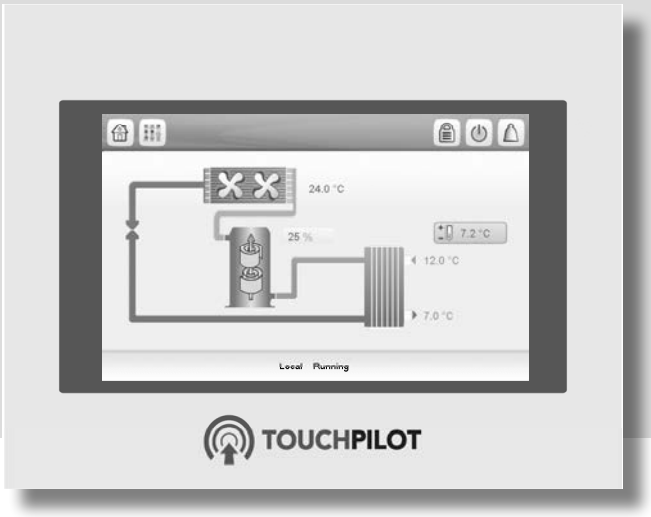
Carrier

United Technologies

CONTROLS MANUAL



Touch Pilot Junior

30RBS (39-160)
30RQS (39-160)

TOUCHPILOT

Original document

CONTENTS

PREFACE

The goal of this document is to give a broad overview of the main functions of the control system used to control 30RBS air-cooled liquid chillers and 30RQS reversible heat pumps with 39 to 160 kW cooling/heating capacity.

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! 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.

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

Acronyms/abbreviations

In this manual, the refrigeration circuits are called circuit A and circuit B. Compressors in circuit A are labelled A1, A2, A3, whereas compressors in circuit B are labelled B1, B2.

BMS	Building Management System
CCN	Carrier Comfort Network
DGT	Discharge Gas Temperature
EXV	Electronic Expansion Valve
EHS	Electric Heater Stage
FC	Free cooling
OAT	Outdoor Air Temperature
LED	Light Emitting Diode
LEN	Sensor Bus (internal communication bus linking the basic board to slave boards)
SCT	Saturated Condensing Temperature
SST	Saturated Suction Temperature
Network mode/Net	Operating type: Network
Local-Off/LOFF	Operating type: Local Off
Local-On/L-C	Operating type: Local On mode
Local-Schedule/L-SC	Operating type: Local On following a time schedule
Master mode/Mast	Operating type: Master unit (master/slave assembly)
Remote mode/Rem	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.

CAUTION
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.

CAUTION
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

Carrier 30RBS chillers and 30RQS heat pumps come with a Touch Pilot Junior control that serves as the user interface and configuration tool for Carrier communicating devices.

Touch Pilot Junior is an electronic control system used to regulate the following types of units:
- 30RBS air-cooled liquid chillers
- 30RQS reversible heat pumps

Touch Pilot Junior control can function as a stand-alone system or it may be connected to the building management system using CCN communication bus.

30RBS and 30RQS units may be fitted with standard fixed speed fan control system or the optional variable speed fan drives which can reduce the unit energy use during occupied and unoccupied periods, provide condensing or evaporating pressure control and smooth fan start.

For both 30RBS chillers and 30RQS 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.

2.3 - 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 or BACnet). 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.

3.1 - Touch Pilot Junior control

Touch Pilot Junior control system:

- Allows users to control the unit via the Touch Pilot Junior user interface.
- Provides web connectivity technology.
- Supports *Carrier Connect 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 (RS485 / Ethernet).

3.2 - Chiller

The control manages a number of mechanisms that allow the unit to operate effectively. Touch Pilot Junior controls compressors, fixed or variable speed fans, fixed or variable speed pumps for evaporator/condenser, and more.

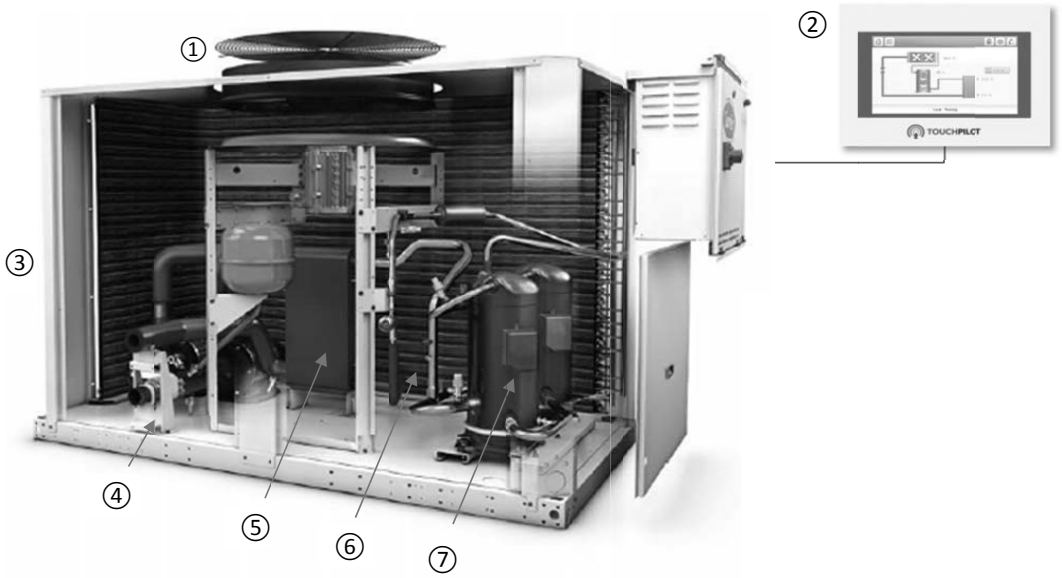


Figure 1: 30RBS unit with Touch Pilot Junior control (picture for reference only)

Legend:
1 Low sound fan system
2 Touch Pilot Junior control system
3 Condenser
4 Hydronic module with variable speed pump control (option)
5 Evaporator
6 Electronic Expansion Valve
7 Scroll compressor(s)

3.3 - Features overview

Feature	Chillers (30RBS)	Heat pumps (30RQS)
4.3" touch screen (Touch Pilot Junior)	X	X
Web connectivity	X	X
E-mail transmission	X	X
Carrier Connect Services	X	X
Language packs	X	X
Language pack customization	X	X
Metric / Imperial unit display	X	X
BMS connection	X	X
CCN communication	X	X
Scroll compressor technology	X	X
Water exchanger heater	X	X
Defrost mechanism		X
Diagnostics	X	X
Variable speed fans	O	O
High static fan	O	O
Fixed or variable speed pumps	O	O
Cooling control	X	X
Heating control	O	X
Boiler heating control	O	O
Electric heating control		O
Free Cooling control	O	O
Desuperheater	O	O

* "X" indicates a standard feature, whereas "O" indicates an option.

4.1 - Control boards

All boards making up the Touch Pilot Junior control system are installed inside the electrical cabinet. They communicate via an internal LEN bus.

The system may embrace up to two SIOB boards, where the first board is used to manage all major inputs and outputs of the controller, whereas the second SIOB board is used to support either the compressor of circuit A or circuit B.

The first SIOB board is also referred to as the main board – the main board continuously monitors the information received from various pressure and temperature probes and accordingly starts the program that controls the unit.

At the same time, up to two (2) AUX1 boards can be installed. The first AUX1 board may provide additional inputs and outputs used to monitor chiller water system cooling temperature (Master/Slave assembly), leakage charge detection readings, electric heating or boiler operation. This board is used only for smaller units (units with only one fan) that have any of the aforementioned options available (electric heaters, boiler, etc.).
The second AUX1 board is optional and it is used for units with the dry cooler option. It provides information required to control the free cooling cycle.

4.2 - Electrical box

The electrical box includes all boards controlling the unit and the user interface (Touch Pilot Junior).

4.3 - Power supply to boards

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

In the event of a power supply interrupt, the unit restarts automatically without the need for an external command. However, any faults active when the supply is interrupted are saved and may in certain cases prevent a given circuit or the unit from restarting.

CAUTION

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

4.4 - Light emitting diodes

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.

4.5 - 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 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.

4.6 - 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.

4.7 - 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 8.5).

Four-way valve (heat pumps only)
The control actuates the four-way valve for cooling / heating mode and defrosts sessions.

4.8 - 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.

Description	Board	Connector / Input / Output	Terminal	Remarks
On/Off Switch	SIOB #1	J1 / DI-01	32-33	Used for the unit on/off control (Remote mode)
Second Setpoint Switch	SIOB #1	J1 / DI-02	65-66	Used to switch between setpoints See section 4.8.2
Limit Switch #1	SIOB #1	J1 / DI-03	73-74	Used to control demand limit. See section 4.8.3
Limit Switch #2	SIOB #1	J1 / DI-04	75-76	Used to control demand limit. See section 4.8.3
Heat/Cool Select	SIOB #1	J3 / DI-06	63-64	Used to switch between cooling and heating when the unit is in Remote mode (Heat pumps only)
Desuperheater Switch	SIOB #1	J3 / DI-07	49-49A	Heat recovery is allowed
power_input_stable	SIOB #1	J3 / DI-08	-	
Water Pump #1	SIOB #1	J6 / IN03-DO-03	-	The control can regulate one or two evaporator pumps and automatically change over between the two pumps
Water Pump #2	SIOB #1	J6 / IN04-DO-04	-	The control can regulate one or two evaporator pumps and automatically change over between the two pumps
Running Relay	SIOB #1	J23 / DO-05	37-38	Indicates if the unit is ready to start or operating
Alarm Relay	SIOB #1	J22 / DO-06	30-31	Indicates alarms
Limit Analog Signal	SIOB #1	J9 / AI-10	43-44	Used for Setpoint Reset
Electrical Heat Stage #1	SIOB #2	J6 / DO-03	-	Used to manage electric heating stage (1)
Electrical Heat Stage #2	SIOB #2	J6 / DO-04	-	Used to manage electric heating stage (2)
Electrical Heat Stage #3	SIOB #2	J23 / DO-05	-	Used to manage electric heating stage (3)
Boiler or Electrical Heat Stage #4	SIOB #2	J22 / DO-06	-	Used to manage boiler heating or electric heating stage (4)

4.8.1 - 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:

	Off	Cooling	Heating	Auto
On/Off contact [ON_OFF_SW]	open	closed	closed	open
Cooling/heating contact [HC_SW]	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 auto changeover is enabled (*Heat/Cool Select [HC_SEL]*, GENUNIT), the operating mode is selected based on OAT.

4.8.2 - 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.

	Cooling		Heating	
	Stp 1	Stp 2	Stp 1	Stp 2
Setpoint selection contact [SP_SW]	open	closed	open	closed

4.8.3 - Volt-free demand limit selection contact
Three steps demand limit based on two dry contacts can be used to limit unit capacity.

