (otherwise manual)                                                 | Free Cooling disabled                                       | FC pump is running, but pressure readings are below the required threshold         |
| 96        | 11218 | FC Glycol Water Loop : Low Pressure Warning           | Automatic, if pressure reading returns to normal                                                                                                                                      | None                                                        | Water pressure is below the required threshold                                     |

### Service and factory

|    |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                          |                        |                              |
|----|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|------------------------|------------------------------|
| 97 | 70nn | Illegal Factory Configuration Number #1 to nn<br>List of illegal configurations:<br>01: Unit size unknown (FACTORY_unitsize).<br>02: Fan type unavailable for the configured unit size.<br>03: Pump configuration failure. Pump doesn't exist for the configured unit size.<br>04: This configuration is not available for the unit – unavailable type of refrigerant selected (FACTORY_refrig). Please note that the correct configuration of FACTORY_refrig parameter depends on the software version:<br>• FACTORY_refrig = 1 (R32) for software version 3.0 or lower<br>• FACTORY_refrig = 3 (R32) for software version 4.0 or higher | Automatic, if configuration is corrected | Unit cannot be started | Incorrect unit configuration |
| 98 | 8000 | No Factory Configuration                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Automatic, if configuration is provided  | Unit cannot be started | No factory configuration     |

### Compressor failure

|     |      |                       |        |                          |                                                                                      |
|-----|------|-----------------------|--------|--------------------------|--------------------------------------------------------------------------------------|
| 99  | 1199 | Compressor A1 Failure | Manual | Compressor A1 shuts down | Compressor temperature too high, high pressure switch opened, compressor not started |
| 100 | 1299 | Compressor A2 Failure | Manual | Compressor A2 shuts down | As above                                                                             |
| 101 | 1399 | Compressor A3 Failure | Manual | Compressor A3 shuts down | As above                                                                             |
| 102 | 1499 | Compressor A4 Failure | Manual | Compressor A4 shuts down | As above                                                                             |
| 103 | 2199 | Compressor B1 Failure | Manual | Compressor B1 shuts down | As above                                                                             |
| 104 | 2299 | Compressor B2 Failure | Manual | Compressor B2 shuts down | As above                                                                             |
| 105 | 2399 | Compressor B3 Failure | Manual | Compressor B3 shuts down | As above                                                                             |
| 106 | 2499 | Compressor B4 Failure | Manual | Compressor B4 shuts down | As above                                                                             |