	100%	Limit 1	Limit 2	Limit 3
Demand limit switch 1 [LIM_SW1]	open	closed	open	closed
Demand limit switch 2 [LIM_SW2]	open	open	closed	closed

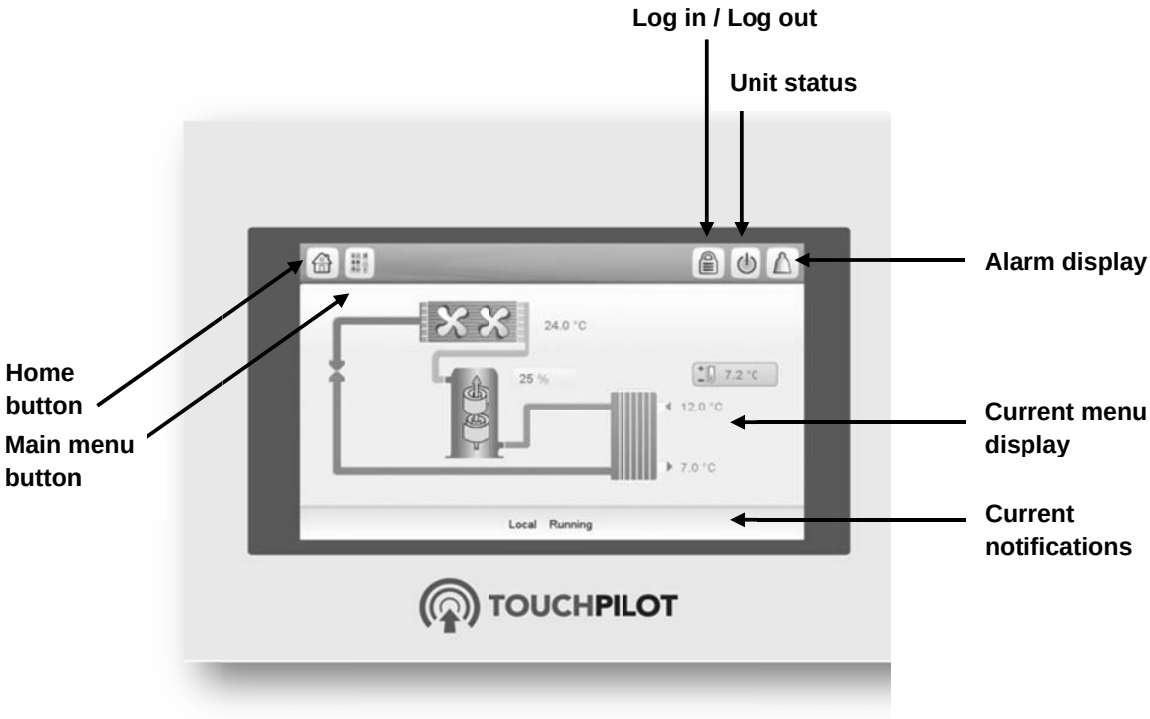


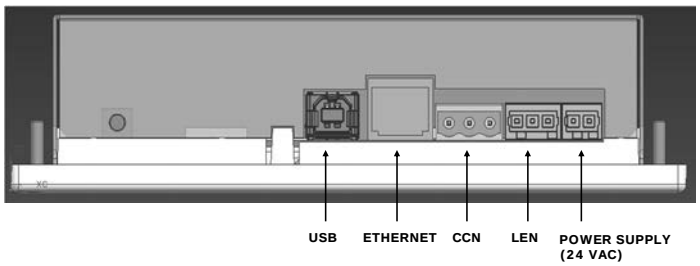
Figure 2: Touch Pilot Junior user interface display

Features of Touch Pilot Junior user interface

- 4.3"colour touch screen with quick display of alarms, current unit operating status, etc.
- Resistive touch screen technology
- Web connectivity
- Custom language support

Connections

Connections are located on the back side of the controller.



5.1 - Touch Pilot Junior overview

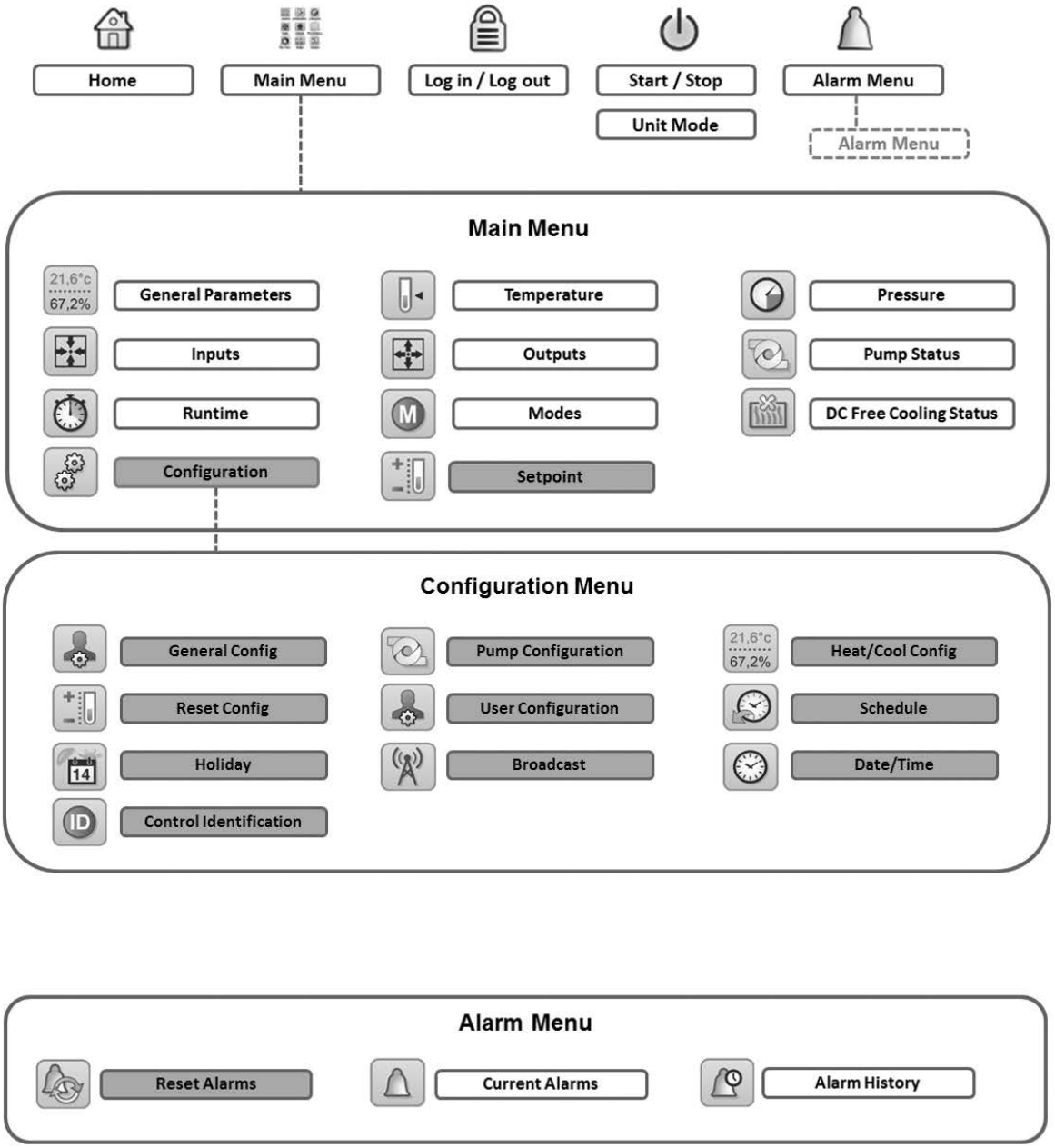
Touch Pilot Junior provides access to the following screens:

- Welcome screen
- Synoptic screen
- Operating mode selection screen
- Data/configuration screens
- Password entry and language selection screen
- Alarms screen
- Parameter modification screen
- Time schedule screen

WARNING

If the Touch Pilot user interface is not used for a long period, the Welcome screen is displayed, and then it goes blank. The control is always active and the operating mode remains unchanged. Press anywhere on the screen and the Welcome screen will be displayed.

5.2 - Touch Pilot Junior menu structure



Legend:

Basic access (0 = password)

User password required

5.3 - Read the welcome screen

The Welcome screen is the first screen shown after starting the user interface. It displays the application name as well as the current software version number.

To exit the Welcome screen, press

Information message box
The information box displayed in the status bar at the bottom of the screen includes relevant messages regarding the current user action.

All screens presented further in this manual may display the following messages:

MESSAGE	STATUS
COMMUNICATION FAILURE!	Equipment controller did not respond while reading the table content.
ACCESS DENIED!	Equipment controller denies access to one of the tables.
LIMIT EXCEEDED!	The value entered exceeds the parameter limit.
Save changes?	Modifications have been made. The exit must be confirmed by pressing Save or Cancel.
HIGHER FORCE IN EFFECT!	Equipment controller rejects Force or Auto command.

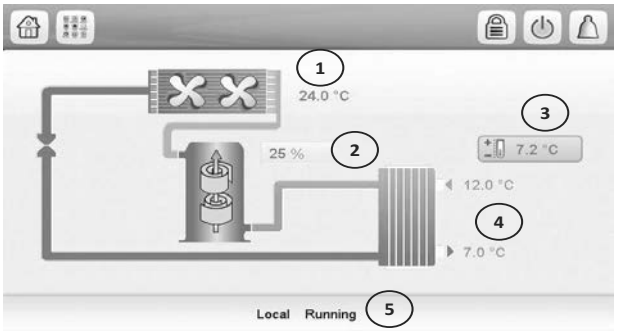
5.4 - Explore the synoptic screen

The Synoptic screen provides an overview of the system control, allowing the user to monitor the vapour-refrigeration cycle.

The diagram indicates the current status of the unit, giving information on the unit capacity, the status of water heat exchanger pumps, and the pre-defined setpoint parameter.

All unit functions can be accessed by pressing the **Main menu** button

IMPORTANT: The synoptic screen display may vary depending on pumps configuration.



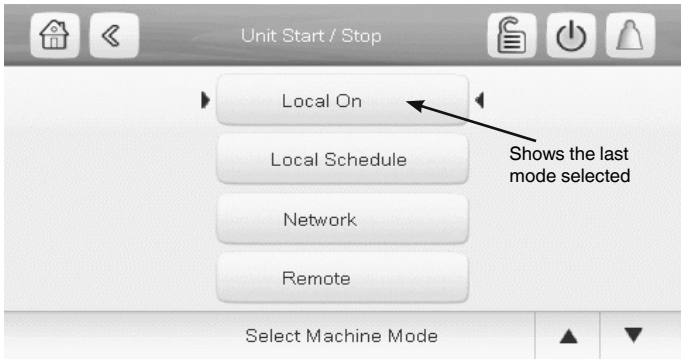
1 Outdoor air temperature
2 Unit capacity percentage
3 Setpoint
4 Evaporator inlet and outlet water temperature
5 Status screen message

The bell located in the upper-right part of the screen lights when any fault is detected.

By default, the parameters are presented in metric units. For more information on how to change the system of measurement, see section 5.8.3.

5.5 - Start the unit

With the unit in the Local off mode, press the **Start/Stop** button to display the list of operating modes and select the required mode.



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 allowed to start if the period is occupied.

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

5.6 - Stop the unit

To stop the unit, press the **Start/Stop** button

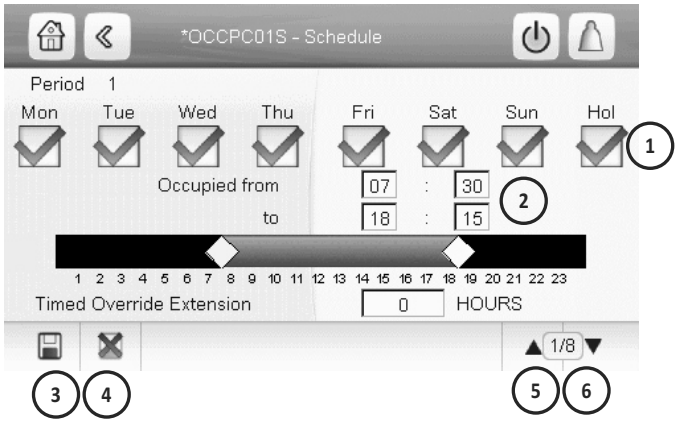
Confirm the unit shutdown by pressing **Confirm Stop** or cancel the unit shutdown by pressing the **Back** button

5.7 - Set the schedule

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 control offers the user the possibility of setting eight occupancy periods.

To set the unit start/stop schedule:

1. Navigate to the Configuration menu and select *Schedule* (SCHEDULE).
2. Go to **OCCPC01S**.
3. Select appropriate check boxes to set the unit occupancy on specific days.
4. Define the time of occupancy.
5. When the time schedule is set, the selected period will be presented in the form of the green band on the timeline.
6. Press to confirm or to cancel changes.