## 8 - DIAGNOSTICS

| JBus code                          | Code  | Alarm description                                                         | Reset type                                                                                                                      | Action taken                                                                                                                                                            | Possible cause                                     |
|------------------------------------|-------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| 107                                | 6001  | Circuit A Welded Contactor Failure                                        | Automatic in the case of cooler flow switch failure, high pressure trip or cooler freeze alarm or Manual (power cycle required) | Unit shuts down, but the evaporator pump continues to operate                                                                                                           | Welded contactor of a compressor                   |
| 108                                | 6002  | Circuit B Welded Contactor Failure                                        | As above                                                                                                                        | As above                                                                                                                                                                | As above                                           |
| <b>Software failure</b>            |       |                                                                           |                                                                                                                                 |                                                                                                                                                                         |                                                    |
| 109                                | 55001 | Database Module Failure                                                   | Manual                                                                                                                          | Unit shuts down                                                                                                                                                         | Software problem. Contact Carrier service          |
| 110                                | 56001 | Lenscan Module Failure                                                    | Manual                                                                                                                          | Unit shuts down                                                                                                                                                         | Software problem. Contact Carrier service          |
| <b>Service and factory</b>         |       |                                                                           |                                                                                                                                 |                                                                                                                                                                         |                                                    |
| 111                                | 90nn  | Master Chiller Configuration Error Number #1 to nn                        | Automatic, if master/slave configuration returns to normal or the unit returns to the standalone mode                           | Master/slave operation is disabled and the unit returns to the stand-alone mode                                                                                         | Configuration failure                              |
| <b>Service maintenance warning</b> |       |                                                                           |                                                                                                                                 |                                                                                                                                                                         |                                                    |
| 112                                | 13nnn | Service Maintenance Alert Number # nn 004: Maintenance Servicing Required | Manual (or Automatic when the new maintenance date is set)                                                                      | None                                                                                                                                                                    | Servicing action required. Contact Carrier service |
| 113                                | 13005 | Fgas check needed, call your maintenance company                          | As above                                                                                                                        | None                                                                                                                                                                    | As above                                           |
| 114                                | 13006 | Check the concentration of corrosion inhibitor (see IOM)                  | As above                                                                                                                        | None                                                                                                                                                                    | As above                                           |
| <b>VFD drive failure</b>           |       |                                                                           |                                                                                                                                 |                                                                                                                                                                         |                                                    |
| 115                                | 170nn | Circuit A VFD Fan Drive 1 Failure                                         | Automatic or Manual (motor overload)                                                                                            | Units with one drive on the circuit: Circuit A shuts down<br>Units with two drives on the circuit: Circuit A continues to run as long as one of two drives is operating | Speed controller fault (see also section 8.6.2)    |
| 116                                | 180nn | Circuit A VFD Fan Drive 2 Failure                                         | As above                                                                                                                        | As above                                                                                                                                                                | As above                                           |
| 117                                | 190nn | Circuit B VFD Fan Drive 1 Failure                                         | As above                                                                                                                        | Units with one drive on the circuit: Circuit B shuts down<br>Units with two drives on the circuit: Circuit B continues to run as long as one of two drives is operating | As above                                           |
| 118                                | 200nn | Circuit B VFD Fan Drive 2 Failure                                         | As above                                                                                                                        | As above                                                                                                                                                                | As above                                           |
| 119                                | 21nnn | VFD Pump 1 Drive Failure                                                  | Automatic or Manual                                                                                                             | Unit is restarted with another pump running. If no pumps are available, the unit shuts down                                                                             | As above                                           |
| 120                                | 22nnn | VFD Pump 2 Drive Failure                                                  | As above                                                                                                                        | As above                                                                                                                                                                | As above                                           |
| 121                                | 350nn | Circuit A VFD Fan Drive 1 Alert                                           | Automatic                                                                                                                       | None                                                                                                                                                                    | As above                                           |
| 122                                | 360nn | Circuit A VFD Fan Drive 2 Alert                                           | Automatic                                                                                                                       | None                                                                                                                                                                    | As above                                           |
| 123                                | 370nn | Circuit B VFD Fan Drive 1 Alert                                           | Automatic                                                                                                                       | None                                                                                                                                                                    | As above                                           |
| 124                                | 380nn | Circuit B VFD Fan Drive 2 Alert                                           | Automatic                                                                                                                       | None                                                                                                                                                                    | As above                                           |
| 125                                | 39nnn | VFD Pump 1 Drive Alert                                                    | Automatic                                                                                                                       | None                                                                                                                                                                    | As above                                           |
| 126                                | 40nnn | VFD Pump 2 Drive Alert                                                    | Automatic                                                                                                                       | None                                                                                                                                                                    | As above                                           |
| <b>SIOB/CIOB board failure</b>     |       |                                                                           |                                                                                                                                 |                                                                                                                                                                         |                                                    |
| 127                                | 57001 | Circuit A SIOB/CIOB Low Voltage Failure                                   | Automatic, if the alarm occurred not more than 6 times in the last 24 hours (otherwise manual)                                  | Unit shuts down                                                                                                                                                         | Unstable electrical supply or electrical issue     |
| 128                                | 57002 | Circuit B SIOB/CIOB Low Voltage Failure                                   | As above                                                                                                                        | Unit shuts down                                                                                                                                                         | As above                                           |
| 129                                | 57006 | EMM SIOB/CIOB Low Voltage Failure                                         | As above                                                                                                                        | Unit shuts down                                                                                                                                                         | As above                                           |
| <b>EXV failure</b>                 |       |                                                                           |                                                                                                                                 |                                                                                                                                                                         |                                                    |
| 130                                | 57020 | Main EXV Stepper Motor Failure - Cir A                                    | As above                                                                                                                        | Circuit A shuts down                                                                                                                                                    | EXV motor fault                                    |
| 131                                | 57021 | Main EXV Stepper Motor Failure - Cir B                                    | As above                                                                                                                        | Circuit B shuts down                                                                                                                                                    | As above                                           |
| <b>Communication failure</b>       |       |                                                                           |                                                                                                                                 |                                                                                                                                                                         |                                                    |
| 132                                | 10029 | Loss of Communication With System Manager                                 | Automatic, if communication with System Manager is restored                                                                     | Unit returns to the standalone mode                                                                                                                                     | Communication error                                |