1 Selection of days for the time schedule
2 Start/end of the schedule
3 Save
4 Cancel
5 Previous time period
6 Next time period

IMPORTANT: Only logged-in users are allowed to access the Configuration menu.

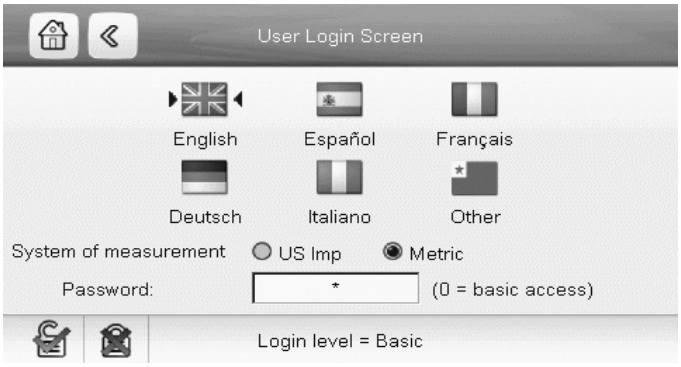
5.8 - Manage display settings

The User Login screen allows the user to select the language of the controller, change the system of measurement (imperial or metric) and enter a password to gain access to more control options.

To access the User Login screen, press the **Log** button in the upper-right corner of the screen (see also section 5.4).

5.8.1 - Security access settings

User-level security ensures that only authorised users are allowed to modify critical unit parameters.



1 Cursor indicating the selected language
2 Logged-in button
3 Logged-off button
4 System of measurement: Metric/Imperial
5 Password dialog box

IMPORTANT: Only logged-in users are allowed to access the Configuration menu.

WARNING

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.

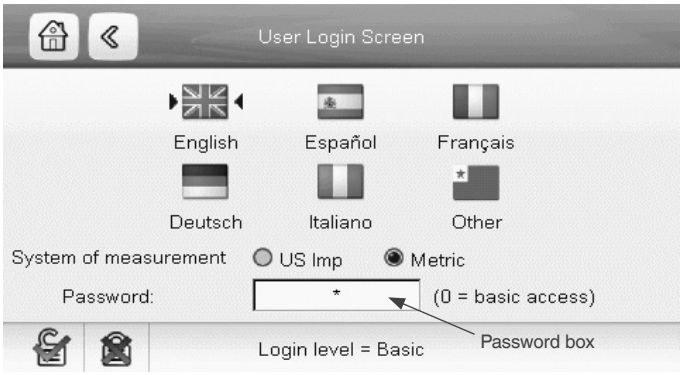
Only people qualified to manage the unit should be familiarized with the password.

User login

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

To log in as user:

1. Press the **Log** button to open *User Login Screen*.
2. Press the Password box.

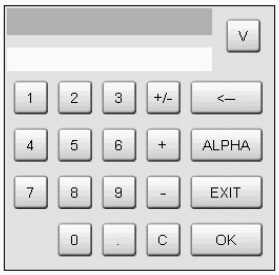


3. A dialog box appears.

4. Provide the password (11) and press OK.
5. The User Login screen appears.
6. Press to save or to cancel changes.

Password change
User password can be modified in the User Configuration menu.

To change your password:
1. Navigate to the Configuration menu and select *User Configuration* (USERCONF).
2. Press the User Password box.
3. A dialog box appears.

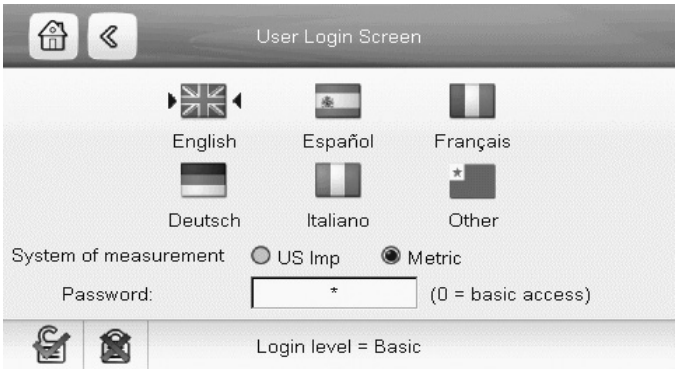


4. Enter your new password and press OK.
5. The User Configuration screen appears.
6. Press to save or to cancel changes.

5.8.2 - Display language
Display language can be modified in the User Login Screen on the Touch Pilot Junior user interface.

To change a display language:

1. Press the **Log** button to open *User Login Screen*.
2. Select the new language of the display.



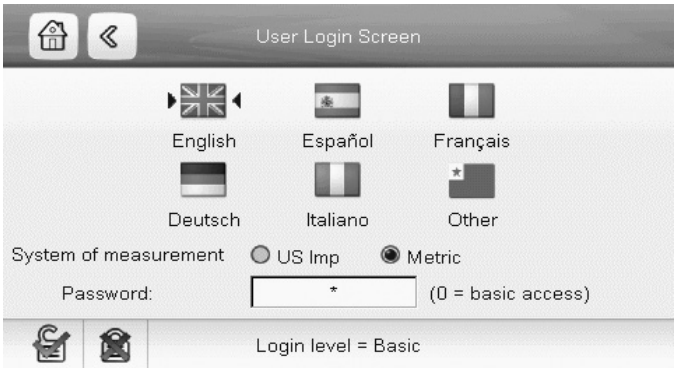
3. Press to save or to cancel changes.

IMPORTANT: Touch Pilot Junior allows users to add new languages to the control. To learn more about language customization, please contact your local Carrier representative.

5.8.3 - System of measurement
The control offers the possibility of selecting the system of measurement displayed on the user interface.

To change a system of measurement:

1. Press the **Log** button to open *User Login Screen*.
2. Select the system of measurement.

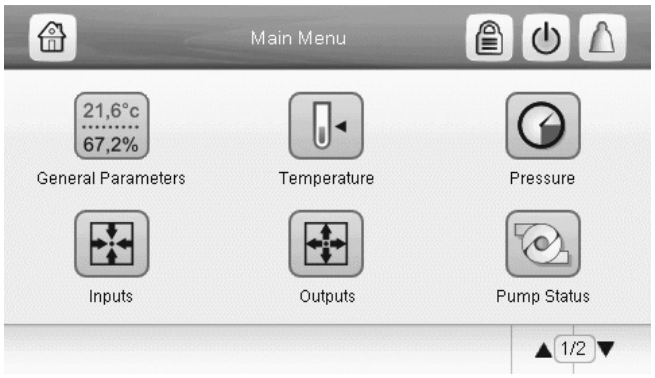


3. Press to save or to cancel changes.

5.9 - Monitor unit parameters

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 Synoptic screen (see also section 5.4).

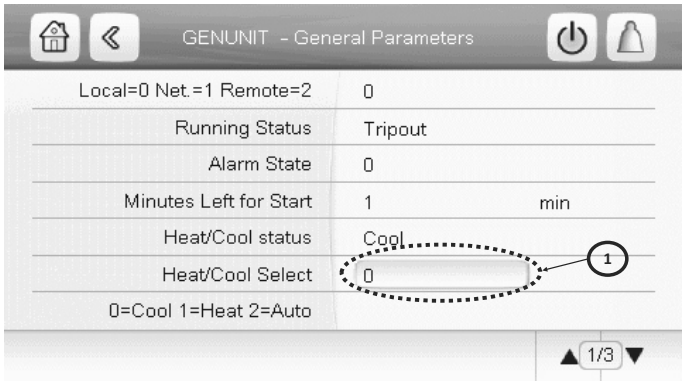


Specific unit parameters can be accessed by pressing the icon corresponding to the desired category.

To go back to the Synoptic screen, press .

General unit parameters
The General parameters screen provides access to a set of general unit parameters.

To access the General parameters screen, go to the Main menu and select **General Parameters** 

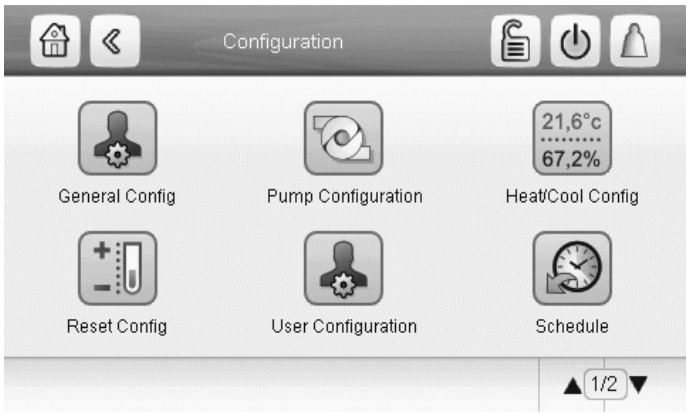


1 Forceable point

Press the **Up/Down** buttons  to navigate between the screens.

5.10 - Modify unit parameters

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 (see also section 5.8.1).



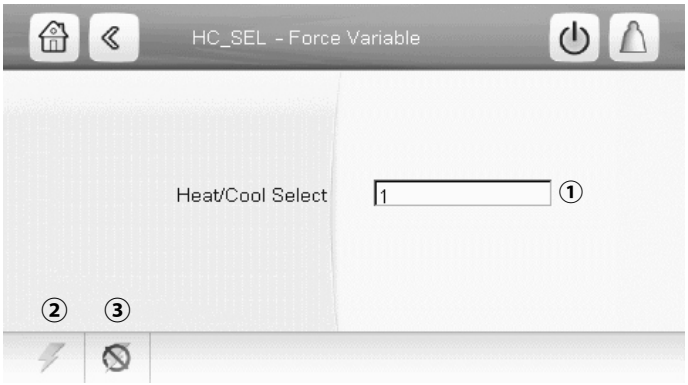
Press the field corresponding to the parameter to be modified and introduce all the necessary changes.

Press the **Up/Down** buttons  to navigate between the screens. Once all the necessary modifications have been made, press  to confirm or  to cancel changes.

5.11 - Override system configuration

In some cases it is possible to override system configuration. The override screen provides the option to issue the command overriding the current operation of the unit.

To access the override screen, press the forceable point of the data screen. Note that not all parameters can be overridden by the control.



1 Forced value
2 Set force
3 Auto

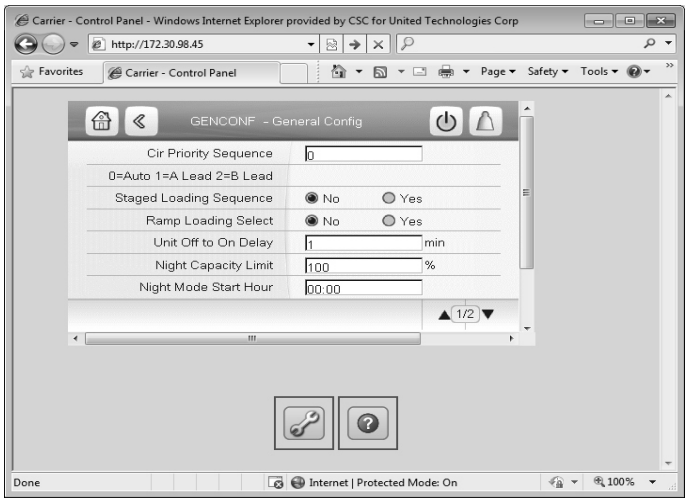
6.1 - Web interface

The Touch Pilot Junior control can be accessed via a web browser (Internet Explorer, Mozilla Firefox, etc.). Connection is from a PC using a web browser with Java.

CAUTION
Use firewalls and VPN for secure connection.

6.2 - Open the web interface

To access the Touch Pilot Junior control, enter the IP address of the unit in the address bar of the web browser.



Unit default address: 169.254.0.1.
This address can be changed.