## 8 - DIAGNOSTICS

| JBus code                                                   | Code  | Alarm description                                                                   | Reset type                                                                                                                                                                                                                          | Action taken                                                                                                                                                                                                                                                | Possible cause                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------|-------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Replacement mode: Software Activation Key(s) missing</b> |       |                                                                                     |                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                             |
| 133                                                         | 10122 | Replacement Mode: please contact Carrier service representative to activate options | Automatic, if Software Activation Key is installed<br>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                                                                                                                                                                                                              |
| <b>Configuration failure</b>                                |       |                                                                                     |                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                             |
| 134                                                         | 8001  | Illegal Brand Identifier                                                            | Automatic, if configuration is corrected                                                                                                                                                                                            | Unit not allowed to start                                                                                                                                                                                                                                   | Incorrect unit configuration                                                                                                                                                                                                                                                                |
| <b>Heat Reclaim failure</b>                                 |       |                                                                                     |                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                             |
| 135                                                         | 10052 | Heat Reclaim flow switch failure                                                    | Automatic, if the alarm occurred not more than 3 times in the last 24 hours (otherwise manual)                                                                                                                                      | No action (alert)                                                                                                                                                                                                                                           | The flow switch has been opened for 5 minutes when the HR pump is running and the 3-way valve opening is exceeding its pre-configured minimum position (the timer can be modified by setting "HR delay flow switch" in HR_CFG table)                                                        |
| 136                                                         | 10128 | Heat Reclaim Condenser Freeze Protection                                            | Automatic, if operating conditions return to normal                                                                                                                                                                                 | Heat Recovery mode is stopped, but the chiller continues to operate                                                                                                                                                                                         | HR entering or leaving water temperature is below 1.1°C (applies only to units with "HR condenser fluid" set to "water")<br>The trigger temperature can be modified by setting "HR Min water temp" in HR_CFG table                                                                          |
| 137                                                         | 10129 | Heat Reclaim high Water Temperature                                                 | Automatic, if the alarm occurred not more than 5 times in the last 24 hours (otherwise manual)                                                                                                                                      | Unit shuts down                                                                                                                                                                                                                                             | HR leaving water temperature is above 95°C for 3 minutes                                                                                                                                                                                                                                    |
| <b>Phase controller failure</b>                             |       |                                                                                     |                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                             |
| 138                                                         | 10054 | 3-Phase Control: Fault Detection                                                    | Depends on the configuration of the Phase Controller Action (USERCONF, PhCtrAct).<br>For units with PhCtrAct = 0 or 1 (USERCONF): Automatic, if the fault condition is cleared<br>For units with PhCtrAct = 2 (USERCONF): Manual    | Depends on the configuration of the Phase Controller Action (USERCONF, PhCtrAct).<br>For units with the alert enabled (USERCONF, PhCtrAct = 0): No action ("alert" only)<br>For units with the alarm enabled (USERCONF, PhCtrAct = 1 or 2): Unit shuts down | The Phase Controller output has opened due to a detected fault:<br>Phase Loss (PL) fault,<br>Phase Sequence (PS) fault,<br>Under Voltage (UV) fault,<br>Over Voltage (OV) fault,<br>Three-Phase Voltage Asymmetry (ASYM) fault,<br>Under Frequency (UF) fault,<br>Over Frequency (OF) fault |
| <b>Energy Meter failure</b>                                 |       |                                                                                     |                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                             |
| 139                                                         | 59001 | Loss of communication with Energy Meter                                             | Automatic, if communication is re-established                                                                                                                                                                                       | No action (alert)                                                                                                                                                                                                                                           | Bus installation fault, Energy Meter fault, communication error                                                                                                                                                                                                                             |

## 8 - DIAGNOSTICS

### 8.6.2 - Fans and pumps drive alarms/alerts

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

- 17-YYY to 19-YYY (17=A1, 18=A2, and 19=B1, 20=B2) for alarms (YYY stands for the alarm code).
- 35-YYY to 38-YYY (35=A1, 36=A2, 37=B1, 38=B2) for alerts (YYY stands for the alert code).

Pump drive alarms are displayed as follows:

- 21-YYY for pump 1 and 22-YYY for pump 2 (YYY stands for the alarm code).

Pump drive alerts are displayed as follows:

- 39-YYY for pump 1 and 40-YYY for pump 2 (YYY stands for the alert code).

| Code                | Description                                        | Code | Action to be taken                                   |
|---------------------|----------------------------------------------------|------|------------------------------------------------------|
| <b>Drive alarms</b> |                                                    |      |                                                      |
| 0                   | No error                                           | NErr | Contact Service Agency 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                                             |
| 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                                             |

## 8 - DIAGNOSTICS

| Code                | Description                                                    | Code | Action to be taken                                   |
|---------------------|----------------------------------------------------------------|------|------------------------------------------------------|
| <b>Drive alerts</b> |                                                                |      |                                                      |
| 1                   | Overcurrent                                                    | -    | Contact Service Agency 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                                             |

\* Error 24 and 104 possible

\*\* Error 50 to 58 possible

\*\*\* Error 70 or 250 possible

† Not applicable to variator size 102

## 9 - MAINTENANCE

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In order to ensure the optimal operation of the equipment as well as the optimisation 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.

## 10 - APPENDIX 1: SMART GRID READY INSTALLATION INSTRUCTIONS

### 10.1 - Introduction

The increase in renewable electricity generation is leading more and more to load fluctuations. These fluctuations can be intelligently compensated by smart grid systems which combined with heat pumps allow an efficient use of energy. Electrical energy can be converted into thermal energy (heat) and the heat can be stored with the use of a water tank.

The Smart Grid Ready ("SG Ready") label of the heat pump allows the energy supplier to access the heat pump and manage its four energy usage control states. These states are activated through two inputs (SGR0\_BST and SGR1\_LCK).



The Smart Grid Ready label is valid only in the DACH region (Germany, Austria, Switzerland).

This document contains information about four "energy usage" control states supported by the heat pump and gives instructions on how the system should be configured by an installer.

It is strongly recommended to read the whole document prior to starting any installation or maintenance procedures. Please note that screenshots provided in this manual are solely for the purpose of illustration and they may differ from the actual look.

**The Smart Grid Ready functionality (option 157D) is not provided as standard. Please contact the Manufacturer to purchase this option.**

**For 30RQ(P) 165R-680R, the SG Ready option requires:**

- an additional I/O board (A156 board)
- factory configuration

### 10.2 - Configuration of Smart Grid Ready option

The Smart Grid Ready option can be configured on the local touch screen.

#### Smart Grid Ready inputs

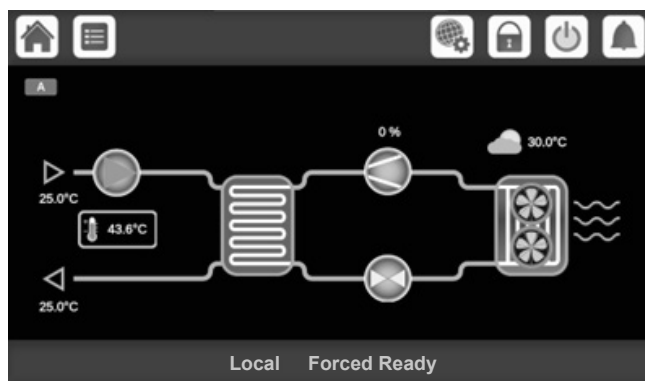
Two digital inputs (SGR0\_BST and SGR1\_LCK) are used to allow the energy supplier to control the heat pump and enhance load management.

After wiring these two digital inputs (SGR0\_BST and SGR1\_LCK) to the energy supplier module and enabling the "SG Ready" option, the Smart Grid Ready option offers four energy control modes (1 = LOCK, 2 = NORMAL, 3 = BOOST, 4 = FORCED).

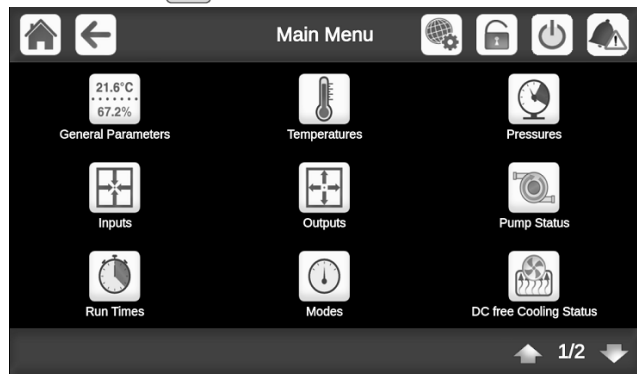
The status of Smart Grid inputs can be verified in the Inputs menu on the local touch screen.

#### To verify the status of Smart Grid inputs

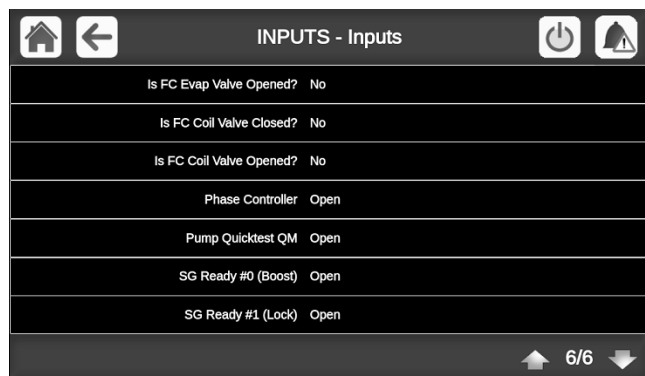
1. Tap to open the Main Menu.



2. Select "Inputs" .



3. The Inputs menu will be displayed.



4. In this view, find "SG Ready #0 (Boost)" and "SG Ready #1 (Lock)" to verify the status of Smart Grid Ready Inputs.
  - SG Ready #0 (Boost): open/closed.
  - SG Ready #1 (Lock): open/closed.

## 10 - APPENDIX 1: SMART GRID READY INSTALLATION INSTRUCTIONS

### 10.3 - Smart Grid Ready operating modes

For heat pumps with Smart Grid enabled, there are four control states ("energy control modes") available.

The active mode depends on SGR0\_BST and SGR1\_LCK signals:

| State | Name   | SGR0_BST | SGR1_LCK |
|-------|--------|----------|----------|
| 1     | LOCK   | 0        | 1        |
| 2     | NORMAL | 0        | 0        |
| 3     | BOOST  | 1        | 0        |
| 4     | FORCED | 1        | 1        |