IMPORTANT: Only two web connections can be authorised at the same time.

CAUTION
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.

6.3 - Manage web browser settings

Minimum web browser configuration:

- Internet Explorer (version 8 or higher) or Mozilla Firefox (version 26 or higher). In the advanced connection options add the unit IP address to the exceptions list. Do not use a proxy server.
- Java platform (version 6 or higher). In the control panel, clear the *Keep temporary files on my computer* checkbox and use a direct connection.

IMPORTANT: Two users can be connected simultaneously with no priority between them. Note that the last modification is taken into account.

7.1 - Main menu

Icon	Displayed text*	Description	Name
	General Parameters	General parameters	GENUNIT
	Temperature	Temperatures	TEMP
	Pressure	Pressures	PRESSURE
	Inputs	Inputs status	INPUTS
	Outputs	Outputs status	OUTPUTS
	Pump Status	Pump status	PUMPSTAT
	Runtime	Run times	RUNTIME
	DC Free Cooling Status	Dry Cooler - Free Cooling	FCOOL_ST
	Modes	Modes status	MODES
	Setpoint	Setpoints	SETPOINT
	Configuration	Configuration menu	CONFIG

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

CAUTION

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

General Parameters Menu – GENUNIT

	Point name	Status	Unit	Displayed text*	Description
1	CTRL_TYP	0 to 2	-	Local=0 Net.=1 Remote=2	Operating mode: 0 = Local, 1 = Network, 2 = Remote
2	STATUS	xxx	-	Running Status	Unit running status: 0 = Off, 1 = Running, 2 = Stopping, 3 = Delay, 4 = Trip out, 5 = Ready, 6 = Override, 7 = Defrost, 8 = Run Test, 9 = Test
3	ALM	xxx	-	Alarm State	Alarm status
4	min_left	0 to 0	min	Minutes Left for Start	Minutes left before the unit start-up
5	HEATCOOL			Heat/Cool status	Heating/Cooling status
6	HC_SEL	0 to 2	-	Heat/Cool Select	Heating/Cooling selection
				0=Cool 1=Heat 2=Auto	0 = Cool, 1 = Heat, 2 = Auto
7	SP_SEL	0 to 2	-	Setpoint Select	Setpoint select
				0=Auto. 1=Spt1. 2=Spt2	0 = Auto, 1 = Setpoint 1, 2 = Setpoint 2
8	SP_OCC	no/yes	-	Setpoint Occupied?	Setpoint occupied?
9	CHIL_S_S	dsable/enable	-	Net.: Cmd Start/Stop	Unit start/stop via Network: When the unit is in Network mode, start/stop command can be forced
10	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
11	CAP_T	0 to 100	%	Percent Total Capacity	Total unit capacity
12	CAPA_T	0 to 100	%	Circuit A Total Capacity	Total capacity, circuit A
13	CAPB_T	0 to 100	%	Circuit B Total Capacity	Total capacity, circuit B
14	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
15	SP	-	°C / °F	Current Setpoint	Current setpoint
16	CTRL_PNT	-20.0 to 67.0 -4.0 to 153.0	°C °F	Control Point	Control point: Water temperature that the unit must produce
17	EMSTOP	dsable/enable	-	Emergency Stop	Emergency stop

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

Temperature Menu – TEMP

	Point name	Status	Unit	Displayed text*	Description
1	EWT	-	°C / °F	Entering Water Temp	Entering water temperature: Used for capacity control
2	LWT	-	°C / °F	Leaving Water Temp	Leaving water temperature: Used for capacity control
3	OAT	-	°C / °F	External Temperature	Outdoor air temperature: Used to determine a number of control mechanisms such as heat/cool changeover, water exchanger heater operation, defrost cycle
4	CHWSTEMP	-	°C / °F	Common Master/Slave Temp	Common master/slave temperature
5	SCT_A	-	°C / °F	Saturated Cond Tmp A	Saturated condensing temperature, circuit A
6	SST_A	-	°C / °F	Saturated Suction Tmp A	Saturated suction temperature, circuit A
7	SCT_B	-	°C / °F	Saturated Cond Tmp B	Saturated condensing temperature, circuit B
8	SST_B	-	°C / °F	Saturated Suction Tmp B	Saturated suction temperature, circuit B
9	DEFRT_A	-	°C / °F	Defrost Temp Cir A	Defrost temperature, circuit A (heat pumps only)
10	DEFRT_2	-	°C / °F	Defrost Temp Second Coil	Defrost temperature on the second coil on circuit A (heat pumps only)
11	sgtc1	-	°C / °F	Suction Gas Temp Coil 1	Suction gas temperature coil 1
12	sgtc2	-	°C / °F	Suction Gas Temp Coil 2	Suction gas temperature coil 2

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

Pressure Menu – PRESSURE

	Point name	Status	Unit	Displayed text*	Description
1	DP_A	-	kPa / PSI	Discharge Pressure A	Compressor discharge pressure, circuit A
2	SP_A	-	kPa / PSI	Suction Pressure A	Compressor suction pressure, circuit A
3	DP_B	-	kPa / PSI	Discharge Pressure B	Compressor discharge pressure, circuit B
4	SP_B	-	kPa / PSI	Suction Pressure B	Compressor suction pressure, circuit B

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

Inputs Menu – INPUTS

	Point name	Status	Unit	Displayed text*	Description
1	ONOFF_SW	open/close	-	Remote On/Off Switch	Remote On/Off switch
2	HC_SW	open/close	-	Remote Heat/Cool Switch	Remote Heat/Cool switch
3	on_ctrl	xxx	-	Current Control	Current control status: Off, On Cool, On Heat, On Auto
4	SETP_SW	open/close	-	Remote Setpoint Switch	Remote setpoint switch
5	LIM_SW1	open/close	-	Limit Switch 1	Demand limit switch 1
6	LIM_SW2	open/close	-	Limit Switch 2	Demand limit switch 2
7	LIM_ANAL	-	mA	Limit Analog Input	Limit Analog Input 4-20mA
8	FLOW_SW	open/close	-	Flow Switch	Water exchanger flow switch
9	leak_v	-	V	Leakage detector #1 val	Leakage detector 1
10	leak_2_v	-	V	Leakage detector #2 val	Leakage detector 2
11	DSHT_SW	open/close	-	Desuperheater Switch	Desuperheater switch
12	PWRIN_ST	open/close	-	Power Input Stable	Power input stable
13	HP_SWA	open/close	-	HP Switch Circuit A	High pressure switch, circuit A
14	HP_SWA3B	open/close	-	HP Switch Circuit A3/B	High pressure switch, circuit B
15	bacdongl	no/yes	-	BACnet Dongle	BACnet dongle status (BACnet option)

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

Outputs Menu – OUTPUTS

	Point name	Status	Unit	Displayed text*	Description
1	CP_A1	off/on	-	Compressor A1 Output	Compressor A1 status
2	CP_A2	off/on	-	Compressor A2 Output	Compressor A2 status
3	CP_A3	off/on	-	Compressor A3 Output	Compressor A3 status
4	FAN_A1LS	off/on	-	Fan A1LS Output	Fan A1 low speed status
5	FAN_A1HS	off/on	-	Fan A1HS Output	Fan A1 high speed status
6	FAN_A2LS	off/on	-	Fan A2LS Output	Fan A2 low speed status
7	FAN_A2HS	off/on	-	Fan A2HS Output	Fan A2 high speed status
8	HD_POS_A	-	%	Head Pressure Position A	Head pressure, circuit A
9	EXVPosA	-	%	EXV Position Circuit A	EXV position, circuit A
10	EXVNPosA	-	%	EXV Next Pos Circuit A	EXV next position, circuit A
11	RV_A	off/on	-	4 Way Refrigerant ValveA	4-way refrigerant valve, circuit A: Used to manage cooling / heating / defrost operation (heat pumps)
12	CP_B1	off/on	-	Compressor B1 Output	Compressor B1 status
13	CP_B2	off/on	-	Compressor B2 Output	Compressor B2 status
14	FAN_B1LS	off/on	-	Fan B1LS Output	Fan B1 low speed status
15	FAN_B1HS	off/on	-	Fan B1HS Output	Fan B1 high speed status
16	HD_POS_B	-	%	Head Pressure Position B	Head pressure, circuit B
17	EXVPosB	-	%	EXV Position Circuit B	EXV position, circuit B
18	EXVNPosB	-	%	EXV Next Pos Circuit B	EXV next position, circuit B
19	RV_B	off/on	-	4 Way Refrigerant ValveB	4-way refrigerant valve, circuit B: Used to manage cooling/heating/ defrost operation (heat pumps)
20	C_HEATER	off/on	-	Cooler & Drain Pan Heatr	Water exchanger / Drain pan heater
21	BOILER	off/on	-	Boiler Command	Boiler status
22	EHS_STEP	-	-	Electrical Heat Stage	Electric heating stages
23	ALARM_R	off/on	-	Alarm Relay Status	Alarm relay status
24	RUN_R	off/on	-	Running Status	Unit ON relay
25	OIL_VALV	off/on	-	Oil Valve Status	Oil valve status

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

Pump Status Menu – PUMPSTAT

	Point name	Status	Unit	Displayed text*	Description
1	CPUMP_1	off/on	-	Water Pump #1 Command	Water pump 1 command
2	CPUMP_2	off/on	-	Water Pump #2 Command	Water pump 2 command
3	ROT_PUMP	no/yes	-	Rotate Pumps Now?	Water exchanger pumps rotation
4	W_P_IN	-	kPa / PSI	Inlet Water Pressure	Inlet water pressure
5	W_P_OUT	-	kPa / PSI	Outlet Water Pressure	Outlet water pressure
6	WP_CALIB	no/yes	-	Water Pressure Calibrat	Water pressure calibration
7	WP_OFFST	-	kPa / PSI	Water Pressure Offset	Water pressure offset
8	DP_FILTR	-	kPa / PSI	Delta Water Press. Filt	Delta water pressure filtration
9	WP_MIN	-	kPa / PSI	Mini Water Pressure	Minimum water pressure
10	WAT_FLOW	-	l/s / GPS	Water Flow	Water flow status
11	CAPPOWER	-	kW	Actual Power Capacity	Actual power capacity
12	p_dt_spt	-	^C / ^F	Water DT Setpoint	Water discharge temperature setpoint
13	p_dp_spt	-	kPa / PSI	Water DP Setpoint	Water discharge pressure setpoint
14	drvp_pct	-	%	Pump Drive Percent	Pump drive percent
15	drvp_pwr	-	kW	Pump Drive Power	Pump drive power
16	drvp_i	-	A	Pump Drive Amps	Pump drive (A)
17	drvp_ver	xxx	-	Pump Drive Version	Pump drive version

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

Runtime Menu – RUNTIME

	Point name	Status	Unit	Displayed text*	Description
1	hr_mach	-	hour	Machine Operating Hours	Unit operating hours
2	st_mach	-	-	Machine Starts Number	Number of unit starts
3	hr_cp_a1	-	hour	Compressor A1 Hours	Operating hours, compressor A1
4	st_cp_a1	-	-	Compressor A1 Starts	Number of starts, compressor A1
5	hr_cp_a2	-	hour	Compressor A2 Hours	Operating hours, compressor A2
6	st_cp_a2	-	-	Compressor A2 Starts	Number of starts, compressor A2
7	hr_cp_a3	-	hour	Compressor A3 Hours	Operating hours, compressor A3
8	st_cp_a3	-	-	Compressor A3 Starts	Number of starts, compressor A3
9	hr_cp_b1	-	hour	Compressor B1 Hours	Operating hours, compressor B1
10	st_cp_b1	-	-	Compressor B1 Starts	Number of starts, compressor B1
11	hr_cp_b2	-	hour	Compressor B2 Hours	Operating hours, compressor B2
12	st_cp_b2	-	-	Compressor B2 Starts	Number of starts, compressor B2
13	hr_cpum1	-	hour	Water Pump #1 Hours	Operating hours, water pump 1
14	hr_cpum2	-	hour	Water Pump #2 Hours	Operating hours, water pump 2
15	hr_fana1	-	hour	Circuit A Fan #1 Hours	Operating hours, fan 1, circuit A
16	st_fana1	-	-	Circuit A Fan #1 Starts	Number of starts, fan 1, circuit A
17	hr_fana2	-	hour	Circuit A Fan #2 Hours	Operating hours, fan 2, circuit A
18	st_fana2	-	-	Circuit A Fan #2 Starts	Number of starts, fan 2, circuit A
19	hr_fanb1	-	hour	Circuit B Fan #1 Hours	Operating hours, fan 1, circuit B
20	st_fanb1	-	-	Circuit B Fan #1 Starts	Number of starts, fan 1, circuit B
21	nb_def_a	-	-	Circuit A Defrost Number	Defrost session number, circuit A
22	nb_def_b	-	-	Circuit B Defrost Number	Defrost session number, circuit B

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

DC Free Cooling Status Menu – FCOOL_ST

	Point name	Status	Unit	Displayed text*	Description
1	fc_oat	0 to 0	°C / °F	Free Cooling OAT	Free Cooling OAT (see section 8.10)
2	fc_lwt	0 to 0	°C / °F	FC Leaving Water Temp	Free Cooling LWT
3	fc_wloop	0 to 0	°C / °F	FC Water Loop Temp	Free Cooling water loop temperature
4	m_fcool	no/yes	-	Free Cooling Mode Active	Free Cooling mode – status
5	fc_cap	0 to 100	%	FC Capacity	Capacity in Free Cooling mode
6	fc_fanst	0 to 7	-	FC Fan Stage	Number of fan stages in Free Cooling
7	FC_HOUR	0 to 999999	hour	FC Operating Hours	Free Cooling running time
8	FC_FAN1S	0 to 999999	-	FC Fan Stage 1 Start	Number of starts, FC fan stage 1
9	FC_FAN1H	0 to 999999	-	FC Fan Stage 1 Hours	Operating hours, FC fan stage 1
10	FC_FAN2S	0 to 999999	-	FC Fan Stage 2 Start	Number of starts, FC fan stage 2
11	FC_FAN2H	0 to 999999	-	FC Fan Stage 2 Hours	Operating hours, FC fan stage 2
12	FC_FAN3S	0 to 999999	-	FC Fan Stage 3 Start	Number of starts, FC fan stage 3
13	FC_FAN3H	0 to 999999	-	FC Fan Stage 3 Hours	Operating hours, FC fan stage 3
14	FC_FAN4S	0 to 999999	-	FC Fan Stage 4 Start	Number of starts, FC fan stage 4
15	FC_FAN4H	0 to 999999	-	FC Fan Stage 4 Hours	Operating hours, FC fan stage 4
16	FC_FAN5S	0 to 999999	-	FC Fan Stage 5 Start	Number of starts, FC fan stage 5
17	FC_FAN5H	0 to 999999	-	FC Fan Stage 5 Hours	Operating hours, FC fan stage 5
18	FC_FAN6S	0 to 999999	-	FC Fan Stage 6 Start	Number of starts, FC fan stage 6
19	FC_FAN6H	0 to 999999	-	FC Fan Stage 6 Hours	Operating hours, FC fan stage 6
20	FC_FAN7S	0 to 999999	-	FC Fan Stage 7 Start	Number of starts, FC fan stage 7
21	FC_FAN7H	0 to 999999	-	FC Fan Stage 7 Hours	Operating hours, FC fan stage 7

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

Modes Menu – MODES

	Point name	Status	Unit	Displayed text*	Description
1	m_delay	no/yes	-	Delay Active	Delay active (when switching between modes)
2	m_2ndspt	no/yes	-	Second Setpoint Active	Second setpoint active (during unoccupied periods)
3	m_reset	no/yes	-	Reset Active	Reset is active
4	m_limit	no/yes	-	Demand Limit Active	Demand limit active
5	m_ramp	no/yes	-	Ramp Loading Active	Ramp loading active
6	m_cooler	no/yes	-	Cooler Heater Active	Water exchanger heater active
7	m_pmprot	no/yes	-	Pump Rot Active	Pump rotation active
8	m_pmpper	no/yes	-	Pump Per Active	Periodical pump start active
9	m_night	no/yes	-	Night Low Noise Active	Night low noise mode active
10	m_SM	no/yes	-	System Manager Active	System Manager active
11	m_leadla	no/yes	-	Master Slave Active	Master/Slave active
12	m_auto	no/yes	-	Auto Changeover Active	Auto changeover active
13	m_heater	no/yes	-	Electric Heat Active	Electric heating active
14	m_lo_ewt	no/yes	-	Heating Low EWT Lockout	Heating low EWT lockout
15	m_boiler	no/yes	-	Boiler Active	Boiler active
16	m_ice	no/yes	-	Ice Mode Active	Ice mode active
17	m_defr_a	no/yes	-	Defrost Active On Cir A	Defrost active, circuit A
18	m_defr_b	no/yes	-	Defrost Active On Cir B	Defrost active, circuit B
19	m_sst_a	no/yes	-	Low Suction Circuit A	Low suction temperature, circuit A
20	m_sst_b	no/yes	-	Low Suction Circuit B	Low suction temperature, circuit B
21	m_dgt_a	no/yes	-	High DGT Circuit A	High discharge gas temperature, circuit A
22	m_dgt_b	no/yes	-	High DGT Circuit B	High discharge gas temperature, circuit B
23	m_hp_a	no/yes	-	High Pres Override Cir A	High pressure override, circuit A
24	m_hp_b	no/yes	-	High Pres Override Cir B	High pressure override, circuit B
25	m_sh_a	no/yes	-	Low SuperHeat Circuit A	Low superheat, circuit A
26	m_sh_b	no/yes	-	Low SuperHeat Circuit B	Low superheat, circuit B

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

Setpoint Menu – SETPOINT

	Point name	Status	Default	Unit	Displayed text*	Description
1	csp1	-28.9 to 20.0 -20.0 to 68.0	7.0 44.6	°C °F	Cooling Setpoint 1	Cooling setpoint 1
2	csp2	-28.9 to 20.0 -20.0 to 68.0	7.0 44.6	°C °F	Cooling Setpoint 2	Cooling setpoint 2
3	hsp1	25.0 to 55.0 77.0 to 131.0	38.0 100.4	°C °F	Heating Setpoint 1	Heating setpoint 1
4	hsp2	25.0 to 55.0 77.0 to 131.0	38.0 100.4	°C °F	Heating Setpoint 2	Heating setpoint 2
5	ramp_sp	0.1 to 1.1 0.2 to 2.0	0.6 1.0	^C ^F	Ramp Loading	Ramp loading
6	cauto_sp	3.9 to 50.0 39.0 to 122.0	23.9 75.0	°C °F	Cool Changeover Setpt	Cool changeover setpoint
7	hauto_sp	0 to 46.1 32.0 to 115.0	17.8 64.0	°C °F	Heat Changeover Setpt	Heat changeover setpoint
8	lim_sp1	0 to 100	100	%	Switch Limit Setpoint 1	Switch limit setpoint 1
9	lim_sp2	0 to 100	100	%	Switch Limit Setpoint 2	Switch limit setpoint 2
10	lim_sp3	0 to 100	100	%	Switch Limit Setpoint 3	Switch limit setpoint 3
11	min_sct	26.7 to 60.0 80.0 to 140.0	40.0 104.0	°C °F	Desuperheater Min Sct	Desuperheater minimum saturated condensing temperature

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

7.2 - Configuration menu (CONFIG)

Icon	Displayed text*	Description	Name
	General Config	General configuration	GENCONF
	Pump Configuration	Pump configuration	PUMPCONF
	Heat/Cool Config	Heat/Cool configuration	HCCONFIG
	Reset Config	Reset configuration	RESETCFG
	User Configuration	User configuration	USERCONF
	Schedule	Schedule menu	SCHEDULE
	Holiday	Holiday menu	HOLIDAY
	Broadcast	Broadcast menu	BROADCAST
	Date/Time	Date/time configuration	DATETIME
	Control Identification	Control identification	CTRL_ID

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

CAUTION

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

General Config Menu – GENCONF

	Point name	Status	Default	Unit	Displayed text*	Description
1	lead_cir	0 to 2	0	-	Cir Priority Sequence	Circuit priority sequence
					0=Auto 1=A Lead 2=B Lead	0 = Automatic changeover
						1 = Circuit A lead
						2 = Circuit B lead
2	seq_typ	no/yes	no	-	Staged Loading Sequence	Staged loading sequence
3	ramp_sel	no/yes	no	-	Ramp Loading Select	Ramp loading sequence
4	off_on_d	1 to 15	1	min	Unit Off to On Delay	Unit OFF to ON delay
5	nh_limit	0 to 100	100	%	Night Capacity Limit	Night capacity limitation
6	nh_start	00:00	00:00	-	Night Mode Start Hour	Night mode start hour
7	nh_end	00:00	00:00	-	Night Mode End Hour	Night mode end hour
8	bas_menu	0 to 3	0	-	Basic Menu Config	Basic menu configuration
					0 = All Access	0 = All access
					1 = no alarm menu	1 = Alarm menu
					2 = no setpoint menu	2 = Setpoint menu unavailable
					3 = 1 + 2	3 = Alarm and Setpoint menus are unavailable

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

Pump Configuration Menu – PUMPCONF

	Point name	Status	Default	Unit	Displayed text*	Description
1	pump_seq	0 to 4	0	-	Water Pumps Sequence	Water pumps sequence
					0 = No Pump	0 = No pump
					1 = One Pump Only	1 = One pump only (units with one pump)
					2 = Two Pumps Auto	2 = Two pumps automatic control
					3 = Pump#1 Manual	3 = Pump 1 selected (units with two pumps)
					4 = Pump#2 Manual	4 = Pump 2 selected (units with two pumps)
2	pump_del	24 to 3000	48	hour	Pump Auto Rotation Delay	Pump automatic rotation delay
3	pump_per	no/yes	no	-	Pump Sticking Protection	Pump sticking protection
4	pump_sby	no/yes	no	-	Stop Pump During Standby	Pump stopped when the unit is in standby
5	pump_loc	no/yes	yes	-	Flow Checked if Pump Off	Water flow is checked when the pump is off

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

Heat/Cool Config Menu – HCCONFIG

	Point name	Status	Default	Unit	Displayed text*	Description
1	auto_sel	no/yes	no	-	Auto Changeover Select	Heating/Cooling automatic changeover
2	cr_sel	0 to 3	0	-	Cooling Reset Select	Cooling reset
3	hr_sel	0 to 3	0	-	Heating Reset Select	Heating reset
					1=OAT, 0=None 2=Delta T 3= Analog (4-20mA)	0 = No reset 1 = Reset based on OAT 2 = Reset based on delta T 3 = Reset based on analog input (4-20 mA)
4	heat_th	-20.0 to 0.0 -4.0 to 32.0	-15.0 5.0	°C °F	Heating OAT Threshold	Heating OAT threshold
5	boil_th	-15.0 to 15.0 5.0 to 59.0	-9.9 14.2	°C °F	Boiler OAT Threshold	Boiler OAT threshold
6	ehs_th	-5.0 to 21.1 23.0 to 70.0	5.0 41.0	°C °F	Elec Stage OAT Threshold	Electric heating stage OAT threshold
7	both_sel	no/yes	no	-	HSM Both Command Select	HSM command
8	ehs_back	no/yes	no	-	1 Elec Stage For Backup	Electric heating stage for back-up
9	ehs_pull	0 to 60	0	min	Electrical Pulldown Time	Electrical pull-down time: It defines the time between starting the unit and determining whether the electric heating stage should be started
10	ehs_defr	no/yes	no	-	Quick EHS For Defrost	Quick electric heating used for defrost