#### Smart Grid operating modes:

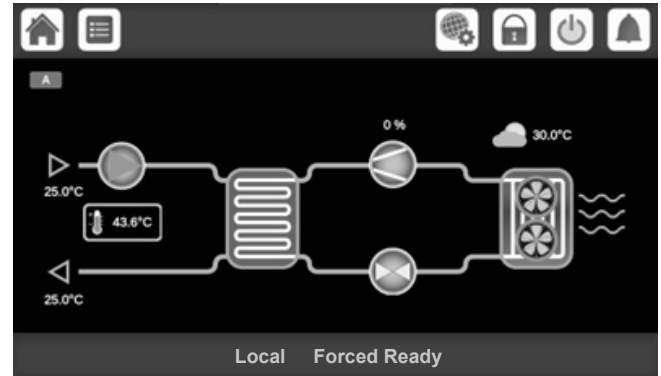
- **Lockout state (1 = LOCK):** In this mode, the heat pump occupancy is turned off in order to stop the heat pump. If configured, the boiler output is turned on. The buffer tank will be used to provide heating demand. See also section 10.3.2.
  - The energy supplier can block the operations of the heat pump (activate the LOCK mode) for a maximum of 6 hours a day. One lockout may last 2 hours maximum and there must be at least a two-hour interval between two lockouts. For example, if the lockout starts at 10:00 and ends at 12:00, then the next lockout cannot be activated until 14:00.
- **Normal operating state (2 = NORMAL):** In this mode, the heat pump runs in energy-efficient normal mode with proportional heat storage.
- **Low current surplus state (3 = BOOST):** In this mode, the energy supplier allows the heat pump to run at its maximum capacity. The heat pump is requested to use the surplus energy to reach the maximum possible temperatures for heating and warm water. A user-defined offset is applied to the desired temperature setpoint (see section 10.3.3).
  - This is not a definite start-up command, but a switch-on recommendation based on the boost in energy supply.
- **High current surplus state (4 = FORCED):** In this mode, the heat pump is forced to run at its maximum capacity. A user-defined offset is applied to the desired temperature setpoint (see section 10.3.3).
  - The heat pump occupancy is turned on independently of any schedule program. This can be for the buffer tank, room heating or domestic hot water production.
  - The heat pump will run in this mode for an undetermined period of time (until the FORCED mode is deactivated).

#### 10.3.1 - Smart Grid status

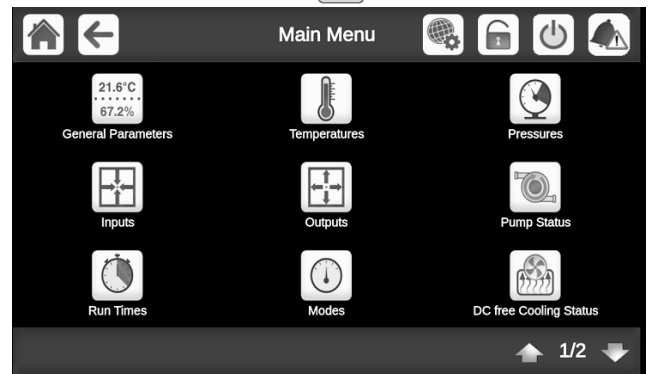
The Smart Grid Status can be found in the General Parameters menu (GENUNIT) or at the bottom of the SmartVu™ touch screen.

#### To check the Smart Grid mode or change Heat/Cool mode

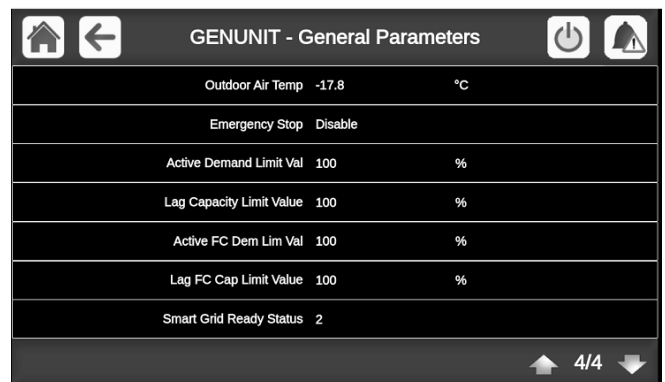
1. Tap  to open the Main Menu.
  - The Smart Grid mode is displayed at the bottom bar on the SmartVu touch screen ("Forced Ready").



2. Select "General Parameters" .



3. The General Parameters menu will be displayed.
  - In this view, find "Smart Grid Ready Status".
    - 1 = LOCK
    - 2 = NORMAL
    - 3 = BOOST
    - 4 = FORCED



Note: "Heat/Cool Select" allows you to set the unit in Heating or Cooling mode.

## 10 - APPENDIX 1: SMART GRID READY INSTALLATION INSTRUCTIONS

### 10.3.2 - LOCK operating mode

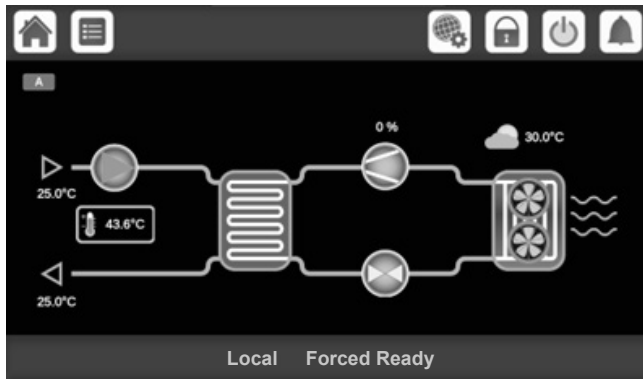
In the LOCK mode, the heat pump is in the OFF state.

For units with a boiler, the boiler can be started during the lock state only when "SGR Threshold" setting allows.

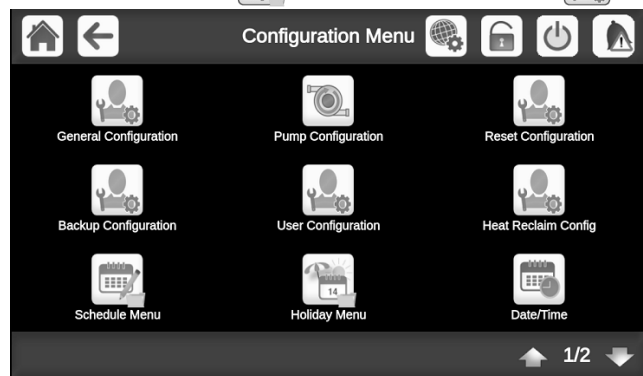
To start the boiler, the Outside Air Temperature (OAT) must be below the SGR Boiler OAT Threshold which is defined by the user.

#### To change the SGR boiler threshold

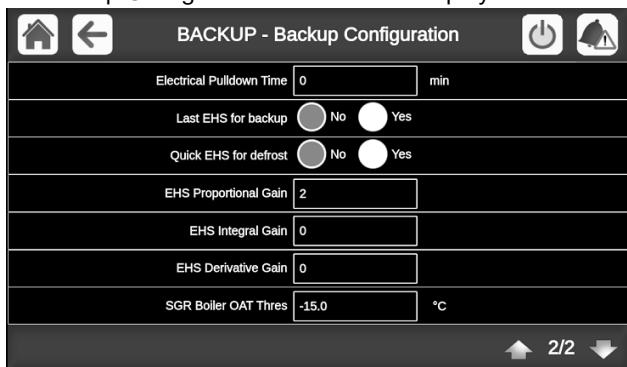
1. Tap  to open the Main Menu.



2. Go to "Configuration"  > "Backup Configuration" .



3. The Backup Configuration menu will be displayed.



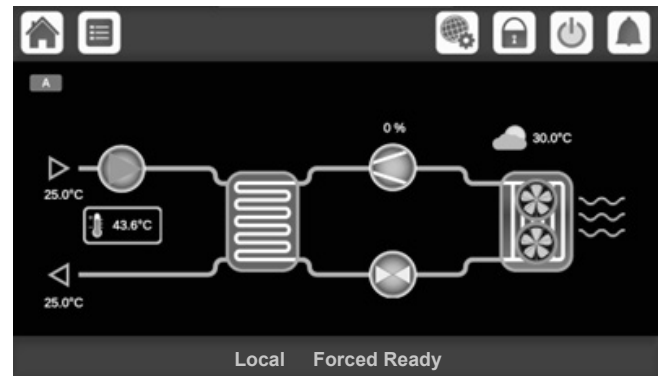
4. Set the Smart Grid threshold to start the boiler.
  - The threshold ("SGR Boiler OAT Thres") is -15°C by default.

### 10.3.3 - BOOST/FORCED operating mode

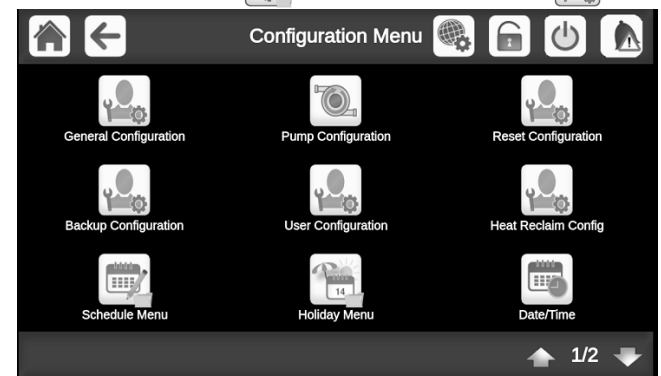
In the BOOST/FORCED mode, it is possible to define an offset used to adjust the water temperature setpoint.

#### To set the Smart Grid offset

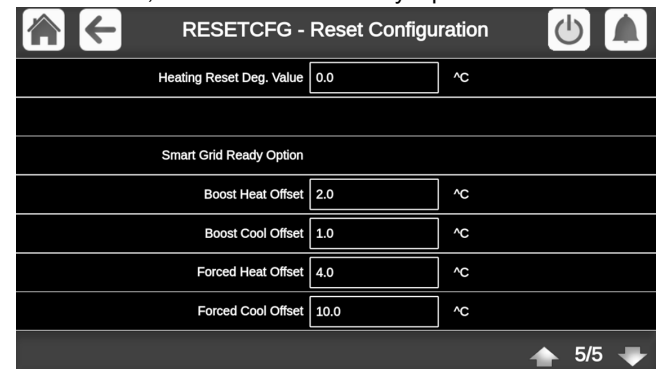
1. Tap  to open the Main Menu.



2. Go to "Configuration"  > "Reset Configuration" .



3. The Reset Configuration menu will be displayed.
  - In this view, find "Smart Grid Ready Option".



4. Set the Smart Grid offset value for Heating or Cooling mode.
  - "Boost Heat Offset" (0°C by default).
  - "Boost Cool Offset" (0°C by default).
  - "Forced Heat Offset" (0°C by default).
  - "Forced Cool Offset" (0°C by default).