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

Reset Config Menu – RESETCFG

	Point name	Status	Default	Unit	Displayed text*	Description
1					**COOLING RESET**	**Cooling reset parameters**
2	oatcr_no	-10.0 to 51.7 14.0 to 125.0	-10.0 14.0	°C °F	OAT No Reset Value	OAT no reset value
3	oatcr_fu	-10.0 to 51.7 14.0 to 125.0	-10.0 14.0	°C °F	OAT Full Reset Value	OAT full reset value
4	dt_cr_no	0 to 13.9 0 to 25.0	0 0	^C ^F	Delta T No Reset Value	Delta T no reset value
5	dt_cr_fu	0 to 13.9 0 to 25.0	0 0	^C ^F	Delta T Full Reset Value	Delta T full reset value

	Point name	Status	Default	Unit	Displayed text*	Description
6	I_cr_no	0 to 20	0	mA	Current No Reset Value	Current no reset value
7	I_cr_fu	0 to 20	0	mA	Current Full Reset Value	Current full reset value
8	cr_deg	-16.7 to 16.7 -30.0 to 30.0	0 0	^C ^F	Cooling Reset Deg. Value	Cooling reset deg. value
9					**HEATING RESET**	**Heating reset parameters**
10	oathr_no	-10.0 to 51.7 14.0 to 125.0	-10.0 14.0	°C °F	OAT No Reset Value	OAT no reset value
11	oathr_fu	-10.0 to 51.7 14.0 to 125.0	-10.0 14.0	°C °F	OAT Full Reset Value	OAT full reset value
12	dt_hr_no	0 to 13.9 0 to 25.0	0 0	^C ^F	Delta T No Reset Value	Delta T no reset value
13	dt_hr_fu	0 to 13.9 0 to 25.0	0 0	^C ^F	Delta T Full Reset Value	Delta T full reset value
14	I_hr_no	0 to 20	0	mA	Current No Reset Value	Current no reset value
15	I_hr_fu	0 to 20	0	mA	Current Full Reset Value	Current full reset value
16	hr_deg	-16.7 to 16.7 -30.0 to 30.0	0 0	^C ^F	Heating Reset Deg. Value	Heating reset deg. value

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

User Configuration Menu – USERCONF

	Point name	Status	Default	Unit	Displayed text*	Description
1	use_pass	-	11	-	User Password	The password required to access User Configuration menu
2	alert_r	no/yes	no	-	Alarm Relay for Alerts?	Alarm relay status. Alarm output relay is used for "alarm" + "alert"

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

Schedule Menu – SCHEDULE

	Point name	Status	Default	Unit	Displayed text*	Description
1	OCCPC01S	-	-	-	OCCPC01S - Schedule Menu	Unit on/off time schedule
2	OCCPC02S	-	-	-	OCCPC02S - Schedule Menu	Unit setpoint selection time schedule

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

Holiday Menu – HOLIDAY

	Point name	Status	Default	Unit	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).

Broadcast Menu – BROADCAST (BROCASTS)

	Point name	Status	Default	Unit	Displayed text*	Description
1	Ccnbroad	0 to 2	2		Activate	Not applicable
2	OAT Broadcast					
3	oatbusnm	0 to 239	0		Bus	Bus number of the unit with the outdoor temperature sensor
4	oatlocad	0 to 239	0		Element	Element number of the unit with outdoor temperature
5	dayl_sel	disable/enable	disable		Daylight Savings Select	Summer/winter time activation (Daylight saving selection)
Daylight Savings Select – Summer time (entering)						
6		1 to 12	3		Month	Month
7		1 to 7	7		Day of Week (1=Monday)	Day of the week (1 = Monday)
8		1 to 5	5		Week Number of Month	Week of the month
Daylight Savings Select – Winter time (leaving)						
9	Stopmon	1 to 12	10		Month	Month
10	Stopdow	1 to 7	7		Day of Week (1=Monday)	Day of the week (1 = Monday)
11	Stopwom	1 to 5	5		Week Number of Month	Week of the month

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

Date/Time Menu – DATETIME

	Point name	Status	Default	Unit	Displayed text*	Description
Date (DD/MM/YY)						
1	d_of_m	1 to 31	-		Day of month	Day of the month
2	month	1 to 12	-		Month of year	Month
3	year	0 to 99	-		Year	Year
4	dow	Monday-Sunday	-		Day of Week	Day of the week
Time (HH:MM)						
5	hour	0 to 24	hour		Hour	Hour
6	minute	0 to 59	min		Minute	Minutes
Daylight Saving Time						
7	dlig_on	no/yes	-		Daylight sav. time on	Daylight saving time on/off
8		no/yes	-		Today is a holiday	The present day is a holiday
9	tom_hol	no/yes	-		Tomorrow is a holiday	The following day is a holiday

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

Control Identification Menu – CTRL_ID

	Point name	Status	Default	Unit	Displayed text*	Description
1	elemt_nb	0 to 239	1		CCN Element Number	Element number
2	Bus_nb	0 to 239	0		CCN Bus Number	Bus number
3	Baudrate	9600/19200/38400	9600		CCN Baud Rate	Communication speed
4	Device description	-	30RBSRQS		Device Description	Device
5	Location Description				Location Description	Location
6	Software Part Number	-	ECG-SR-20R430-xx		Software Part Number	Software version
7	Serial Number	-			Serial Number	Serial number (MAC address)

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

7.3 - Alarm menu

Icon	Displayed text*	Description	Menu name
	Reset Alarms	Alarm reset	ALARMRST
	Current Alarms	Current alarms	CUR_ALRM
	Alarm History	Alarm history	ALMHIST1

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

8.1 - 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 summarizes 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						**Parameter 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**
-	-	-	-	-	-	-	-	-	-	enable	-	-	off
-	-	-	-	-	-	-	-	-	-	-	yes	-	off
active						-	-	-	-	-	-	local	off
		active				-	-	-	unoccupied	-	-	local	off
			active			-	off	-	-	-	-	remote	off
			active			-	-	-	unoccupied	-	-	remote	off
				active		disable	-	-	-	-	-	network	off
				active		-	-	-	unoccupied	-	-	network	off
					active	-	-	local	unoccupied	-	-	local	off
					active	-	off	remote	-	-	-	remote	off
					active	-	-	remote	unoccupied	-	-	remote	off
					active	disable	-	network	-	-	-	network	off
					active	-	-	network	unoccupied	-	-	network	off
	active					-	-	-	-	disable	no	local	on
		active				-	-	-	occupied	disable	no	local	on
			active			-	on_cool	-	occupied	disable	no	remote	on
			active			-	on_heat	-	occupied	disable	no	remote	on
			active			-	on_auto	-	occupied	disable	no	remote	on
				active		enable	-	-	occupied	disable	no	network	on
					active	-	-	local	occupied	disable	no	local	on
					active	-	on_cool	remote	occupied	disable	no	remote	on
					active	-	on_heat	remote	occupied	disable	no	remote	on
					active	-	on_auto	remote	occupied	disable	no	remote	on
					active	enable	-	network	occupied	disable	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.

8.2 - 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 (pump_sby, PUMPCONF – Pump Configuration).

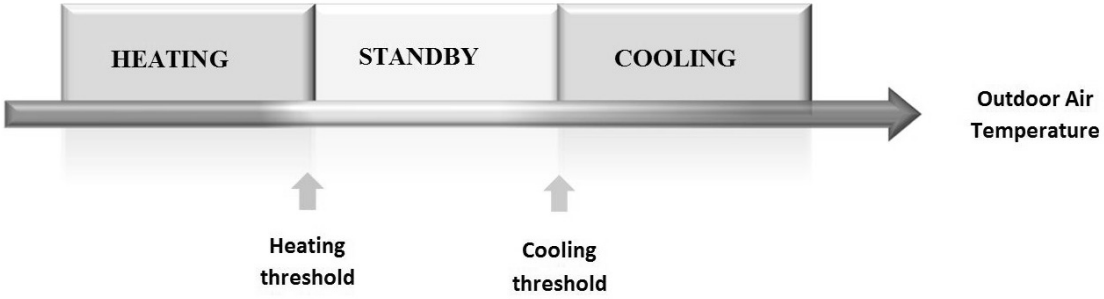


Figure 3: Heating /Cooling changeover for heat pumps and chillers fitted with a boiler

8.2.1 - Operating mode control

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

- **Control type:** 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	-	-	-	cool
local	heat	-	-	-	heat
local	auto*	-	-	> cauto_sp + 1	cool
local	auto*	-	-	< hauto_sp -1	heat
local	auto*	-	-	hauto_sp + 1 < oat < cauto_sp -1	standby
local	-	on_cool	-	-	cool
local	-	on_heat	-	-	heat
local	-	on_auto	-	> cauto_sp +1	cool
local	-	on_auto	-	< hauto_sp - 1	heat
remote	-	on_cool	-	-	cool
remote	-	on_heat	-	-	heat
remote	-	on_auto	-	> cauto_sp + 1	cool
remote	-	on_auto	-	< hauto_sp - 1	heat
remote	-	on_auto	-	hauto_sp + 1< oat < cauto_sp - 1	standby
network	-	-	cool	-	cool
network	-	-	heat	-	heat
network	-	-	auto*	> cauto_sp + 1	cool
network	-	-	auto*	< hauto_sp - 1	heat
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”.
** cauto_sp = cooling changeover setpoint; hauto_sp = heating changeover setpoint; oat = outdoor air temp.

8.3 - Cooling/heating selection

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

Cooling/Heating 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.

Cooling/Heating mode can be set manually by the user or automatically by the control. When cooling/heating is automatic, the outdoor air temperature determines the heat/cool/standby changeover (cauto_sp and hauto_sp, SETPOINT). The automatic changeover is optional and requires user configuration (HC_SEL, 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* (SETPOINT).
3. Set *Cool Changeover Setpt* [cauto_sp] or *Heat Changeover Setpt* [hauto_sp].

Cool Changeover Setpt [cauto_sp]	
3.9 to 50.0°C	23.9°C
39.0 to 122.0°F	75.0°F
Heat Changeover Setpt [hauto_sp]	
0 to 46.1°C	17.8°C
32.0 to 115.0°F	64.0°F

8.4 - Supplementary heating

30RBS 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.

30RQS 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.

8.4.1 - 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 *Heat/Cool Config* (HCCONFIG).
3. Set *Boiler OAT Threshold* [boil_th].

Boiler OAT Threshold [boil_th]	
-15.0 to 15.0°C	-9.9°C
5.0 to 59.0°F	14.2°F

8.4.2 - 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 *Heat/Cool Config* (HCCONFIG).
3. Set *Elec Stage OAT Threshold* [ehs_th].

Elec Stage OAT Threshold [ehs_th]	
-5.0 to 21.0°C	5.0°C
23.0 to 70.0°F	41.0°F

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

8.5 - Pump 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).

8.5.1 - Variable speed pumps control

30RBS chillers and 30RQS 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:
1) Fixed speed control (the control ensures a constant pump speed based on compressor capacity).
2) Water flow control based on constant water delta pressure (the control continuously acts on the pump speed to ensure a constant delta pressure).
3) Water flow control based on constant delta T on the water exchanger.

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

8.5.2 - 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 8.5.1).

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.

To set pumps sequence
1. Navigate to the Configuration menu.
2. Select *Pump Configuration* (PUMPCONF).
3. Set *Water Pumps Sequence* [pump_seq].

Water Pumps Sequence [pump_seq]	
0	No Pump
1	One Pump Only
2	Two Pumps Auto
3	Pump#1 Manual
4	Pump#2 Manual

8.5.3 - 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 Rotation Delay* [pump_del].

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

8.5.4 - Customer pumps configuration

Units fitted with external pumps may have only fixed speed pumps available. 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) 3 (pump#1 manual) 4 (pump#2 manual)

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 4.7.