## 10 - APPENDIX 1: SMART GRID READY INSTALLATION INSTRUCTIONS

### 10.4 - Wiring: Smart Grid connections

The Smart Grid Ready module must be connected to "LIM\_SW1" and "LIM\_SW2" inputs. These contacts are used to limit heat pump capacity and the capacity limit setpoint (lim\_sp) applied to the unit depends on the status of these contacts.

- LIM\_SW1 and SGR0\_BST are wired to DI-03 on A1A board.
- LIM\_SW2 and SGR1\_LCK are wired to DI-02 on A156 board.

By default, "lim\_sp1" and "lim\_sp3" are equal to 100%, but they can be set to other values to limit the unit capacity. When the SG Ready option is enabled, these limits are applicable in "Boost" and "Forced" operating modes.

*The Smart Grid Ready option is available only for units equipped with the optional Energy Management Module.*

| Smart Grid status | 1 = LOCK | 2 =NORMAL | 3 = BOOST | 4 = FORCED |
|-------------------|----------|-----------|-----------|------------|
| Capacity Limit    | lim_sp2* | 100%      | lim_sp1   | lim_sp3    |
| SGR0_BST          | open     | open      | close     | close      |
| SGR1_LCK          | close    | open      | open      | close      |

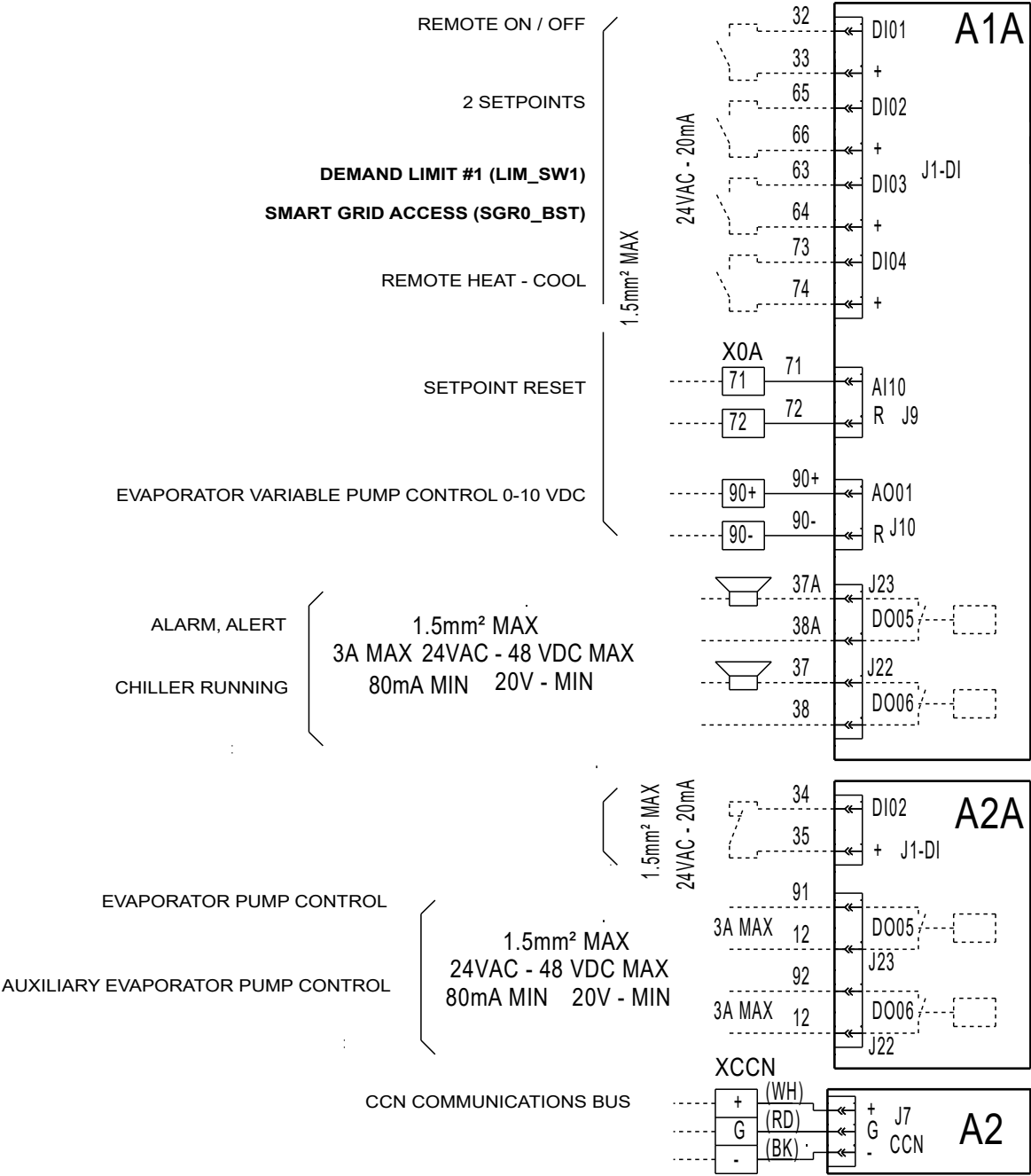
\*Lim\_sp2 becomes not applicable in the LOCK operating mode.