8.5.5 - 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 (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

8.6 - 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 8.5.1.

8.7 - 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.

To verify the control point

1. Navigate to the Main menu.
2. Select *General Parameters* (GENUNIT).
3. Verify *Control Point* [CTRL_PNT].

Control Point [CTRL_PNT]
-20.0 to 67.0°C
-4.0 to 153.0°F

8.7.1 - Active setpoint

Two setpoints can be selected, where the first setpoint is used during occupied periods, whereas the second one is used during unoccupied periods.

Depending on the current operation type, the active setpoint can be selected manually via the Main menu on the user interface, 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 – General Parameters).
- **Setpoint selection [SP_SEL]**: *Setpoint select* permits selection of the active setpoint if the unit is in the Local operating type (GENUNIT – General Parameters).
- **Setpoint switch status [SETP_SW]**: *Remote Setpoint Switch* (INPUTS – Inputs).
- **Occupied state of dual setpoint time schedule [SP_OCC]**: Schedule for setpoint selection.

LOCAL OPERATING TYPE

Heating/Cooling	Setpoint selection (Local)	Setpoint switch	Schedule 2 status	Active setpoint
Cooling	sp-1	-	-	Cooling setpoint 1
Cooling	sp-2	-	-	Cooling setpoint 2
Cooling	auto	-	occupied	Cooling setpoint 1
Cooling	auto	-	unoccupied	Cooling setpoint 2
Heating	sp-1	-	-	Heating setpoint 1
Heating	sp-2	-	-	Heating setpoint 2
Heating	auto	-	occupied	Heating setpoint 1
Heating	auto	-	unoccupied	Heating setpoint 2

REMOTE OPERATING TYPE

Heating/Cooling	Setpoint selection (Local)	Setpoint switch	Schedule 2 status	Active setpoint
Cooling	-	sp1	-	Cooling setpoint 1
Cooling	-	sp2	-	Cooling setpoint 2
Cooling	-	auto	occupied	Cooling setpoint 1
Cooling	-	auto	unoccupied	Cooling setpoint 2
Heating	-	sp1	-	Heating setpoint 1
Heating	-	sp2	-	Heating setpoint 2
Heating	-	auto	occupied	Heating setpoint 1
Heating	-	auto	unoccupied	Heating setpoint 2

NETWORK OPERATING TYPE

Heating/Cooling	Setpoint selection (Local)	Setpoint switch	Schedule 2 status	Active setpoint
Cooling	sp-1	-	-	Cooling setpoint 1
Cooling	sp-2	-	-	Cooling setpoint 2
Cooling	auto	-	occupied	Cooling setpoint 1
Cooling	auto	-	unoccupied	Cooling setpoint 2
Cooling	auto	-	-	Cooling setpoint 2
Heating	sp-1	-	-	Heating setpoint 1
Heating	sp-2	-	-	Heating setpoint 2
Heating	auto	-	occupied	Heating setpoint 1
Heating	auto	-	unoccupied	Heating setpoint 2
Heating	auto	-	-	Heating setpoint 2

8.7.2 - 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:

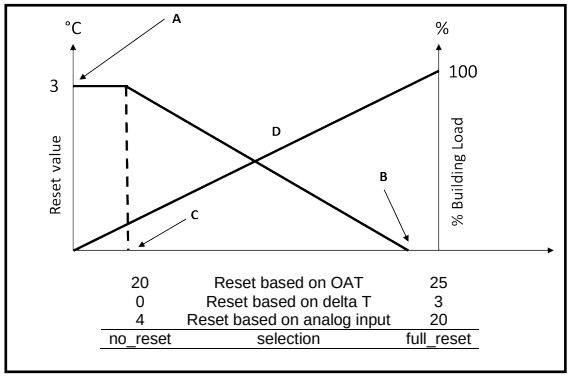
- OAT that gives the measure of the load trends for the building.
- Return water temperature (ΔT provides the average building load).

The reset source and the reset parameters can be configured in the Main menu (RESETCFG – Reset Config). In response to a change in the reset source (e.g. OAT), the setpoint is normally reset 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 for the space temperature



Legend

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

8.8 - Capacity limitation

Touch Pilot Junior 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. The unit capacity can never exceed the limit setpoint activated by these contacts.
- By lag limit [LAG_LIM] set by the master unit in the 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* (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 Config* (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%	-

8.9 - 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 starts (value weighted by their operating time).

8.9.1 - 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 Config).

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 Config* (GENCONF).
3. Set *Staged Loading Sequence* [seq_typ].

Staged loading sequence [seq_typ]	
No/Yes	No

8.9.2 - 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 Config).

- **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 Config* (GENCONF).
3. Set *Cir Priority Sequence* [lead_cir].

Cir Priority Sequence [lead_cir]	
0	Auto
1	Circuit A lead
2	Circuit B lead

8.10 - Free cooling option

30RBS chillers and 30RQS heat pumps may be fitted with a dry cooler that enables power consumption reduction which amounts to energy and cost savings (FREE COOLING).

The installation of a dry cooler allows for “free cooling”, i.e. 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).

Starting free cooling
The free cooling mode is ENABLED when the free cooling OAT [fc_oat] is below the water loop temperature and the start threshold:

fc_oat < fc_wloop – fc_start

fc_oat: Free Cooling OAT
fc_wloop: Free Cooling Water Temperature
fc_start: Free Cooling Start Threshold (service access only)

Note: [fc_wloop] and [fc_oat] temperatures measured by the control are read-only values that can be verified in the DC Free Cooling Status menu (FCOOL_ST).

To verify Dry Cooler water loop temp.
1. Navigate to the Main menu.
2. Select *DC Free Cooling Status*  (FCOOL_ST).
3. Verify *FC Water Loop Temp* [fc_wloop].

FC Water Loop Temp [fc_wloop]
°C / °F

To verify Free Cooling OAT
1. Navigate to the Main menu.
2. Select *DC Free Cooling Status*  (FCOOL_ST).
3. Verify *Free Cooling OAT* [fc_oat].

Free Cooling OAT [fc_oat]
°C / °F

Stopping free cooling
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.

Free Cooling is normally stopped when the free cooling OAT [fc_oat] is above the water loop temperature and the start/stop threshold:

fc_oat > fc_wloop - fc_start + fc_stop

fc_oat: Free Cooling OAT
fc_wloop: Free Cooling Water Temperature
fc_start: Free Cooling Start Threshold (service access only)
fc_stop: Free Cooling Stop Threshold (service access only)

When FC capacity is at 100%, then mechanical cooling can be started.

8.11 - 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 Config). Only logged-in users can modify the night mode settings.

8.12 - Coil pressure control

The coil pressure of each circuit is managed by a maximum of two fans in circuit A and one fan in circuit B. 30RBS/30RQS units are fitted with fixed speed fans or variable speed fans which provide 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.

8.13 - Holidays

This function is used to define 16 holiday periods. Each period is defined by three parameters, i.e. 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 (HOLIDAY – Holiday Menu).

To modify holiday periods
1. Navigate to the Configuration menu.
2. Select *Holiday Menu* (HOLIDAY).
3. Choose the holiday period, e.g. HOLDY_01.
4. Set *Holiday Start Month* [HOL_MON],
   Start Day [HOL_DAY],
   Duration (days) [HOL_LEN].

Holiday Start Month [HOL_MON]	
0-12	0
Start Day [HOL_DAY]	
0-31	0
Duration (days) [HOL_LEN]	
0-99	0

8.14 - BACnet option

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

IMPORTANT: BACnet option can be installed only by Carrier service.

8.15 - Desuperheater option

30RBS/30RQS 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.

To set minimal condensing setpoint
1. Navigate to the Main menu.
2. Select *Setpoint* (SETPOINT).
3. Set *Desuperheat Min SCT* [min_sct].

Desuperheat Min SCT [min_sct]	
26.7 to 60.0°C	40.0°C
80.0 to 140.0°F	104.0°F

8.16 - 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.

8.17 - 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, 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.

The control system has many fault tracing aid functions, protecting the unit against risks that could result in the failure of the unit.

Touch Pilot Junior gives quick access to monitor all unit operating conditions. If an operating fault is detected, the alarm is triggered.

9.1 - Control diagnostics

The Touch Pilot Junior user interface allows the quick display of the unit status.

- The blinking bell icon indicates that there is an alarm, but the unit is still running.
- The highlighted bell icon indicates that the unit is shut down due to a detected fault.

9.1.1 - Current alarms

All currently active alarms can be found in the Current Alarms menu. In addition to the description of the alarm, the control provides information such as date, time the alarm occurred. The control may display up to 10 current alarms.

To access the list of currently active alarms

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

9.1.2 - Alarms reset

Alarm can be reset without stopping the machine. Only logged-in users can reset alarms (see also section 5.8.1). The alarm can be reset either automatically or manually through the user interface or the web interface (Reset Alarms menu).

Note that the Reset Alarms menu displays up to five alarm codes which are currently active on the unit.

To reset alarms manually

1. Press the **Alarm** button  in the upper-right part of the screen.
2. Select **Reset Alarms** 
3. Set the Alarm Reset to “Yes” and press 

CAUTION
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.

9.1.3 - Alarm history

Information regarding resolved alarms is stored in the Alarm history menu.

To access alarms history

1. Press the **Alarm** button  in the upper-right part of the screen.
2. Select **Alarm History** 

9.1.4 - Alarm codes

Each alarm has a code associated with a particular fault.

The alarm codes are displayed in the **Reset Alarms** menu, while the **Current Alarms** menu and the **Alarm History** menu include the description of the alarm.

9.1.5 - 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.

E-mail notifications can be set at service access level.