10 - APPENDIX 1: SMART GRID READY INSTALLATION INSTRUCTIONS

10.5 - Electrical diagram

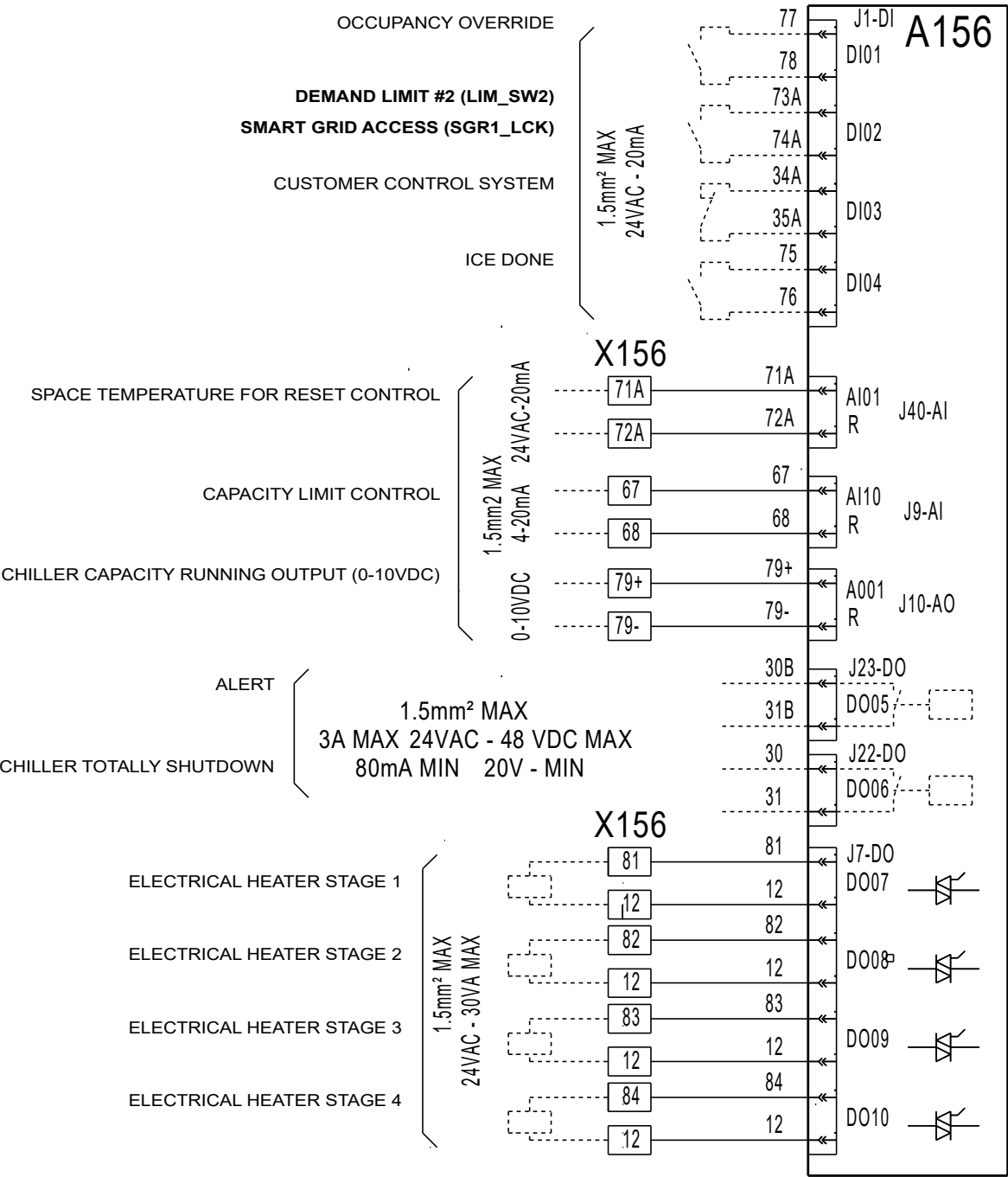
SG Ready module must be wired to DI-03 on A1A I/O board and DI-02 on A156 I/O board.

Customer control connections: A1A board



10 - APPENDIX 1: SMART GRID READY INSTALLATION INSTRUCTIONS

Customer control connections: A156 board (optional)





The quality management system of this product's assembly site has been certified in accordance with the requirements of the ISO 9001 standard (latest current version) after an assessment conducted by an authorized independent third party.  
The environmental management system of this product's assembly site has been certified in accordance with the requirements of the ISO 14001 standard (latest current version) after an assessment conducted by an authorized independent third party.  
The occupational health and safety management system of this product's assembly site has been certified in accordance with the requirements of the ISO 45001 standard (latest current version) after an assessment conducted by an authorized independent third party.  
Please contact your sales representative for more information.

Order No: 10554, 09.2024 - Supersedes order No: 10554, 05.2024.  
Manufacturer reserves the right to change any product specifications without notice.

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