9.2 - Alarms description

9.2.1 - Alarms

	Name	Code	Description	Reset	Action taken	Possible cause
1	COOL_EWT_F	15001	Water Exchanger Entering Fluid Thermistor Failure	Automatic, if thermistor reading returns to normal	Unit shuts down	Defective thermistor
2	COOL_LWT_F	15002	Water Exchanger Leaving Fluid Thermistor Failure	As above	As above	As above
3	DEFROST_T_A_F	15003	Circuit A Defrost Thermistor Failure	As above	Cooling mode: Unit continues to operate Heating mode: Circuit A shuts down	As above
4	DEFROST_T_B_F	15004	Circuit B Defrost Thermistor Failure	As above	Cooling mode: Unit continues to operate Heating mode: Circuit B shuts down	As above
5	OAT_F	15010	OAT Thermistor Failure	As above	Unit shuts down	As above
6	CHWSTEMP_F	15011	MASTER/Slave Common Fluid Thermistor Failure	As above	Master/Slave operation is disabled, each unit returns to the stand-alone mode	As above
7	SUCTION_T_A_F	15012	Circuit A Suction Gas Thermistor Failure	As above	Circuit A shuts down	As above
8	SUCTION_T_B_F	15013	Circuit B Suction Gas Thermistor Failure	As above	Circuit B shuts down	As above
9	SGTC1_F	15044	Coil Suction Gas Thermistor Sensor 1 Failure	As above	Circuit A shuts down (in heating mode); None (in cooling mode)	As above
10	SGTC2_F	15045	Coil Suction Gas Thermistor Sensor 2 Failure	As above	Circuit B shuts down (in heating mode); None (in cooling mode)	As above
11	DP_A_F	12001	Circuit A Discharge Pressure Transducer Failure	Automatic, if sensor voltage reading returns to normal	Circuit A shuts down	Defective transducer
12	DP_B_F	12002	Circuit B Discharge Pressure Transducer Failure	As above	Circuit B shuts down	As above
13	SP_A_F	12004	Circuit A Suction Pressure Transducer Failure	As above	Circuit A shuts down	As above
14	SP_B_F	12005	Circuit B Suction Pressure Transducer Failure	As above	Circuit B shuts down	As above
15	SIOB_CIR_A_ COM_F	4901	Loss of communication with SIOB Board Number A	Automatic, if communication is re-established	Circuit A shuts down	As above
16	SIOB_CIR_B_ COM_F	4902	Loss of communication with SIOB Board Number B	As above	Circuit B shuts down	Bus installation fault, communication error
17	AUX1_COM_F	4601	Loss of communication with AUX1 Board	As above	Unit shuts down	As above
18	COOLER_ FREEZE_F	10001	Water Exchanger Freeze Protection	Automatic (the first alarm in the last 24 h) or Manual	Unit shuts down, the water exchanger pump is running	No water flow, defective thermistor
19	LOW_SUCTION_A_F	10005	Circuit A Low Saturated Suction Temperature	Automatic (the first alarm in the last 24 h) or Manual	Circuit A shuts down	Pressure transducer defective, EXV blocked or lack of refrigerant
20	LOW_SUCTION_B_F	10006	Circuit B Low Saturated Suction Temperature	As above	Circuit B shuts down	As above
21	HIGH_SH_A_F	10008	Circuit A High Superheat	Manual	Circuit A shuts down	Pressure transducer defective, temperature sensor defective, EXV blocked or lack of refrigerant
22	HIGH_SH_B_F	10009	Circuit B High Superheat	Manual	Circuit B shuts down	As above
23	LOW_SH_A_F	10011	Circuit A Low Superheat	Manual	Circuit A shuts down	As above
24	LOW_SH_B_F	10012	Circuit B Low Superheat	Manual	Circuit B shuts down	As above
25	COOLER_LOCK_F	10014	Interlock Failure	Automatic (if the unit was stopped) or Manual	Unit shuts down	Customer interlock input set on
26	CPA1_REVERSE_ ROT_F	10016	Compressor A1 Not Started Or Pressure Increase not Established	Manual	Compressor A1 shuts down	Compressor breaker or fuse fault, compressor switch open
27	CPA2_REVERSE_ ROT_F	10017	Compressor A2 Not Started Or Pressure Increase not Established	Manual	Compressor A2 shuts down	As above
28	CPA3_REVERSE_ ROT_F	10018	Compressor A3 Not Started Or Pressure Increase not Established	Manual	Compressor A3 shuts down	As above
29	CPB1_REVERSE_ ROT_F	10020	Compressor B1 Not Started Or Pressure Increase not Established	Manual	Compressor B1 shuts down	As above
30	CPB2_REVERSE_ ROT_F	10021	Compressor B2 Not Started Or Pressure Increase not Established	Manual	Compressor B2 shuts down	As above
31	LOSS_COM_SM_F	10029	Loss of communication with System Manager	Automatic, if communication is re-established	Unit returns to the stand-alone mode	CCN bus installation defective
32	LOSS_COM_MS_F	10030	Master/Slave communication Failure	Automatic, if communication is re-established	Master/Slave operation is disabled, the unit returns to the stand-alone mode	CCN bus installation defective

	Name	Code	Description	Reset	Action taken	Possible cause
33	M_S_CONFIG_F	9001	Master chiller configuration error	Automatic, if master/slave configuration returns to normal	Master/slave mode is stopped	Master/slave configuration error
34	INI_FACT_CONF_F	8000	Initial factory configuration required	Automatic, if configuration is entered	Unit shuts down	The unit size has not been configured
35	ILL_FACT_CONF_F	7001	Illegal configuration	Manual	Unit shuts down	The unit size has been configured with the wrong value
36	CCN_EMSTOP_F	10031	Unit is in CCN emergency stop	Automatic, if emergency stop is deactivated	Unit shuts down	Network emergency stop command
37	COOL_PUMP1_F	10032	Water Pump 1 fault	Manual	Unit is restarted with another pump running; If no pump is available, the unit shuts down	Flow switch or water pump fault
38	COOL_PUMP2_F	10033	Water Pump 2 fault	Manual	As above	As above
39	REPEATED_HIGH_DGT_A_F	10037	Circuit A Repeated High Discharge Gas Overrides	Automatic (no discharge gas overrides within 30 min) or Manual	None	Repetitive capacity decreases
40	REPEATED_HIGH_DGT_B_F	10038	Circuit B Repeated High Discharge Gas Overrides	As above	None	As above
41	REPEATED_LOW_SST_A_F	10040	Circuit A Repeated Low Suction Temp Overrides	Manual	Circuit A shuts down	As above
42	REPEATED_LOW_SST_B_F	10041	Circuit B Repeated Low Suction Temp Overrides	Manual	Circuit B shuts down	As above
43	HEAT_LOW_EWT_F	10043	Low Entering Water Temperature In Heating	Automatic	None	Low entering fluid temperature in Heating mode
44	SENSORS_SWAP_F	10097	Water Exchanger Temperature Sensors Swapped	Manual	Unit shuts down	Input and output temperature reversed
45	SERVICE_MAINTNANCE_ALERT	130-nn	Service maintenance alert	Manual	None: Contact Carrier service	Servicing required
46	DRV_FAN_A_F	16001	Circuit A Variable Speed Fan Failure	Automatic	Circuit A shuts down	Speed controller fault
47	DRV_FAN_B_F	17001	Circuit B Variable Speed Fan Failure	Automatic	Circuit B shuts down	As above
48	DRV_WTR_PUMP_F	19001	Water pump Variable Speed Fan Failure	Automatic	Unit is restarted with another pump running; If no pump is available, the unit shuts down	As above
49	SIOB_LOW_VOLT_CIRA_F	57001	Circuit A SIOB Low Voltage Failure	Automatic, if the alarm occurred up to 6 times in the last 24 h (otherwise manual)	Unit shuts down	Unstable electrical supply or electrical issue
50	SIOB_LOW_VOLT_CIRB_F	57002	Circuit B SIOB Low Voltage Failure	As above	Unit shuts down	As above
51	WP_IN_F	12024	Water Exchanger Entering Fluid Transducer Failure	Automatic, if sensor voltage reading returns to normal	Unit shuts down	Defective transducer
52	WP_OUT_F	12025	Water Exchanger Leaving Fluid Transducer Failure	As above	Unit shuts down	Defective transducer
53	WL_PRESS_ZERO_ERROR_F	11202	Water Loop : Delta Pressure Error	Automatic, if water pressure delta returns to normal	Unit shuts down	Too low or high water pressure reading
54	WL_PRESS_TOO_LOW_F	11203	Water Loop : Pressure Too Low	Automatic, if water pressure reading returns to normal and the alarm occurred up to 6 times in the last 24 h (otherwise manual)	Unit shuts down	Pump inlet pressure is below 60 kPa
55	WL_PUMP_NOT_STARTED_F	11204	Water Loop : Pump Not Started	Automatic	Pump is stopped	Too low or high pump pressure reading
57	WL_PUMP_OVERLOAD_F	11206	Water Loop : Pump Overload	Automatic	None	Water pressure drop too low
58	WL_LOW_FLOW_F	11207	Water Loop : Flow Too Low	Automatic, if water flow reading returns to normal	Pump is stopped	Water loop pressure drop too high
59	WL_PRESS_CROSS_F	11208	Water Loop : Pressure Sensors Crossed	Manual	Unit shuts down	Pressure sensors crossed
60	WL_LOW_PRESS_WARNING_F	11209	Water Loop : Low Pressure Warning	Automatic, if water pressure reading returns to normal	None	Water pressure is below 60 kPa
61	HP_SWITCH_A_F	10063	Circuit A High pressure switch Failure	Manual	Circuit A shuts down	High pressure switch is open, compressor fault
62	HP_SWITCH_B_F	10064	Circuit B High pressure switch Failure	Manual	Circuit B shuts down	As above
63	FLUIDE_FAIL	10099	Possible Refrigerant Leakage Failure	Automatic	None	Refrigerant leak detected
64	FC_PROCESS_F	10101	Free Cooling Process Failure	Automatic	Free Cooling is stopped	Installation fault
65	FC_WLOOP_F	15046	Free Cooling Water Loop Thermistor Failure	Automatic, if thermistor reading returns to normal	Free cooling is stopped	Defective thermistor
66	FC_LWT_F	15047	Free Cooling Leaving Water Thermistor Failure	Automatic, if thermistor reading returns to normal	Free cooling is stopped	Defective thermistor
67	FC_OAT_F	15048	Free Cooling OAT Water Thermistor Failure	Automatic, if thermistor reading returns to normal	OAT sensor reading (instead of FC OAT sensor) is used	Defective thermistor
68	FC_AUX1_COM_F	4602	Loss of communication with Free Cooling Board 1	Automatic, if communication is re-established	Free Cooling is stopped	Bus installation fault, communication error

9.2.2 - Drive alarms

Drive alarms or alerts for VLT drive failure are displayed based on the following formula: 16000+X*1000+YYY for alarms and 34000+X*1000+YYY for alerts. X stands for the number of the circuit and YYY is the alarm/alert code.

For example, alarm codes for "VLT Fan Drive Failure" are as follows: 17YYY (circuit A) and 18YYY (circuit B).

Drive alarms for pump drive failure are displayed based on the following formula: 19000+YYY. YYY is the alarm code.

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

Code	Alarm/Alert	Description	Action to be taken
1	Alarm	Over-current during acceleration	Contact Carrier Service
2	Alarm	Over-current during deceleration	Contact Carrier Service
3	Alarm	Over-current during constant speed operation	Contact Carrier Service
4	Alarm	Over-current in load at start-up	Contact Carrier Service
5	Alarm	Short circuit in arm	Contact Carrier Service
8	Alarm	Input phase failure	Contact Carrier Service
9	Alarm	Output phase failure	Contact Carrier Service
10	Alarm	Overvoltage during acceleration	Contact Carrier Service
11	Alarm	Overvoltage during deceleration	Contact Carrier Service
12	Alarm	Overvoltage during constant speed operation	Contact Carrier Service
13	Alarm	Over-LOAD in inverter	Contact Carrier Service
14	Alarm	Over-LOAD in motor	Contact Carrier Service
16	Alarm	Overheat trip	Contact Carrier Service
17	Alarm	Emergency stop	Contact Carrier Service
18	Alarm	EEPROM fault 1 (writing operation)	Contact Carrier Service
19	Alarm	EEPROM fault 2 (reading operation)	Contact Carrier Service
20	Alarm	EEPROM fault 3 (other)	Contact Carrier Service
21	Alarm	RAM fault	Contact Carrier Service
22	Alarm	ROM fault	Contact Carrier Service
23	Alarm	CPU fault	Contact Carrier Service
24	Alarm	Communication error trip	Contact Carrier Service
26	Alarm	Current detector fault	Contact Carrier Service
27	Alarm	Optional circuit board type error	Contact Carrier Service
28	Alarm	Graphic keypad communication error	Contact Carrier Service
29	Alarm	Small-current trip	Contact Carrier Service
30	Alarm	Trip due to undervoltage in main circuit	Contact Carrier Service
32	Alarm	Over-torque trip	Contact Carrier Service
34	Alarm	Ground fault trip (hardware detection)	Contact Carrier Service
37	Alarm	Overcurrent flowing in element during acceleration	Contact Carrier Service
38	Alarm	Overcurrent flowing in element during deceleration	Contact Carrier Service
39	Alarm	Overcurrent flowing in element during operation	Contact Carrier Service
41	Alarm	Inverter type error	Contact Carrier Service
46	Alarm	External thermal input	Contact Carrier Service
47	Alarm	VIA cable break	Contact Carrier Service
50	Alarm	Break in an analog signal cable	Contact Carrier Service
51	Alarm	CPU fault	Contact Carrier Service
52	Alarm	Excess torque boost	Contact Carrier Service
53	Alarm	CPU fault	Contact Carrier Service
84	Alarm	Auto-tuning error	Contact Carrier Service
72	Alarm	Closed damper 1 fault	Contact Carrier Service
73	Alarm	Closed damper 2 fault	Contact Carrier Service

10 - MAINTENANCE

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.

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